

MiniSim 1000 Advanced

User Manual



▶ **Compact**

▶ **Lightweight**

▶ **Easy to Use**

Patient Simulator
(Waveform Simulation Instrument)



NETECH

Innovative Instruments Since 1987

Table of Contents

Notices	4
<i>Copyright.....</i>	4
<i>Quality Assurance/Trademark</i>	4
<i>Unpacking and Inspection of the Unit.....</i>	4
<i>Refunds/Restocking/Repairs</i>	5
<i>Calibration</i>	5
<i>General Contact Information</i>	6
<i>Warnings.....</i>	6
Introduction.....	7
<i>Description.....</i>	7
<i>MiniSim 1000 Advanced Features.....</i>	7
Specification.....	8
<i>General Specifications.....</i>	8
<i>Output Connections</i>	10
<i>Part Numbers/Ordering Information</i>	11
<i>Optional Accessories.....</i>	12
Instrument Familiarization	13
Operating Instructions.....	14
<i>Basic Operating Instructions.....</i>	15
<i>Atrial Arrhythmias.....</i>	21
<i>Atrial Conduction Arrhythmias.....</i>	22
<i>Ventricular Arrhythmias.....</i>	23
<i>R Wave Detection.....</i>	25
<i>Tall T Wave Rejection.....</i>	26

Pacemaker Pulse Rejection..... 27

TAC Test..... 28

Respiration 29

Blood Pressure..... 30

Temperature..... 31

Maintenance and Storage..... **32**

Maintenance..... 32

Warranty..... **33**

Notices

Copyright

Copyright © 2025 by Netech Corporation. All rights reserved. No part of this publication may be reproduced or transmitted in any form other than for the purchaser's personal use without written permission from Netech Corporation.

Quality Assurance

Netech is ISO 9001-2015 Registered. This instrument was thoroughly tested and inspected according to Netech's ISO 9001-2015 quality system and test procedures and found to meet those specifications when it was shipped from the factory. Calibration measurement Instruments are traceable to the NIST (National Institute of Standards and Technology).

Trade Mark

Netech and MiniSim 1000 Advanced are trademarks of Netech Corporation. Any other trademark names used in this manual are only for editorial purposes and the benefit of the respective trademark owner with no intention of improperly using that trademark

Unpacking and Inspection of the Unit

Before unpacking the MiniSim 1000 Advanced, inspect the shipping box for any visual damage. If damage is found, do not unpack the unit and immediately notify the shipping carrier. If no damage is found to the shipping box, open the box and perform a visual inspection of the MiniSim 1000 Advanced. If any damage to the unit is observed please contact Netech Customer Service.

Technical Support

For technical support questions, either email

Techsupport@NetechBiomedical.com or Call 1-800-547-6557

or (1-631-531-0100)

Refunds and Credits

A Return Material Authorization (RMA) number must be obtained from our service or customer service dept, before a product is returned for refund or credit. The RMA number should be clearly marked on the package along with a statement indicating the reason for return.

Restocking Charges

Products returned within 30 days after purchase are subject to a restocking charge of 15%. Products must be shipped prepaid in original shipping cartons with all accessories and parts. Additional charges will be applied for any missing parts or accessories.

Repair and Recalibration

Products returned for repair or recalibration must obtain a RMA (Return Material Authorization) from our service department after completing a service request form our website <https://www.NetechBiomedical.com/repair> or contact Netech Customer Service

Department at CustomerService@NetechBiomedical.com

Calibration

The MiniSim 1000 Advanced is factory calibrated, thoroughly tested, and meets Netech's ISO 9001-2015 quality standards.

Any attempt to remove or tamper with the calibration seal will void the warranty.

General Contact Information

Netech Corporation, 110 Toledo St, Farmingdale, NY 11735.

Phone: 631-531-0100, (or) 1-800-547-6557

Website: www.NetechBiomedical.com

Email: sales@NetechBiomedical.com

Warnings

SYMBOL	DESCRIPTION
	Caution: Important Safety Information
	Hazardous Voltage
	Conforms to European Union Directive

Introduction

Description

The MiniSim 1000 Advanced Multi-Parameter Patient Simulator is an advanced microcontroller based instrument. It is designed to simulate patient signals of ECG, arrhythmia, invasive blood pressure, respiration, and temperature. The device also simulates square, sine, triangle, and pulse performance waveforms.

