

**Main Functions:**

- 1. Six display interface;
- 2. Store and recall: maximum 720 hour graphic and tabular trends of all parameters, 2 hours waveform, 1000 group NIBP, 200 group alarm events;
- 3. Sound, light, voice prompt alarm;
- 4. Support wire or wireless WIFI networking
- 5. ST segment point adjustable

**Standard Configuration:**

- 1. 15" widescreen TFT, Resolution ratio: 1024×768, up to 12 waveforms ;
- 2. Display ECG, SpO2, pulse rate, NIBP, respiration, temperature
- 3. Plumbic acid battery.

**Optional:**

- 1. Recorder(Built-in)
- 2. CO2
- 3. Anesthesia depth
- 4. Anesthesia gas monitoring
- 5. Oxygen monitoring

**1 Classification**

Item Specification

SFDA Classification : Class II

Anti-electroshock degree : Class I equipment with internal power supply

Anti-electroshock degree : Temp/SpO2/NIBP : BF

ECG/RESP : CF

Explosion proof level : Ordinary equipment,without explosion proof

Harmful liquid proof degree : Ordinary equipment,without liquid proof.

Working System : Continuous running equipment

## 2 Applicable standards

Medical electrical equipment GB 9706.1-2007, Part I: General requirements for safety  
GB 9706.25-2005 Medical electrical equipment Part 2-27: ECG monitoring equipment safety requirements

YY 1079-2008 ECG

YY0667-2008 Medical electrical equipment Part 2: Automatic cycling non-invasive blood pressure monitoring equipment, safety and essential performance

YY0668-2008 Medical electrical equipment Part 2: multi-parameter patient monitoring equipment requirements for the safety

## 3 Monitor size and weight

size 365 ×300 ×160 mm

Weight 5 kg

## 4 Power Supply

100~240 VAC, 50/60 Hz, Pmax=90VA Fuse T1.5A

## 5 Battery

2.6 Ah 12V rechargeable battery

Operating time after full charge is more than 1 hours

Operating time after the first alarm of low battery will be about 5 minutes

Maximum charging time is less than 6 hours.

## 6 Signal Interface

Network interface standard RJ45 Socket

## 7 Storage

Trend 720 hours

NIBP review 1000 NIBP events

Wave review 2 hours

Alarm review 200 alarm events

All storage data are non volatile.

## 8 Environment

### 8.1 Temperature

Working 0 ~ 40 °C

Storage -20 ~ 50°C

### 8.2 Humidity

Working 15% - 90 % (no coagulation)

**Storage 15% - 90 % (no coagulation)**

### 8.3 Atmospheric pressure

Working 86.0 kPa ~ 106.0kPa;

Storage 86.0 kPa ~ 106.0kPa

## 9 ECG Specification

### 9.1 Heart rate calculation method

Since the first occurrence of heart rate to heart rate occurred in the second interval T1; second heart rate, heart rate occurred to a third place time interval T2; continuous record 10 times, and then calculated the average interval of 10, must the heart rate per minute. 3s ~ 10s refresh every heart.

### 9.2 Heart rate meter accuracy and arrhythmia response

Monitor the 20s stable time after figure ECG heart rate a wave group): heart rate display 40bpm  $\pm$  5bpm; b): heart rate display 30bpm  $\pm$ 5bpm; c): heart rate display 120bpm $\pm$ 5bpm; d): heart rate display 45bpm $\pm$ 5bpm

A) Couple rhythm — two waves of duration is 1500ms; if the calculation all the QRS complex, heart rate to 80bpm, if only large R wave or S-wave, the heart rate to 40bpm.

B) Slow change couple rhythm — if the calculation all the QRS complex, heart rate to calculate 60bpm, if only large waves, heart rate to 30bpm.

C) Fast couple rhythm — if the calculation all the QRS complex, heart rate as 120bpm.

D) bi-directional contraction — if you calculate the QRS complex, heart rate to calculate 90bpm, if only large waves, heart rate to 45bpm.

### 9.3 Lead mode

5 Leads: RA, LA, LL, RL, V; lead mode: I, II, III, AVR, AVL, AVF, V

### 9.4 Gain

Gain control: manually four stalls

1/4 stalls( $\times$ 0.25) 2.5mm/mV; 1/2 stalls ( $\times$ 0.50) 5.0mm/mV; 1 stall ( $\times$ 1) 10mm/mV; 2 stalls ( $\times$ 2) mV 20mm/mv;

### 9.5 Heart rate

Measure range:

Adult	15 ~ 300 bpm
Neonatal/Pediatric	15 ~ 350 bpm
accuracy	$\pm$ 1%
resolution	1 bpm

### 9.6 Sensitivity

> 200  $\mu$ V P-P

## 9.7 Differential Input Impedance

> 5 M ohm

## 9.8 Bandwidth

Surgery	1 ~ 20 Hz
Monitor	0.5 ~ 40 Hz
Diagnostic	0.05 ~ 130 Hz

## 9.9 CMRR

Diagnostic Mode	>90 dB
Monitor Mode	>110 dB
Surgery Mode	>110 dB

## 9.10 Electrode offset potential

±300mV

## 9.11 Input dynamic range

In any lead, the applied DC bias voltage of ± 300mV to 320mV / s rate of change of ± 5mV of the differential mode voltage, and display devices should have the capacity to respond; output signal amplitude error should not exceed ± 10% ;

### 9.12 pacing pulse suppression

Monitor switch is open in the pacemaker, can inhibit the range: ± 2 mV ~ ± 700mV, width: 0.1ms ~ 2ms, rise time: 10us ~ 100µs normal QRS wave single pulse without overshoot pacing pulse does not affect heart rate calculation.

