

ALTEC

NEUVITA

Operation Manual of Veterinary
Handheld Vital Signs Monitor

Explanation

Product Name: Veterinary handheld Vital signs monitor Operation Manual

Model Specifications: NEUVITA

Scope of application: This device is applicable for medical institutions to monitor functions such as non-invasive blood pressure (NIBP), pulse oxygen saturation (SpO₂), temperature (Temp), end-tidal carbon dioxide (EtCO₂) and anesthesia gas (AG) of cats, dogs and horses. The monitoring information can be displayed, reviewed and stored.

Warranty and Maintenance Services

During the warranty period, all products are entitled to free after-sales service. However, please note that even within the warranty period, if the product needs repair due to the following reasons, the company will provide paid repair service and you will have to pay for the repair fee and accessory cost:

- Human-caused damage;
- Improper usage
- Grid voltage exceeding the range specified by the product;
Unforeseen natural disasters;
- Replacement or use of components, accessories, consumables or spare parts that have not been approved by the company, or repair by unauthorized personnel;
Other faults not caused by the product itself.

Chapter 1 Safety

1. 1 Security Information

This section lists the basic safety information that the user should pay attention to and follow when using the monitor, and the same, similar or other safety information related to specific operations will appear in each section.



Warning Refer to potentially hazardous or unsafe behavior that, if not avoided, Could result in death or serious injury to the patient.

Note

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- Highlight important considerations, provide instructions or explanations to better use the product.
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1.1.1Caution

Caution

- Before use, users must check the equipment, connecting cables and accessories to ensure that they can work normally and safely.
- This device can only be connected to a power socket with protective grounding. If the power socket is not connected to a ground wire, please do not use the socket and use a rechargeable battery to power the device.
- The equipment shall not be used in an SpO₂-rich environment or in an environment where flammable or explosive items such as anesthetics are placed to prevent fire or explosion.
- Do not open the equipment enclosure for a possible electric shock hazard. Maintenance or upgrading of the equipment shall only be performed by maintenance personnel trained and authorized by the Company.
- The alarm volume and alarm limit should be set for the actual situation of the animal. Cannot rely solely on an audible alarm system to monitor

the animals. The alarm volume is adjusted to a lower volume and may cause an animal hazard. The actual clinical condition of the animal should be closely watched.

- The physiological waveform, physiological parameters and alarm information displayed in this equipment are only for doctor reference and cannot be directly used as the basis for clinical treatment.
- When handling packaging materials, local regulations or hospital waste disposal regulations.
- For animal monitoring, the continuous power supply of the monitor shall be ensured. Unintended power loss of the monitor will result in the loss of animal data.

Chapter 2 Overview

2.1 Intended Use

The monitor is for monitoring, storing, and reviewing of, and to generate alarms for, multiple physiological parameters of adults, pediatrics and neonates in healthcare environments.

Monitored parameters include: NIBP, SpO₂, TEMP, ETCO₂ and AG. Additionally, the monitor is intended for use in transport situations within a healthcare facility.

⚠Warning

The monitor must only be used by, or under the guidance of health care professionals in hospital environments. Users of the monitor have received adequate training in the use of such equipment.

2.2 Contraindication

- Do not measure NIBP on patients with sickle-cell disease or any condition where skin damage has occurred or is expected.
- For patients with severe thrombotic diseases, it is necessary to decide whether to undergo automatic blood pressure measurement based on clinical conditions
- There is a risk of hematoma on the limb where the sleeve is tied.
- Do not wear sensing components on limbs with arterial catheters or intravenous infusion tubes.

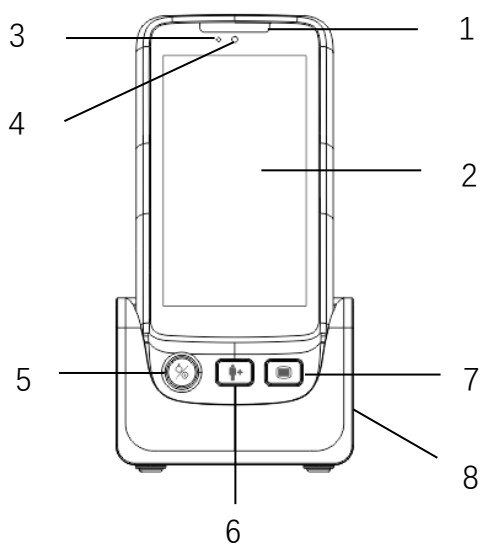
2.3 Product Structure and Composition

The monitor is mainly composed of host, battery, display screen and accessories.

2.4 Host

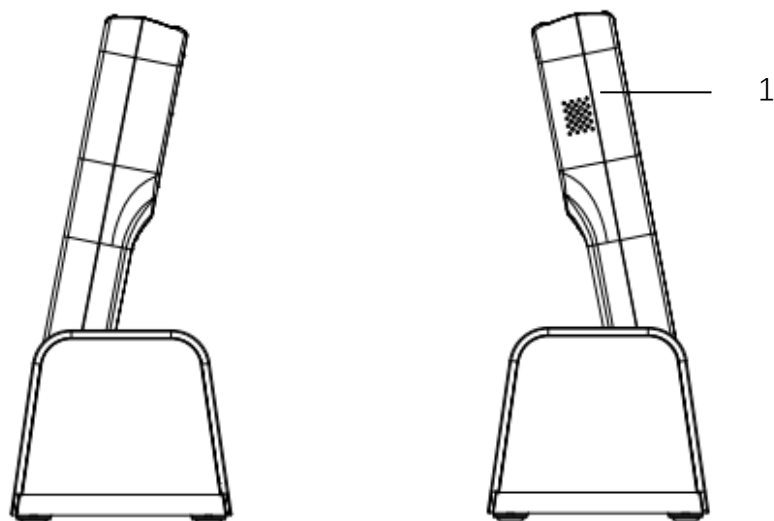
2.3.1 Front view

The following figure is for reference only, and your monitor may display slightly different graphics.



