Handheld ETCO2 Monitor User's Manual

Notice

Warranty

The information contained in this document is subject to change without notice.The patient monitor makes no warranty of any kind with regard to this material,including, but not limited to, the implied warranties or merchantability and fitness fora particular purpose.

The factory shall not be liable for errors contained herein or forincidental or consequential damages in connection with the furnishing, performance,or use of this material.

Intended Use

Description

This patient monitor is network connectable bedside patient monitoring device. The machine may power by either AC line power or by battery power.

Purpose

This machine measures and displays multiple physiological parameters and waves,and generates alarms and recordings. The machine is not a therapeutic device.

Environment

The Patient Monitoring System is intended to be used in a clinical environment by trained healthcare professionals.

Indications for use

Condition

The Patient Monitoring System is generally indicated when the clinician decides there is a need to measure and display multiple physiological parameters and waves, to generate alarms and recordings of adult,pediatric, or neonatal patients.

Patient Population

Adult, pediatric and neonatal non-ambulatory patients.

Warnings, Cautions, and Notes

Warnings, cautions, and notes are used throughout this User's Manual to give you additional information about the Patient Monitoring System. The warnings and cautions included in this safety section refer to the equipment in general.

Warning

A "warning" calls attention to the user of imminent hazard to people if proper procedures are not followed.

- For continued safe use of this equipment, it is necessary that the listed instructions are followed. Instructions in this manual in no way supersede established medical procedures.
- Explosion Hazard - Do not use this equipment in the presence of flammable anesthetics.
- Alarms - 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 jeopardy. Remember that the most reliable method of patient monitoring combines close personal surveillance with correct operation of monitoring equipment.
- This equipment is only intended for use in healthcare facilities by trained healthcare professionals.
- This product is not intended for home use.
- Do not disassemble the device, to prevent irreparable damage.
- Exposure of electrical contracts or connections to saline or other liquids and gels is dangerous. Electrical contacts and connections such as cable connectors, power supplies, parameter module plug-in connections and rack connections must be kept clean and dry. Thoroughly dry and electrical connections that become contaminated with liquids. If additional decontamination is required please contact your biomedical department.
- Although this equipment is shielded against Electromagnetic Interference (EMI),it is recommended to avoid the use of electrically radiating devices in close proximity to this equipment.

Caution

A "caution" calls attention to a condition or possible situation that could cause injury to the user

- Ventilation Requirements – Failure to meet ventilation requirements may cause equipment failure and, in turn, jeopardize the functions of automated monitoring. Do not locate equipment in enclosed area which could restrict heat dissipation.
- Maintenance – Failure on the part of the responsible individual, hospital or institution employing the use of this equipment implement a satisfactory maintenance schedule may cause undue equipment failure and possible health hazards.
- Replacement Parts – It is highly recommended that only the factory recommended parts and accessories be used with this equipment. Failure to do so

may result in the degradation of performance. Accessories and parts for individual modules and components are listed at the back of the appropriate section in this manual.

Responsibility of the Manufacturer

The factory only considers itself responsible for any effects on safety, reliability and performance of the equipment, only if you follow the specifications below:

- Use this product under exactly following the specifications in User Manual.
- The installation, maintenance, re-adjustments, modifications and upgrading must be carried out by persons authorized by the factory.
- The environment of store, working and electricity should comply with national Standards.
- The label or serial number of this equipment must be clearly identified and the identification should indicate it is made by the factory.
- Non-human damages.

To ensure optimum usage, we recommend that accessories specified by the factory are used. If not, The The factory is not liable for any damage that these accessories cause to the equipment.

Table of Contents

Overview

Introduction

The UM1X0 mainly used to monitor carbon dioxide (CO2). This monitor is suitable for adult, pediatric and neonatal and may be applied in general ward, including, but not limited to, ICU, CCU or ambulance and so forth.

WARNING This equipment must be operated by professional clinical doctor or trained healthcare professionals. Anybody who is not authorized ortrained cannot do any operations for monitoring procedure.

NOTE The illustrations in this manual are probably slightly different from your monitor, according to the real object please.

Major Keys and Parts

This monitor mainly consists of main unit, digital SpO2 probe, nasal tube, water-trap column and AC power adapter.

Main Unit

Power Adapter

NOTE The accessories you are using should be specified by the factory. If not,the factory will not liable for any hazard to patient or paramedic.