The easy to operate MiniSim 1000 Advanced is menu driven via eight tactile feel soft keys. All functions are displayed on a two-line sixteen-character LCD display.

The small hand held instrument is powered by one 9 Volt batteries or an optional AC adapter. The MiniSim 1000 Advanced is CE marked and shipped with a Certificate of Calibration traceable to the NIST.

The MiniSim 1000 Advanced is a rugged instrument that performs its simulations quickly, accurately, and with ease.

MiniSim 1000 Advanced Features

- 12 Lead ECG
- 45 Arrhythmias
- ECG Performance Waveforms
- 2 Blood Pressure simulations
- Respiration / Apnea, and Temperature
- Accurate, Portable, and Easy-to-Use
- Menu-Driven Operation and Large LCD Display
- Tactile Keypad
- Battery or AC Powered

Specification

General Specifications

ECG: 12 leads with independent outputs referenced to RL.

NORMAL SINUS RHYTHM (NSR)

ECG Rates: 30, 60, 70, 80, 90, 100, 120, 150, 180, 210, 240, 270, 300, and 350 BPM.

Accuracy 0.5%.

Amplitudes: 0.15, 0.3, 0.5, 1.0, 2.0, 3.0, 4.0, and 5.0 mV on Lead II.

Lead I is 0.6 X Lead II, Lead III is 0.4 X Lead II, and Lead V is the same as Lead II.

High Level: 500 X low level output on Lead II.

Accuracy: 2% (1-5mV).

PERFORMANCE WAVEFORMS (PERF):

Sine, Square, Triangle, Pulse

Frequencies: 0.1 to 0.9 in 0.1 Hz steps.

1.0 to 9.0 in 1.0 Hz steps.

10 to 100 in 10 Hz steps.

Accuracy: 1%

Amplitudes: 0.1, 0.2, 0.5, 1.0, 2.0, 3.0, 4.0, and 5.0 mV on Lead II.

Pulse: 20 ms pulse of 1mV amplitude repeated at 4 second intervals.

R WAVE DETECTION (RWD)

Widths: 10, 40, 50, 60, 70, 80, 90, 100, 110, and 120 ms.

Amplitudes: 0.15, 0.3, 0.5, 1.0, 2.0, 3.0, 4.0, 5.0 mV on Lead II.

PACER (PCR)

AP: Atrial Pacer set at 70 BPM.

ASP: Asynchronous Pacer – Ineffective Pacing.

Pacer Amplitudes: + 2 mV and –2mV.

QRS Amplitudes: 1 mV

PCR: Pacer pulses alone.

Pacer Widths: 0.1, 0.2, 0.5, 1.0, 1.5, and 2.0 ms.

Amplitudes: 0.15, 0.3, 0.5, 1.0, 2.0, 3.0, 4.0, and 5.0 mV.

VP: Ventricular Pacer set at 70 BPM.

AVP: Atrial Ventricular Pacer set at 70 BPM.

QRS Amplitude: 1 mV.

Pacer Amplitude: -2mV.

RESPIRATION

Baseline Impedance: 250, 500, 750, and 1000 Ohms.

Delta Impedance: 0.1, 0.5, 1.0, and 1.5 Ohms.

Accuracy: 20%.

Rates: 15, 30, 60, and 120 BPM.

Accuracy: 1%

Apnea: Off, continuous, 12 seconds and 32 seconds.

Lead Configuration: Leads I and II.

BLOOD PRESSURE

Impedance: 350 Ohms.

Excitation: 2 to 16 Volts.

Sensitivity: 5 μ V/V/mmHg.

Static: 0, 5, 10, 20, 25, 30, 40, 50, 100, 150, 200, and 300 mmHg.

Dynamic: 50/10, 60/20, 70/30, 80/40, 100/60, and 120/80 mmHg.

Dynamic waveforms track all NSR rates.

Accuracy: 1%

TEMPERATURE

Compatibility: YSI 400 and 700 Series.

Temperature: 25 and 37 degrees Centigrade.

Accuracy: 2% of setting

POWER REQUIREMENTS: One 9 Volt alkaline battery or optional AC adapter.

PHYSICAL CHARACTERISTICS:

Dimensions: 5.5 X 3.5 X 1.5 inches (13.9 X 8.9 X 3.8 cm).

Weight: 10 oz (0.3 kg).

TEMPERATURE REQUIREMENTS:

Operating: 59 to 95° F (15 to 35°C).

Storage: 32 to 131° F (0 to 55°C).