1. Alarm Light 2. Display screen 3. Light sensor 4. Charging indicator light
5. On/off key 6. Receiving new animals 7. Menu 8. Dock

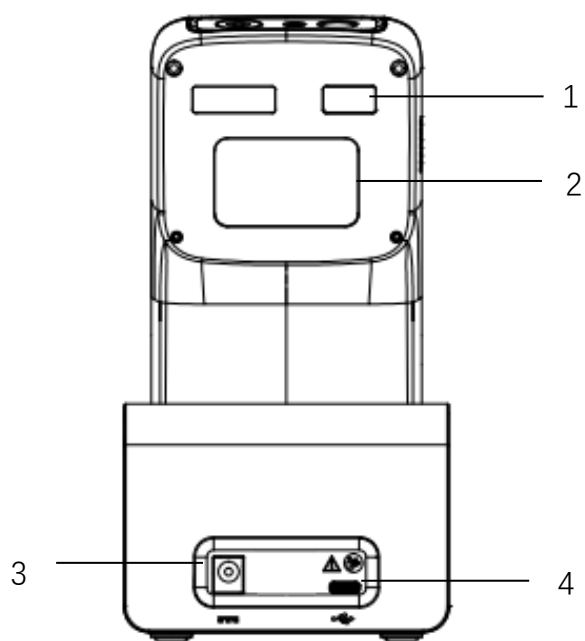
2.3.2 Side view



1. Speaker For alarm tones, pulse tones and so forth.

3.3 Rear View

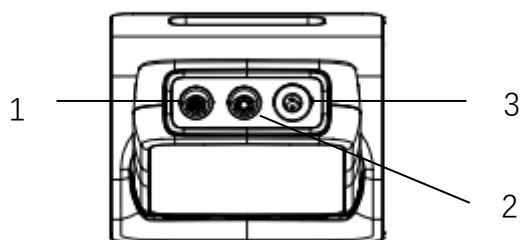
The following figure is for reference only, and your monitor may display slightly different graphics.



1. Serial number
2. Rating plate
3. AC power input
4. TypeC interface

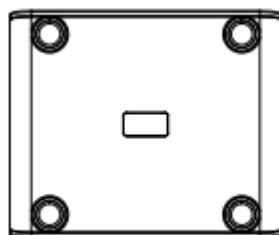
2.3.4 Top view

The following figure is for reference only, and your monitor may display slightly different graphics.



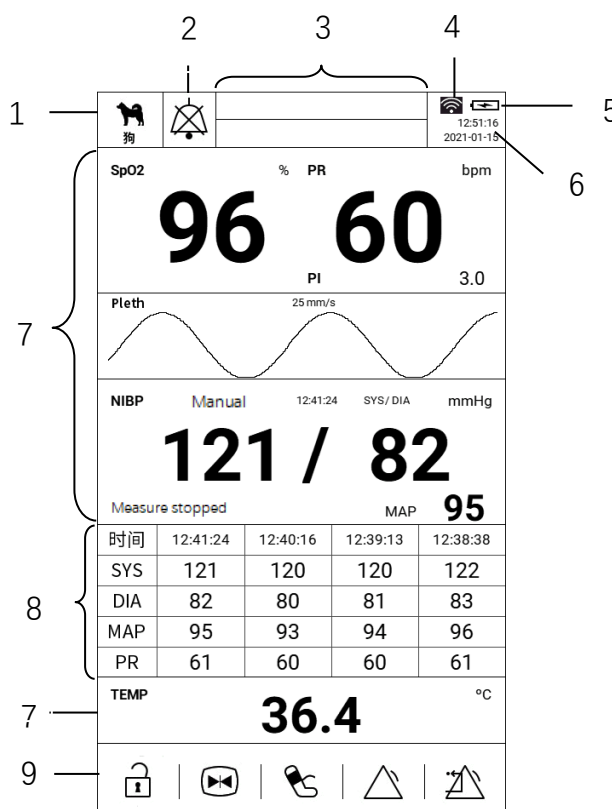
1. TEMP/ ETCO2/AG interface (optional)
2. SpO₂ interface
3. NIBP interface

2.3.5 Bottom View



2.4 Screen Display

The following figure is for reference only, and your monitor may display slightly different graphics.



1. Animal information
Click here to view animal information and accept animals.
2. Patient information
Click here to view patient information and create new patients.
3. Alarms status icon
The icons on the interface and their meanings are as follows:

- ◆  indicates alarm reset;
- ◆  indicates audio alarm turned off;
- ◆  indicates alarm paused;
- ◆  indicates alarm turned off.

4. Alarms information area

Alarm information area is divided into two parts. The upper and lower layer displays technical alarm information, and physiological alarm information, respectively. When different level alarms occur at the same time, alarm sound and alarm indicator prompt the highest level alarm, alarm messages display in turn.

