COMEN

Vital Signs Monitor NC5

BRIEF TRAINING

COMEN share with the world

01 Brief Introduction

02 Get Started and Use

03 Hardware Introduction

04 Troubleshooting

05 Maintenance

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Part 01

Brief Introduction

- Product Introduction
- Appearance
- Accessory

Introduction

Intended usage:

The NC5 Vital Signs Monitor is designed for monitoring ECG, non-invasive blood pressure (NIBP), pulse oxygen saturation (SpO2), and pulse rate (PR) of patients, as well as body temperature (TEMP) of adults, pediatrics and neonates. Monitoring information can be displayed, reviewed, stored and printed. The device is mainly used in places such as internal medicine and surgical wards, outpatient and emergency triage.

Main parts:

- Main unit
- Accessory
- Trolley, Wall mount *

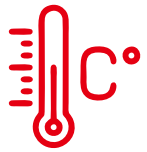
Introduction

COMEN

The environment

Normal working environment

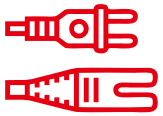
Ambient temperature: 0℃～+40℃(without ear thermometer)
15℃～+36℃(with ear thermometer)



Relative humidity: ≤93%, Non-condensing（without ear thermometer）
≤ 85% non-condensing(with ear thermometer）

Atmospheric pressure:70.0kPa～106.0kPa

Power supply



AC power: 110-240V 50/60Hz
Input current: 0.5-0.3A

Built-in battery: 11.1V/2200mAh , providing continuous sustainable power supply for at least 3 hours under full charge and normal use.
11.1V 4400mAh , providing continuous sustainable power supply for at least 8 hours under full charge and normal use. (optional)

Brief Introduction

External Appearance & Layout

Alarm indicator light

1. Could be observed from 360° angle, automatic visible and audible alarm.
2. Left: Physiological alarm lamp
   Right:Technical alarm lamp

Display area

Infrared ear thermometer

non-contact measurement mode avoids cross infection, 2~3 seconds measurements time, more quick, stable and accurate

Brief Introduction

External appearance

Left-Side Panel

Recorder
(optional)

NIBP

ECG
(optional)

SpO2

Right-Side Panel

Handle

Infrared ear thermometer

Power switch

Disposable ear muff placement area

Brief Introduction

External appearance

Rear Panel

Handle

Loudspeaker

USB port

Software updating, data output, import&outport config, support mouse, key board, external printer.

Power socket

Power off protection,
100-240V~, 50/60Hz

Multi-function connector

It can be used as a ***nurse call*** interface. When connected to the hospital call system, it will output a nurse call signal to inform the nurse that there is an alarm.

Equipotential jack

Network port

Supports networking with the central monitoring system via a network cable.

Brief Introduction

Configuration

Picture	Model	Standard	Optional
	NC5	◆**8’ LED-backlit Touch Screen** ◆**Comen SPO2** ◆**NIBP** ◆**PR** ◆**Built-in battery:** 2200mAh,at least 3 consecutive hours.	◆ **Printer** ◆ **Built-in battery**:4400mAh,at least 8 consecutive hours. ◆ **3lead ECG** ◆**Masimo.SPO2** ◆**Nellcor.SPO2** ◆**TEMP**

Introduction

Accessory-ECG

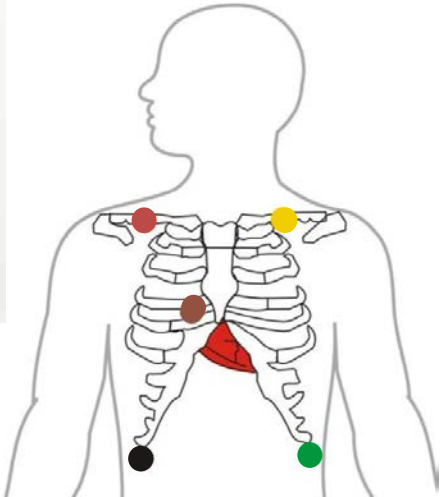
Buckle type

Clip-on type

Parts:

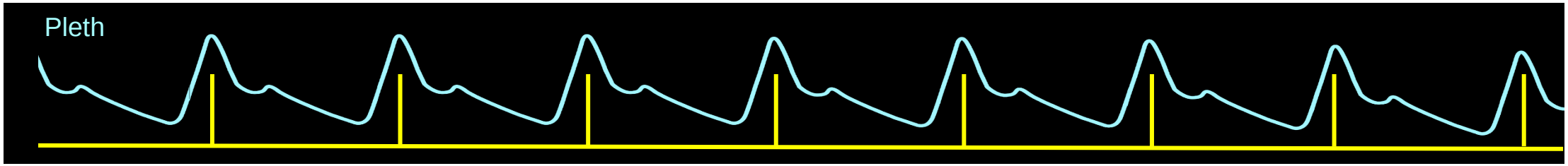
ECG Cable
ECG Electrode Slice

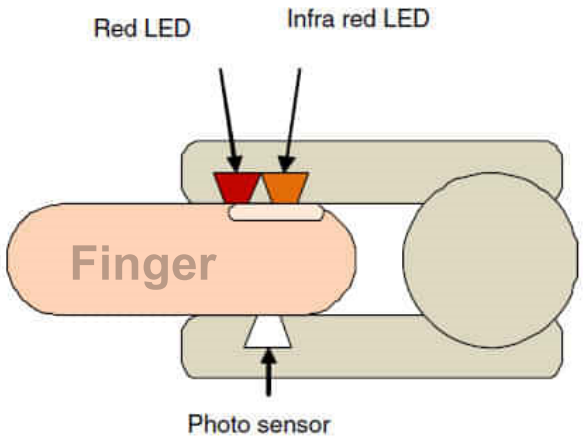
Electrode slice



Introduction

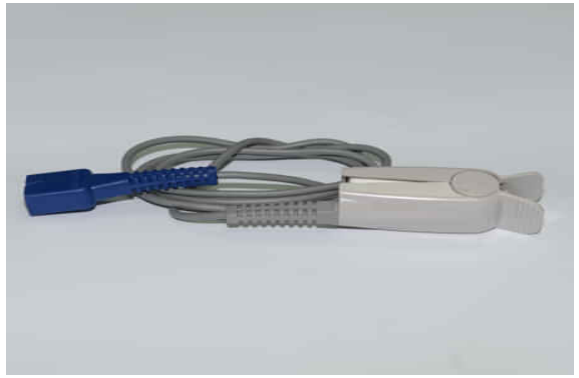
Accessory-SpO2





Masimo SpO2

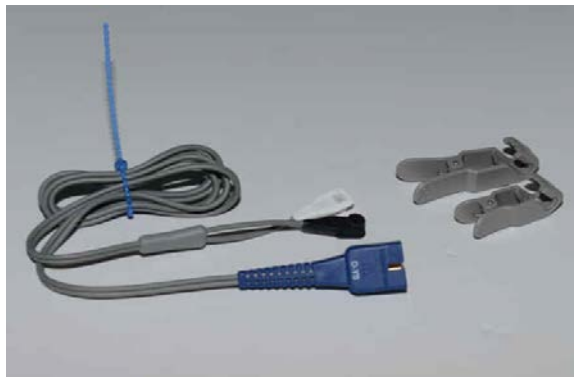
Nellcor SpO2



COMEN SpO2

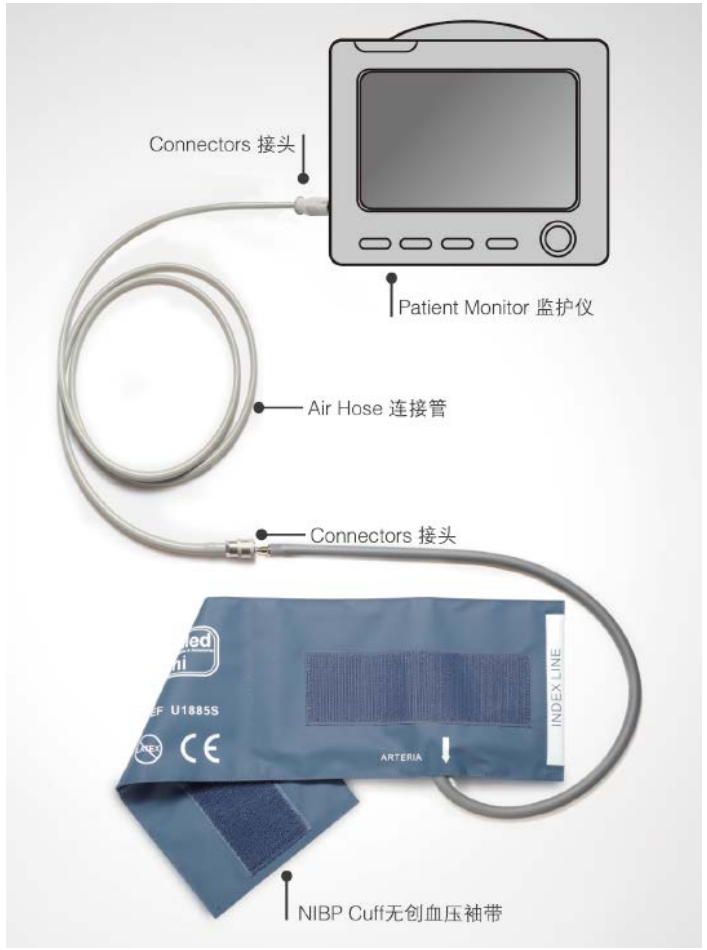
Parts:

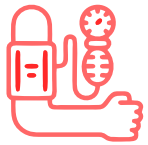
SpO2 Cable
SpO2 Sensor Clip

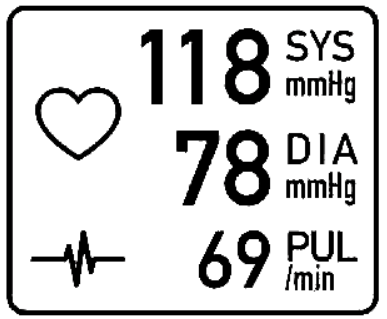


Introduction

Accessory-NIBP







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Introduction

Accessory-Temperature

Parts:

Ear thermometer
Ear thermometer cap

Wireless connection: when the ear thermometer is off, press and hold the “ejector key”, then turn on the ear thermometer by pressing the switching button, and hold the “ejector key” all the time.
When the screen shows “SE”(alternate display ℃ and ℉ for twice), then loose the “ejector key”, and start to press the temperature area then choose “Connect thermometer”.

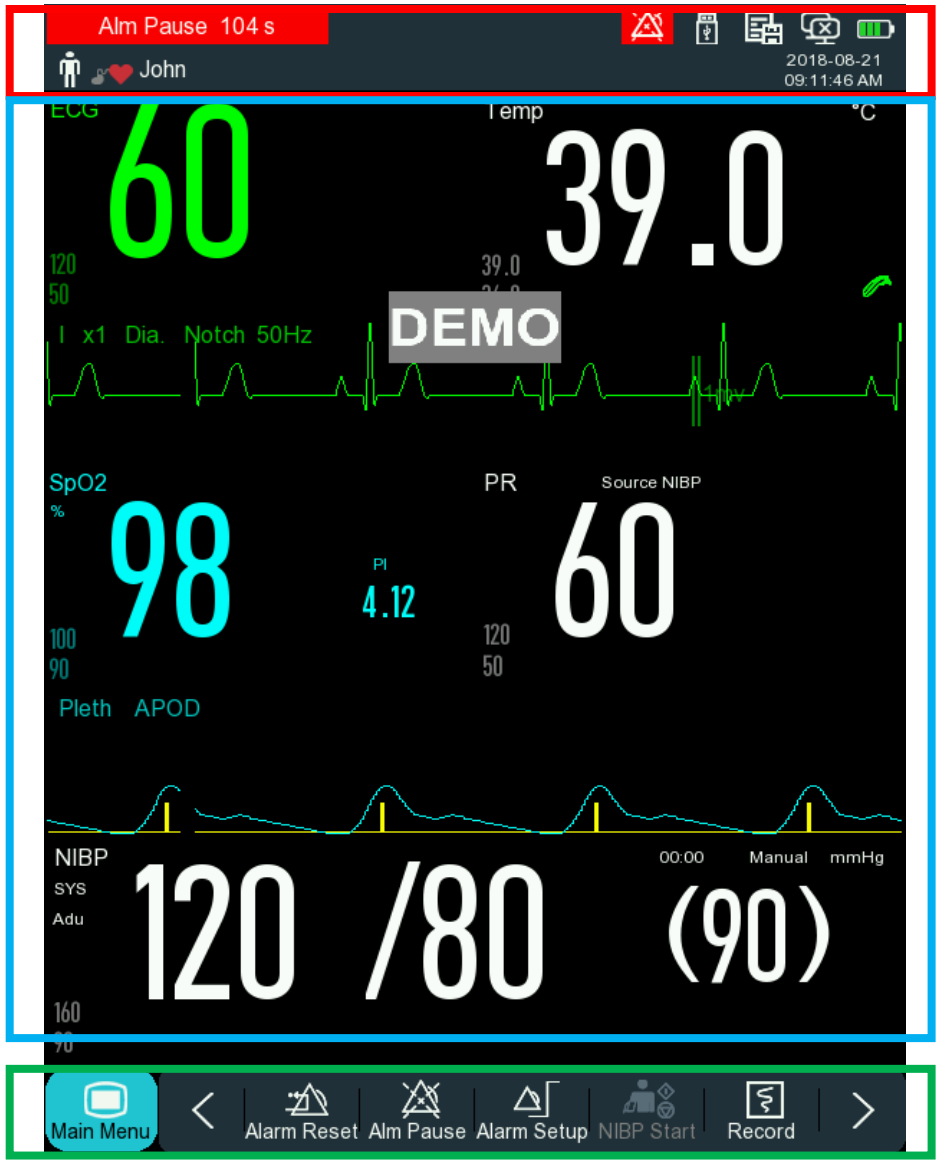
When wireless connection is successful, the screen prompts icon” ”

How To Connect NC5 Thermometer - Onedrive
https://1drv.ms/v/s!Aj4lc-thpU3R4XE4fy8gBXZ7D42R?e=SDh99Z

Part 02

System Operation

Screen display



Prompt Message Area

a) Physiological alarm message

b) Technical alarm message

c) Prompt icons, Patient info, Clock

d)Monitor setup area: USB card status , SD card status, CMS status, battery status.