CALIBRATED DC OUTPUTS: 10 Calibrated DC outputs from 0.04 to 2 mV.

Output Connections:

Part # 303-R1, Open Ended Pressure cable:

Pressure: Single Pressure

Pin 1 + Excitation

Pin 4 + Signal

Pin 2 - Signal

Pin 5 - Excitation

Pressure: Dual Pressure

Pin 3 + Signal

Pin 2 - Signal

Part # 327, 328 Open Ended Temperature Cable:

3.5 mm Stereo Jack

YSI 400 Tips, Ring, Shield.

YSI 700 Tip, Ring.

High Level Output: 3.5 mm Stereo Jack

Signal Positive Tip

Signal Ground Shield

Input/Unused Ring

Note: Specifications are subject to change without notice

Part Numbers and Ordering Information

Part Number: **300-1.3:** MiniSim 1000 Advanced Multi-Parameter Patient Simulator

Standard Accessories (Included with the unit):

535-CASE: Hard Carrying Case

1000: Universal ECG Snap to banana plug adapter (set of 10)

327: YSI 700 Temperature Interface cable

303-R1: Open ended Blood Pressure Interface Cable with metal Receptacle

Optional Accessories:

PART NO.	DESCRIPTION
327	Temperature Interface Cable (YSI 700) for MiniSim 1000 (Advanced).
328	YSI 400 Temperature Interface cable
303-R1	Unterminated Blood Pressure Interconnect Cable
305-R1	Dual Space Labs BP Interface Cable for Patient Simulator (R1)
305-S-R1	Single Space Labs BP Interface Cable for Patient Simulator (R1)

Optional Accessories (Continued):

306-R1	Dual Datascope BP Interface Cable (R1)
308-R1	Single Hewlett Packard (HP) / Philips BP Interface Cable (R1)
311 - R1	Dual Bard BP Interface Cable (R1)
311-S-R1	Single Bard Medical BP Interface Cable (R1)
313B-R1	GE Healthcare Marquette IBP Interface Cable (R1)
316R1	Datex Ohmeda AS3 Single Input BP Interface Cable (R1)
323-R1	Datex Ohmeda AS3 Single Input BP Interface Cable (R1)
325-R1	Single Maquet BP Interface Cable (R1)
326-R1	WITT BP Interface Cable (R1)

Note: Various Manufacturers' model specific interface cables are available. Please call for the part numbers or visit www.NetechBiomedical.com

Instrument Familiarization

Before getting started, it is important to get familiar with the control and operation of the unit.

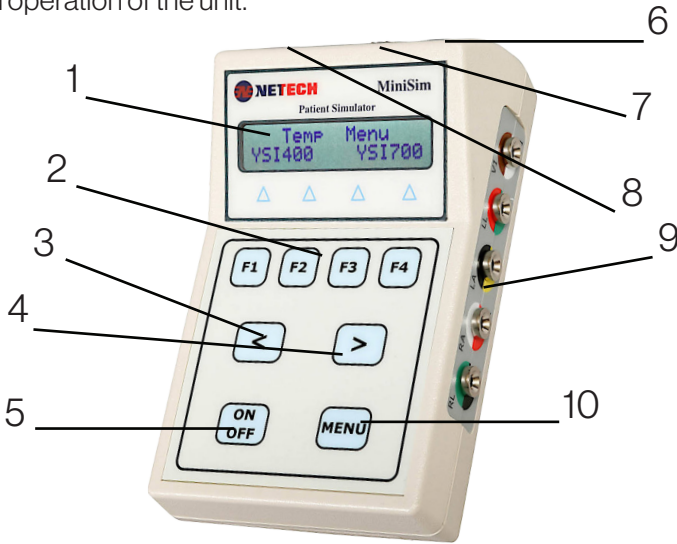


Figure 1. Waveform Simulator Controls

Number	Description
1	LCD Display
2	Function Keys (F1, F2, F3, F4)
3	Arrow Key < (Left)
4	Arrow Key > (Right)
5	On/Off Key
6	High Level ECG Output
7	Blood Pressure Connector
8	Temperature Connector
9	ECG Lead Snaps Arrow Key < (Left)
10	Menu Key

The operating menu of the MiniSim 1000 Advanced is arranged in a tree structure. When turned on, the microcontroller initializes a test routine and displays the model and software version numbers and then switches to the Main Menu.

During operation, the 'MENU' key returns the currently displayed menu to the previous menu.