Front View

1. Alarm LED (Red and Yellow)
2. 5 inch colorful LCD display
3. Power On/Off Button
4. Return/Cancel Key

If you are in the configuration dialog,pressing this key will go back to the mian dialog and the settings will be enabled

5. Down Key,Move focus forward.
6. Up/Silence Key

If you are in the configuration dialog,press this key to move the focus backward. If not, pressing this key will suspend or resume alarm speaker.

7. Menu/OK Key

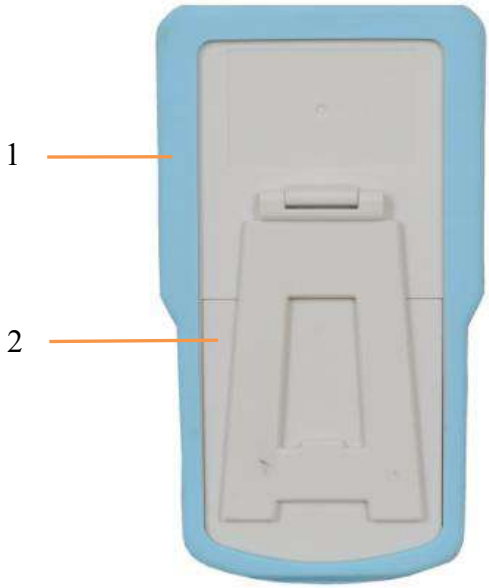
If you are in the configuration dialog,pressing this key will enter its child dialog or start to edit a control. If not, pressing this key enters the Main Menu dialog.

8. Start/Stop CO2 Pump Key

If you are in the configuration dialog,pressing this key will make settings be enabled

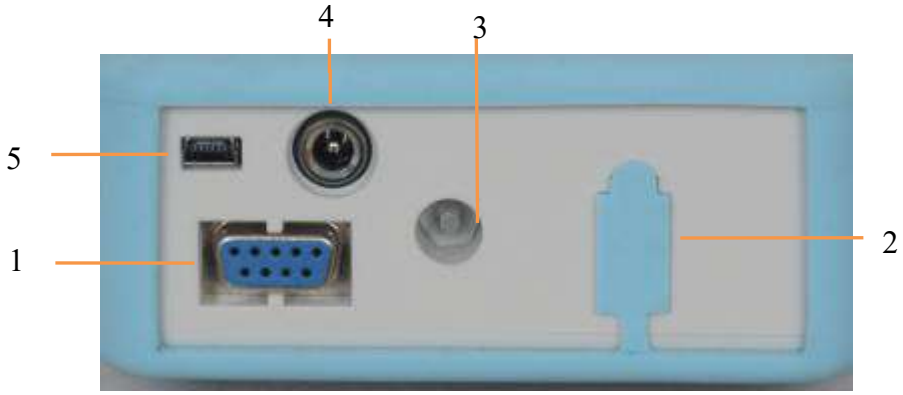
If not,when the pump is on,pressing this key,they pump will be off.

Back View



1. Plastic protective sleeve
2. Battery cover (note: 4 pcs 3.7V 2000mAh Li-battery)

Top View



1. SpO2 Probe Socket
2. Airway adapter interface（Respiratory measuring intake port）
3. Waste Gas Vent（Respiratory measuring exhaust port）
4. Power socket
5. USB interface