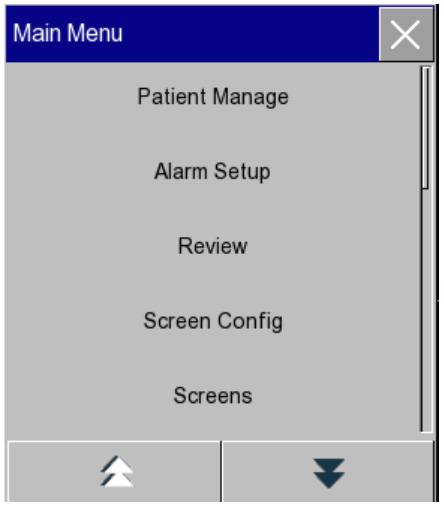
Lower Menu Bar

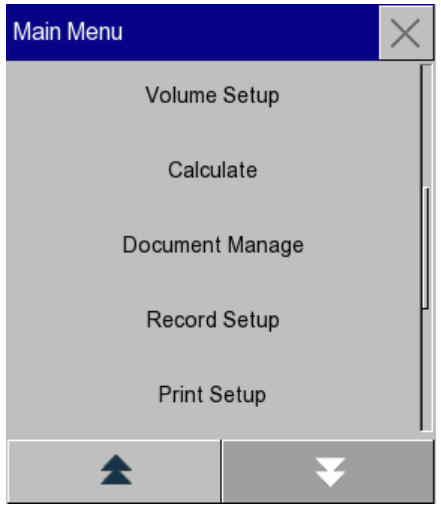
The Lower Menu Bar contains onscreen Quick Keys, which enable users to operate the device faster. The Quick Keys are displayed in the Lower Menu Bar depended on the monitor‘s configuration

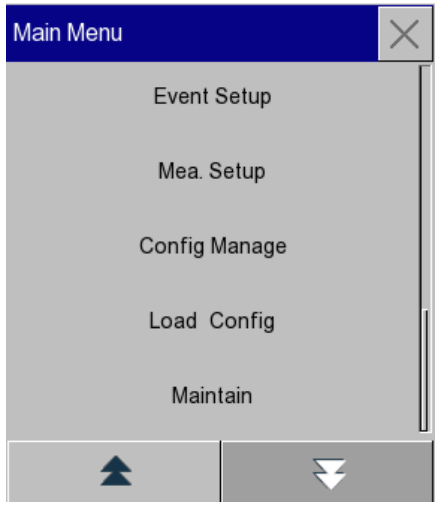
Parameter Area

Click a waveform to open the corresponding setup window.

Main Menu







The functions included in the main menu are:

[Patient Manage]-[Alarm setup]-[Review]-[Screen Config]- [Screens]-

[Volume Setup]-[Calculate]-[Document Manage]-[Record Setup]- [Print Setup]-

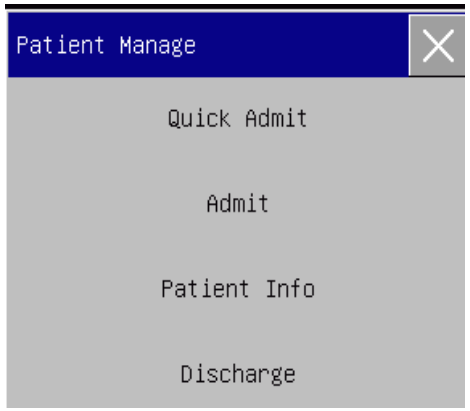
[Event Setup]-[Mea. Setup]- [Config Manage]-[Load Config]-[Maintain]

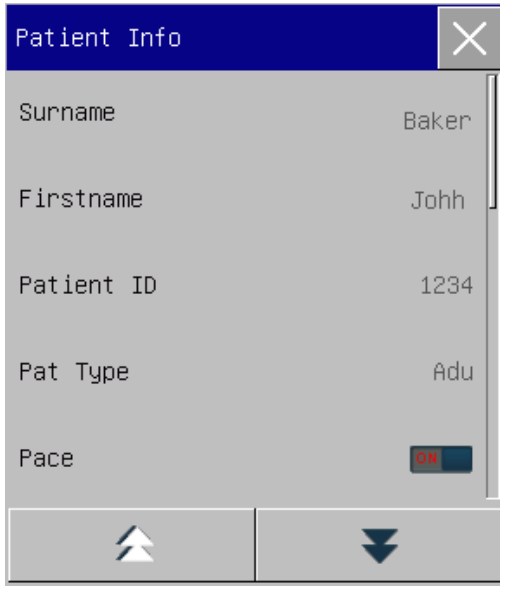
**controlling can be operated through touch screen and shortcut keys*

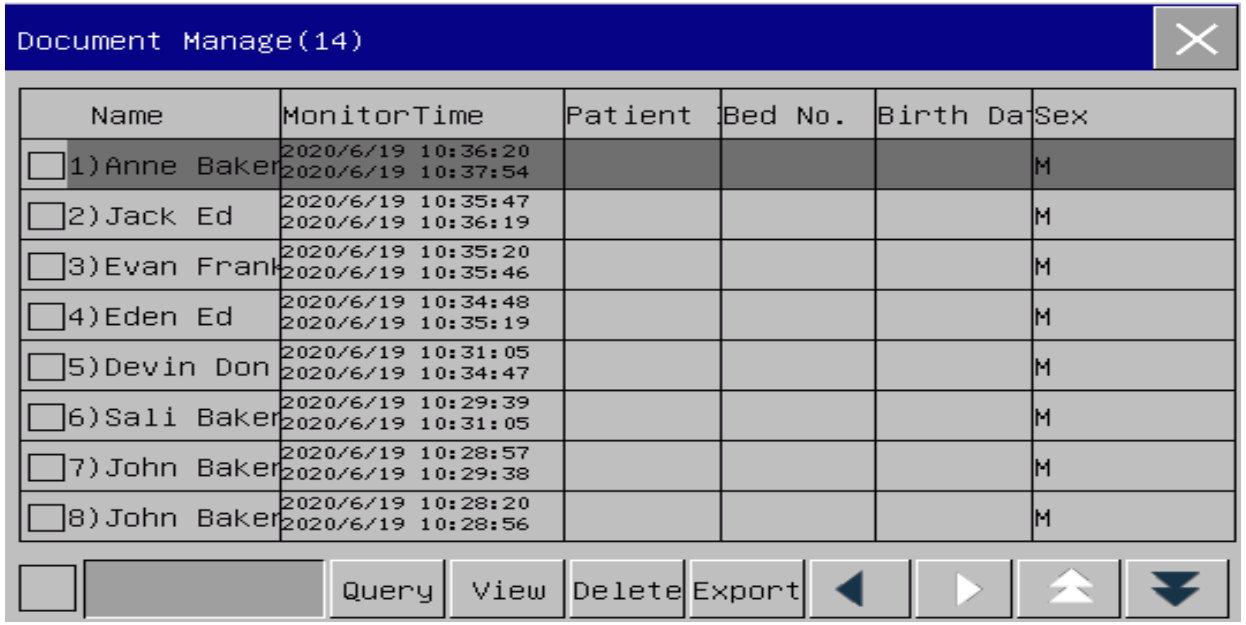
Patient Manage

You can Admit, Quick admit, and discharge a patient when the monitor is ready to be used on a new patient.

You can inquire, review, delete and export archived patient files in [Main Menu]-->[Document Manage]







[File Format]: options are .bin, .txt or .xls.

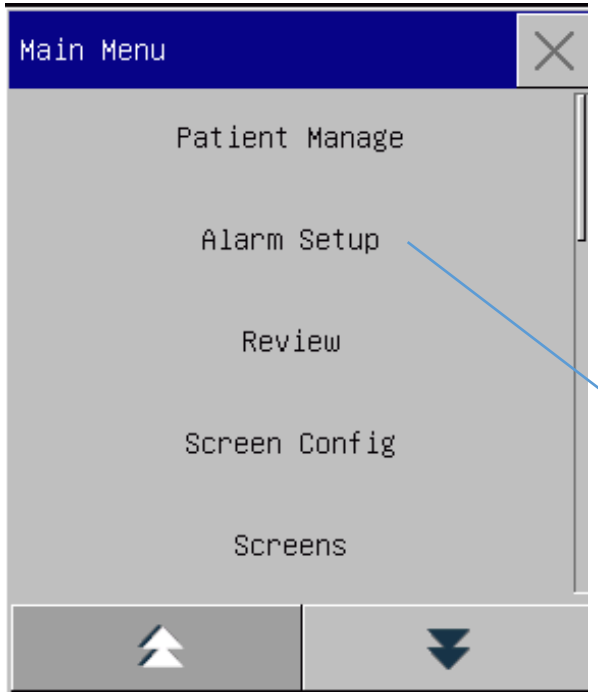
[Export Media]: options are USB or FTP.

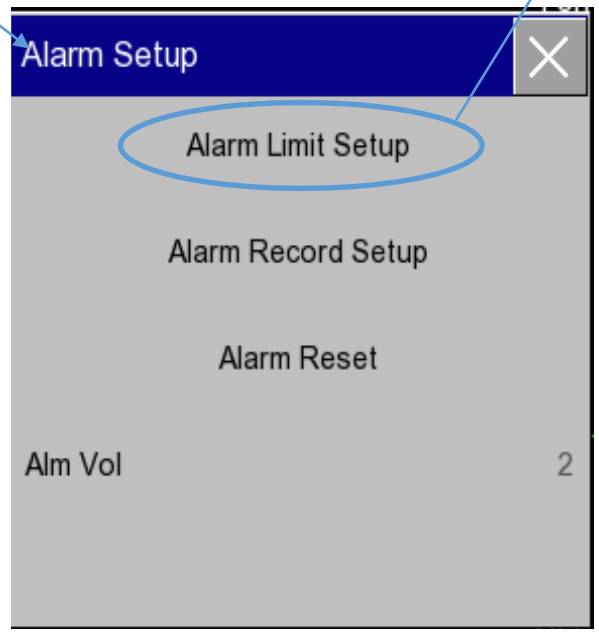
- USB: Export to a USB flash drive.
- FTP: Export to a FTP server via wired NETWORK.

Select [Data Export] to start export.

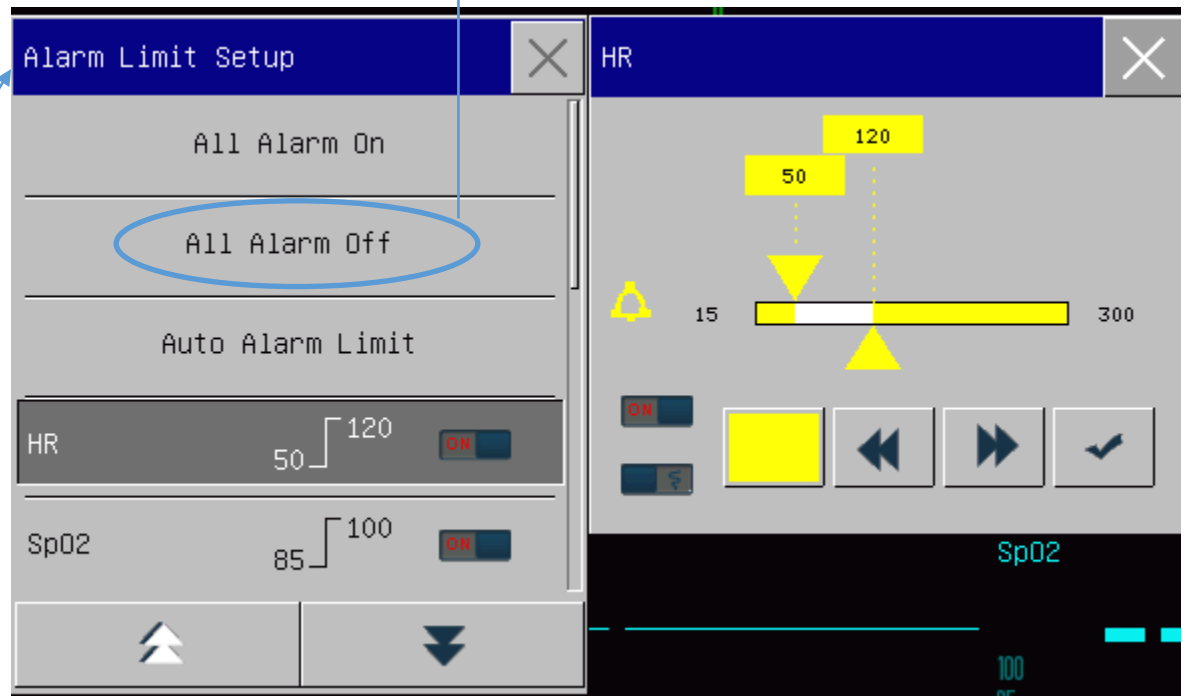
When it is finished, the prompt message [Data Export] succeeded will be shown. Then please restart.

