

# SECULIFE | PS200 MULTI-PARAMETER PATIENT SIMULATOR

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# TABLE OF CONTENTS

	<b>Page</b>
WARNINGS, CAUTIONS, NOTICES.....	4
DESCRIPTION SECULIFE   PS200 PATIENT SIMULATOR .....	9
LAYOUT.....	13
TOUCH KEYS.....	14
ECG - NORMAL SINUS RHYTHM .....	19
ECG - ARRHYTHMIAS.....	21
ECG - PERFORMANCE .....	24
BLOOD PRESSURE.....	26
RESPIRATION.....	28
TEMPERATURE.....	29
SETUP.....	30
POWER UP SETTINGS .....	32
SPO <sub>2</sub> (Option).....	33
OUTPUT CONNECTIONS.....	34
LIMITED WARRANTY .....	35
SPECIFICATIONS.....	36
NOTES.....	38

## WARNINGS, CAUTIONS, NOTICES

### WARNING - USERS

The SECULIFE | PS200 is for use by skilled technical personnel only.

### WARNING - USE

The SECULIFE | PS200 is intended for testing only and should never be used in diagnostics, treatment or any other capacity where it would come in contact with a patient.

### WARNING - CONNECTIONS

All connections to patients must be removed before connecting the DUT to the SECULIFE | PS200. A serious hazard may occur if the patient is connected when testing with the SECULIFE | PS200.

### CAUTION - MODIFICATIONS

The SECULIFE | PS200 is intended for use within the published specifications. Any application beyond these specifications or any unauthorized user modifications may result in hazards or improper operation.

### CAUTION - SERVICE

The SECULIFE | PS200 is intended to be serviced only by authorized service personnel. Troubleshooting and service procedures should only be performed by qualified technical personnel.

**CAUTION - OPENING / REPAIR**

The equipment may be opened only by authorized service personnel to ensure the safe and correct operation of the equipment and to keep the warranty valid.

Even original spare parts may be installed only by authorized service personnel.

In case the equipment was opened by unauthorized personnel, no warranty regarding personal safety, measurement accuracy, conformity with applicable safety measures or any consequential damage is granted by the manufacturer.

**CAUTION - INSPECTION**

The SECULIFE | PS200 should be inspected before each use for obvious signs of abuse or wear. The SECULIFE | PS200 should not be used and should be serviced if any parts are in question.

**CAUTION - CLEANING**

Do not immerse. The SECULIFE | PS200 should be cleaned by wiping gently with a damp, lint-free cloth. A mild detergent can be used if desired.

**CAUTION - LIQUIDS**

Do not submerge or spill liquids on the SECULIFE | PS200. Do not operate the SECULIFE | PS200 if it may have been exposed to fluid.

**CAUTION - ENVIRONMENT**

Exposure to environmental conditions outside the specifications can adversely affect the performance of the SECULIFE | PS200. Allow the SECULIFE | PS200 to acclimate to specified conditions for at least 30 minutes before attempting to operate them.



EG - KONFORMITÄTSERKLÄRUNG  
DECLARATION OF CONFORMITY



Dokument-Nr./ Document.No.: 833 / 11-022  
 Hersteller/ Manufacturer: GMC-I GOSSEN-METRAWATT GMBH  
 Anschrift / Address: Südwestpark 15  
 D - 90449 Nürnberg  
 Produktbezeichnung/ Product name: Patient Simulator  
 Patientensimulator  
 Typ / Type: SECULIFE PS100 /PS200 /PS300  
 Bestell-Nr / Order No: M695L /M /N

Das bezeichnete Produkt stimmt mit den Vorschriften folgender Europäischer Richtlinien überein, nachgewiesen durch die vollständige Einhaltung folgender Normen:

The above mentioned product has been manufactured according to the regulations of the following European directives proven through complete compliance with the following standards:

Nr. / No.	Richtlinie	Directive
2006/95/EG 2006/95/EC	Elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen - Niederspannungsrichtlinie - Anbringung der CE-Kennzeichnung : 2013	Electrical equipment for use within certain voltage limits - Low Voltage Directive - Attachment of CE mark : 2013

EN/Norm/Standard	IEC/Deutsche Norm	VDE-Klassifikation/Classification
EN 61010-1 : 2010	IEC 61010-1 : 2010	VDE 0411-1 : 2011

Nr. / No.	Richtlinie	Directive
2004/108/EG 2004/108/EC	Elektromagnetische Verträglichkeit - EMV Richtlinie -	Electromagnetic compatibility - EMC directive -

Produktfamilienorm / Product family standard

EN 61326-1 : 2006

Nürnberg, den 25.03.2013




Ort, Datum / Place, date:

Geschäftsführung / managing director

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusicherung von Eigenschaften. Die Sicherheitshinweise der mitgelieferten Produktdokumentationen sind zu beachten.

This declaration certifies compliance with the above mentioned directives but does not include a property assurance. The safety notes given in the product documentations, which are part of the supply, must be observed.

## NOTICE – SYMBOLS

Symbol	Description
	<b>Caution</b> (Consult Manual for Further Information)
	<b>Center Negative</b>
	Per European Council Directive 2002/95/EC, do not dispose of this product as unsorted municipal waste.