Instrument Consumables Accessories

1 Internal Sidestream Etco2 Sensor and Accessories

Airway sample accessories

Nasal sampling tube

2 Plug-in Sidestream Etco2 Sensor and Accessories

Plug-in Sidestream Etco2 Sensor

Airway sample accessories

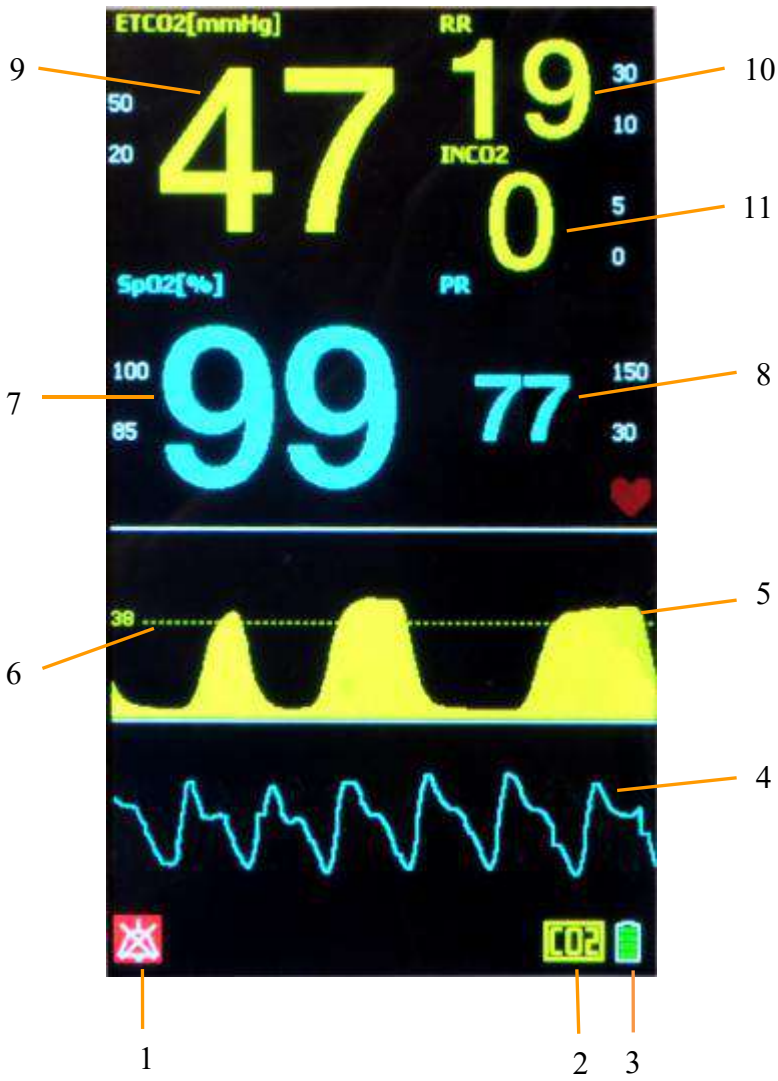
Nasal sampling tube

3 Mainstream Etco2 Sensor and Accessories

Mainstream Etco2 Sensor

Adult/Neonate Airway Adapter

Understanding Screen

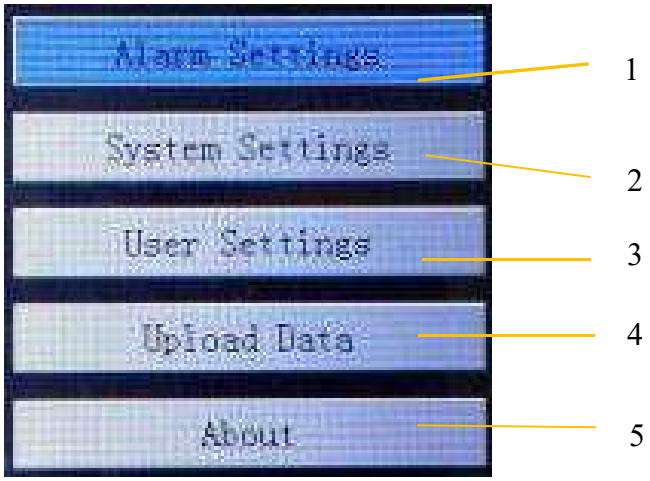


1. Alarm Speaker Status Symbol
   : Alarm speaker is suspended.
   : Alarm speaker is off.
   : Alarm system is suspended.
2. CO2 Pump Status Symbol
   : This symbol indicates that the CO2 pump is on.If the system doesn't showthis symbol, which says the CO2 pump is off or faulty.
3. Battery Status Symbol
4. SPO2 Waveform
5. CO2 waveform
6. CO2 waveform 38mmHg reference line
7. SPO2
8. PR
9. ETCO2

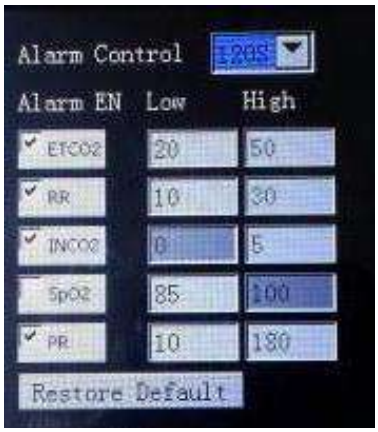
10. RESP Rate
11. INCO2

Main Menu

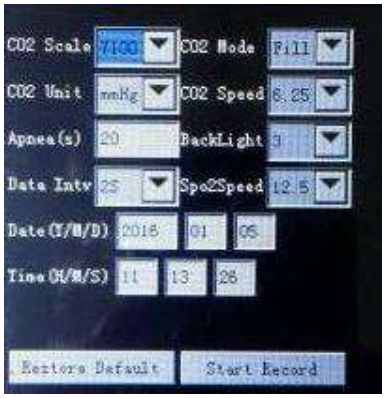
Press Menu Key on the keyboard to enter the Main Menu dialog below. In this menu,you can perform all operations and settings.