Alarm setup





The [Alarm Off] function is only available for physiological alarms



Take ECG as an example:

1. Select ECG parameter area;
2. Select [Alm Limit Setup];
3. Click the button to switch the alarm level.

System Operation

Alarm Type

(1) Physiological alarm

Physiological alarm is usually caused by a certain physiological parameter of the patient which exceeds the set upper/lower limit scope or by the physiological abnormality of the patient. The alarm message of the physiological alarm will appear in the physiological alarm message area.

(2) Technical alarm

The technical alarm is also referred to as a system error message, indicating the alarm is caused by a mis-operation or system malfunction thereby causing improper operation of a system function or distortion of monitored results. The alarm message of the technical alarm will appear in the technical alarm message area.

System Operation

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Alarm Pause，Alarm Delay，Minimum Alarm Volume

NOTE:

Every time the monitor is turned on, the system will enter the alarm pause state automatically.

After the alarm pause time (set by user) expires, the monitor will cancel alarm pause automatically; user can press the alarm pause/cancel key to cancel alarm pause.

Operation steps for ***alarm pause***:

1) Enter [User Maintain] → [Alarm Setup] → [Alm Pause Time].
2) Set the appropriate pause time: **[1min], [2min], [3min], [5min], [10min], [15min]**.

Alarm delay cannot be applied to ECG.

Operation steps:

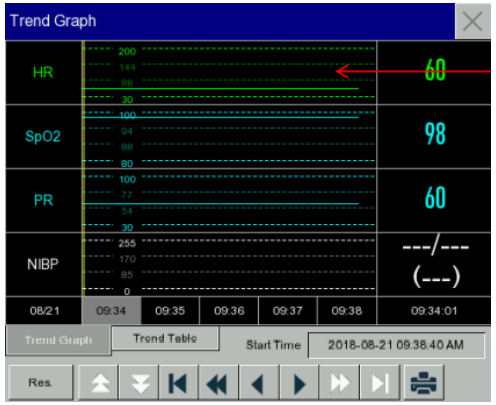
1) Enter [User Maintain] → [Alarm Setup] → [Alarm Delay].
2) Set the appropriate delay time： **[Not Allowed], [5s], [10s], [15s] and [20s]**.

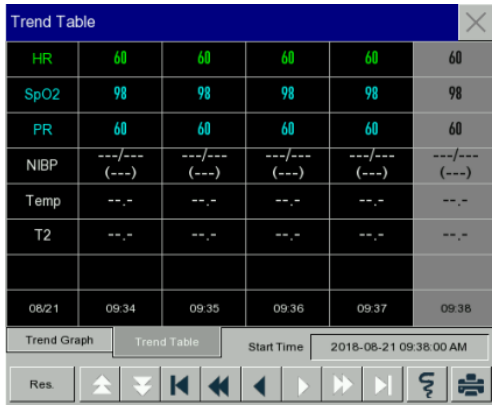
Follow the operation steps below to set up the minimum alarm volume:

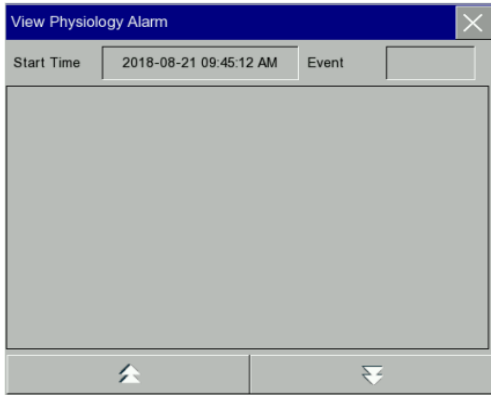
1) Enter [User Maintain] → [Alarm Setup] → [Min. Alm Volume].
2) Set the appropriate volume.

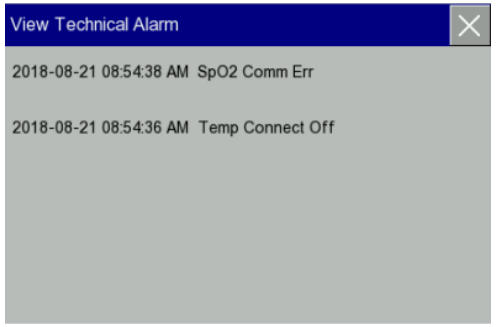
System Operation

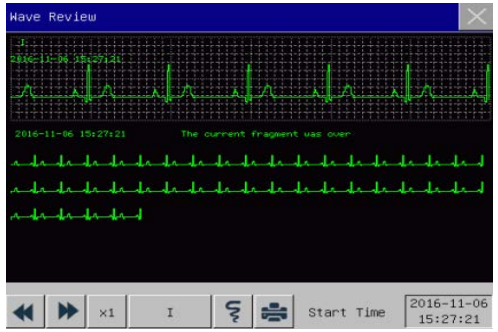
Review











Trend Review

160 hrs trend graph and 160 hrs trend table

NIBP Review

2000 sets NIBP review

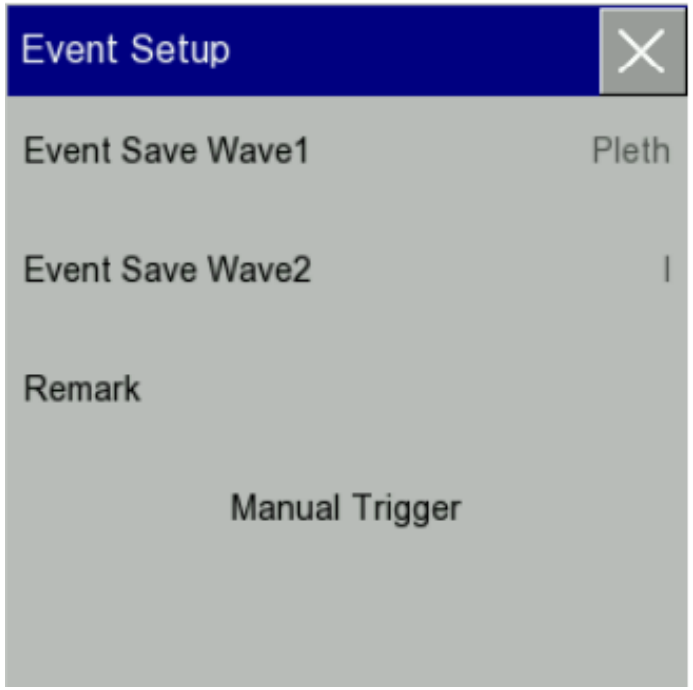
Alarm Event Review

200 sets alarm event review

Wave Review

48 hrs holographic waveform review

Event setup



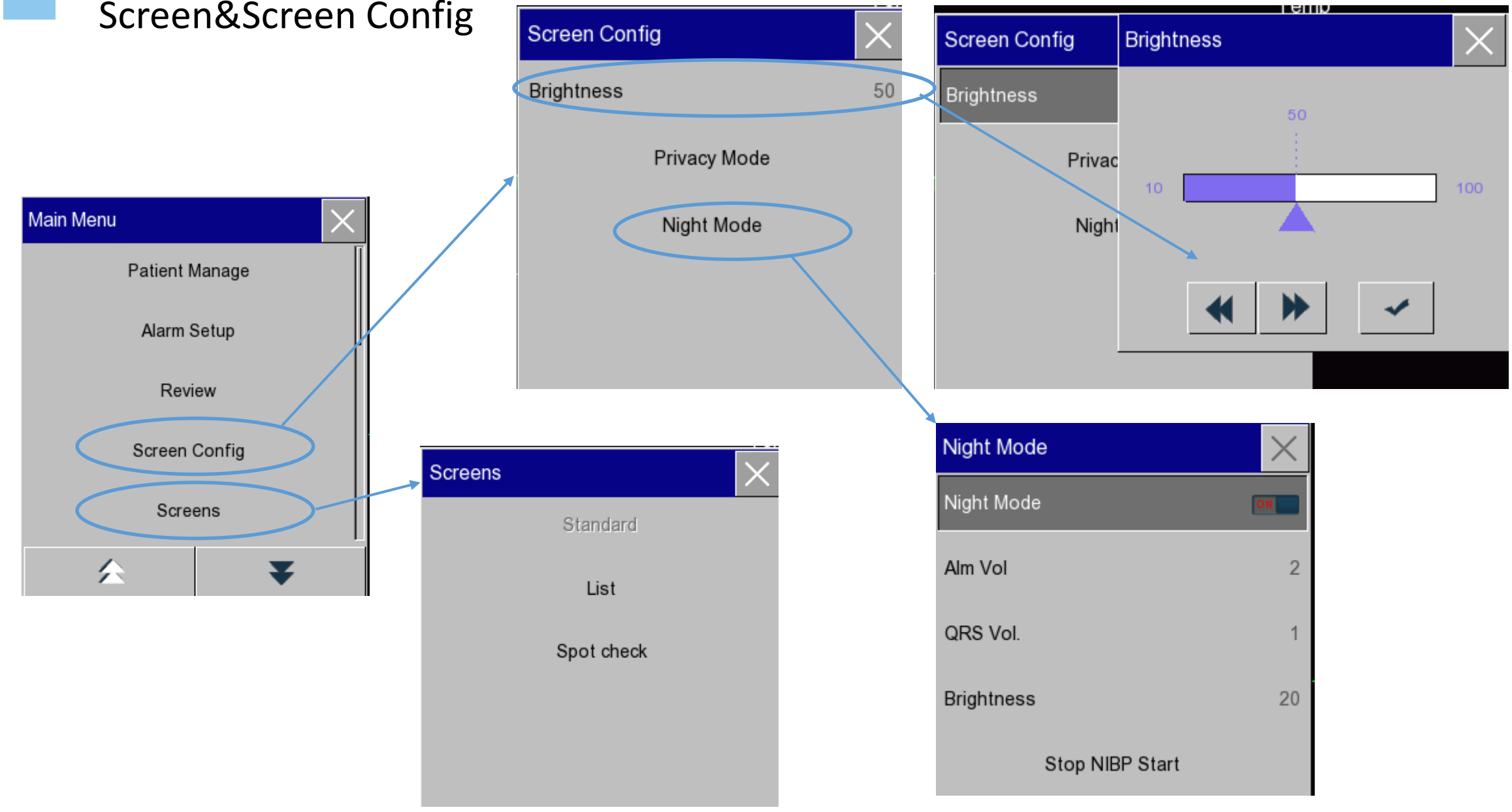
- **Enter [Main Menu] → [Event setup]**
- Select 2 waveforms from the options to save the waveform as an event.
- Enter appropriate comments in the Comment option.
- Select [Manual Trigger].

A [Manual Trigger Successfully] message is indicated at the bottom left of the screen.

- You can select the events to review in the [View Physiology Alarm] menu of [Alarm Event Review].

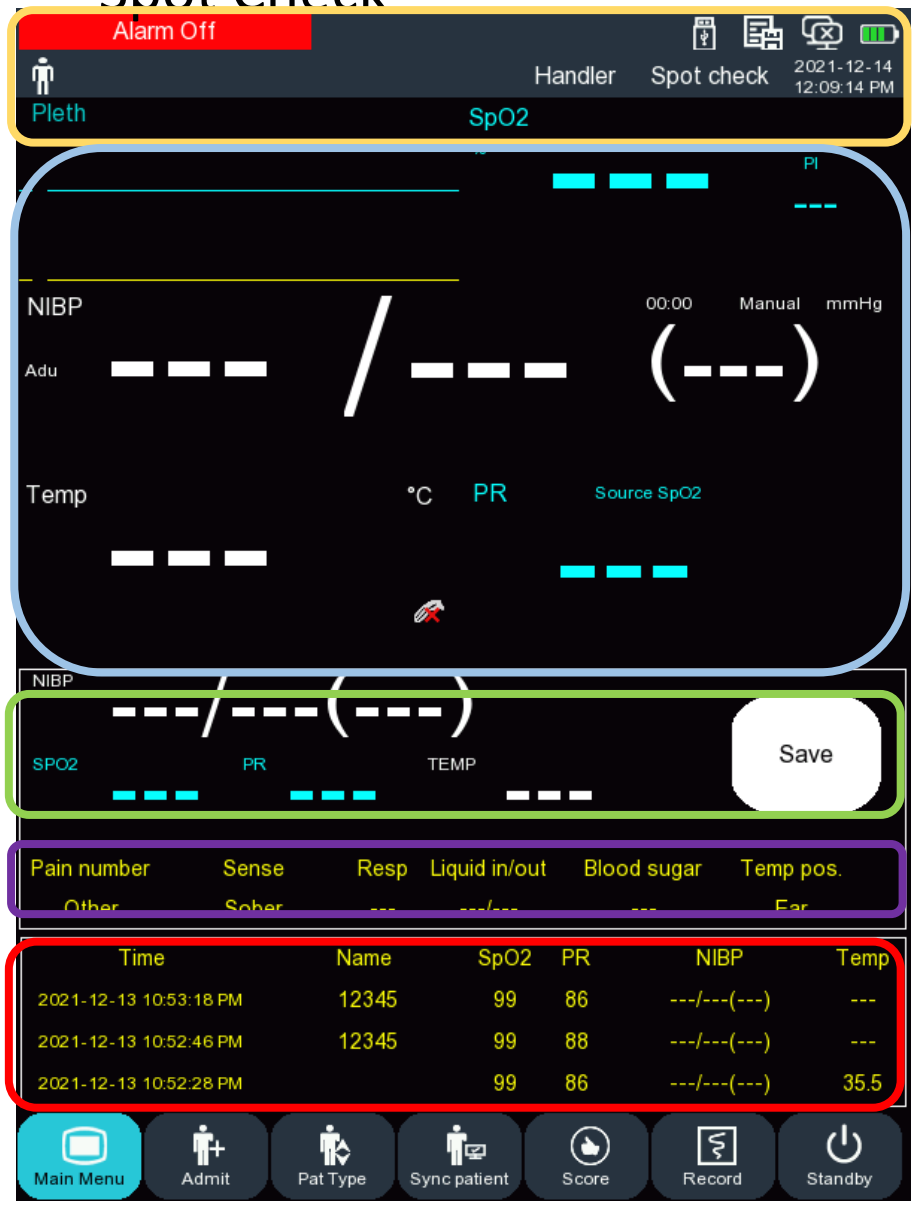
System Operation

Screen&Screen Config



System Operation

Spot Check



Notification area or Upper Menu Bar

Specifically includes technical alarm reminder, icon reminder, monitor setup, battery level icon, patient information, system time

Parameter area and Waveform area

Click a waveform to open the corresponding setup window.