## NOTICE – ABBREVIATIONS

<b>AHA</b>	<b>American Heart Association</b>
<b>ANSI</b>	<b>American National Standards Institute</b>
<b>BPM</b>	<b>Beats Per Minute</b>
<b>BrPM</b>	<b>Breaths Per Minute</b>
<b>C</b>	<b>Celsius</b>
<b>°</b>	<b>degree(s)</b>
<b>ECG</b>	<b>Electrocardiogram</b>
<b>F</b>	<b>Fahrenheit</b>
<b>Hz</b>	<b>hertz</b>
<b>IEC</b>	<b>International Electrotechnical Commission</b>
<b>IBP</b>	<b>Invasive Blood Pressure</b>
<b>kHz</b>	<b>kilohertz</b>
<b>LED</b>	<b>Light Emitting Diode</b>
<b>μV</b>	<b>microvolt(s)</b>
<b>mA</b>	<b>milliamp(s)</b>
<b>mm</b>	<b>millimeter(s)</b>
<b>mV</b>	<b>millivolt(s)</b>
<b>ms</b>	<b>millisecond(s)</b>
<b>NEDA</b>	<b>National Electronic Distributors Association</b>
<b>NSR</b>	<b>Normal Sinus Rhythm</b>
<b>Ω</b>	<b>ohm(s)</b>
<b>Lbs</b>	<b>pounds</b>
<b>RMS</b>	<b>Root Mean Square</b>
<b>USA</b>	<b>United States of America</b>
<b>V</b>	<b>Volts</b>
<b>VDC</b>	<b>Volts Direct Current</b>

**NOTICE – DISCLAIMER**

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**NOTICE – DISCLAIMER**

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## DESCRIPTION SECULIFE | PS200 PATIENT SIMULATOR

The Model SECULIFE | PS200 is a Microprocessor based Patient Simulator. It provides ECG, Blood Pressure, Respiration and Temperature Simulation. There are 12 arrhythmias, a pacemaker rhythm, a Fetal/Maternal rhythm, seven waveforms with constant QRS duration and 12 machine performance testing waveforms.

The SECULIFE | PS200 makes viewing and selecting the desired waveforms and parameters quick and intuitive, with all operational information being available at one time on a cursor-based graphic display, allowing for easy maneuvering through parameters and scrolling through available options.

The following are highlights of some of the main features:

- SIMPLE TO OPERATE
- NO CODES TO REMEMBER OR ENTER
- BACKLIT GRAPHICS DISPLAY WITH SIMULTANEOUS DETAILED STATUS OF PARAMETERS AND SCROLLING CONTROL OF OPTIONS
- DROP DOWN CHOICE SCREENS LIST ALL OPTIONS FOR PARAMETERS
- SPECIAL POWER UP FEATURE ALLOWS THE USER TO CHOOSE TO USE DEFAULT, LAST OR CUSTOM SETTINGS
- AUTO SEQUENCES FOR BPM, STATIC-PRESSURE LEVELS AND PERFORMANCE
- 10 UNIVERSAL PATIENT LEAD CONNECTORS
- 9 VOLT BATTERY POWER
- % BATTERY LIFE DISPLAY
- LOW BATTERY INDICATOR
- AVAILABLE BATTERY ELIMINATOR
- FLASH PROGRAMMABLE FOR UPGRADES

### ECG FUNCTIONS

The unit can produce a wide variety of ECG simulations. The user simply selects the parameters that match the desired output.

- RATE:  
30, 60, 80, 120, 180, 240, 300 BPM
- AMPLITUDE:  
0.5, 1.0, 1.5, 2.0 mV (Lead II)
- AUTOMATIC MODE

## PACEMAKER FUNCTION

A pacemaker waveform may be simulated.

- WAVEFORM:  
ASYNCHRONOUS
- PULSE HEIGHT:  
1.0 mV
- PULSE WIDTH:  
1.0 ms

## FETAL/MATERNAL

A combination of fetal and maternal ECG waveforms may be simulated.

- FETAL HEARTRATE:  
120 BPM

## ARRHYTHMIA FUNCTIONS

The unit can simulate 12 different arrhythmias. Where applicable, both manual and automatic triggering of the waveform is available.

- 12 DIFFERENT ARRHYTHMIAS
- MANUAL AND AUTOMATIC TRIGGERIN

## ECG-PERFORMANCE FUNCTIONS

The unit will generate Sine, Square and Triangular waveforms with adjustable amplitudes for performance testing. A special Automatic mode is available to auto sequence through the entire range of waveforms.

- SINE:  
0.1, 0.5, 5, 10, 40, 50, 60, 100 Hz
- SQUARE:  
0.125, 2.000 Hz
- TRIANGLE:  
2.000 Hz
- AMPLITUDE:  
0.5, 1.0, 1.5, 2.0 mV (Lead II)
- AUTOMATIC MODE

## RESPIRATION

Respiration is simulated at 8 different rates plus apnea, with the ability to select from 2 Baseline Impedances, the Lead in which it will appear, and the Delta Ohms (amplitude) of the signal.