1. Alarm Settings
   Select this button to enter alarm settings dialog.

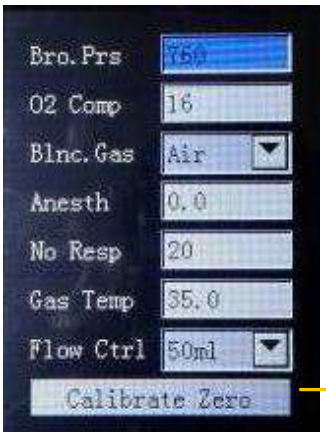


2. System Settings
   Select this button to enter system settings dialog



3. User Settings

Select this button to enter user settings dialog.zero calibration function is on the bottom.



Calibrate Zero

4. Upload Data

Select this button to enable you to start uploading history data that recorded in SD card via USB

5. About

Select this button to enter about dialog. This dialog shows software version and basic information of manufacturer.

Working Environment

The working environment of this equipment should avoid noise, shake, dust and corrosive or explosive things and so on. For a good ventilation environment, the monitor should set aside at least 3 inches.

WARNING Make sure that the monitor is working under the proper environment. If not, maybe it causes unexpected damages.

Basic Operation

The basic operation section gives you an overview of the monitor and its functions. It tells you how to perform operations that are common to all measurements (such as switching the monitor on and off, setting up and adjusting wave speeds, connecting transducers with the monitor).

Open-package Inspection

The first thing you need to do is to inspect main engine and all accessories according to the packing list when you received this patient monitor. If the monitor has any mechanical damages or the accessories don't match with the description of packing list, please get contact with the manufacturer.

NOTE You'd better keep the packing materials, which will be convenient for you to transport or store in the future.

WARNING The packing materials ought to be placed out of the reach of children. Processing packing materials must be in compliance with the local correlation laws or regulations.

Inspecting the Monitor

WARNING If the monitor is mechanically damaged, or if it is not working properly, do not use it for any monitoring procedure on a patient.Please contact your service personnel or manufacturer.

Before you start to make measurements, carry out the following checks on the monitor:
- Check for any mechanical damage.
- Check all the external cables and accessories.

Plug the power cord into the AC power source. If you are using battery power, ensure that the battery has sufficient power for monitoring. When you use a battery for the fist time, you must charge it, following the instructions given in the section on. Charging Batteries in the User Manual.Check all the functions of the instrument that you need to monitor the patient, and ensure that the instrument is in good working status.

Switching the Monitor On

Press the power key for three second to switch the monitor on. The monitor performs a self test including alarm lamps, alarm loudspeaker,measurement modules and so forth. After that, the start-up picture is shown. System is not ready to monitor until it disappears.

Setting up the Modules

Before you do any monitoring procedures, you’d better do some things as the following:
1.Check the CO2 sampling line and CO2 adapter are configured appropriately
2.Check the monitor is configured correctly.

Starting Monitoring

1. Connect your patient to the monitor.
2. Check whether alarm limits, alarm loudspeaker volume, patient category and pacemaker status are appropriate for your patient. Change if necessary.
3. Refer to the appropriate measurement section herein for details of how to perform the measurements you require.

Switching the Monitor Off

When you finish monitoring, you’d better follow the steps below:
1.Guarantee you have finished monitoring.
2.Disconnect monitor with the patient.
3.Press power key for about 3 seconds to shut down the machine.
4.Disconnect the AC power source with the monitor.
5.Manage disposable consumptive materials reasonably.

Alarms

This chapter will help you understand the system alarms. The alarm information here applies to all measurements. Measurement-specific alarm information is discussed in the sections on individual measurements.

Alarm message

An alarm message appears in the alarm status area at the top of the screen. Different text colors of alarm message indicate the different alarm priorities. For details, refer to the following tables.

Priority	Color
High	Red
Medium	Yellow
Low	Yellow

When a numeric violates its alarm limits, the background color of the numeric is changed into red. The figures below show a possible alarm message and numeric

Alarm lamps

Alarm lamps on the monitor’s front panel flashes or lights tell you that more than one alarm event is active. The alarm lamps are divided into two sections. The left section contained a green lamp lights continuously for technical alarm. The right section contained a yellow lamp and a red lamp flashes for alarm priority. If the green lamp lights continuously, this informs you that at least a technical alarm is active. The right section lamps always indicate the highest priority alarm event is active. The following table gives you details about alarm lamps.

