

MS400

Multiparameter Simulator

MS400 Multiparameter Simulator is a kind of small, light weight portable device. It can accurately simulate the 12-lead ECG, respiration, temperature and IBP channels—1, 2, 3 and 4. It can check rapidly the monitor near the bed, also can use to test the quality warranty of ECG equipment, monitor and remote therapy equipment.



- ◆ 3.5-inch color TFT touch-screen, 320*240 pixels, slide the touch-screen to switch the waveforms expediently and rapidly.
- ◆ Display the output waveforms of ECG, respiration, and IBP synchronously, which is convenient for user to compare with the test equipment.
- ◆ Two operation modes: keystroke and touch-screen.
- ◆ Two operation interfaces: Chinese and English.
- ◆ It integrates the functions of TF card socket, user can output and display synchronously the custom waveform placed in TF card through the device.
- ◆ Built-in template list provides the waveforms expressed by each preset sequence number, which is convenient for searching.
- ◆ Built-in 3.7V/4000mAh rechargeable lithium-polymer battery and/or linear adapter.

Normal Sinus Rhythm

- ECG reference: Lead II
- Output: 12-lead ECG, output to 10 ECG Sockets, color-coded to AHA and IEC Standards
- Amplitude: 0.5, 1.0, 1.5 and 2.0mV
- The accuracy of Amplitude: $\pm 5\%$
- ECG Rate: 15, 20, 25, 30, 40, 60, 80, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280, 300, 320, 340 and 350BPM
- The accuracy of ECG Rate: ± 1 BPM or $\pm 1\%$ BPM (which is greater)
- ECG artifacts: 50 and 60 Hz, Muscle, Baseline drift and Breathing
- The elevation of the ST segment: -0.8 mV to $+0.8$ mV, the step is 0.1mV

Arrhythmia

- Default: 80BPM, 1mV
- Atrial: Atrial Fib(coarse), Atrial Fib(fine), Atrial Flutter, Sinus Arrhythmia, Missed Beat, Atrial Tachycardia, Nodal Rhythm, Supraventricular Tachycardia
- Ventricular: Vent Fib (coarse), Vent Fib (fine), PVCs 6/min, PVCs 12/min, PVCs 24/min, Frequent Multifocal, Bigeminy, Trigeminy, Paired PVCs, Run 5 PVCs, Run 11 PVCs, Vent Tachycardia, Asystole
- Premature Beats: Atrial PAC, Nodal PNC, PVC1 LV Focus, PVC1 E LV Focus, R on T LV Focus, PVC2 RV Focus, PVC2 ERV Focus, R on T RV Focus, Multifocal PVC
- Conduction Defects: First Degree Heart Block, Second Degree Heart Block, Third Degree Heart Block, Right Bundle Branch Block, Left Bundle Branch Block

Pacemaker

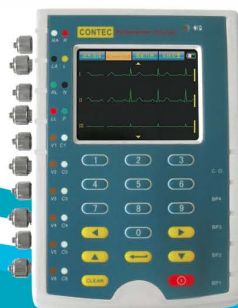
- Pace Amplitude: 2, 4, 6, 8 and 10mV
- Pace Width: 0.1, 0.5, 1.0, 1.5 and 2.0ms
- Pacemaker Arrhythmia: Asynchronous (75BPM)
 - Demand Freq Sinus
 - Demand Occ Sinus
 - A/V Sequential
 - Non Capture
 - Non Function