The 'F1', 'F2', 'F3', and 'F4' keys select the parameter for simulation, the specific type of parameter, and the functional characteristics of the parameter.

The '<' and '>' arrow keys move through the available choices under the selected parameter.

Operating Instructions

Menu Descriptions: The following are the menu sequence displays, their abbreviations, definitions, and default settings.

SIMULATOR MENU			
Ecg	Resp	Bp	Temp

Ecg: ECG

Default Setting: Normal Sinus Rhythm (NSR) at 80 BPM with Amplitude of 1 mV

Resp: Respiration

Default Setting: 30 BPM, Impedance 500 Ohms, Delta R 1.0 Ohm, and Apnea Off

Bp: Blood Pressure

Default Setting: 120/80 Dynamic Setting

0 Static Setting

Temp: Temperature

Default Setting: YSI 700 series set to 25°C

YSI 400 series set to 25°C

Basic Operating Instructions:

1. Connect the MiniSim 1000 Advanced to a patient monitor using the ECG lead snaps, correct blood pressure interface cable and correct temperature interface cable.
2. Turn the Minisim 1000 Advanced On.
3. Select the parameter for simulation, 'ECG', 'Resp', 'BP', or 'Temp'.
4. Continue to select choices under the parameter to be simulated until the functional characteristics have been chosen.
5. Each Parameter has default settings.

ECG MENU			
Base	Perf	Arth	Aut

Base: Baseline ECG

Perf: Performance Waveforms

Arth: Arrhythmia Waveforms

Aut: Automatic Test Sequences

Baseline ECG			
NSR	PCR	ST	RWD

NSR: Normal Sinus Rhythm

PCR: Pacer Waveforms

ST: ST Segment Analysis Waveforms

RWD: R Wave Detection

NSR/	
Rate	Ampl

Rate and Amplitude selections under NSR are:

Rate: 30 60 70 80 90 100 120 150 180 210 240 270 300 350

Ampl.:15 0.3 0.5 1.0 2.0 3.0 4.0 5.0

Pacer Waves	
Atr	Vent

Selecting **Atr** branches to:

Atr_Pcr Waves			
+ve	AP	PCR	ASP

+ve: Changes pacer pulse from positive (+ve) to negative (–ve).

AP: Atrial Pacer – Normal Paced Rhythm

QRS with rate of 60 BPM and Pacemaker pulses with amplitudes of +2 mV and –2 mV with duration of 0.1 ms or 2 ms with a normally paced QRS T (QRS amplitude of 1 mV, duration of 100 ms, T wave amplitude of 0.2 mV, duration of 180 ms, and Q-T interval of 350ms)

PCR: Pacer Pulses Alone. Amplitude default setting of 1.0 mV and width of 1.0 ms.

Widt: width selections

0.1 0.2 0.5 1.0 1.5 2.0

Ampl: amplitude selections
.15 0.3 0.5 1.0 2.0 3.0 4.0 5.0

ASP: Asynchronous Pacer – Ineffective pacing.

A non-synchronized waveform that combines QRS waves at 30 BPM and other specifications as in AP above with pacer waves with a 0.1 ms or 2 ms width and amplitude of ± 2 mV at 80 BPM.

Note: 0.1 ms pacer width for AP and ASP can only be selected by going to 'PCR'. A selection other than 0.1 ms produces 2 ms wide pulses.

Selecting **Vent** branches to:

Vtr_Pcr Waves VP AVP

VP: Ventricular Pacer at 70 BPM

AVP: Atrial Ventricular Pacer at 70 BPM

Selecting **ST** branches to:

ST-Segment			
el	dep	MI	TalT

ST segment analysis waveforms are divided into four classes:

el: ST Elevation

dep: ST Depression

MI: Myocardial Infarction

TalT: Tall T Wave Rejection

ST_ELVATION			
7%	13%	20%	Flat

ST Elevation: 7, 13, and 20% DC levels of ST Elevation may be selected. Example: at a QRS amplitude of 1 mV, ST segments are produced at positive DC levels of 70, 130, and 200 micro volts.

Waveforms may be selected with a **Flat**, a positive **+sl**, or a negative **-sl** slope. The ST segment is proportional to the ECG amplitude setting.

ST_DPRESION			
7%	13%	20%	Flat

ST Depression: Identical to ST Elevation except the ST segments are now depressed.