Priority	Lamp Color	How long the lamp is on or off while flashing	
		off	off
High	Red	0.25 seconds	0.25 seconds
Medium	Yellow	1 second	1 second
Low	Yellow	All the time	0

Audible Alarm Indicators

The audible alarm indicators configured for your monitor depend on which alarm standard applies in your hospital. Audible alarm indicator patterns are repeated until you acknowledge the alarm by switching it off or making it paused, or until the alarm condition ceases (if audible alarm indication is set to non-latching).

WARNING 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.

The audible alarm always indicates the highest priority alarm events that are happening. The system will play different voices according to different alarm priorities. The table below shows rhythms about alarm voice.

Priority	Voice
High	Du-Du-Du—Du-Du
Medium	Du-Du
Low	Du

Changing the Alarm Control

If alarm loudspeaker volume is too low or high, you can increase or decrease the volume. It is not recommended to switch the alarm loudspeaker off or adjust the volume too low.

Procedure:

1. Press menu key on the keyboard to enter the Main Menu dialog.
2. Select System Settings button to enter the System Settings dialog.
3. Move focus on Alarm Control control to select an appropriate setting:
   - ON keep the alarm loudspeaker on and press silence key not to affect the loudspeaker status.
   - OFF keep the alarm loudspeaker off and press silence key not to affect the loudspeaker status.
   - 60S keep the alarm loudspeaker on and press silence key will suspend the alarm speaker for 60 seconds.
   - 120S keep the alarm loudspeaker on and press silence key will suspend the alarm speaker for 120 seconds.

When alarm loudspeaker is off, the following symbol will be shown on the screen.

Alarm Loudspeaker Off

CAUTION If the alarm loudspeaker is adjusted to off, restarting the machine will switch it on with default setting.

Suspending or Resuming the Alarm Loudspeaker

If you want to temporarily prevent alarm loudspeaker from sounding, you can pause alarm loudspeaker. Just press the SILENCE key on the keyboard to suspend the alarm loudspeaker. And press the SILENCE key again to resume the alarm loudspeaker. If you make the alarm loudspeaker paused, the following symbol will be shown on the screen.

Alarm Loudspeaker Paused

CAUTION If the alarm loudspeaker is off or the alarm task is paused,tosuspend or resume the alarm speaker is invalid.

If alarm loudspeaker is paused, it will be automatically resumed after three minutes.

Switching Individual Alarm On or Off

You can switch off any parameter alarm, when necessary.

Procedure:

1. Press menu key on the keyboard to enter the Main Menu dialog.
2. Select Alarm Settings button to enter the Alarm Settings dialog.
3. Select a parameter to switch the alarm off or on.

CAUTION If you switch a parameter alarm off, the system will not check and indicate the alarm any more.

Monitoring Carbon Dioxide

Use the CO2 measurement to monitor the patient’s respiratory status and to control patient ventilation. In general, there are two methods for measuring carbon dioxide in the patient’s airway: Mainstream measurement and Sidestream measurement. Mainstream measurement uses a CO2 sensor attached to an airway adapter directly inserted into the patient’s breathing system. Sidestream measurement takes a sample of the respiratory gas with a constant sample flow from the patient’s airway and analyzes it with a remote CO2 sensor built into the measurement system.

The measurement principle of both mainstream and sidestream is infrared transmission, where the intensity of infrared light passing the respiratory gas is measured with a photodetector. As some of the infrared light is absorbed by the CO2 molecules, the amount of light passing the gas probe depends on the concentration of the measured CO2. But for this monitor, only sidestream measurement is available.

Introduction

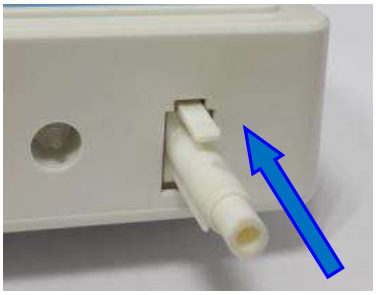
The system measures the concentration of the CO2 from the patient's breath. It provides real time CO2 concentration curve, ETCO2 (end-tide CO2), INCO2 (inspiration CO2) and awRR (airway respiratory rate).

1. ETCO2 numeric label and unit

2. ETCO2 numeric
3. RR numeric label and unit
4. INCO2 numeric
5. 38mmHg reference lines
6. RESP Waveform

Preparations Before Monitoring Carbon Dioxide

1. If the ETCO2 sensor is selected as a internal sidestream mode, Plug the CO2 adapter into the monitor.



Plug the adapter

If the ETCO2 sensor is selected as a plug-in sidestream mode, Plug the CO2 water filter into the module.