ECG Performance Testing

- Pulse: 30 and 60BPM, the width of pulse wave is 60ms
- Square: 0.125 and 2Hz
- Triangle: 2 and 2.5Hz
- Sine: 0.5, 5.0, 10, 40, 50, 60 and 100Hz
- Standard adult ECG:
 - ECG Rate: 80BPM, QRS-Wave Width: 100ms, T-Wave Width: 180ms, QRS-Wave Height: 1.0mV, T-Wave Height: 0.4mV, Q_T: 350 ms
- Standard pediatric ECG:
 - ECG Rate: 100BPM, QRS-Wave Width: 60ms, T-Wave Width: 130ms, QRS-Wave Height: 1.0mV, T-Wave Height: 0.4mV, Q_T: 260 ms
- QRS-wave detection:
 - ECG Rate: 15, 20, 25, 30, 40, 60, 80, 100, 120, 140, 160, 180, 200, 220, 240, 250, 260, 280, 300, 320, 340, 350 BPM
 - Height : 0.5, 1.0, 2.0, 3.0, 4.0, 5.0 mV
 - Width: 40 ~ 120ms, the step is 10ms
 - R-Wave upgrade Amplitude: 0.875 , Width: 0.4375
 - R-Wave downgrade QRS Amplitude, Width: 0.5
 - S-Wave upgrade Amplitude: 0.125 , Width: 0.0625
- Tall T-wave rejection capability:
 - Wave QT: 350ms
 - T-Wave Width: 180ms
 - T-Wave :1/2 Sinewave
 - Amplitude 0.4, 0.6, 0.8, 1.0 and 1.2 mV
 - Rate 80BPM
- The accuracy of ECG Rate: $\pm 1\%$
- The accuracy of Amplitude: $\pm 5\%$

Respiration

- Respiration Rate: 0, 15, 20, 30, 40, 60, 80, 100, 120 and 150BrPM
- Accuracy: $\pm 2\%$
- Impedance: 0.2, 0.5, 1.0 and 3.0 Ω
- Baseline Impedance: 500, 1000, 1500 and 2000 Ω
- Lead: LL
- Apnea: 12, 22 and 32s
- Default: 20BrPM, 1.0 Ω , 1000 Ω



Temperature

- Temperature: 0°C(32°F), 24°C(75°F), 37°C(98.6°F), 40°C(104°F)
- Accuracy: $\pm 0.1^\circ\text{C}$

IBP

- Exciter pressure: DC5V
- Sensor sensitivity: 5 $\mu\text{V/V/mmHg}$
- Unit: mmHg
- The accuracy of pressure: $\pm 1\%$
- Dynamic IBP Waveforms:
 - P1 Channel: Artery 120/80, Radial Artery 120/80, Left Ventricle 120/00, Right Atrium(CVP) 25/00
 - P2 Channel: Artery 120/80, Radial Artery 120/80, Left Ventricle 120/00, Right Atrium(CVP) 15/10, Right Ventricle 25/00, Pulmonary Artery 25/10, Pulmonary Wedge 10/2, Left Atrium 14/4
 - P3 Channel: Artery 120/80, Radial Artery 120/80, Left Ventricle 120/00, Right Atrium(CVP) 15/10, Right Ventricle 25/00, Pulmonary Artery 25/10, Pulmonary Wedge 10/2, Left Atrium 14/4
- Swan-Ganz:
 - P4 Channel: Auto Swan-Ganz(every 15 seconds): RA(CVP), RV, PA, PAW (Pulmonary Wedge); Man Swan-Ganz: RA(CVP), RV, PA, PAW (Pulmonary Wedge)

- Static-Pressure Levels:

- P1 Channel: 0, 80, 160, 240, 320 and 400mmHg
- P2 Channel: 0, 50, 100, 150, 200 and 250mmHg
- P3 Channel: 0, 20, 40, 60, 80 and 100mmHg
- P4 Channel: 0, 20, 40, 60, 80 and 100mmHg

- Default: 00/00mmHg

General Technical Index

- Operating temperature: 15°C ~ 35°C
- Storage Temperature: 0°C ~ 50°C
- Humidity: 1°C below 80%, and 40°C, the linear reduction to 50%
- Altitude: 2000m
- Size: 18.86 cm(L) \times 12.50 cm(W) \times 4.32 cm(H)
- Weight: 1.4Kg
- Display: 3.5-inch color TFT touch-screen
- Power: 3.7V/4000mAh rechargeable lithium-polymer battery and/or linear adapter which can charge for the lithium-polymer battery.

Standard Components:

- 1.4.01.08.006 MS400 User Manual (print version)
- 1.4.08.00011 adapter RHD090100(CE),230 ~ 240V(input)(Europe)

Optional Accessories:

- 1.4.08.00009 adapter JY-1015A, ~ 220V(input)(China)
- 1.4.08.00010 adapter RHD150100(UL), ~ 120V(input)(USA)
- 2.3.20.00004 MS400 Multiparameter Simulator IBP Cable
- 2.3.20.00005 MS400 Multiparameter Simulator Temperature Cable
- 2.3.30.08.001 Case Conversion Soft



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