Selecting MI Myocardial Infarction branches to:

Myocard_Inf			
lsc	lnj	lnf	linf

lsc: Ischemia

lnj: Injury

lnf: Infarction

linf: Inferior Infarction

lsc: Ischemia : Normal Sinus Rhythm (NSR) with fully inverted T waves. This is a condition of reduced blood supply to the heart in a normal patient.

Inj: Injury. A waveform with ST elevation of 20% with a negative slope and inverted T wave.

Inf: Infarction. Normal Sinus Rhythm (NSR) with a large Q wave with the amplitude increased six times and the width increased three times compared to normal.

linf: Inferior Infarction. A waveform with the Q wave modified as in Infarction and the ST segment elevated 7% as in ST Elevation.

Selecting TaT branches to:

TaT/Rate=80	
Rate	Ampl

An 80 BPM QRS test signal of 1 mV amplitude and 100 ms duration is generated with a T wave duration of 180 ms and Q-T interval of 350ms.

The T wave amplitude may be varied from 0 to 1.2 mV in steps of 0.1mV .

Rate: 80 BPM

Amplitude: 0.0 0.1 0.2 0.3 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2

Selecting **RWD** branches to:

RWD/	
Widt	Ampl

RWD: R Wave Detection. A QRS waveform is generated at 70 BPM with selectable width and amplitude changes.

Widt: Width default setting 100 msec

10 40 50 60 70 80 90 100 110 120

Ampl: Amplitude default setting 1.0 mV

.15 0.3 0.5 1.0 2.0 3.0 4.0 5.0

Perf. Waves			
SIN	SQR	TRI	PLS

SIN: Sine Wave

SQR: Square Wave

TRI: Triangle Wave

PLS: Pulse Wave

SIN/	
Freq	Ampl

SQR/	
Freq	Ampl

TRI/	
Freq	Ampl

The frequency and amplitude default settings and choices are the same for the sine, square and triangle performance waveforms.

Freq: Frequency default setting 1.0 Hz

0.9 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10 20 30 40 50 60 70 80 90 100
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8

Ampl: Amplitude default setting 2.0 mV

2.0 3.0 4.0 5.0 0.2 0.5 1.0

Pulse wave default setting: A pulse wave is generated at 4 second intervals with an amplitude of 1mV and width of 20 ms.

Selecting Arr branches to:

Perf. Waves		
Atr	AC	Vent

Arrhythmias are divided into Atrial, Atrial Conduction, and Ventricular waveforms. Normal Sinus Rhythm (NSR) at 80 BPM is the default waveform in this menu. Function keys select the desired arrhythmia and the MENU key clears the arrhythmia to NSR.

The following are the arrhythmia definitions:

Atrial: Atrial Arrhythmias

SA: Sinus Arrhythmia: The ECG rate uniformly increases and decreases continuously.

The pattern is cyclic with rates changing in the following order: 60, 70, 80, 90, 100, 90, 80, 70, 60 BPM.

M80: Missing Beat: Normal Sinus Rhythm is generated at 80 BPM with every 10th beat missing.

AFLT: Atrial Flutter: Varying ECG rates with 12 cycles at 60 BPM for 12 seconds, 9 cycles at 90 BPM for 6 seconds, 15 cycles at 150 BPM for 6 seconds repeating with large P waves at 300 BPM. This corresponds to ventricular responses of 5:1 for 12 seconds, 3:1 for 6 seconds, and 2:1 for 6 seconds.

AFB: Atrial Fibrillation: Irregular QRS complexes with no P waves

and constantly changing R-R intervals are generated. The rate varies in a cyclic fashion at 30, 60, 70, 80 and 30 BPM with low amplitude oscillations on the baseline.

PAT: Paroxysmal Atrial Tachycardia: NSR is generated at 180 BPM with inverted P waves.

NODL: Junctional Premature Contraction: NSR is generated at 80 BPM with a short PR interval. The QRS starts immediately following the P wave.

AC: Atrial Conduction Arrhythmias

AB1: First Degree AV Block: The QRS is generated at 80 BPM, the P wave precedes the QRS by a fixed but prolonged PR interval > 0.2 seconds (PR interval = 0.26 seconds).

MB1: Second Degree AV Block: Mobitz I: Wenckebach: The QRS is generated at 80BPM. There is a progressive lengthening of the PR interval with intermittent dropped beats. The PR intervals are 170, 230, and 310 ms.