Plug the adapter

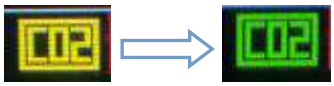
If the ETCO2 sensor is selected as a mainstream mode, Plug the mainstream

adapter into the sensor.

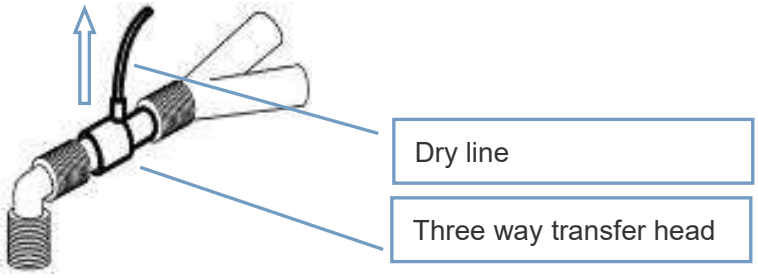
Note: If the machine has a blood oxygen monitoring function, you need to use a conversion wire to connect the blood oxygen probe to the external etco2 sensor.

2. The sidestream CO2 sensor will automatically zeroing after plug the sdiestream co2 adapter into the monitor. Please keep no breathing gas sampling into the co2 sensor, because the breathing gas will affect the baseline during the zero processing. The zero processing time about 20 seconds.

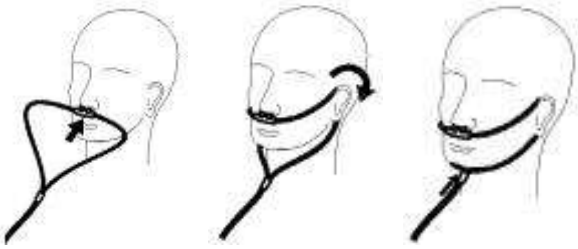
When the sensor automatic zeroing, the CO2 icon will turn green. As below



3. For intubated patients requiring an airway adapter: Install the airway adapter at the proximal end of the circuit between the elbow and the ventilator Y-section.



4. For non-intubated patients: Place the nasal cannula onto the patient.



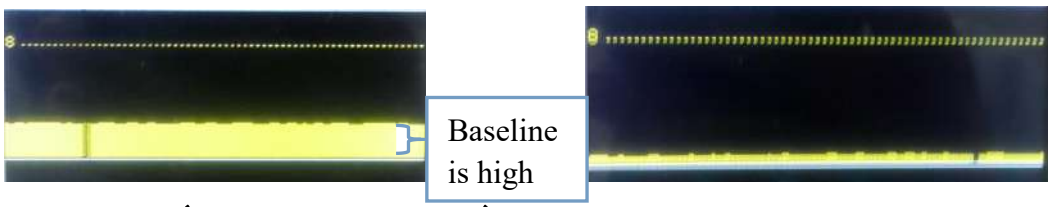
Step 1 Step 2 Step 3

WARNING During CO2 monitoring, you must keep the waste gas vent unblocked.

NOTE Always disconnect the cannula, airway adapter or sample line from the sensor when not in use

Calibrating the CO2 Measurement

1. It is recommended to calibrate CO_2 Sensor when you start CO_2 monitoring
2. When the *CO2 need zero calibration* displays in the alarm area please check if the adapter is configured appropriately,then carry out the CO2 zero calibration.
3. When plugging in the adapter but be patient respiratory monitoring,if you find the waveform reference line higher than normal,you also need to do zero calibration



Baseline is high（**need zero calibration**） **Normal**

Procedure:

1. Press menu key on the keyboard to enter the Main Menu dialog.
2. Select User Settings button to enter the User Settings dialog.
3. Select Calibrate Zero button to calibrate CO2 measurement.A 20-second countdown will appear when the correct operation
4. About 20 seconds later, if the calibration failed, the failure message will be shown.

WARNING Before you start to calibrate the CO_2, the adapter must be configured appropriately,and no CO2 from patient's breathe enter the monitor directly, and make sure that the pump is on.

NOTE Before carrying out zero calibration,please make sure the apnea display in the message area,then the zero calibration can operate correctly.

Setting the pump sampling flow

According to users' needs,you can adjust pump exhaust flow, the higher the flow, the more rapid response corresponding to the waveform edge. In most cases, keep the default (50ml), if there are special needs, properly adjusted. For cats, rats and other small animals, we recommend selecting a flow rate of default (50ml).