- RATE:  
15, 20, 30, 40, 60, 80, 100, 120 BrPM
- BASELINE IMPEDANCE:  
500, 1000  $\Omega$
- LEAD:  
LA or LL
- DELTA IMPEDANCE:  
0.1, 0.2, 0.5, 1.0, 2.0, 3.0  $\Omega$
- APNEA: CONTINUOUS (0 BrPM)

## BLOOD PRESSURE

Both static and dynamic invasive pressures are simulated. In the static mode the BP output is fixed at the selected level or sequenced through the list using the Automatic mode selection. In the Dynamic mode the selected waveform is synchronized with the ECG and provides a continuous output.

- STATIC:  
0, 20, 40, 80, 100, 200, 250, 300 mmHg
- AUTOMATIC STATIC PRESSURE MODE
- 6 DYNAMIC WAVEFORMS
- SENSITIVITY:  
5 and 40  $\mu\text{V/V/mmHg}$

## TEMPERATURE

The unit will simulate three temperatures. This is done by providing the necessary ohmic levels for both the YSI 400 and 700 Series thermistors.

- YSI SERIES 400 and 700 SIMULATION
- SELECTIONS:  
30, 37, 40  $^{\circ}\text{C}$  (86.0, 98.6, 104.0  $^{\circ}\text{F}$ )

## LEAD TEST FUNCTION

The unit provides a set of test terminals to quick check leads. It will determine if a lead has less than 1000 Ohms resistance.

## SPO2 SIMULATION (Option)

When used with the SECULIFE OX external module and FingerSim family of SpO<sub>2</sub> finger simulators, the system will provide a pulse synchronized SpO<sub>2</sub> output for all NSR rates.

- RATE: 30, 60, 80, 120, 180, 240, 300 BPM
- SpO<sub>2</sub> OUTPUT: 80, 90, 97 %

# LAYOUT

This section looks at the layout of a SECULIFE | PS200 and gives descriptions of the elements that are present.

**Lead Test Connections**

**LCD Graphical Display:**  
Shows Parameters for ECG, Respiration, Blood Pressure and Temperature

**10 Universal Patient Lead Connectors:**

RA	R
LA	L
RL(-)	N
LL	F
V1	C1
V2	C2
V3	C3
V4	C4
V5	C5
V6	C6

**6-Pin Mini-DIN Plug Connector** for Blood Pressure Cable

**8-Pin Mini-DIN Plug Connector** for Temperature Cable

**7-Pin Mini-DIN Plug Connector** for Aux Functions

**7 Light Touch Keys for Selecting Parameters and Settings:**  
LEFT and RIGHT Curved Arrows for Moving through Parameters  
UP and DOWN Arrows for Scrolling through Options  
ENTER for Selecting Option  
CHOICES for Displaying Submenu of All Options for a Given Parameter  
QUIT for Returning to Previous Status

**4 Light Touch Keys for Category Selection:**  
Normal Sinus Rhythm  
Arrhythmias  
Performance  
Setup

**Battery Eliminator jack**

**Power Key** for Turning Unit On and Off

**Back Light Key** for turning on and off the backlight

**ECG / RESPIRATION / BLOOD PRESSURE / TEMPERATURE**

**SECULIFE PS200 PATIENT SIMULATOR**

Normal Sinus Rhythm  
80 BPM 1.0 mV Adult  
20 BrPM 1.0 ohms  
Static 0 mmHg  
37.0 C 98.6 F

PREVIOUS VALUE NEXT  
QUIT ENTER CHOICES

Normal Sinus Rhythm Arrhythmias  
Performance Setup

BACK LIGHT HOLD TO POWER OFF

BP TEMP AUX


















GOSSEN METRAWATT

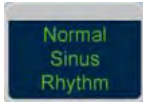
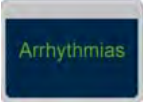
## TOUCH KEYS


### General Operation


The unit is controlled by 13 light touch keys. They allow the user to move around within the displayed parameters, select the desired options, choose a specific category and control the setup and power for the unit. When a key is depressed there is an audio click when it is accepted, or a razz tone if the key is invalid.

A graphics LCD display provides the user with information about the current status of the ECG, Respiration, Blood Pressure and Temperature settings.

Touch key	Meaning	Used in this Manual
	The keys move the block cursor through the displayed information; highlighting the parameter available for selection	
		
	The keys change the options for the highlighted parameter. The cursor begins flashing if the parameter has been changed.	
		
	This key selects the changed option	
	This key returns to the previous state, without any changes being made	
	To make option selection even easier and to make memorizing and using codes unnecessary, the key will bring up a screen that displays all the options for the selected parameter. The   and  keys can then be used to quickly scroll through the available options and select the desired setting	




Three category keys allow for quick setting of output waveforms. The  ,  and

 keys move the display directly to the selected category. The **UP** **DOWN** or **CHOICES** keys can then be used to scroll through and select the desired settings.


The  key opens a screen that allows the user to select the unit's general output settings, as well as setup for the system

## Category Keys


The category, **UP** **DOWN** and **ENTER** keys can be used to select ECG waveforms.

Touch key	Meaning	Used in this Manual
	This key enters the NSR category and gives access to the seven BPM (Beats Per Minute) settings with constant QRS duration.	<b>Normal Sinus Rhythm</b>
	This key enters the arrhythmia category and changes the first line in the display to the first arrhythmia choice	<b>Arrhythmias</b>
	This key enters the machine performance testing category and changes the first line in the display to the first performance waveform choice	<b>Performance</b>

## Power Key

Touch key	Meaning	Used in this Manual
	This key turns the unit on and off. To turn off the unit, the key must be held for 1 second.	<b>Power</b>

## Backlight

Touch key	Meaning	Used in this Manual
	This key is provided to toggle the backlight on or off at any time	<b>BACK LIGHT</b>

The Graphic LCD display may be viewed with or without the backlight. Depressing any key will activate the backlight. However, since the backlight will drain the battery if left on, it will automatically shut off after a few seconds when running on battery power. (**Note:** This time is selectable in the System Setup screen).