MB2: Second Degree AV Block: Mobitz II: The QRS is generated at 80 BPM with every 4th QRS missing. The PR interval is constant at 170 ms.

AB3: Third degree AV Block: The P wave and QRS are independent of each other.

The P wave is generated at 80 BPM and the QRS is generated at 50BPM.

RBB: Right Bundle Branch Block: A prolonged QRS (>0.12 sec) is generated at 80BPM. The resulting QRS looks like the letter "M".

LBB: Left Bundle Branch Block: A widened QRS is generated at 80 BPM with a large wide S wave.

LAH: Left Anterior Hemiblock: A QRS is generated at 80 BPM with an S wave larger than the R wave.

Ventricular: Ventricular Arrhythmias

PV1: Premature Ventricular Contraction 1: NSR is generated at 80 BPM. Each time the 'F1' function key is pressed one PVC is generated.

PV3: Premature Ventricular Contraction 3: NSR is generated at 80 BPM. Each time the 'F2' function key is pressed 3 PVCs are generated.

PV6: Premature Ventricular Contraction 6: NSR is generated at 80 BPM. Each time the 'F3' function key is pressed 6 PVCs are generated.

PV12: Premature Ventricular Contraction 12: NSR is generated at 80 BPM. Each time the 'F4' function key is pressed 12 PVCs are generated at different intervals.

PV24: Premature Ventricular Contraction 24: NSR is generated at 80 BPM. Each time the 'F1' function key is pressed 24 PVCs are generated at different intervals.

BGY: Bigeminy: NSR is generated at 80 BPM with every other beat as a PVC.

TGY: Trigeminy: NSR is generated at 80 BPM with every third beat as a PVC.

PVC: Premature Ventricular Contraction: Continuous PVCs are generated at 80BPM.

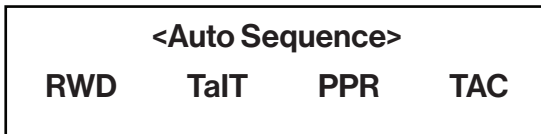
VFLT: Ventricular Flutter: Sine waves at 240 BPM are generated with irregular amplitudes.

VFB: Ventricular Fibrillation: A totally irregular waveform is generated with chaotic undulations of the baseline.

VTC: Ventricular Tachycardia: A fast moving series of PVCs is generated at 210BPM.

PVR: Right Focal PVC: NSR is generated at 80 BPM with every 10th beat a right focal PVC.

Selecting **Aut** branches to:



The Automatic Test Sequence generates test waveforms in sequences according to AAMI requirements eliminating the need for the user to make numerous manual selections.

The automatic test sequences are:

RWD: R Wave Detection

TaIT: Tall T Wave Rejection

PPR: Pacemaker Pulse Rejection

TAC: Time for Alarm for Tachycardia

The automatic sequence is initiated when the test is selected and continues until all of the test patterns have been generated. During the test sequence the values generated are displayed on the LCD. At the completion of the automatic test, the display will return to its steady mode.

RWD: R Wave Detection

R waves are generated with three varying parameters of amplitude, width, and rate. The three parameter values are displayed on the LCD while generated. Each test waveform is displayed for 20 seconds.

The complete waveform test sequence is performed in three separate sets.

Set 1: Variable Parameters

Amplitude: 0.5, 2, 5 mV

Width: 100, 70, 120 ms

Rate: 80, 30, 210 BPM

Set 1 Complete Test Sequence

Amplitude (mV)	Width (ms)	Rate (BPM)	Time (sec)
0.5	100	80, 30, 210	20
	70	80, 30, 210	20
	120	80, 30, 210	20
2.0	100	80, 30, 210	20
	70	80, 30, 210	20
	120	80, 30, 210	20
5.0	100	80, 30, 210	20
	70	80, 30, 210	20
	120	80, 30, 210	20

As the test progresses, the indicated heart rate displayed on the patient monitor should be within $\pm 10\%$ or ± 5 BPM whichever is greater of the applied rate.

Set 2: Variable Parameters

Amplitude: 0.15 mV

Width: 70, 120 ms

Rate: 30, 210 BPM

Set 2 Complete Test Sequence

Amplitude (mV)	Width (ms)	Rate (BPM)	Time (sec)
0.15	70	30, 210	20
0.15	120	30, 210	20

The monitor will not respond to the waveforms in this sequence Set.