Procedure:

1. Press menu key on the keyboard to enter the Main Menu dialog
2. Select System Setting button to enter the User Settings dialog.
3. Move to the Flow Contr,choose the value according settings below:
   50ml default pump exhaust flow is 50 ml/min
   100ml setting pump exhaust flow is 100 ml/min
   150ml setting pump exhaust flow is 150 ml/min

Adjust the waveform amplitude

If the CO2 waveform is too high or low,you can adjust the numeric value to adjust the waveform height.

Procedure

1.Press menu key on the keyboard to enter the Main Menu dialog
2.Select System Setting button to enter the System Settings dialog.

3.Move to the CO2 gain,select the suitable numeric values below:

Y50 CO2 waveform top height 50mmHg

Y76 CO2 waveform top height 76mmHg

Y100 CO2 waveform top height 100mmHg

Note If the CO2 waveform numeric value exceed the limited that you set, the excess of the waveform will not display,but the value will display properly

Adjust the CO2 waveform scan speed

Increase the scan speed will expend the CO2 waveform,reduce the scan speed will reduce the CO2 waveform.If necessary,user can adjust the scan speed.

Procedure

1.Press menu key on the keyboard to enter the Main Menu dialog

2.Select System Setting button to enter the System Settings dialog.

3.Move to the CO2 speed,select the suitable values below:

-6.25mm/s waveform speed 6.25mm/s

-12.65mm/s waveform speed 12.5mm/s

Adjust the CO2 waveform display type

The CO2 waveform can be drawn in two ways: Fill and Type.

Procedure

1.Press menu key on the keyboard to enter the Main Menu dialog

2.Select System Setting button to enter the System Settings dialog.

3.Move to CO2 mode,then select Fill or Line

Adjust the apnea alarm time

By default,when more than 20s undetectable breathing,the system will trigger the Apnea alarm.Conduct apnea alarm time setting,then the system will alarm according to the time you set.

Procedure

1.Press menu key on the keyboard to enter the Main Menu dialog

2.Select System Setting button to enter the System Settings dialog.

3.Move to the Apnea(s) control,then enter the appropriate time interval

Changing the CO2 Unit

The default CO2 unit is mmHg. If the unit is not suitable for you, you can change it.

Procedure

1.Press menu key on the keyboard to enter the Main Menu dialog

2.Select System Setting button to enter the System Settings dialog.

3. Move focus on the CO2 Unit control to select an appropriate unit from the following settings:

- mmHg
- cmH2O
- KPa
- %

NOTE The relationships among the units are:
KPa = mmHg / 7.5 or mmHg = KPa * 7.5
% = mmHg / 760.0 * 100 or mmHg = % * 760.0 / 100

Configuring the CO2 Alarm Settings

Before you start monitoring CO2, it is very important to configure the CO2 alarm settings correctly.

Procedure

1.Press menu key on the keyboard to enter the Main Menu dialog

2.Select System Setting button to enter the System Settings dialog.

3.Move focus on the ETCO2 / INCO2 / RR controls to configure the ETCO2 / INCO2 / RR Alarm settings.

NOTE The ETCO2 and INO2 alarm limits are in mmHg, even though you have changed the CO2 unit.

CO2 compensation parameter settings

When the CO2 monitoring environment changes, you need to relevant compensation factors,so the result will be the best measurement accuracy.

Procedure

1. Press menu key on the keyboard to enter the Main Menu dialog.
2. Select User Settings button to enter the User Settings dialog.
3. Settings below:
4. Bro Prs Changing Barometric Pressure

5. O2 Cop Changing the O2 Compensation
6. Blnc.Gas Changing the Balance Gas
7. Anesh Changing the Anesthetic Agent
8. Gas Temp Changing the Gas Temperature
9.
10.

Battery

Introduce

The rechargeable battery is optional for this monitor. No matter the machine is on or off, connecting to the AC power will recharge the battery immediately. When AC power is disconnected, the monitor will continue working with battery.

Battery symbols shown on the screen have the following statuses:

 : If power adapter plugs in, this symbol indicates the battery has been finished recharging. If not, it says the remaining volume is more than 80%.

 : If power adapter plugs in, this symbol indicates the battery is recharging. If not, it says the remaining volume is more than 50%.

 : If power adapter plugs in, this symbol indicates the battery is recharging. If not, it says the remaining volume is more than 25%.

 : If power adapter plugs in, this symbol indicates the battery is recharging. If not, it says the remaining volume is more than 10%. You'd better charge the battery again.