Data to be Saved area

This area displays the stable parameters. Press the Save button to save the data displayed in the area and to update the Point meas List.

Manual Input Data area

This area displays the data manually input by users. Press on the area to display the data input menu.

Point meas List area

In the Point meas List area, 3 spot data can be displayed in reverse chronological order. If you press this area, a Spot Data Trend Table menu is displayed

Notes：

1. The monitor does not provide a physiological alarm, but only the technical alarm and status message.
2. Continuous and Automatic NIPB Parameter Measurement are not available.
3. Only the spot data is stored, and the trend data is not stored.

EWS

Early warning grade (EWS) is part of the clinical assistance function. EWS acts as the early warning index for severe illnesses and potential ones, helpful with identifying the early signs of deterioration. EWS provides the corresponding grade by monitoring and observing the vital signs and state of the patient. And the system will provide advices and measures that should be taken according to the grade.

The device provides the following grading system:

Modified Early Warning Grade（MEWS）
National Early Warning Grade（NEWS）
Early Warning Grade（EWS）

Notes:

The result of grading system only serves as reference and cannot be directly used for clinical diagnosis.

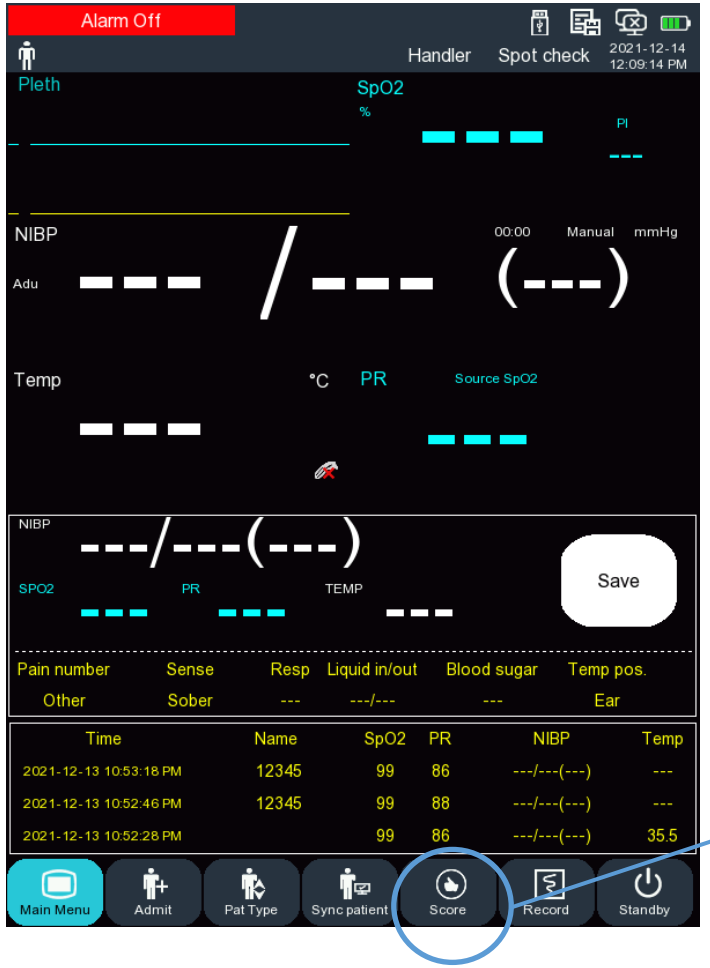
Grading cannot be used for comprehensive clinical diagnosis and should never replace the doctors' assessment on patient totally.

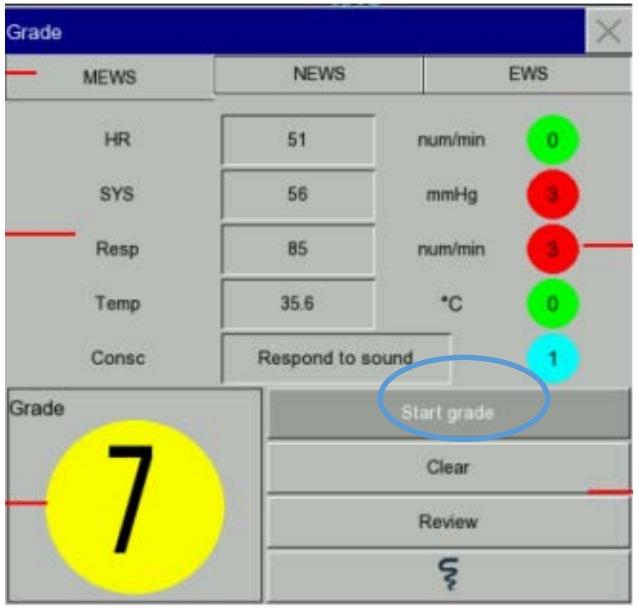
System Operation

EWS

How to get a “EWS” result ?

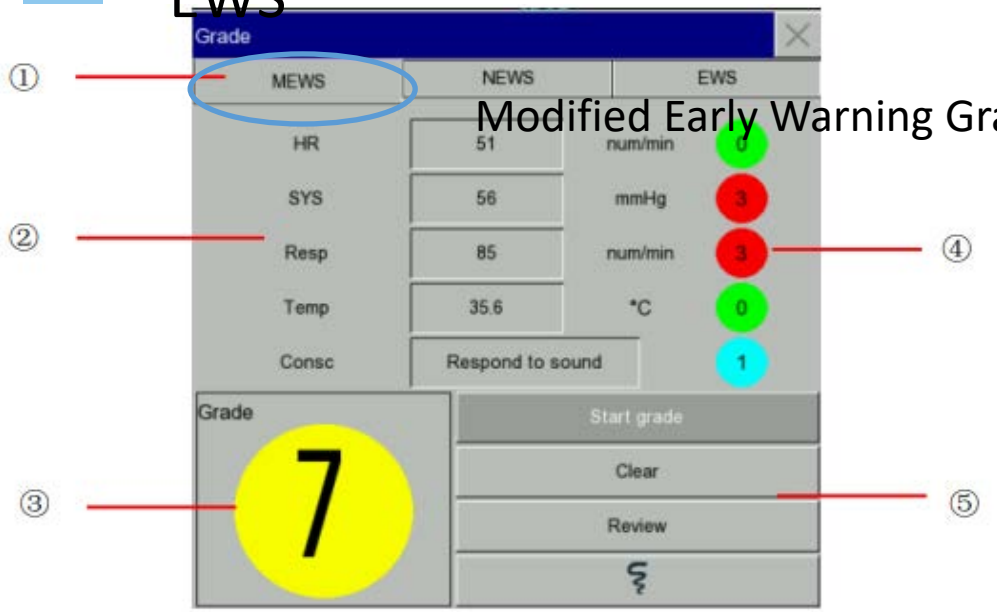
1. Enter “Spot Check” interface.
2. Press “Score”
3. Input the parameters and degree of awareness
4. Press “Start grade”



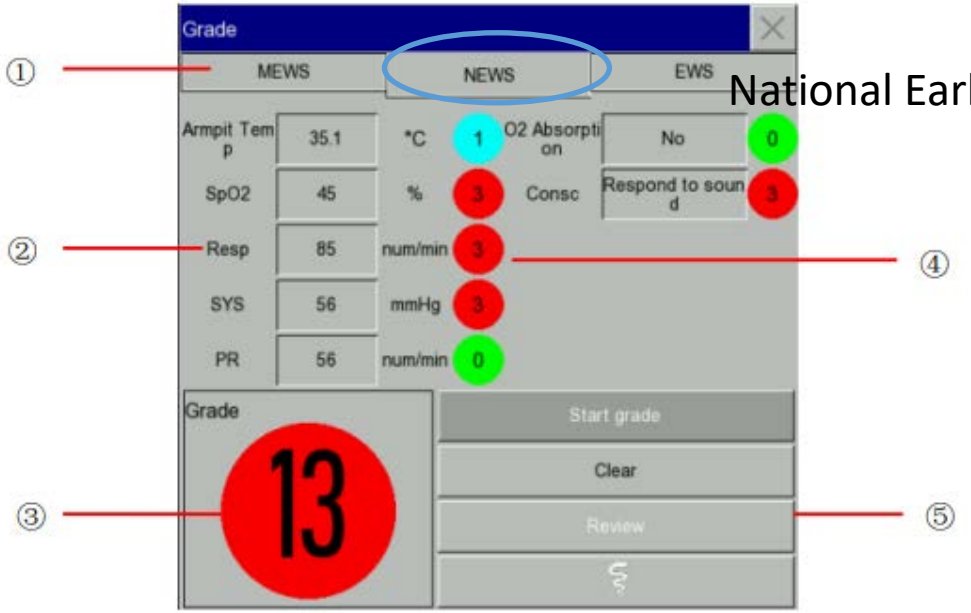


System Operation

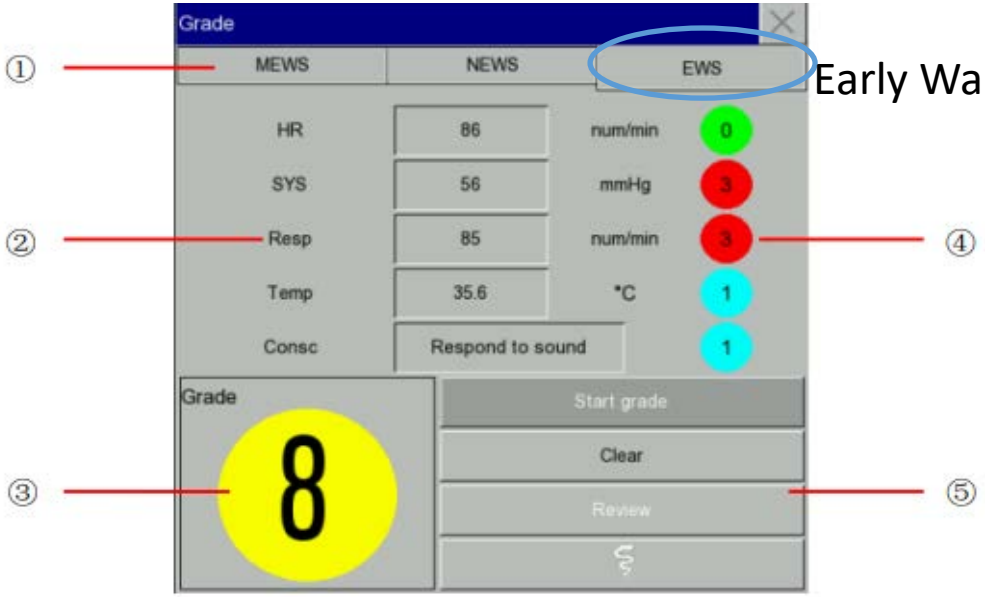
EWS



Modified Early Warning Grade



National Early Warning Grade



Early Warning Grade

①	The name of grading system
②	The involved parameter in grading
③	Total grade
④	Grade for each parameter
⑤	Functional Key

System Operation

Configuration management

In order to configure the monitor more effectively and rapidly, this monitor provides a variety of configurations to meet the requirements of different patient types and different hospital departments. You can also customize a configuration according to actual conditions and save it as a **user-defined configuration**. You can import / export, and load a configuration quickly in **[Main Menu]-->[Config Manage]:**

Configuration info includes:

>Department

General, OR, ICU, NICU, CCU

>General Configuration

General settings, such as alarm settings, logging, etc.

>Parameter Configuration

The settings related to each parameter measurement, such as waveform gain, speed, unit, alarm switch and alarm limit.