5. Wi-Fi network symbol

-  Not connected to wireless network.
-  The wireless network is connected, but the server connection fails.
-  The wireless network is connected, and the server connection succeeds.

6. Battery status icon

The icon indicates battery status ,and shows the current charge of the monitor's battery. For more information, see **Battery** on **Chapter 11**

7. Date and time

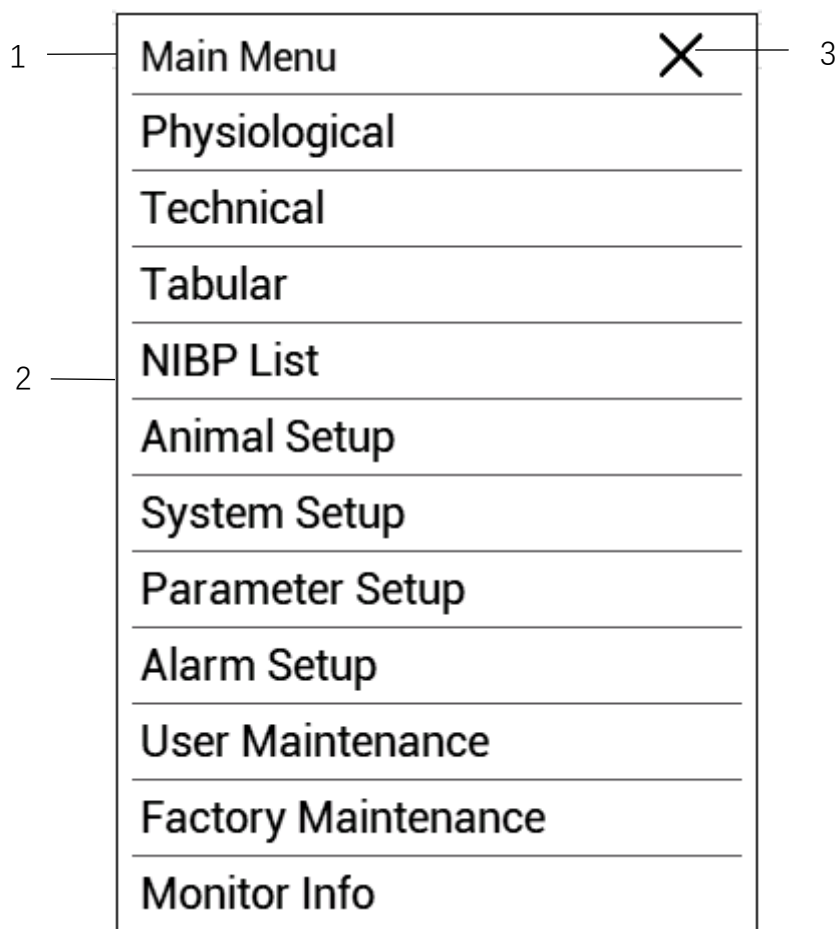
8. Parameters data and waveform area

9. NIBP trend data area

10. Shortcut key area

-  : Select this item by the trim knob to enable the touch screen operation
-  : To freeze waveform.
-  : NIBP measurement.
-  : To start alarm pause.
-  : To reset the alarm for monitor mode only

2.5 Menu Layout



The monitor menu generally consists of the following parts:

1. Menu title: A summary of the current menu.
2. Main Display Area: Select this option to enter the appropriate submenu.
3. : Exit the current menu and save the settings.

Chapter 3 User Operation

3.1 ON/OFF

3.1.1 Checking the Monitor

It is recommended that you check the following items before starting up:

- ◆ Environment
Ensure that the environment in which the patient monitor is installed is not subject to any sources of strong electromagnetic interference, such as radio transmitters, mobile telephones, microwaves, etc.
- ◆ Power
Ensure that the AC outlet is properly grounded and supplies the specified voltage and frequency (AC 100 - 240 V, 50/60 Hz).
- ◆ Accessories Connection
Ensure that the accessories are firmly connected to the monitor.

3.3.2 Power on

After the completion of installation and inspection, you can start the monitor for monitoring.

1. Connecting the monitor to the AC power. If battery power is to be used, ensure that the battery is sufficiently charged.
2. Press the hardkey  on the front panel.

During startup, the monitor will perform self-test of alarm system. During this self-test, the monitor also tests the speaker; listen for an audible tone to confirm that the speaker is working properly. The monitor from the start to provide basic performance for about 10 seconds.

⚠Warning

- If any sign of damage is detected, or the monitor displays some error messages, do not use it on any patient. Contact customer service center immediately.

Note

- When starting up, please check whether the monitor performs self-test as described above. If the self-test fails, please contact the service personnel immediately.
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3.3.3 Power off

Please turn off the monitor according to the following steps:

1. Confirm ending the monitoring of patients.
2. Disconnect the cuff and probe from the patient.
3. Confirm storing or clearing the monitoring data of patients.
4. Long press  to turn off the monitor.

Chapter 4 Animal Data Management

4.1 Receive animals

You can receive animals in three ways:

- Press  key to receive animals
- Receiving animal with the animal type icon  on the top left of the screen
- Add the animal to be received in **【Animal Information Settings】**

Note

- All data for the current animal is deleted when the new animal is received.
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4.2 Review of animal data

Select  → **【Trend】** so that you can review the current animal trend data.

4.3 Animal data clearance

Select  → **【User Maintenance】** → to enter the user maintenance password point → **【Confirm】** to enter the user maintenance menu.
Select **【Data】** to enter the Data Purge menu.