The intensity of the backlight can be adjusted in the System Setup screen to conserve battery life.

The **BACK LIGHT** key is provided to toggle the backlight on or off at any time.

**NOTE:** The backlight parameter in the System Setup screen may be set to Off, 1-30 sec Timed or Manual.

## ECG Waveforms

The microprocessor has stored in its memory all of the digitalized waveforms. It sends the individual lead waveforms to D/A converters, which generate accurate analog representations. The waveforms are then sent through resistor networks, developing the appropriate signals on the output terminals.

## Respiration

Respiration waveforms are provided that have adjustable rates from 15 to 120 BrPM (Breaths Per Minute) as well as an Apnea (0 BrPM) setting. The signal is generated by a variation in the impedance in either the LL or LA lead (selectable). The amplitude is settable from 0.5 to 3.0 ohms.

## Blood Pressure

IBP pressure simulation is available through the 6-pin mini-DIN plug connector on the right side of the unit. The circuit is totally isolated.

## Temperature

There is an 8-pin mini-DIN plug connector on the right side of the unit for connection of a Temperature cable. Temperatures are simulated for both YSI 400 and YSI 700 probe types. There are three different temperatures selectable for each.



## Universal Patient Lead Connectors

The 10 Universal Patient Lead Connectors allow for 12 lead ECG simulation with independent outputs. AHA and IEC color-coded labels are located on the face of the unit to aid in connecting the corresponding U.S. and International Patient Leads.

AHA Label	IEC Label	Description
RA	R	Right Arm
LA	L	Left Arm
RL	N	Right Leg (reference or ground)
LL	F	Left Leg
V1 V2 V3 V4 V5 V6	C1 C2 C3 C4 C5 C6	V Leads (U.S. Canada), also referred to as pericardial, precordial or unipolar chest leads  Chest Leads (International)

## High Level Output (+)

A high level ECG output signal (200 x Amplitude Setting) is available in the BP 6-Pin mini-DIN connector.

## Lead Test Terminals

There are two test terminals on the top of the unit that allow for a quick test of the continuity of the lead cables. Connecting one end of the cable to one terminal and the other end to the other terminal will test the cable. If the cable is OK (less than 1000 ohms), the LEAD TEST ACTIVE screen will be displayed.

## Auto Power Off

The unit may be programmed to automatically turn off after a selected number of minutes of no key activity to conserve the battery. (**Note:** This time is selectable in the System Setup screen).

## Battery

The unit utilizes two 9 Volt Alkaline Batteries in the rear battery compartment. When the unit detects a LOW BATTERY condition (5 % Battery Life), a warning window will appear once per minute to alert the user. The **QUIT** key may be used to clear this window and continue use of the unit. If the battery is not replaced before the battery reaches a critical level (0 % Battery Life), the unit will shut down. (The percentage of life left in the batteries can be viewed in the System Setup screen.)

## Battery Eliminator

The unit has a 2.1 mm jack for connecting a 9-Volt Battery Eliminator (Optional).

**Note:** The Battery Eliminator will not charge the battery.

## Power Up Settings

The unit may be setup to turn on using either the factory default settings, the same settings that it had when last turned off or a custom set of parameters as previously saved by the user (See Power Up Settings section for details).

## Automatic Modes

The ECG NSR Rate, ECG Performance and Static Blood Pressure Parameters all allow for an automatic setting. In each of these, the unit will sequence through the full range of settings automatically at a fixed rate (as selected in the Auto Step Time Parameter). When in this mode, the time remaining in each step is displayed.

The **ENTER** key may be used to manually advance to the next step. The **QUIT** key is used to terminate the mode.

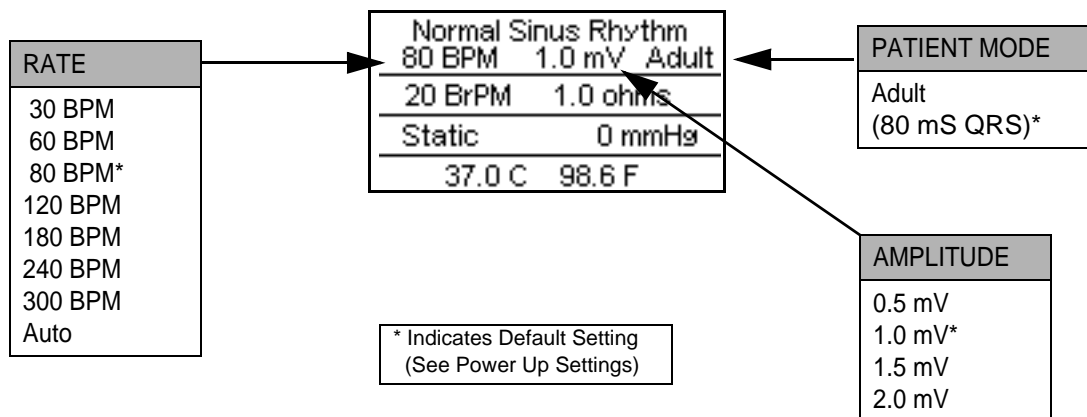
## ECG - NORMAL SINUS RHYTHM

The SECULIFE | PS200 can send NSR waveforms to ECG machines in 3, 5 or 12 lead configurations. It has independent outputs for each signal lead, referenced to the right leg.