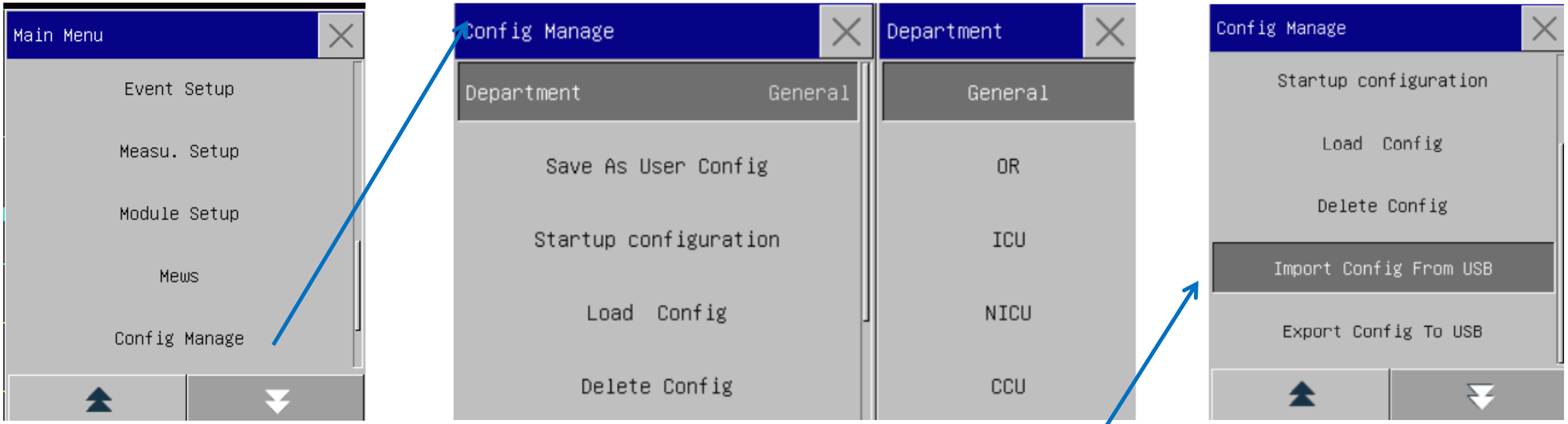
>Maintenance Configuration

User maintenance related settings, such as waveform draw setting, language, nurse call, etc.

System Operation

Configuration management

- Enter [Main Menu] → [Config manage] →password:5188
- The menu options as below.



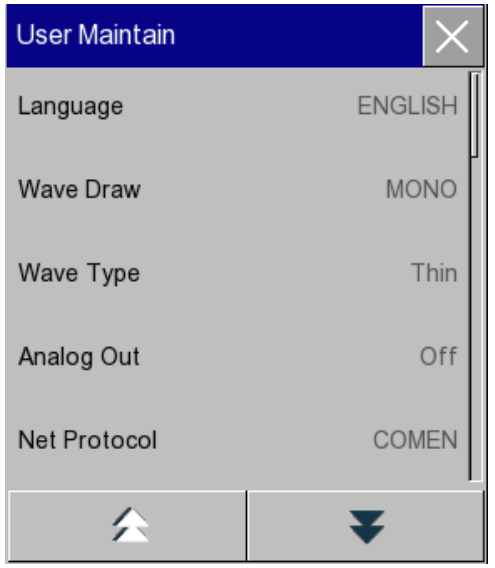
Plug in USB disk>config manage(input 5188)>export config to USB>import config from USB

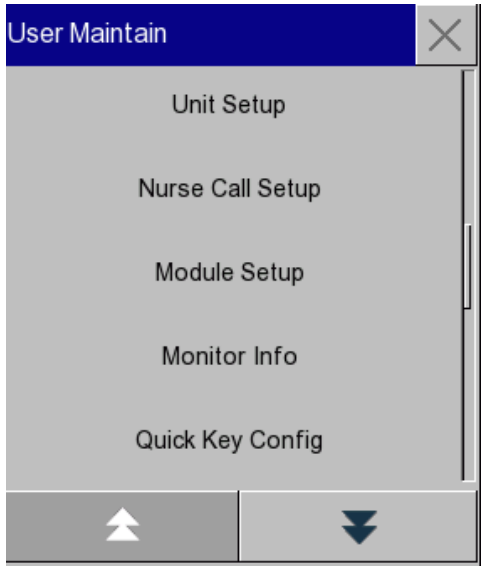
System Operation

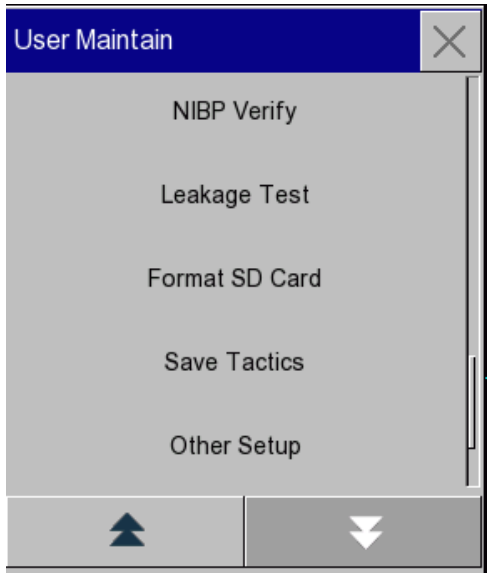
User maintain(5188)

- Enter [Main Menu] → [Maintain] → Password:5188 →User Maintain menu

Notes:
For NC5, you do not need to calibrate the touch screen so there is no "touch screen calibration" in 5188maintain.

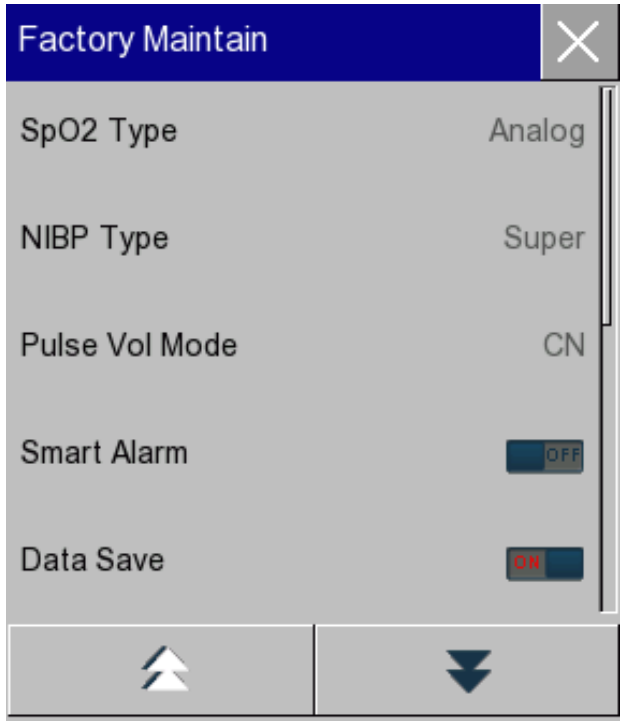


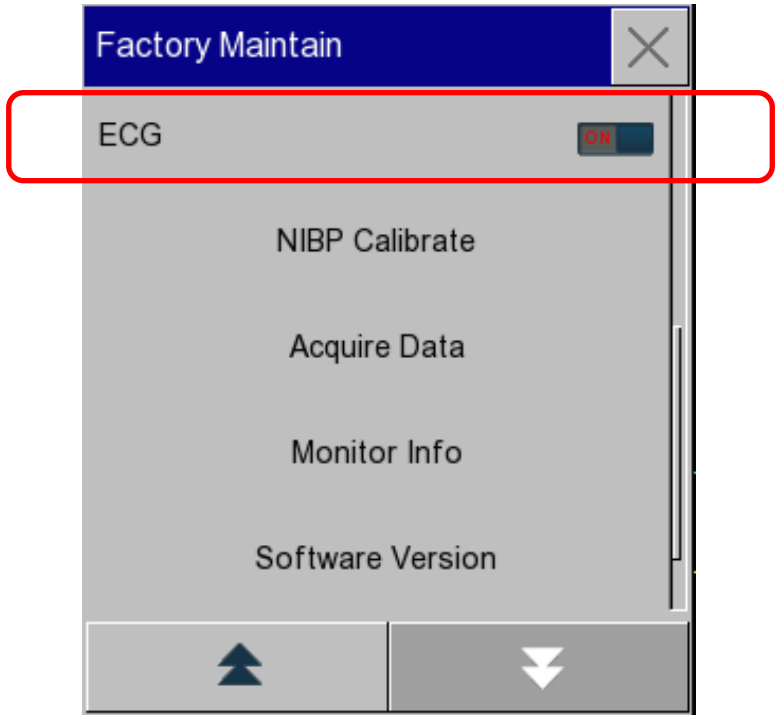


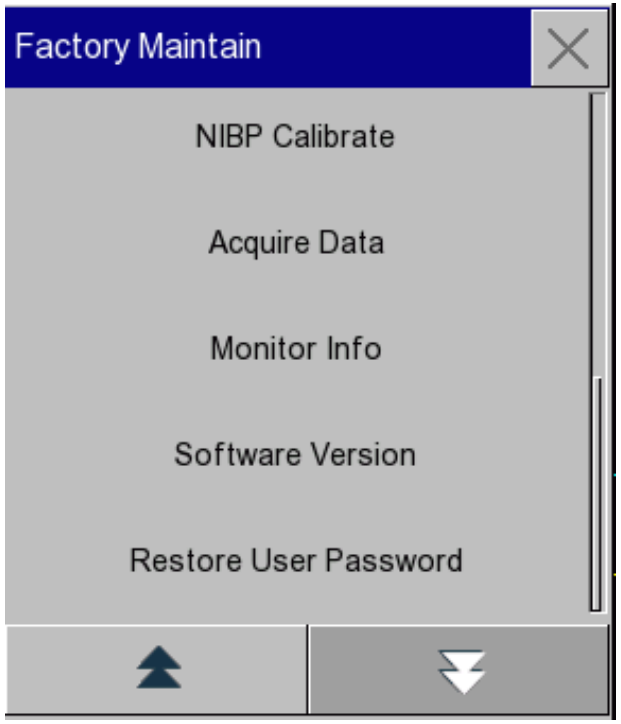


Factory Maintain(2016)

- **Enter [Main Menu] → [Maintain] → Password [2016]**
- **The menu options as below.**

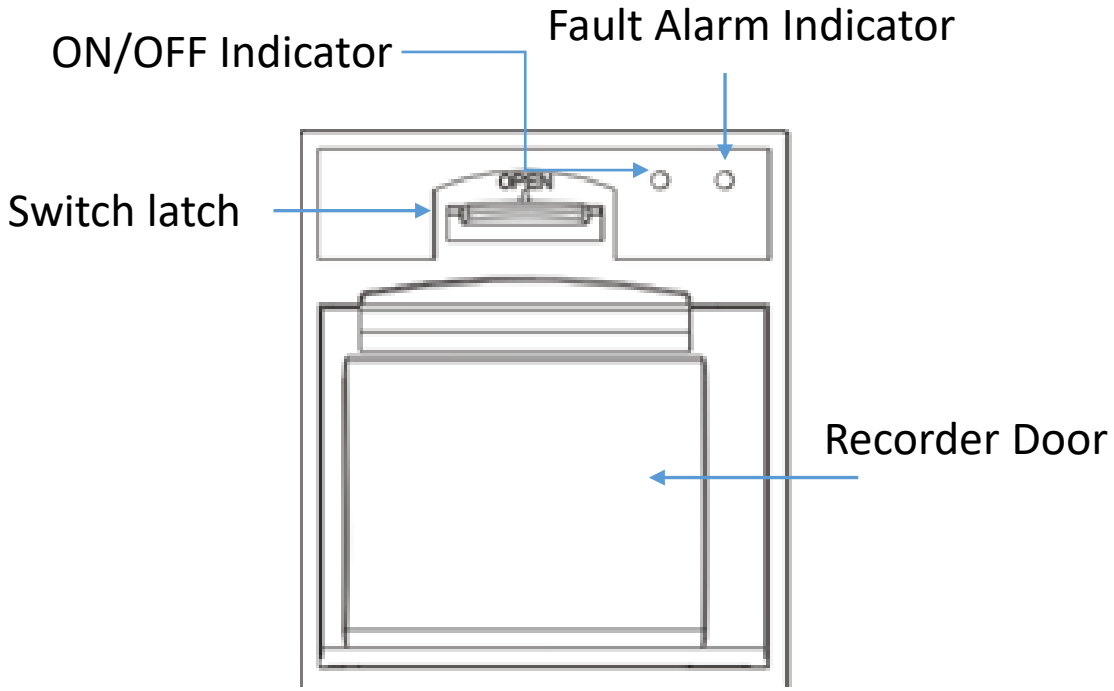






System Operation

Record

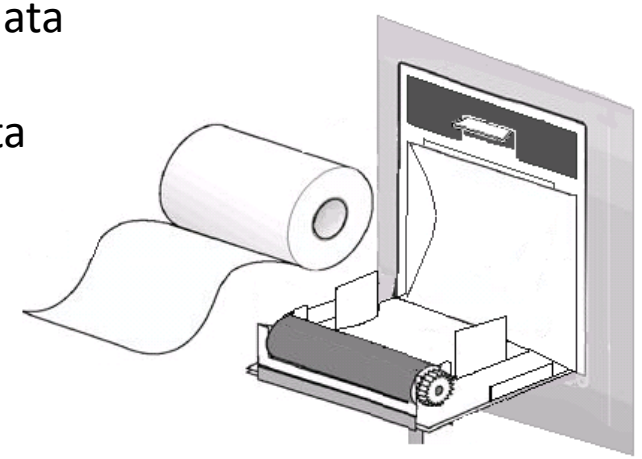


Based on the triggered method, records can be divided into:

- Manually activated real-time record.
- Timed record – the recorder automatically starts at set intervals.
- Alarm record triggered by parameter overrun, etc.