Chapter 5 Alarm

Alarm alert you to conditions that need immediate attention. When an alarm event occurs, the monitor issues both a visual and audible alarm.

⚠Warning

- A potential hazard can exist if different alarm presets are used for the same or similar equipment in any single area, e.g. an intensive care unit or cardiac operating room.
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5.1 Alarm Category

According to the type of alarms, the monitor provides physiological alarms and technical alarms.

1. Physiological Alarms

If one or several physiological parameters of the currently monitored patient exceed the predefined alarm limit, the monitor will give an alarm, and this type of alarm is called physiological alarms. Physiological alarms only occurs in monitor mode.

2. Technical Alarms

If one or several technical status of the device is in abnormal status, the monitor will give an alarm. And this type of alarm is called technical alarms. Technical alarms can't be disabled.

3. Prompts

The monitor can give the character indication of monitoring process or other functions. And this character is called prompts.

5.2 Alarm Levels

In terms of severity, the device's alarm levels can be classified into three categories: high level alarms, medium level alarms and low level alarms.

1. High level alarms

A high level alarm intensively warns the operator of a high priority alarm condition which requires immediate operator response. Failure to respond to the cause of the alarm condition is likely to result in death or irreversible injury of the patient.

2. Medium level alarms

A medium level alarm warns the operator of a medium priority alarm condition which requires prompt operator response. Failure to respond to the cause of the alarm condition is likely to result in reversible injury of the patient.

3. Low level alarms

A low level alarm reminds the operator of a low priority alarm condition which requires response. And the response time for a low priority alarm condition can be greater than that for a medium priority alarm condition. Failure to respond to the cause of the alarm condition is likely to result in discomfort or reversible minor injury of the patient.

The high/medium/low-level alarms are indicated by the system in following different ways:

Alarm level	Prompt
High	Mode is “DO-DO-DO-----DO-DO”, which is triggered once every 8-10 seconds. The alarm indicator flashes in red, with frequency of 1.4 Hz ~2.8 Hz. The alarm message flashes with red background, and the symbol***is displayed at the alarm area.
Medium	Mode is “DO-DO-DO”, which is triggered once every 23-25 seconds. The alarm indicator flashes in yellow, with frequency of 0.4 Hz ~ 0.8 Hz. The alarm message flashes with yellow background, and the symbol**is displayed at the alarm area.
Low	Mode is “DO-”, which is triggered once every 24-26 seconds. The alarm indicator is constantly yellow. The alarm message flashes with yellow background, and the symbol*is displayed at the alarm area.

The parameter area has two flash methods to prompt alarms: background flash and text flash. User can click respective parameter area to enter parameter setup menu:

- 1.Text Flash: text flashes with frequency of 1Hz.
- 2.Background Flash:background flashes with frequency of 1Hz.

Note

- When different level alarms occur at the same time, alarm sound and alarm indicator prompt the highest level alarm, alarm messages display in turn.
-

5.3 Alarm Icons

Alarm icons represent the current alarm status.

-  indicates alarm reset

-  indicates audio alarm turned off
-  indicates alarm paused
-  indicates alarm turned off.

5.4 Setting Alarm Options

5.4.1 Setting Alarm Volume

1. Select  → **【User Maintenance】** , then type the correct password **ABC** into the displayed interface.
2. Select **【Alarm Param】** to open alarm setup menu.
3. Select **【Alarm Volume】** : X~9。

Level X represents the minimum alarm volume, which depends on the setting of the minimum alarm volume; level nine represents the maximum volume.

When the alarm volume is set to Zero level, the audio alarm will be turned off and an icon  will be displayed on the screen.

5.4.2 Setting Minimum Alarm Volume

1. Select  → **【User Maintenance】** , then type the correct password into the displayed interface.
2. Select **【Alarm Param】** to open alarm setup menu.
3. Select **【Minimum Volume】** , and the minimum alarm volume range is 0 ~ 9.

The minimum alarm volume determines the minimum value of the alarm volume setting. It is not affected by the default configuration.

△Warning

- When the alarm tone is turned off, the monitor will not give an alarm prompt if an alarm occurs. In order to avoid endangering the patient's life,

the user should use this function cautiously. Do not rely exclusively on the audible alarm system for patient monitoring.

- Adjustment of alarm volume to a low level or off during patient monitoring may result in patient danger. Remember that the most reliable method of patient monitoring combines close personal surveillance with correct operation of monitoring equipment
 - Setting ALARM LIMITS to extreme values that can render the ALARM SYSTEM useless.
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5.4.3 Setting Alarm Pause Time

1. Select  → **【User Maintenance】** , then type the correct password **ABC** into the displayed interface.
2. Select **【Alarm Param】** to open alarm setup menu.
3. Select **【Pause Time】** : The alarm pause time can be set by minute or permanent pause.

Press the shortcut key  at the bottom of the main screen, the monitor will enter into the alarm paused status. When alarms are paused,

- The monitor displays the alarm paused icon  and the remaining pause time.
- Turn off all alarm prompt of physiological alarm.
- Turn off audio alarm of technical alarm. The visual alarm indications are still displayed.

When the alarm pause time expires, or a low battery alarm occurs, the alarm paused status is automatically terminated. You can also terminate the alarm paused status by pressing shortcut key  pause.