Set 3: Variable Parameters

Amplitude: 1.0 mV

Width: 10 ms

Rate: 30, 210 BPM

Set 3 Complete Test Sequence

Amplitude (mV)	Width (ms)	Rate (BPM)	Time (sec)
1.0	10	30, 210	20

The patient monitor will not respond to the waveforms in the Set 3 test sequence.

Tall T Wave Rejection.

QRS and T waves are generated with the following values:

QRS: Rate 80 BPM
 Amplitude 1 mV
 Width 100 ms

 T Wave Duration 180 ms

QT Interval 350 ms

T Wave Amplitude 0.0, 0.2, 0.4, 0.6, 0.8, 1.0, and 1.2 mV .

In the automatic test sequence the T Wave Amplitude steps through the changes at one minute intervals. The display indicates the T Wave Amplitude and the QRS Rate.

As the T wave amplitude increases, the first value at which the patient monitor counts the T wave at 80 ± 8 BPM should be noted. This value should match the patient monitor manufacturer's specification.

PPR: Pacemaker Pulse Rejection. The test sequence cycles through normal paced rhythm (AP), ineffective pacing (Asynchronous Pacing ASP), and pacemaker pulses alone (PCR).

For normal pacing (AP),QRS and pacer waves are generated with the following values:

QRS:	Amplitude	1 mV
	Width	100 ms
T wave:	Amplitude	0.2 mV
	Duration	180 ms
Q-T Interval		350 ms
R-R Interval		1 Sec
Pacer:	Amplitude	2 mV, -2 mV
	Width	2 ms, 0.1 ms

For ineffective pacing (ASP), the values of the QRS and pacer waves are the same as normal pacing except for the QRS rate that becomes 30 BPM and the pacer rate that becomes 80 BPM.

During the ASP and AP test sequences the display will show the pacer amplitude, the pacer width, and the QRS rate.

For pacemaker pulses alone (PCR) the values generated are:

Pacer:	Rate	60 BPM
	Width	2.0 ms, 0.1 ms
	Amplitude	2 mV, -2 mV

During the PCR test sequence the display will show the pacer amplitude, the pacer width, and the QRS rate.

Each set of values in the test sequence is generated and displayed for 20 seconds.

TAC: Time to Alarm for Tachycardia: The TAC test is designed to measure the time it takes for the patient monitor to alarm after the onset of ventricular tachycardia. The low and high alarms on the patient monitor should be set at 60 BPM 100 BPM before starting the test.

This auto test sequence generates a QRS wave form at the rate of 80 BPM alternating with a ventricular tachycardia waveform with rates of 206 and 195 BPM and amplitudes of 1.0, 0.5, 2.0, and 4.0 mV.

Each waveform is generated for 20 seconds and the display will show the amplitude and the rate of the waveform being generated.

The following is the sequence of waveforms:

QRS		Ventricular Tachycardia		
Rate	Amp	Width	Rate	Amp
(BPM)	(mV)	(ms)	(BPM)	(mV)
80	1	100	206	1.0
80	1	100	206	0.5
80	1	100	206	2.0

QRS		Ventricular Tachycardia		
Rate	Amp	Width	Rate	Amp
(BPM)	(mV)	(ms)	(BPM)	(mV)
80	1	100	195	2.0
80	1	100	195	1.0
80	1	100	195	4.0

RESPIRATION:

Select Resp in the Simulator Menu to access the Respiration selections.

Resp Menu			
Rate	Imp	dR	Apne

Respiration waveforms are generated with four selectable rates, baseline impedances, and delta impedance variations.

The Respiration default settings are:

Respiration Rate	30 BPM
Impedance	500 Ohms
Delta Impedance	1.0 Ohm
Apnea	Off

The value changes that may be made are:

Rate: 15, 30, 60, 120 BPM.

Impedance: 250, 500, 750, and 1000 Ohms.

Delta Impedance: 0.1, 0.5, 1.0, and 1.5 Ohms.

Apnea:

Resp/Apne=Off			
Off	Cont	12s	32s

Off: Apnea is absent. Normal respiration waveforms are generated.

Cont: Continuous Apnea. No respiration waveforms are generated.

12s: No respiration waveform is generated for 12 seconds.

32s: No respiration waveform is generated for 32 seconds.

BLOOD PRESSURE:

Select Bp in the Simulator Menu to access Blood Pressure selections.

BP1 Menu	
Dyna	Stat

Two blood pressure waveforms are generated with selections of 12 static and 6 dynamic values. BP1 values are selected from the listed choices and BP2 values are ½ of those selected for BP1.