NSR occurs when the heartbeat is normal, beating at a rate between 50 and 100 BPM with a standard QRS waveform shape and height. The SECULIFE | PS200 simulates the NSR with a default rate of 80 BPM, amplitude of 1.0 mV on Lead II and P-R interval of 160 milliseconds

The SECULIFE | PS200 is placed into NSR mode by pressing the **Normal Sinus Rhythm** category key.

The display will resemble the following:



The rates and amplitudes can be selected by using **PREVIOUS** **NEXT** to highlight the parameter to change and using **UP** **DOWN** to scroll to the desired value. Then **ENTER** is used to accept the new setting.

Alternately, to see a submenu of all the options for a highlighted parameter, use **CHOICES**. Use **UP** **DOWN** to scroll to the desired option. Then **ENTER** is used to accept the new setting.

## Auto Rate

If the BPM parameter is set to AUTO, the unit will automatically sequence through all of the BPM settings, starting with 30 BPM, incrementing at a fixed interval. The interval may be set in the System Setup Menu under “Auto Step Time”.

* Displays time (seconds) remaining before advancing to next rate.	Normal Sinus Rhythm	
	30 <del>sec</del> (04) 1.0 mV Adult	
	20 BrPM	1.0 ohms
	Static	0 mmHg
	37.0 C	98.6 F

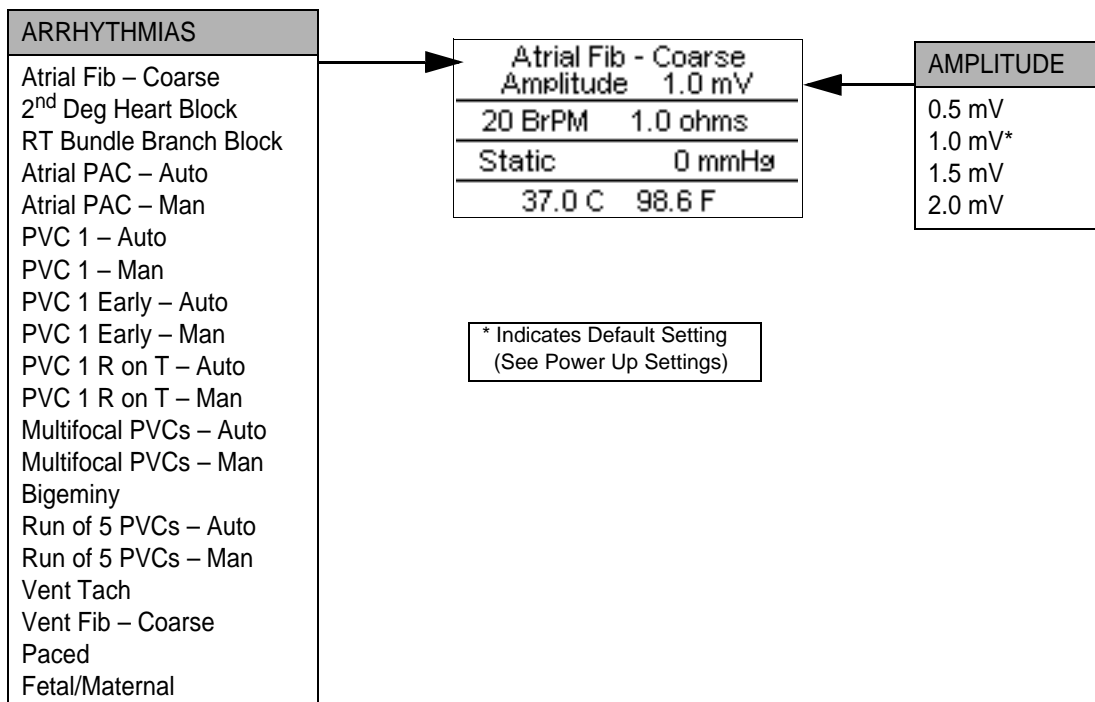
The **QUIT** key can be used to exit the Auto Mode during the sequence.

## ECG - ARRHYTHMIAS

The SECULIFE | PS200 can send arrhythmia waveforms to ECG machines in 3, 5 or 12 lead configurations. It has independent outputs for each signal lead, referenced to the right leg.

There are 12 Arrhythmias available that model abnormal heartbeats, plus Paced and Fetal/Maternal. The SECULIFE | PS200 is placed into ARRHYTHMIA mode by pressing the **Arrhythmias** category key.

The display will resemble the following:



The arrhythmias and amplitude can be selected by using **PREVIOUS** **NEXT** to highlight the parameter to change and using **UP** **DOWN** to scroll to the desired value. Then **ENTER** is used to accept the new setting.

Alternately, to see a submenu of all the options for a highlighted parameter, use **CHOICES**. Use **UP** **DOWN** to scroll to the desired option. Then **ENTER** is used to accept the new setting.