Warning

- The alarm paused may cause danger to the patient, please use this function cautiously.
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5.4.4 Audio Alarm off

Set alarm volume to 0, the audio alarm is turned off. When the audio alarm is off:

- The monitor displays the audio alarm off icon .
- Turn off the alarm tone for all alarms.

5.4.5 Alarm Tone Volume

When the audio alarm is turned off, the monitor can give an alarm prompt to remind you that there is still an alarm in the alarm system.

1. Select  → **【User Maintenance】** , then type the correct password **ABC** into the displayed interface.
2. Select **【Alarm Param】** to open alarm setup menu.
3. Set **【Reminder Signal】** to **【On】** or **【Off】** .
4. Set **【Reminder Interval】** .

5.4.6 Latching Alarms

Physiological alarms can be set to "Latching" or "No-Latching".

- **Latching**: Latching *alarm* continues even after the condition that caused the alarm has resolved itself, the visual and audible alarm indications are still displayed. But the alarm mode will change as follows:
 - ◆ The alarm time is displayed for the latched alarm.
 - ◆ The corresponding parameter values and the alarm limits being exceeded stop flashing.
- **"Non-Latched"**: the alarm stops when the condition that triggered the alarm ends.

To configure the alarm latching setting

1. Select  → **【User Maintenance】** , then type the correct password **ABC** into the displayed interface.
2. Select **【Alarm Param】** to open alarm setup menu.
3. Set **【Latching】** or **【No Latching】** .

You can use the shortcut key  on the screen to acknowledge the latched alarm.

5.5 Acknowledging Technical Alarms

When a technical alarm occurs and you press the **alarm reset** key  once, the monitor responds in one of the following ways:

- The alarm sound、indicator is cleared, but the alarm message and the background color will remain in the message area.
- The alarm sound 、indicator and the background of the pane change colors is cleared ,but the alarm message will remain in the message area.
- The alarm sound、indicator and the error message is cleared.

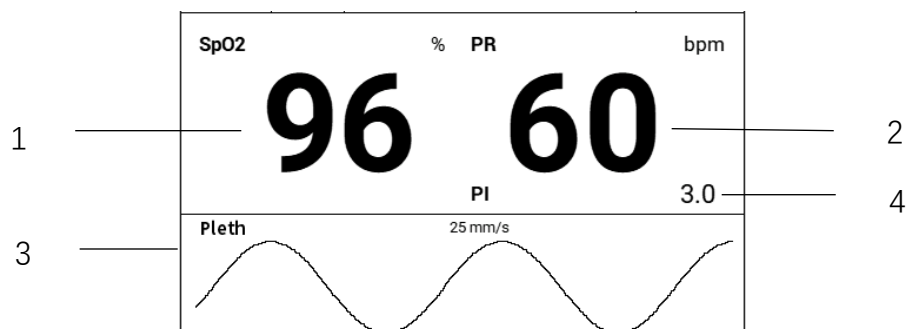
Chapter 6 Monitoring SpO₂

6.1 Overview

Using the photoelectric technology, it is able to continuously monitor oxygen saturation without collecting blood samples. A finger probe is used in this monitor, and the probe is put on the finger when in use. Two light-emitting diodes (LEDs) placed side by side fixed on the upper wall of the probe emits red light at 660 nm and infrared light at 905 nm. A photodetector fixed on the lower wall converts the red light and infrared light transmitted through the arteries of the finger into electrical signals. The pulsation law of the photoelectric signal is consistent with heart beating. Therefore, PR can be determined by the detected repeated signals.

SpO₂ is based on the absorption of pulse blood oxygen to red and infrared light by means of finger sensor and SpO₂ measuring unit. SpO₂ Plethysmogram measurement is employed to determine the oxygen saturation of hemoglobin in the arterial blood.

The following illustration shows the components of the SpO₂ numeric pane.



1. SpO₂: The percentage of oxygenated hemoglobin in total hemoglobin.
2. Pulse Rate (PR): The number of detected pulses per minute obtained from the plethysmographic waveform.
3. Plethography waveform (Pleth): Non-normalized blood oxygen waveform.
4. Perfusion index (PI): The percentage of pulsation and non-pulsation caused by changes in arterial blood flow in the blood oxygen signal. PI reflects the strength of the blood oxygen signal and partly indicates the signal quality. PI>1, optimal; 0.3<PI<1, acceptable; PI<0.3, a weak perfusion. PI<0.3 needs to adjust the probe or select a more suitable perfusion site. If a continuous weak perfusion exists, it needs to verify the saturation condition using other methods.

6.2 Safety Information

⚠Warning

- Use only specified sensors and cables, otherwise patient injury can result. Follow the sensor's instructions for use; adhere to all warnings and cautions.
 - An oximeter should be used to analyze the blood sample of patients with the tendency to hypoxia, thus fully mastering the disease condition.
 - Do not use the monitor or SpO₂ sensors during magnetic resonance imaging (MRI) scanning. Induced current could potentially cause burns. The monitor may affect the MRI image, and the MRI unit may affect the accuracy of the monitor's measurements.
 - Prolonged and continuous monitoring may increase the risk of unexpected change of dermal condition such as abnormal sensitivity, rubescence, vesicle, repressive putrescence, and so on. Inspect the application site every two to three hours to ensure skin quality and correct optical alignment. If the skin quality changes, move the sensor to another site. Change the application site at least every four hours. More frequent examinations may be required for different patients.
 - High oxygen levels may predispose a premature infant to retrolental fibroplasia. If this is a consideration do NOT set the high alarm limit to 100%, which is equivalent to switching the alarm off.
 - Make sure that the sensor is the appropriate size. The sensor should not fall off, nor should it be too tight.
 - For neonatal patients, place all sensor connectors and adapter cable connectors outside the incubator. The humidity in the incubator can cause inaccurate measurements.
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6.3 Measuring SpO₂ Clean the application site, such as colored nail polish.