The Dynamic pressure waveforms track the Normal Sinus Rhythm rates.

The default settings for pressure values are:

BP1	Dynamic: 120/80	Static: 0
BP2	Dynamic: 60/40	Static: 0

The Dynamic pressure value selections are:

100/60	120/80
50/10	60/20
70/30	80/40

The Static pressure value selections are:

0	5	10	20
25	30	40	50
100	150	200	300

TEMPERATURE:

Select Temp in the Simulator Menu to access Temperature value selections.



Temperature simulation is provided for both YSI 400 and YSI 700 standards. The temperature default setting for both is 25 degrees Centigrade.

The Temperature value selections are:

25°C 37°C for both YSI 400 and YSI 700

Maintenance and Storage

Maintenance

The mechanical assembly of the MiniSim 1000 Advanced contains no parts that can be serviced by the user. The unit should be returned to Netech Corporation for repair or calibration.

The alignment and adjustment parameters are critical to the robust and efficient performance of the unit and can be performed only at the factory.

The unit is factory calibrated with NIST traceable standards and recommended to be calibrated once a year.

Netech maintains a complete repair and recalibration service at a very low cost and fast turnaround. Estimates for repair and recalibration are available upon request.

The MiniSim 1000 Advanced contains NO USER SERVICEABLE PARTS and calibration/ service should be performed only by Netech. Attempt to repair / service the unit outside Netech voids the warranty.

Warranty

Netech warrants this instrument to the original purchaser, as purchased from a Netech distributor or dealer, will conform to the written specification as of the date of its manufacture, for two years from the date of purchase. The second-year warranty is contingent upon returning the unit to the factory for the annual recalibration at the end of the first year warranty. Netech warrants this instrument against defects in materials and workmanship. If the instrument fails to conform to these warranties, Netech will repair or replace the unit and/or its components within a reasonable period; if the MINISIM 1000 ADVANCED is returned, shipping prepaid, to Netech's facility at Farmingdale, NY, USA within the warranty period as expressed above.

These warranties are made upon the expressed condition that:

- 1. The purchaser promptly notifies Netech in writing of any nonconformity with the above warranty including a detailed explanation of the alleged deficiencies.*
- 2. The MiniSim 1000 Advanced is returned to Netech at the buyer's expenses only after obtaining the proper RMA authorization from Netech.*
- 3. Netech will not be liable for any incidental or consequential damages.*
- 4. In the opinion of Netech upon inspection, the MiniSim 1000 Advanced has not been misused, altered, or damaged due to the abnormal handling and/or operation.*
- 5. Repairs to the MiniSim 1000 Advanced and/or its components have not been made by anyone other than Netech or one of its authorized repair agents.*
- 6. The MiniSim 1000 Advanced has not been modified, altered, or changed in any manner by anyone other than Netech or one of its authorized repair agents.*
- 7. All shipping and handling charges will be billed to the purchaser.*

THIS WARRANTY EXCLUDES ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, ORAL OR WRITTEN, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE. NETECH IS NOT LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES FROM ANY MISUSE OF THE INSTRUMENT.

To receive free software and firmware updates, please fill out and send the warranty registration card or fill out online warranty registration: -
<http://www.NetechBiomedical.com/warranties>

Appendix: A

Current Revision: R2 08/07/25

Pages revised from the previous Revision (R1).



Serving the Biomedical Industry Worldwide Since 1987

Full Line of Biomedical Test Equipments

Compact. Easy to Use. Best Value.



EXPMT 2000
Ext. Pacemaker Analyzer



DELTA 3300
Defibrillator Analyzer



MINISIM EEG 2000
EEG Simulator



MINISIM 1000
Patient Simulator



DELTA 1600
AED Tester



LKG 601
Electrical Safety Tester



DIGIMANO 1000
Pressure Vacuum Meter



DIGIFLOW 2000
Digital Gas Flow Meter



DIGIMANO 2000
Precision Pressure Vacuum Meter

Made in the USA



Registered to ISO 9001



Contract Holder



Visit our website
www.NetechBiomedical.com
to browse our complete line of
Biomedical Test Instruments.



☎ 1-800-547-6557

✉ sales@NetechBiomedical.com

📍 110 Toledo Street, Farmingdale, NY 11735

Follow Us on Facebook
[@NetechBiomedical](https://www.facebook.com/NetechBiomedical)