### Auto/Manual

There are 6 arrhythmias that have both Automatic and Manual versions. Both versions output the same waveform; however, in the Manual version, the arrhythmia is triggered each time **ENTER** is depressed. In the Auto versions, the arrhythmia is automatically triggered periodically.

The following is a brief description of how the SECULIFE | PS200 simulates the available Arrhythmias:

Abbreviation	Arrhythmia	Description
<b>Atrial Fib</b>	Atrial Fibrillation	Absence of P-wave and irregular P-R interval rate (Continuous)
<b>2<sup>nd</sup> Deg Heart Block</b>	Second Degree Heart Block	80 BPM with increasing P-R interval for four beats (160, 220, 400, 470 ms) followed by a P wave without a QRS (Continuous)
<b>Rt Bundle Branch Block</b>	Right Bundle Branch Block	80 BPM with Normal P-wave and P-R interval but wider QRS complexes (Continuous)
<b>Atrial PAC – Auto</b>	Premature Atrial Contraction	NSR of 80 BPM with Periodic Abnormal 25 % early P waves (PAC, 7 NSR) (Continuous)
<b>Atrial PAC – Man</b>	Premature Atrial Contraction	NSR of 80 BPM with Periodic Abnormal 25 % early P waves (One-Time event)
<b>PVC 1 – Auto</b>	Standard Type 1 Premature Ventricular Contraction	NSR of 80 BPM with periodic left focus premature ventricular beats with 20 % premature timing (PVC Type 1, 9 NSR) (Continuous)
<b>PVC 1 – Man</b>	Standard Type 1 Premature Ventricular Contraction	NSR of 80 BPM with periodic left focus premature ventricular beats with 20 % premature timing (One-Time event)
<b>PVC 1 Early - Auto</b>	Early Type 1 Premature Ventricular Contraction	NSR of 80 BPM with periodic left focus premature ventricular beats with 33 % premature timing (PVC Type 1, 9 NSR) (Continuous)
<b>PVC 1 Early - Man</b>	Early Type 1 Premature Ventricular Contraction	NSR of 80 BPM with periodic left focus premature ventricular beats with 33 % premature timing (One-Time event)
<b>PVC 1 R on T – Auto</b>	R on T Type 1 Premature Ventricular Contraction	NSR of 80 BPM with periodic left focus premature ventricular beats with 65 % premature timing, placing R on the previous T (PVC Type 1, 9 NSR) (Continuous)

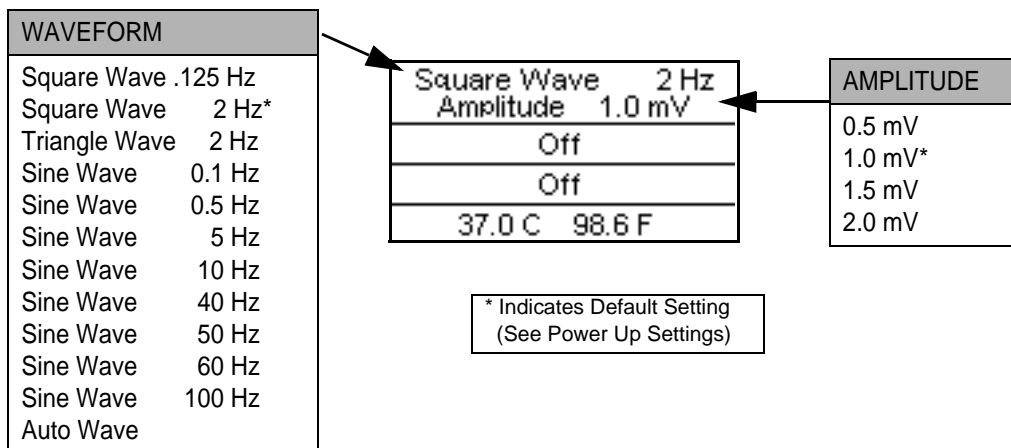
Abbreviation	Arrhythmia	Description
<b>PVC 1 R on T – Man</b>	R on T Type 1 Premature Ventricular Contraction	NSR of 80 BPM with periodic left focus premature ventricular beats with 65 % premature timing, placing R on the previous T (One-Time event)
<b>Multifocal PVCS – Auto</b>	Multifocal Premature Ventricular Contraction	NSR of 80 BPM with Type 1 and Type 2 PVCs (PVC Type 1, 2 NSR, PVC TYPE 2, 2 NSR) (Continuous)
<b>Multifocal PVCS – Man</b>	Multifocal Premature Ventricular Contractions	NSR of 80 BPM with Type 1 and Type 2 PVCs (PVC Type 1, 2 NSR, PVC TYPE 2) (One-Time event)
<b>Bigeminy</b>	Bigeminal Rhythm	NSR of 80 BPM with every other beat a Type 1 PVC (Continuous)
<b>Run of 5 PVCs – Auto</b>	Run of 5 Premature Ventricular Contractions	NSR of 80 BPM with periodic group of 5 Type 1 PVCs (5 PVC Type 1, 36 NSR) (Continuous)
<b>Run of 5 PVCs – Man</b>	Run of 5 Premature Ventricular Contractions	NSR of 80 BPM with periodic group of 5 Type 1 PVCs (One-Time event)
<b>Vent Tach</b>	Ventricular Tachycardia	160 BPM, No P-wave, Beats similar to Type 1 PVC (Continuous)
<b>Vent Fib – Coarse</b>	Ventricular Fibrillation	Irregular waveform with no real P-wave or clear R-R interval (Continuous)
<b>Paced</b>	Paced Rhythm	Ventricular paced beats at 75 BPM with no P-waves (Continuous)
<b>Fetal / Maternal</b>	Fetal/Maternal ECG	Maternal NSR at 80 BPM with Fetal Heart Rate at 120 BPM (Continuous)

## ECG - PERFORMANCE

The SECULIFE | PS200 can send performance waveforms to ECG machines in 3, 5 or 12 lead configurations. It has independent outputs for each signal lead, referenced to the right leg.