Attach the sensor to the appropriate site of the patient finger. Plug the connector of the sensor extension cable into the SpO₂ socket.

6.4 SpO₂ Settings

6.4.1 Opening SpO₂ Menu

To open the SpO₂ menu, you can:

Click the SpO₂ parameter area or waveform area to open SpO₂ Setup menu.

6.4.2 Setting Sensitivity

In the **【SpO₂ Setup】** menu, you can set **【sensitivity】** to **【Normal】** or **【Max】**. **【Max】** indicates the refresh frequency of SpO₂ value is the most frequent.

6.4.3 Setting Average Time

The SpO₂ measurement value is mean data collected in a certain period. A shorter period leads to a faster response of the monitor when the patient's SpO₂ value changes, but a lower accuracy of the measurement. Conversely, a longer period leads to a slower response of the monitor when the patient's SpO₂ value changes, but a higher accuracy of the measurement. A shorter period is favorable to analyze the disease condition in time when monitoring critically ill patients.

In **【SpO₂ Setup】** menu, you can set **【Average Time】** to **【2-4 s】**, **【4-8 s】**, **【8-16s】**.

6.4.4 Setting Pleth Wave Speed

In **【SpO₂ Setup】** menu, you can set **【WaveSpeed】** to **【12.5mm/s】** or **【25mm/s】**.

6.4.5 Setting Alarm Limits

In **【SpO₂ Setup】** menu, select **【Alarm Setup】** to set the alarm limits in pop-up window.

6.5 Influencing Factors of Measurement

If the accuracy of measurement does not seem reasonable, first check the patient's vital signs by alternative means then check the monitor and SpO₂ sensor. Inaccurate measurements can be caused by:

- High levels of ambient light sources, such as surgical lights. To avoid this problem, cover the application site with opaque material.
- Excessive patient movement and vibration
- Dysfunctional hemoglobins
- Low perfusion
- Venous pulsations
- Electromagnetic interference
- intravascular dyshemoglobins such as methemoglobin and carboxyhemoglobin may lead to inaccurate measurements
- Injected dyes such as methylene blue
- Incorrect sensor application
- Placement of the sensor on an extremity with a blood pressure cuff, arterial catheter, or intravascular line

Chapter 7 Monitoring NIBP

7.1 Overview

Non-invasive blood pressure monitoring, or NIBP, measures average arterial pressure, arterial systolic pressure and arterial diastolic pressure.

7.2 Measurement limit

NIBP measurements were not appropriate in animals with extreme heart rates (Below 40 bpm or above 240 bpm) or in animals connected to a heart-lung machine.

The measurement may be inaccurate or impossible for:

- It is difficult to detect a regular arterial pressure pulsation
- Excessive or continuous movements, such as shivering or spasms
- Arrhythmia
- Blood pressure changes rapidly
- Severe shock or hypothermia reduces blood flow to the periphery
- On the edematous limb

7.3 Measurement pattern

This monitor has the following NIBP measurement modes: manual measurement, automatic interval measurement

You can choose the NIBP parameter area to open the **【NIBP setting】** menu, and select the **【interval time】** to set the measurement mode.

7.4 NIBP Measure

7.5.1 Measurement preparation

1. Confirm the animal type, and change it if not.
2. Connect the inflation tube to the blood pressure cuff interface on the monitor.
3. Select the appropriate cuff (the cuff is marked with the appropriate limb circumference)
4. The cuff width shall be 40% of the limb circumference or 2/3 of the length of the upper arm. The inflated part of the cuff should be sufficient to surround 50% -80% of the limb.
5. The cuff is tied to the appropriate limb area or tail of the animal.

6. Connect the sleeve to the inflatable tube. Avoid squeezing the inflatable tube to ensure that the inflatable tube is unobstructed and without entanglement.

Note

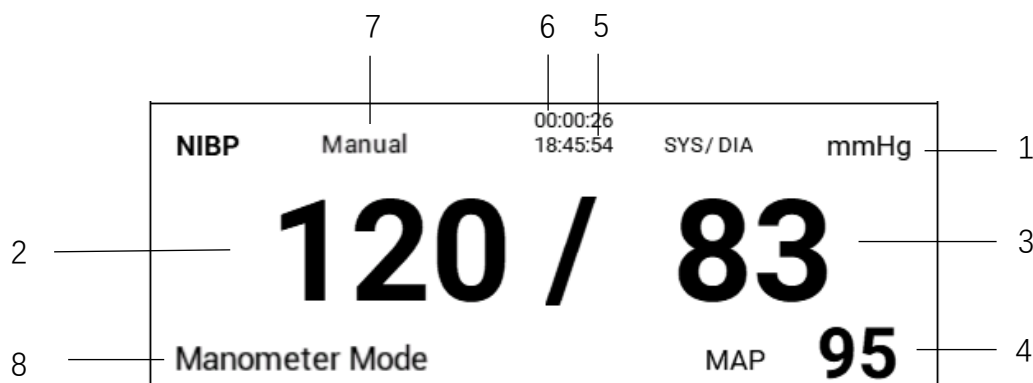
- Animal types cats, dogs, and horses only represent animal types, only setting the animal type may not be set correctly, but also requires the model weight setting. The weight setting is very critical, and the wrong setting may lead to unmeasurement.
- Excessive exercise may result to inability to perform blood pressure measurements.