Monitor switch is open in the pacemaker, can inhibit the range: ± 2 mV ~ ± 5mV, width: 0.5ms ~ 2ms, rise time: 10us ~ 100µs single pulse overshoot normal QRS waves of pacing pulses, without affecting heart rate calculation.

Overshoot (a0) range should 0.025ap to 0.25ap range, independent of the choice of time constant, but not more than 2mV;

Monitor switch is open in the pacemaker, pacing pulse detector inhibition of rapid ECG signal to 1V / s RTI minimum input slew rate.

### 9.13 QRS wave amplitude and period range between

Amplitude (p-v RTI) range: 0.5mV ~ 5mV;

Width (adult monitor): 70 ~ 120ms;

Width (neonatal / pediatric): 40 ~ 120ms;

Set monitor mode for adults should not be less than or equal to 0.15mV amplitude QRS signal or of less than or equal to 10ms between the 1mV signal a response. For neonatal / pediatric mode, monitors allowed to respond to the above two signals to respond to either or both;

### 9.14 frequency voltage tolerance

Superimposed on a QRS wave signals received, and to meet tolerances of ± 10% of heart rate showed the error limits of accuracy required under the premise of the maximum frequency sine wave peak - valley kurtosis should not be less than 100µV (pv)

### 9.15 drift tolerance

When a 0.1Hz, amplitude 4mV (pv) of the triangular wave superimposed on a string of rate of

0.5mV, interval 100ms, repetition rate of 80bpm when the QRS wave, ECG heart rate monitor shows the error should be within  $80\text{bpm} \pm 8\text{bpm}$ ;

### **9.16 baseline control and stability**

Reset: reset recovery time is not greater than the 3s;

Baseline Stability: After boot, 10s baseline drift in the output rate should not exceed  $10\mu\text{V} / \text{s}$  RTI;

After boot, 1h, total drift should not exceed  $500\mu\text{V} / \text{s}$  RTI;

Working temperature should not exceed  $50\mu\text{V} / ^\circ\text{C}$

### **9.17 system noise**

Should be not more than  $30\mu\text{V}$  (p-v RTI)

### **9.18 Multi-channel crosstalk**

Should not be imposed by the channel signal is not imposed without the signal channel output generated more than spin plus signal (multiplied by the gain) 5%;

### **9.19 Electro surgery interference suppression**

Heart rate should not exceed the interference is not activated when the heart rate  $\pm 10\%$ , interfere with the duration should not exceed 10S;

### **9.20 pacemaker pulse display capabilities**

Show an increase is not less than  $0.2\text{mV}$  RTI; in 10s, the baseline drift is not greater than 10mm;

### **9.21 heart rate response time**

Step increase in heart rate from 80bpm to 120bpm maximum response time of less than 10 s;

Heart rate from 80bpm to 40bpm step to reduce the maximum response time of less than 10 s;

9.22 to the alarm time

High heart rate alarm start time is less than 10 s by YY 1079-2008;

Low heart rate alarm start time is less than 10 s according to YY 1079-2008;

Cardiac stop alarm start time is less than 10 s by YY 1079-2008;

Tachycardia alarm start time is less than 10 s.

9.23 calibration signal

$1\text{mV}$  (peak to peak), the accuracy  $\leq \pm 5\%$

## **10 NIBP Specifications**

### **10.1 Measurements**

Pulse wave oscillation

### **10.2 Mode**

Manual / Automatic / Continuous

### **10.3 Automatic measurement mode of measurement interval**

1 minute, 2 minutes, 3 minutes, 4 minutes, 5 minutes, 10 minutes, 15 minutes, 30 minutes, 60 minutes, 90 minutes, 2 hours, 3 hours, 4 hours, 8 hours

### **10.4 Continuous measurement mode of measurement time**

5 minutes

### **10.5 pulse rate range**

40 - 240 bpm

### **10.6 Measurement range and accuracy**

Range

40 ~ 280mmHg systolic blood pressure for adults

Diastolic blood pressure 10 ~ 220mmHg

The average pressure of 20 ~ 240mmHg

40 ~ 220mmHg systolic blood pressure of children

Diastolic blood pressure 10 ~ 160mmHg  
20 ~ 170mmHg mean pressure  
Newborn systolic blood pressure 40 ~ 135mmHg  
Diastolic blood pressure 10 ~ 100mmHg  
The average pressure of 20 ~ 110mmHg  
Static pressure range 0 ~ 300mmHg  
3mmHg static pressure±Accuracy  
5mmHg;±Blood pressure accuracy: the maximum average error of  
Maximum standard deviation 8mmHg

### **10.7 overvoltage protection**

Adult model 300 mmHg  
Child model 240 mmHg  
Neonatal model 150 mmHg

## **11 SpO<sub>2</sub> Specifications**

### **11.1 oxygen saturation**

Measuring range 0 to 100%  
Resolution 1%  
2%±Accuracy of 70 ~ 100%:  
<69%: not defined

### **11.2 pulse rate**

Range 20 ~ 250bpm  
Resolution 1bpm  
3bpm±Accuracy

## **12 temperature specifications**

Sensor type 10K series, 2.25K Series  
Number of channels 2 channels  
C°Range 0 ~ 50  
C°Resolution of 0.1  
C (sensor error not included)° 0.1 ±Accuracy

## **13 recorder (optional)**

Record width of 48 mm  
Walking paper speed 25/50 mm / s  
2-channel waveform tracings