Records related to certain specific functions:

- Freeze waveform
- Event: parameter alarm event, manual event
- Drug calculation data
- Hemodynamic calculation data
- Ventilation calculation data
- Oxygenation calculation data
- Renal calculation data
- Review data



System Operation

Print

An external printer can be connected with the monitor to print reports: Trend Graph Review, Trend Table Review, NIBP List, Alarm Event Review, Wave Review and Real-Time Wave. The compatible printers with PCL language support A4 paper, resolution 300 dpi, include the following brand and model:

HP laserJet 1505n black and white laser printer

HP laserJet P2035n laser printer

HP laserJet P4015 nlaser printer

HP laserJet 1606dn laser printer

Lenovo LJ2650DN laser printer

Lenovo LJ4600DN laser printer

System Operation

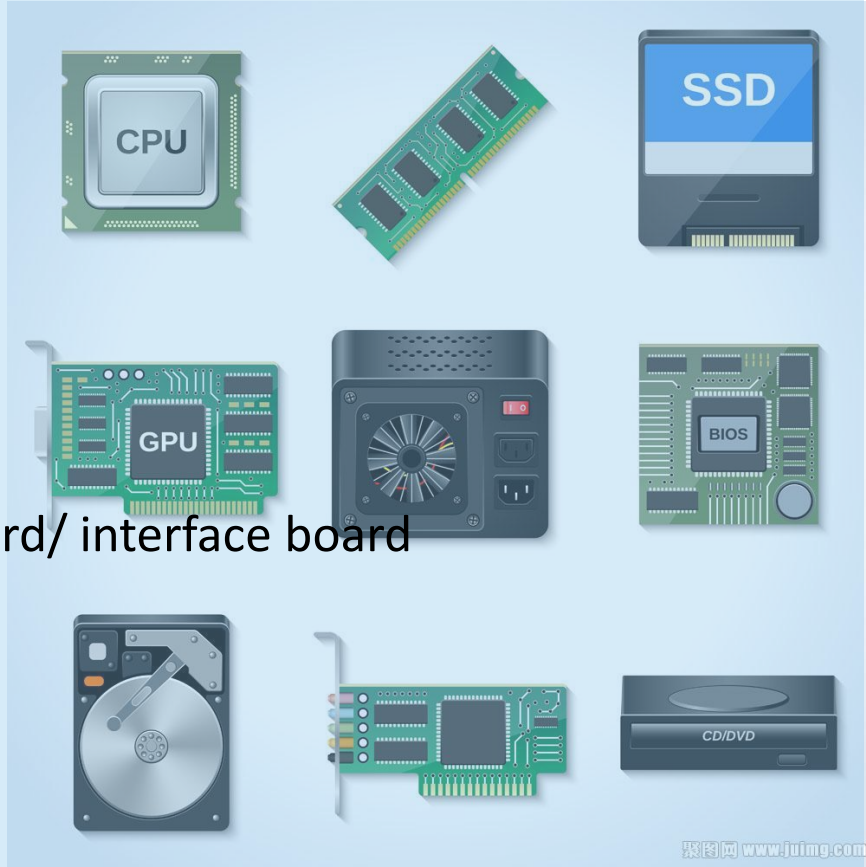
Other functions

1. Nurse call
2. Format the SD card
3. Lock the Screen
4. Connect to the CMS system(STAR8800)

Part 3

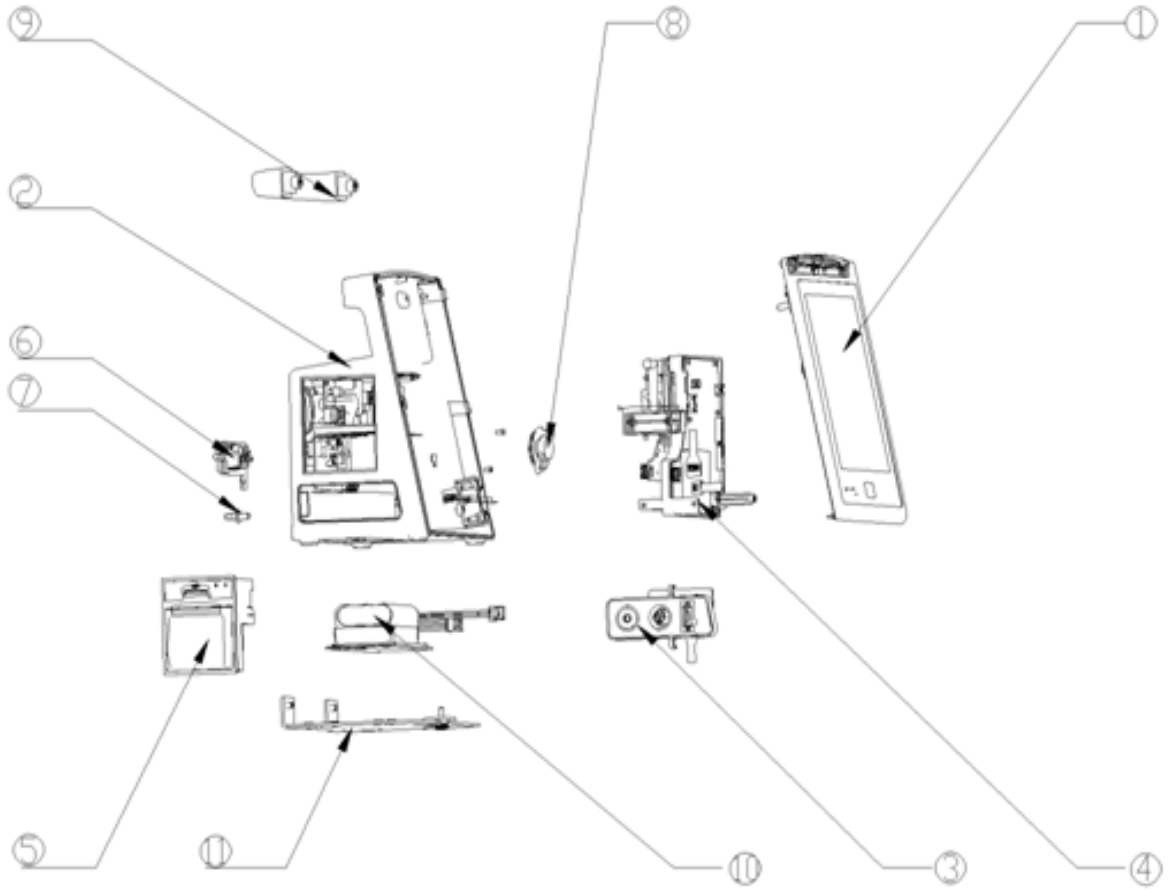
Hardware Introduction

- Structural View
- Block Diagram
- Mainboard
- NIBP board
- AC and DC board
- Buttons board
- Wireless receiver board/ interface board
- SpO2 module
- ECG board



Hardware Introduction

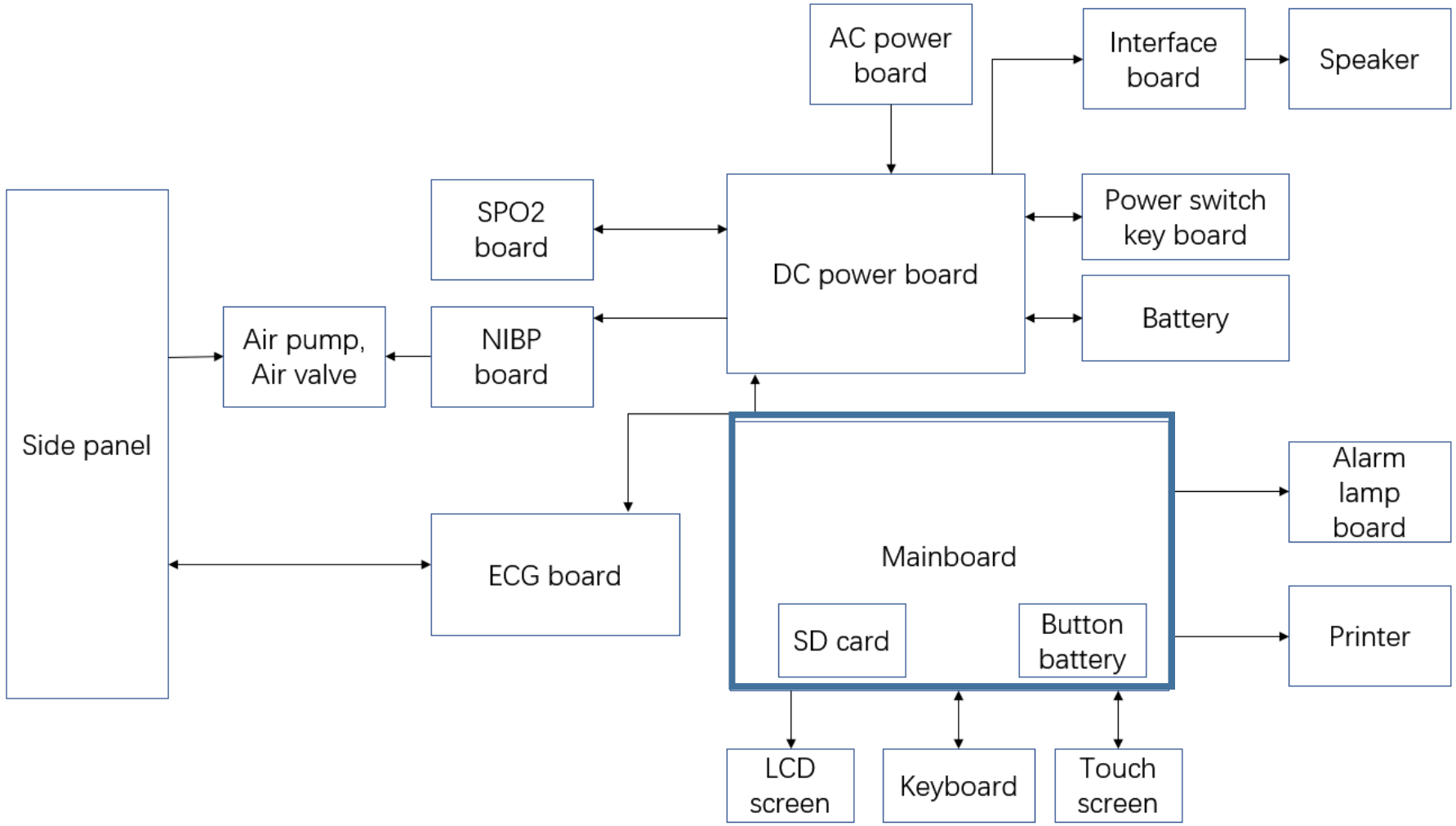
Structural View



Part No.	Description	Remark
1	NC5 front shell assembly	Including front case, LCD screen, LCD adapter board, LCD screen holder etc.
2	NC5 back shell assembly	1 pcs
3	NC5 side panel	Including side panel(plastic), side panel(PCB)
4	Parameter module assembly	Including parameter board, parameter board holder, air pump, air valve etc.
5	NC5 printer	1 pcs
6	AC socket assembly	1 pcs
7	Ground binding	1 pcs
8	Speaker	1 pcs
9	Handle	1 pcs
10	Power supply assembly	Including DC power board, AC power board, battery etc.
11	Assembly for trolley	Including adapter plate, screws etc.