7.4.2 Start / stop the measurement

You can press the hot button below the screen to start the NIBP measurements. Press the hot key at the bottom of the screen again to terminate this NIBP measurement or the continuous NIBP measurement.

7.5 NIBP Display

NIBP measurements without waveform is shown and only the results of NIBP measurements in the parameter area. The following figure is for reference only, and your monitor may display slightly different graphics.



1. Units of stress, mmHg or kPa
2. Systolic blood pressure (High pressure)
3. Diastolic blood pressure (Low pressure)
4. measured mean pressure is shown after the measurement.
5. Time of the last measurement

6. Time from the next automatic measurement
7. Automatically measuring time intervals
8. measurement pattern

7.6 NIBP Parameter setting

Select  → **【Parameter Settings】** to open the NIBP Settings menu.

The parameters such as unit, measurement interval time, sensitivity level, pressure unit and alarm can be set.

Chapter 8 Monitoring TEMP

8.1 Overview

Body temperature monitoring (TEMP) measures the body temperature using the temperature and resistance of the temperature sensor, the temperature monitoring only shows the temperature value, but no waveform, and the temperature value is displayed in the parameter area on the right side of the screen.

8.2 Temperature setting

- Select  → **【Parameter Settings】** and you can set **【temperature units】** to **【°C】** or **【°F】**.
- Select  → **【Alarm Settings】**, and you can set the properties of the parameter alarm in the pop-up window.

8.3 Temperature measurement

Temperature measurement steps are as follows:

- Verify that the temperature probe is inserted into the temperature probe interface of the monitor.
- Verify that the measurement type and the measurement site are set correctly.
- Temperature probe was placed at the measurement site of the animal and secured.

Chapter 9 Monitoring CO₂

9.1 Overview

The monitor uses the method of infrared absorption by gas to measure CO₂. Based on the principle that some gases absorb infrared radiation, carbon dioxide (EtCO₂ and InCO₂) and respiration rate (RR) can be measured in animals.

9.2 Pre-custody preparation

Install the airway joint at the proximal end of the circuit, between the elbow and the ventilator Y tube. For endotracheal intubation animals, airway transfer adapters are required. Install the airway joint at the proximal end of the circuit, between the elbow and the ventilator Y tube.

9.3 CO₂ Measure

1. Insert the sensor cable into the CO₂ interface and heat the sensor for 2 minutes.
2. Connect the catheter, airway joint or sampling tube to the sensor as required.
3. Zero sensor if required. After the sensor zero is complete, the CO₂.

9.4 Set CO₂

Select the CO₂ parameter area or waveform area and open the **【CO₂ Settings】** menu. The parameters of waveform speed, waveform mode, unit, measurement mode, CO₂ suffocation time, O₂ compensation, laughing gas compensation and alarm lamp can be set.

9.5 CO₂ zero

Zero is a very important function of the CO₂ module, start zero, need the host to send zero command. In the mainstream CO₂ module, if the module does not successfully zero, the module will not calculate the terminal carbon dioxide and respiration rate. In the secondary CO₂ module, if the zeroing is unsuccessful, the module will still calculate the terminal CO₂ and respiration rate, but the data may be inaccurate.

Two ways to start a zero:

- Press the hot  key at the bottom of the screen to start the zero directly.
- Press the CO₂ parameter area to enter the 【CO₂ setting】 menu and select 【Start Zero】 to start zero.

Note

- Before zero adjustment, confirm that the adapter is pollution-free and installed correctly.
 - The adapter needs to be placed in air and ensure that the gas in the adapter is air and there is no high concentration of CO₂.
 - The whole zero adjustment process lasts for 10 seconds, without exhaling or passing CO₂ into the adapter, or shaking the adapter.
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9.6 Measure the influencing factors

While measuring, the following factors may affect the accuracy of the measurement:

- Changes in atmospheric pressure
- N₂O、O₂ and water vapour
- Calibration deviation
- Fluid pollution
- Repeat with the disposable catheter
- Catheter was placed incorrectly

Chapter 10 Battery

10.1 Overview

The battery icon on the screen indicates the state of the battery:

-  battery works normally, and the solid part indicates the power level of the battery.
-  Battery level is low, and it needs to be charged.
-  Battery is seriously insufficient and needs to be charged immediately, otherwise the monitor will automatically shut down.

10.2 Battery charging

When the monitor is connected to the AC power supply, the battery can be charged whether it is turned on or not. When charging the battery, the icon displays as , and the battery power icon on the monitor screen changes to .