There are 11 Performance waves available for testing and verifying. The SECULIFE | PS200 is placed into PERFORMANCE mode by pressing the **Performance** category key.

The display will resemble the following:



These waves and amplitudes can be selected by using **PREVIOUS** **NEXT** to highlight the parameter to change and using **UP** **DOWN** to scroll to the desired option. Then **ENTER** is used to accept the new setting.

Alternately, to see a submenu of all the options for a highlighted parameter, use **CHOICES**. Use **UP** **DOWN** to scroll to the desired option. Then **ENTER** is used to accept the new setting.

**NOTE:** Respiration and Blood Pressure outputs are disabled during performance waves.



## Auto Wave

If the Performance parameter is set to AUTO, the unit will automatically sequence through all of the performance waves, starting with Square Wave .125 Hz, incrementing at a fixed interval. The interval may be set in the System Setup Menu under “Auto Step Time”.

A countdown timer is shown in the display:

Square Wave	2 Hz
Amp 1.0 mV	Auto (05)
Off	
Off	
37.0 C 98.6 F	

Displays time (seconds) remaining before advancing to next waveform.

The **QUIT** key can be used to exit the Auto Mode during the sequence.

## BLOOD PRESSURE

**NOTE:** The Transducer Sensitivity (5 uV/V/mmHg or 40 uV/V/mmHg) must be set to correlate with the monitoring equipment before simulation can begin. (See SETUP for selection information).

The SECULIFE | PS200 offers one Blood Pressure Channel and will simulate the set Blood Pressure wave during ECG waveforms where it occurs.

There are 14 Blood Pressure settings available. Each of the six dynamic waveforms will synchronize with the NSR rate or arrhythmia selection.

The display will resemble the following:

WAVEFORM	
Arterial	120/80
Left Vent	120/0
Right Vent	25/0
Pulm Artery	25/10
CVP	15/10
PAW	10/2
Static	0 mmHg*
Static	20 mmHg
Static	40 mmHg
Static	80 mmHg
Static	100 mmHg
Static	200 mmHg
Static	250 mmHg
Static	300 mmHg
Auto Static Pressure	

Normal Sinus Rhythm	
80 BPM	1.0 mV Adult
20 BrPM 1.0 ohms	
Static	0 mmHg
37.0 C 98.6 F	

\* Indicates Default Setting  
(See Power Up Settings)

These settings can be selected by using **PREVIOUS** **NEXT** to highlight the parameter to change and using **UP** **DOWN** to scroll to the desired option. Then **ENTER** is used to accept the new setting.

Alternately, to see a submenu of all the options for a highlighted parameter, use **CHOICES**. Use **UP** **DOWN** to scroll to the desired option. Then **ENTER** is used to accept the new setting.

## Auto Static Pressure

If Auto Static Pressure is selected, the channel will automatically sequence through all of the Static Pressure settings, starting with 0 mmHg, incrementing at a fixed interval. The interval may be set in the System Setup Menu under “Auto Step Time”.

Normal Sinus Rhythm
30 BPM 1.0 mV Adult
20 BrPM 1.0 ohms
Static 0mmHg Auto(02)
37.0 C 98.6 F

Displays time (seconds) remaining before advancing to next static pressure.

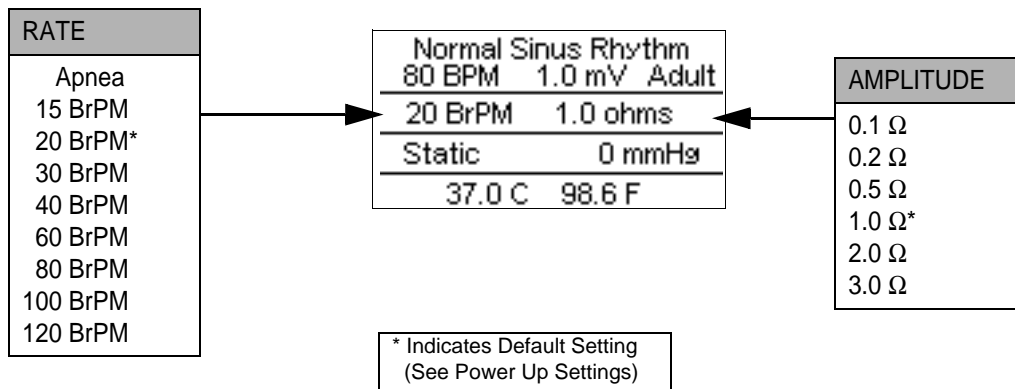
The **QUIT** key can be used to exit the Auto Mode during the sequence.