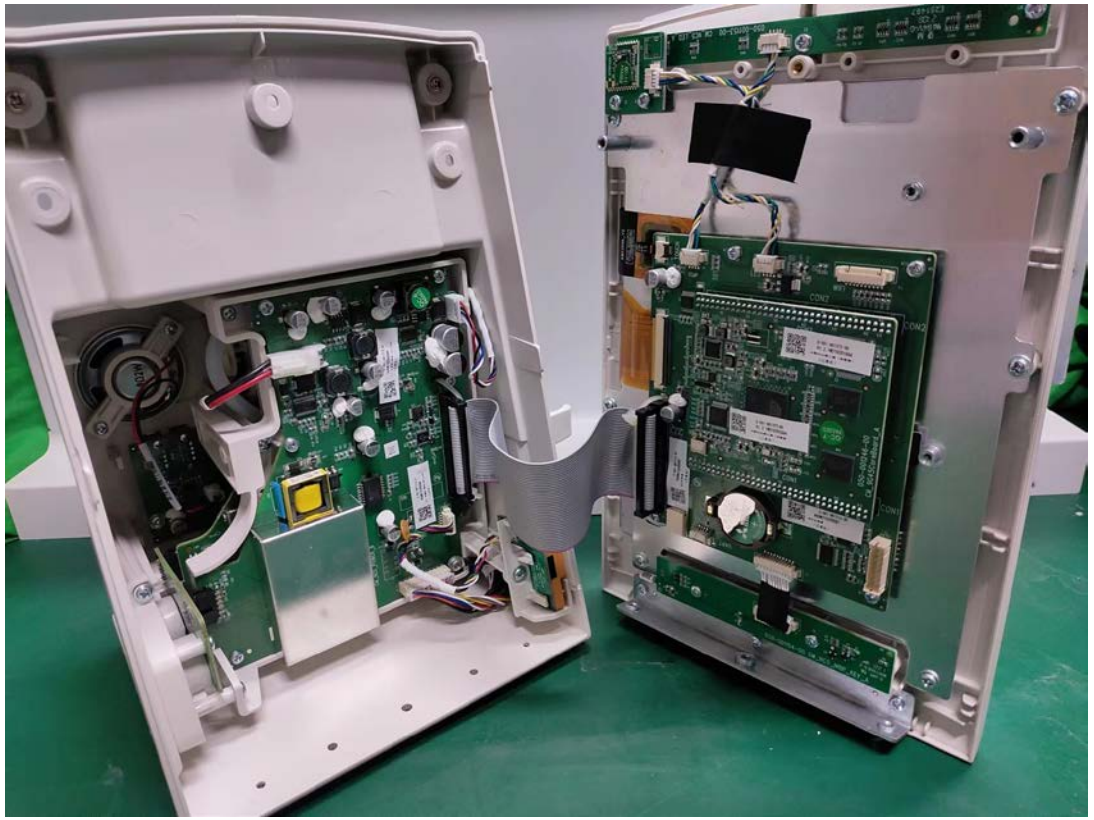
Hardware Introduction

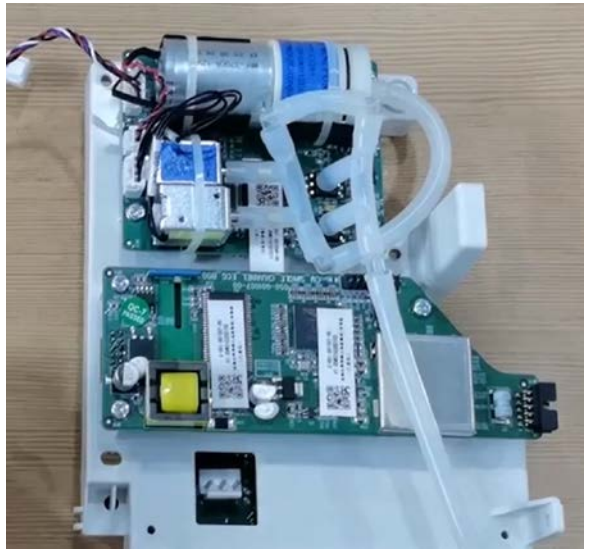
Block Diagram



Hardware Introduction

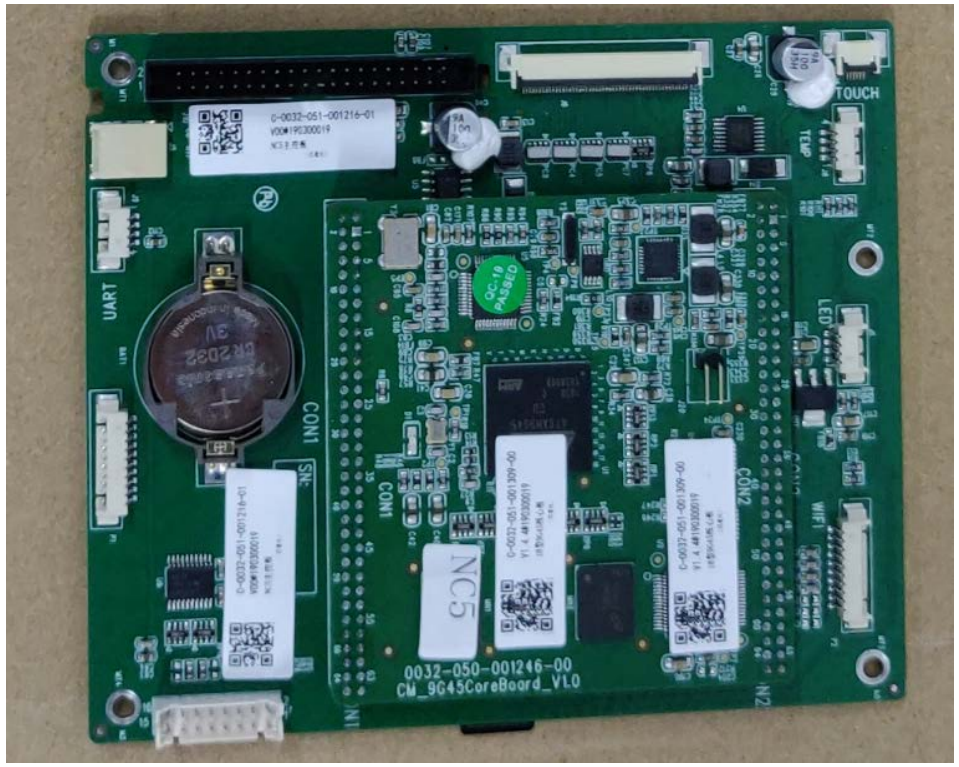
Disassembly Parts

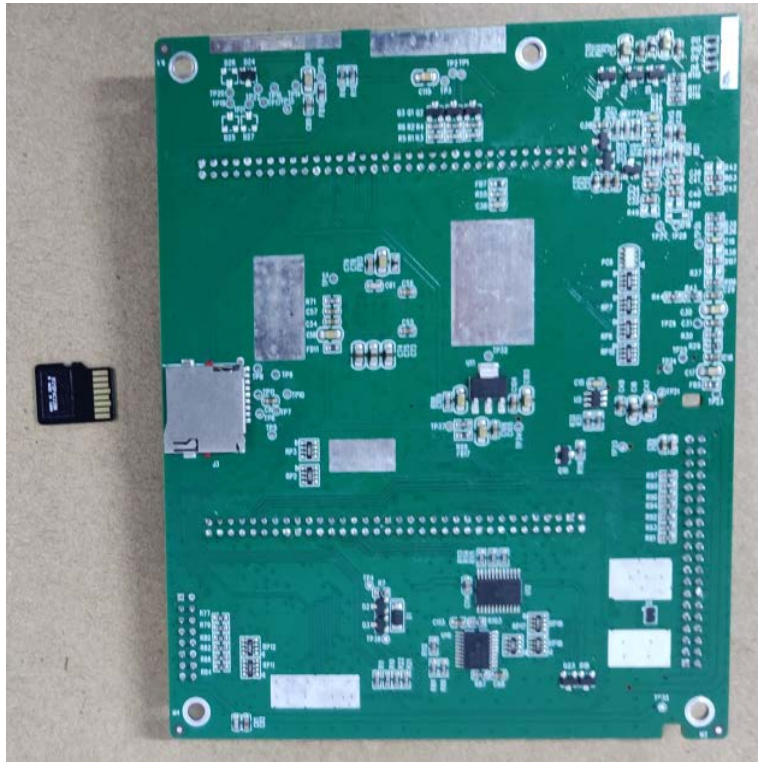




Hardware Introduction

Main Board



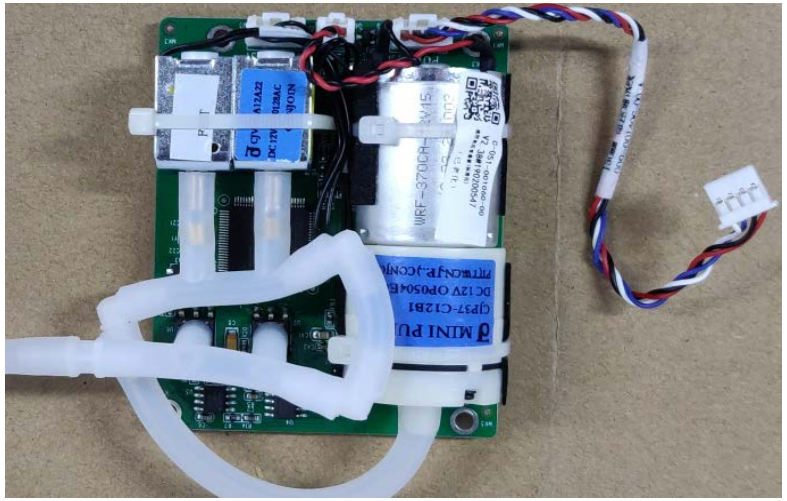


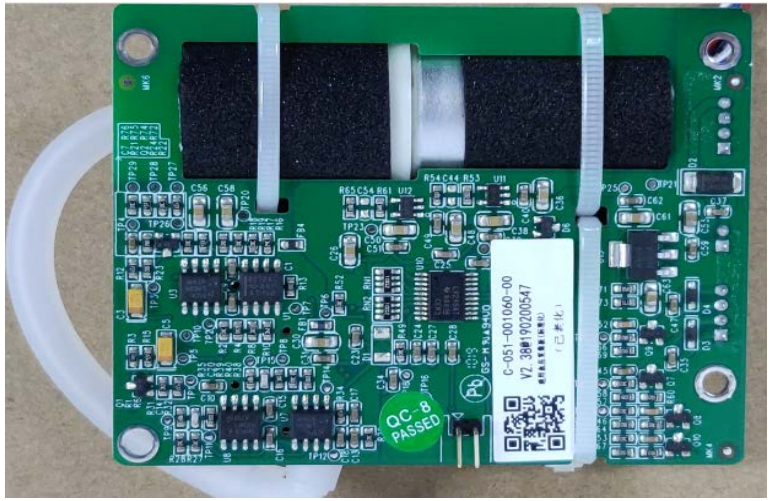
The main board has

- Core control system of the entire monitor
- Processing input and output control signals
- Data storage and processing, display
- Data communication

Hardware Introduction

NIBP Module





NIBP module consists of air pump, air valve and PCB board. It is responsible for

- Mainly control inflation
- Pressure detection
- Overpressure protection.

Hardware Introduction

AC and DC Board power module

The AC Board power module
- converts AC to DC
- transfer the power to DC board

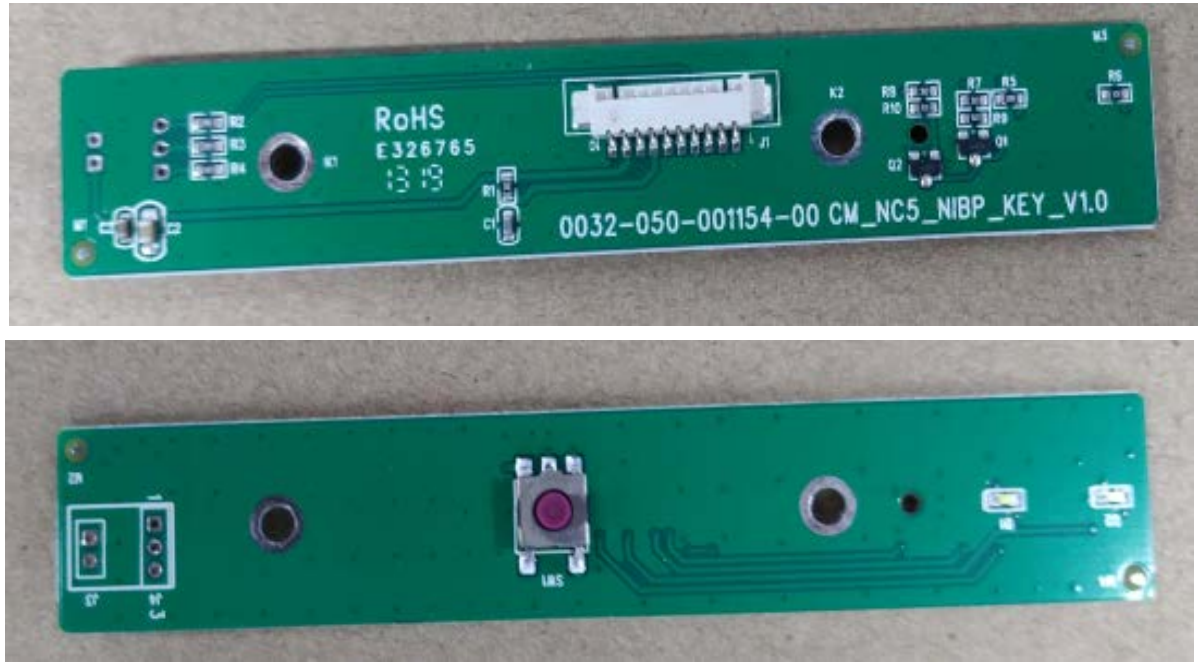
As long as AC power is on, the patient monitor will be powered from AC power. If AC power is not available, the patient monitor will automatically switch to battery power. This will not affect the operating status of the monitor.

The power supply module is located in the back shell, and the SpO2 module is attached to the DC power supply board.