Warning

- Do not remove the battery or go into fire or short it. Battery combustion, explosion and leakage may cause personal injury.
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Chapter 11 Accessories

Warning

- Using only the accessories specified in this chapter, using other accessories may damage this monitor, or fail to meet the specifications claimed in this manual.
 - Do not use the attachment if there are signs of damage to the package or attachment.
 - When connecting and using accessories, avoid contact with metal conductive parts of accessories or equipment.
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11.1 SpO₂ Accessories

Name	Model/Material code	Type
SpO ₂ probe	30110-000030	Reusable

11.2 NIBP Accessories

Name	Model/Material code	Type
NIBP Extended tube	30122-000010	Reusable
Animal blood pressure cuff (No.1)	30120-000060	Reusable
Animal blood pressure cuff (No.2)	30120-000070	Reusable
Animal blood pressure cuff (No.3)	30120-000080	Reusable
Animal blood pressure cuff (No.4)	30120-000090	Reusable
Animal blood pressure cuff (No.5)	30120-000100	Reusable

11.3 TEMP Accessories

Name	Model/Material code	Type
TEMP probe	30140-000040	Reusable

11.4 CO₂ Accessories

Type	Name	Model/Material code	Type
NEUVITA	CO ₂ Sampling tube (Large animal)	30134-000010	Disposable
	CO ₂ Sampling tube (Small animal)	30134-000020	Disposable

Appendix A Product Specification

A.1 Physical Specifications

A.1.1 Display Specifications

Parameters	Specifications
Display size	5.0"

A.1.2 Environmental Specifications

Parameters	Specifications
Operating temperature	0°C ~ 40°C
Storage and transportation Temperature	-20°C ~ +55°C
Relative humidity of Operation	15%~80%, Non-Condensing
Relative humidity of Storage and transportation	10%~93%, Non-Condensing
Atmospheric pressure for Operation	80kPa~107.4kPa (800hPa~1074hPa)
Atmospheric pressure for Storage and transportation	22kPa~107.4kPa (220hPa~1074hPa)

Note

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- The environmental specification of the parameter module not specifically specified is the same as for the host.
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A.1.3 Electrical Specifications

Parameter	Specification
External Power Supply	AC 100V - 240 V, 50/60 Hz
Internal Battery	Lithium ion, 3.7V/4000mAh。
	Battery Operating Time (new, fully-charged battery): ≥ 2 hours.
	Charging time: 8 hours; the monitor is on.

A.2.1 SpO₂ Specifications

Parameters	Specifications
SpO ₂ measuring range	0%~100%
SpO ₂ measurement accuracy	The error is ±2% Middle range of 70%~100%, other ranges are not defined.
Pulse rate measurement range	20bpm~254bpm
Pulse rate alarm range	Consistent with the display range, the alarm limit is set to a step length of 1bpm.
SpO ₂ values and pulse rate refresh	about 1 second
Pulse rate measurement accuracy	±2 bpm
Maximum luminous power	150mW, For all sensors

A.2.2 NIBP Specifications

Parameters	Specifications
Measurement method	Oscillating Method
Measuring parameters	Systolic blood pressure, diastolic blood pressure, mean arterial pressure
Units	mmHg or kPa
Mode of operation	Manual, Automatic, continuous
Systolic blood pressure range	Cat: 30 mmHg~220mmHg(4.0kPa~29.3kPa)
	Dog: 30 mmHg~280mmHg(4.0kPa~37.3kPa)
	Horse: 30 mmHg~280mmHg(4.0kPa~37.3kPa)
Diastolic blood pressure range	Cat: 10mmHg~190mmHg(1.3kPa~22.0kPa)
	Dog: 10 mmHg~220mmHg(1.3 kPa~29.3kPa)

	Horse: 10mmHg~220mmHg(1.3kPa~29.3kPa)
Average pressure range	Cat: 10 mmHg~205mmHg(1.3kPa~23.3kPa)
	Dog: 10 mmHg~235mmHg(1.3kPa~23.3kPa)
	Horse: 10mmHg~235mmHg(1.3kPa~32.0kPa)
Measurement accuracy	Maximum mean error : ± 5 mmHg(± 0.67 kPa) Maximum standard deviation :8mmHg(1.067 kPa)
Alarm range	Consistent with the display range, the alarm limit is set to a step length of 1mmHg or 0.1kPa.
Cuff pressure range	Cat: 0 mmHg~210 mmHg(0 kPa~28.0kPa)
	Dog: 0 mmHg~300 mmHg(0 kPa~40.0kPa)
	Horse:0 mmHg~300 mmHg(0 kPa~40.0kPa)
Display resolution	0.133 kPa (1 mmHg)
Pulse rate Measurement	The measuring range is 40bpm~240bpm, The measuring accuracy is $\pm 2\%$ or ± 2 bpm, The absolute value of both should be greater.

A.2.3 TEMP Specifications

Parameters	Specifications
Measuring range	0°C~50.0°C (32.0°F~122.0°F)
Units of measurement	Degrees Celsius (°C) or Fahrenheit (°F)
Measurement accuracy	$\pm 0.1^\circ\text{C}$
Minimum	About 1s

A.2.4 CO₂ Specifications

Parameters	Specifications
Working pattern	Measurement mode, standby mode
Measuring range	0 mmHg~150mmHg (0 kPa~19.95kPa)
Units	mmHg、kPa or %
Precision	0 mmHg~40 mmHg(0 kPa~5.33 kPa), Precision: ± 2 mmHg(± 0.3 kPa); 41 mmHg~76mmHg(5.47 kPa~10.1 kPa), Precision: ± 5 mmHg(± 0.7 kPa); 77 mmHg~150 mmHg(10.3 kPa~20.00 kPa), Precision: ± 8 mmHg(± 1.1 kPa)。
Alarm setting Range	0 mmHg~150mmHg (0 mmHg~19.95 kPa) ,

	Alarm limit is set to a step length of 1mmHg or 0.1kPa.
Alarm delay time	<10s
Waveform scanning speed	6.25mm/s、 12.5 mm/s