 : This symbol indicates that the volume of battery is very low. The machine can continue to work for five more minutes at most. You must recharge the Battery immediately.

CAUTION Before transporting or long-term non use the monitor, you'd better take out the battery.

WARNING The battery should be placed out of the reach of children. The battery specified by manufacture is only available

Recharging the Battery

If the energy of battery is exhausted, you can recharge the battery. Charge the battery until it is full. Without connecting AC power, a full battery enables the monitor to continue to work for about 10 hours.

Installing Battery

The battery installation must be carried out by persons authorized by the factory.

Recycling Battery

If the battery has any damages or the energy of the battery is exhausted, you should replace and recycle it. The disused battery should be disposed properly according to laws or regulations about the management of battery.

WARNING Don’t disassemble and short-circuit the battery or throw it into fire. The battery combustion, explosion or leakage may cause injury to you.

Appendix A Specifications

A.1.Environment Specifications

Main Unit			
Type	Temperature(℃)	Relative humindity	Atmosphere Pressure (KPa)
Working	5~50	0~95%	70.0~106.0
Storage	0~70	0~95%	22.0~120

A.2.Power Specifications

Type	Specification
Input Voltage	12V DC
Input Current	2.0 A

A.3.Physical Specification

Parts	Weight	Dimension
Main Unit	0.65Kg	192mm x 106mm x 44mm

A.4.Hardware Specification

TFT Screen	
Type	Colorful TFT LCD
Dimension	5.0 inch

Battery	
Quantity	4
Model	Rechargeable lithium battery
Voltage	3.7 V
Capacity	2200mAh
Working time	10 hours
Recharging time	4 Hours

LED	
Patient Alarm Indicator	Two colors:Yellow and Red

Sound Indicator	
Loudspeaker	Play alarm voices

Interfaces	
Power	12VDC power socket*1pc
USB	MINI USB socket*1

A.5.Measurement Specifications

CO2	
Principle	NDIR single beam optics, dual wavelength, no moving parts.
Sample Rate	50mL/min, ±10mL/min
Initialization Time	In 5 seconds,display the CO2 scan wave
Range	CO2 0~99 mmHg 0~13 % Respiratory Rate 2~150 bpm
Resolution	CO2 0.1 mmHg 0 ~ 40 mmHg 0.25 mmHg 40 ~ 99 mmHg Respiratory Rate 1 bpm
Precision	CO2: 0~40 mmHg ±2 mmHg 40 ~99 mmHg ±5% of reading Respiratory Rate ±1 bpm
Apnea Alarm Time	10~60s

Appendix B Alarm Messages

B.1.Patient Alarm Messages

Source	Message	Causes	Actions
XX	XX Too High XX Too Low	The XX numeric violates its limits	Examine the patient health condition and make sure the patient type or alarm limits is appropriate for the current patient.
CO2	Apnea	The system does not detect respiration that is derived from CO2 for a long period.	Examine the patient conditions, nasal cannula or the whole gas path.

B.2.Technical Alarm Messages

Source	Message	Causes	Actions
CO2	Chk airway adpt.	1. CO2 adapter is not configured appropriately 2. Need zero calibration	1. Re-plug the CO2 adapter 2. Carry out zero calibration,if not work,use a new CO2 adapter
	CO2 zero requr.		Calibrate the CO2 module zero.
	Chk smpl line	CO2 sample line clogging	Check sample line,and keep it unobstructed
	Pump off	1. Pump is off 2. CO2 adapter is plugged out	1. Press the OK button to switch the pump on If you plug the CO2 adapter,the pump off alarm is still,then renew the CO2 adapter
	Pump-life exced.	The CO2 pump is over lifetime.	Get contact with the manufacturer to renew the CO2 pump.

Appendix C Default Settings

C.1.Alarm System Default Settings

System Settings	Default
ETCO2 Alarm	On
ETCO2 Alarm (too low)	20 mmHg
ETCO2 Alarm (too high)	50 mmHg
INCO2 Alarm	On
INCO2 Alarm（too high）	5 mmHg
RESP Rate Alarm	On
RESP Rate Alarm（too low）	10
RESP Rate Alarm（too high)	30

C.2.CO2 Default Settings

CO2 Settings	Parameters Settings
CO2 gain	50
Speed	6.25mm/s
Waveform color	Yellow
Apnea Alarm Time	20s
Unit	mmHg
Atmospheric Pressure	760mmHg
O2 Concentration	16
Balance Gas	Air
Anesthetic Gas Concentration	0
Gas TEMP	35.0 ℃
Pump Flow	50ml