It includes
- Charging and power management
- Power distribution to the main board, NIBP module, etc

Hardware Introduction

Buttons board



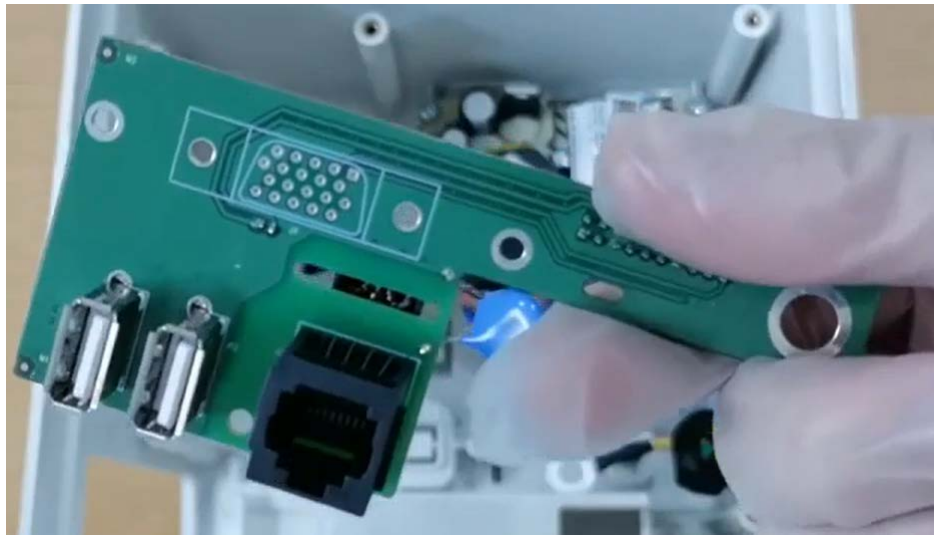
The button board :

- located at the lower part of the monitor’s front panel
- Signals communication
- controls the lights of power indicator, AC indicator and charge indicator

Hardware Introduction

The ear thermometer wireless module

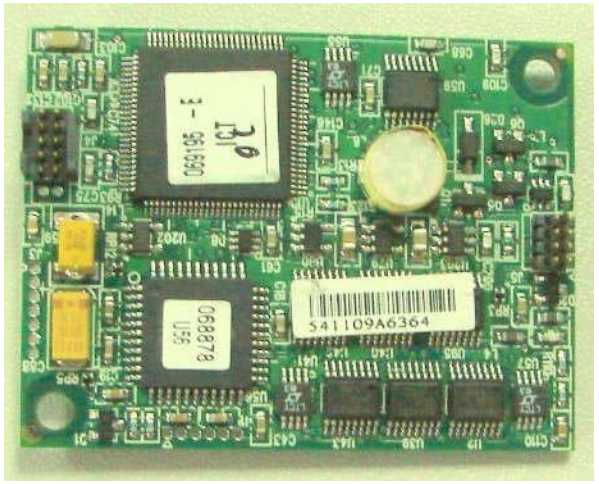
The ear thermometer wireless receiving module controls to receive the thermometer measurement signal, and transmits the signal to the main board and then displays it.

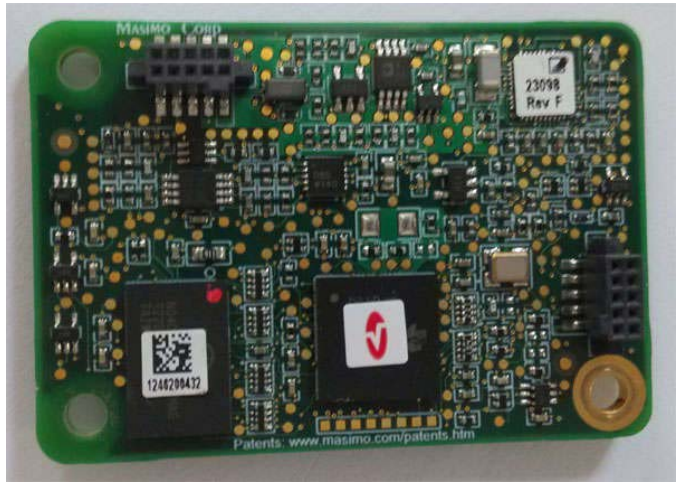


Interface board provide two USB sockets, network port and muti-function port (optional).

Hardware Introduction

SPO2 Module





There are 3 types of SPO2 modules:

- COMEN SPO2
- Masimo SpO2
- Nellcor SpO2

How does SPO2 sensor work?

Small beams of light pass through the blood in the finger, measuring the amount of oxygen. It does this by measuring changes of light absorption in oxygenated or deoxygenated blood. This is a painless process. The pulse oximeter will thus be able to tell you your oxygen saturation levels along with your heart rate.

Hardware Introduction

ECG module

The ECG module is mainly responsible for ECG waveform , data processing and communication with the main board.

COMEN

Part 4

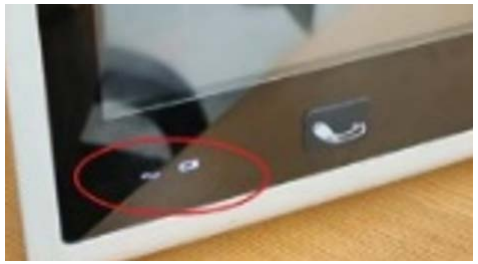
Troubleshooting

Troubleshooting

Power on failure

Symptoms	Possible Cause	Corrective Action
The patient monitor fails to start	AC power cable not connected	Check that AC power is properly connected
	The battery capacity is too low	Check that the battery capacity is sufficient
	Cables defective or poorly connected	1. Check that cables from button board to main board and power module to main board are connected well
		2. Check that cables and connectors are not damaged
	AC board is defective	Replace the AC board
	DC board is defective	Replace the DC board
	Buttons board is defective	Replace the buttons board
	Main board is defective	Replace the Main board

- When the monitor is connected to AC power, the AC indicator light is on.
  Under normal circumstances, the lighting state of the AC indicator can be used as a judgment sign of the power supply cable and the condition of AC power supply board.
- In general, when the battery is power supply separately, the battery indicator lights can be used as a judgment sign for the normal condition of the battery and DC power board.



Troubleshooting

Display problems

Symptoms	Possible Cause	Corrective Action
Integrated display is blank but the patient monitor still works	Cables defective or poorly connected	1.Check that if cables from the LCD to the Main board is connected well.
		2. Check that the cable and connector are not damaged.
	Screen is defective	Replace the Screen.
LCD Screen displays splash or flashing specks	Cables defective or are poorly connected.	Check that the cable between the display and the main board is correctly connected.
	The screen is defective	Replace the screen
LCD screen stuck in the logo interface, unable to continue the program	Software problem	Update software
	SD card is defective	Pull out the SD card
	The main board is defective	Replace the main board.

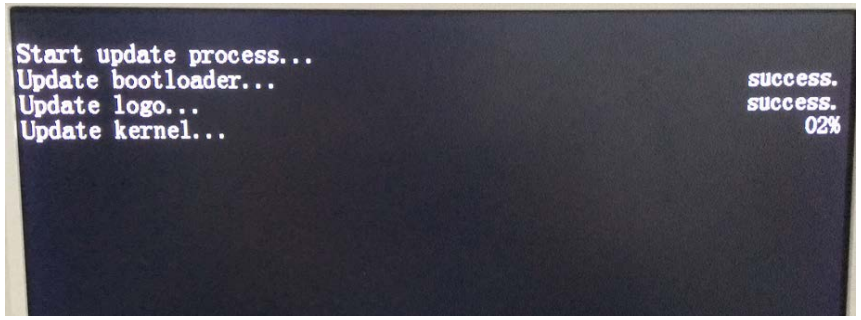
After three minutes of startup, press the NIBP measurement button to confirm whether the monitor is working.

Troubleshooting

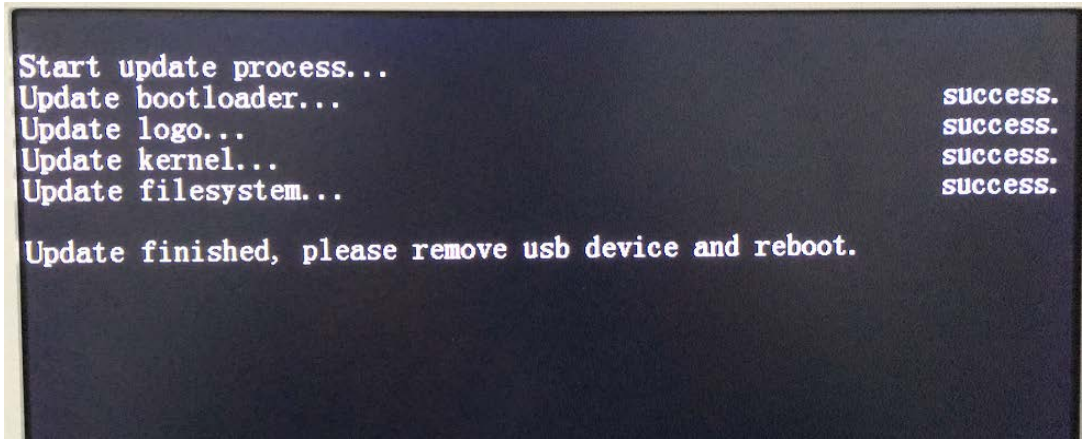
Software update

SOFTUPDATE

8Gb Sandisk



Around 5 minutes



1. Put this File "SOFTUPDATE" into root directory of USB flash disk (8 GB).
2. Insert and Startup the machine.
3. It will automatically enter upgrading interface.
4. When it's finished as shown above, please take off the USB pen drive and reboot.

Troubleshooting

Battery problems

Symptoms	Possible Cause	Corrective Action
Battery can' the recharge	Battery might be defective	Recharge the battery about 4 hours ,check out how long it can use and check out its voltage with a multi-meter .
	Cable defective or poorly connected	Check that cables from battery to battery transfer board and from battery transfer board to main board are correctly connected.
		Check that the cables and connectors are not damaged.
	DC board is defective.	Cross check and Replace the DC board
Battery power failure	Battery might be defective	Check out how long it can use and check out its voltage with a multi-meter .
	DC board could have failure	Check out its voltage with a multi-meter.
	Cable defective or poorly connected	Check that cables from battery to DC board is correctly connected.
		Check that the cables and connectors are not damaged.
	Main board is defective.	Cross check and Replace the main board

Troubleshooting

COMEN

ECG failures

Symptoms	Possible Cause	Corrective Action
ECG no waveform	The patient's dry skin caused the lead to fall off	Replace electrode slice, clean skin and apply coupling agent
	The accessory is defective	Replace the accessory
	Poor contact between the ECG module and the side panel	Check the connection between ECG module and side panel
	ECG module is defective	Replace ECG module
	Main board is defective	Replace the main board
ECG without baseline (ECG comm stopped)	Do no turn on ECG function	Turn on ECG function in 2016 maintain
	The connection is poor	Reconnect from the main board to the ECG board
	ECG board is defective	Replace ECG board
	Main board is defective	Replace the main board

Troubleshooting

COMEN

SpO2 failures

Symptoms	Possible Cause	Corrective Action
The SPO2 no waveform and value	The SPO2 probe is defective	Replace the SPO2 probe
	Spo2 probe and Spo2 module do not match	Replace the SpO2 probe that matches the type of SpO2 module
	SPO2 sensor is defective	Replace the SPO2 sensor
	SPO2 module is defective	Replace the SPO2 module
SPO2 value is incorrect	Long time measurement of NIBP on the same limb or some other condition such as shock or low temp	Start the SPO2 measurement in a normal state
	SPO2 module is defective	Replace the SPO2 module
	SPO2 sensor is defective	Replace the SPO2 sensor
SPO2 alarms	Alarm SPO2 COMM ERR	Check the SPO2 type setting, set to corresponding type
	Alarm SPO2 COMM STOP	Check if the SPO2 module poor connected
		Check if the SPO2 module defected, if yes, replace it
		Replace main board

Troubleshooting

COMEN

NIBP failures

Symptoms	Possible Cause	Corrective Action
Can't start air inflation	The keyboard is defective	Replace the NIBP key board
	Pump defective	Replace the pump
	NIBP module defective	Replace the NIBP module
	Main board is defective	Replace the main board
Inflation repeatedly but no results	The type of the patient is wrong	Check out the type of the patient in the patient management
	There is air leakage in the accessories	Check out the cuff ,the NIBP tube or the interface socket
	The pump or air valve is defective	Replace the pump or air valve
The NIBP values are incorrect	The type of the patient is wrong	Check out the type of the patient in the patient management
	A continue NIBP measurement for a long time	The measurement should start every 5 minutes at least
	The cuff or tube air leakage	1.There is leakage in the cuff or is defective 2. There is leakage in the tube
	There is a problem with the sensitivity of the sensor	Do the verification and calibration
	NIBP module defective	Replace the NIBP module

Part 05

Maintenance

- Battery
- Cleaning and disinfection
- Maintenance schedule

Maintenance

Battery Optimization

- **Battery optimization every 3 months**
- Steps：
  - Fully charged, the charging time is not less than 6 hours;
  - Fully discharge, disconnect the AC power and keep using until the monitor cannot start;
  - Fully charged, the charing time is not less than 6 hours
- *The battery life depends on the frequency and time of use. If the maintenance and storage of lithium batteries are appropriate, the service life is about 3 years. If the battery is used improperly, its life may be shorter.*
- **We recommend replacing the lithium battery every 3 years**

Maintenance

Cleaning And Disinfection

- Cleaning：

Wipe with a cotton ball or soft cloth moistened with detergent (normal saline), and dry in a ventilated place;

- Disinfection：

Disinfectant: 70% alcohol, 70% isopropyl alcohol

Wipe with a soft cloth moistened with disinfectant, then wipe the residual disinfectant with a soft cloth moistened with clean water, and dry in a ventilated place;

The disinfection operation may cause a certain degree of damage to the monitor. It is recommended that the instrument be disinfected only when necessary in the hospital maintenance plan.

Maintenance

Cleaning And Disinfection

- Do not immerse the accessories in water or disinfectant;
- Do not wet the pins of the cable;
- Frequent disinfection of the accessory will cause damage to it. It is recommended to disinfect the accessory only when needed according to the regulations of the hospital;

Routine Maintenance

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COMEN

Regularly check the accessories, including whether they are missing, whether the function is normal, whether there are faults and damage, etc.;
Check the battery power regularly to ensure that the battery power is sufficient, and do battery optimization every three months;
Clean and disinfect regularly to avoid cross infection; when cleaning and disinfecting, please cut off the power of the instrument and pay attention to safety;
When the monitor is not in use, it is necessary to fix the accessory cable to avoid wire damage;
Do not allow liquid to enter the cabinet, switch, interface or any ventilation holes;

Thanks

THANKS YOU FOR WATCHING

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