## RESPIRATION

**NOTE:** The delta ohm Respiration Signal can be inserted in either the LL or LA lead. The Baseline impedance can be set to either 500 or 1000 Ohms. These must be set to correlate with the monitoring equipment before simulation can begin. (See SETUP for selection information).

There are 9 rate settings available.

The display will resemble the following:



These rates and Impedance Variations can be selected by using **PREVIOUS** **NEXT** to highlight the parameter to change and using **UP** **DOWN** to scroll to the desired option. Then **ENTER** is used to accept the new setting.

Alternately, to see a submenu of all the options for a highlighted parameter, use **CHOICES**. Use **UP** **DOWN** to scroll to the desired option. Then **ENTER** is used to accept the new setting.

## TEMPERATURE

The SECULIFE | PS200 simulates 3 temperatures that are independent from the rest of the functions of the unit. The temperature setting can be selected at any time.

The output will simulate both YSI 400 and YSI 700 Temperature probes.

(**Note:** Both outputs are available at the output connector simultaneously.)

The display will resemble the following:

Normal Sinus Rhythm	80 BPM	1.0 mV	Adult	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">           * Indicates Default Setting (See Power Up Settings)         </div>								
20 BrPM	1.0 ohms											
Static	0 mmHg											
37.0 C	98.6 F											
				<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <table border="1" style="border-collapse: collapse; width: 100%;"> <thead> <tr> <th colspan="2" style="background-color: #cccccc;">TEMPERATURE</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">30 °C</td> <td style="padding: 2px;">86.0 °F</td> </tr> <tr> <td style="padding: 2px;">37 °C</td> <td style="padding: 2px;">98.6 °F*</td> </tr> <tr> <td style="padding: 2px;">40 °C</td> <td style="padding: 2px;">104.0 °F</td> </tr> </tbody> </table> </div>	TEMPERATURE		30 °C	86.0 °F	37 °C	98.6 °F*	40 °C	104.0 °F
TEMPERATURE												
30 °C	86.0 °F											
37 °C	98.6 °F*											
40 °C	104.0 °F											

These temperatures can be selected by using **PREVIOUS** **NEXT** to highlight the parameter to change and using **UP** **DOWN** to scroll to the desired option. Then **ENTER** is used to accept the new setting.

Alternately, to see a submenu of all the options for a highlighted parameter, use **CHOICES**. Use **UP** **DOWN** to scroll to the desired option. Then **ENTER** is used to accept the new setting.

## SETUP

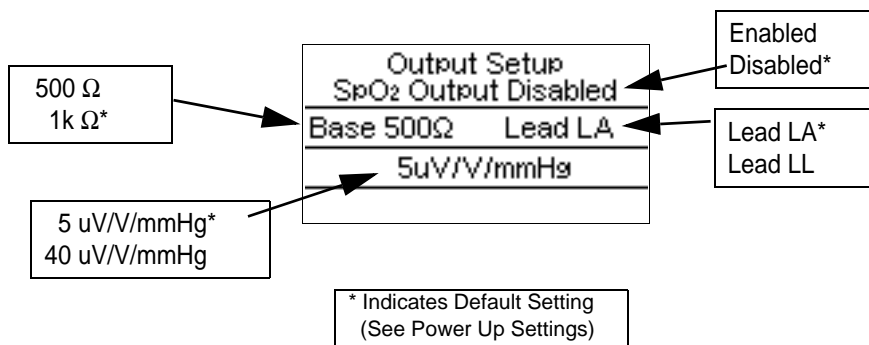
The SECULIFE | PS200 allows for setup of the Outputs and the System Parameters through the **Setup** category key. Depressing the key multiple times toggles between the Output and System Setup screens.

The Output Setup screen allows for the setting of the SpO<sub>2</sub> Output, Respiration Baseline Ohms, Respiration Lead and the Blood Pressure Sensitivity parameters. These should be set according to the device under test.

### Output Setup

The Output Setup screen allows for the setting of the parameters that control the placement and level of the outputs.

The display will resemble the following:



### System Setup

The System Setup screen allows for the setting of the parameters controlling various function of the unit as well as the viewing of Battery Life and Software information.

The display will resemble the following:

System Setup MORE+	
Auto Off Timer (Min)	30
Backlight Time (Sec)	5
Backlight Intensity	50%
Contrast Adjust	10
Battery Life	100%

These settings can be selected by using **PREVIOUS** **NEXT** to highlight the parameter to change and using **UP** **DOWN** to scroll to the desired option. Then **ENTER** is used to accept the new setting.

Alternately, to see a submenu of all the options for a highlighted parameter, use **CHOICES**. Use **UP** **DOWN** to scroll to the desired option. Then **ENTER** is used to accept the new setting.

The following is a brief description of the parameters and the available range of settings:

Parameter	Description	Range
Auto Off Timer	The elapsed time after which the unit will automatically power down. This timer is reset by each key depression. (Setting the value to 0 eliminates this feature.)	0-30 min
Backlight Timed	Off – Always off 1-30 sec – The elapsed time after which the backlight will automatically turn off. Manual – The backlight will be manually controlled by backlight key.	Off, 1-30 sec, Manual
Backlight Intensity	Sets the intensity of the backlight. <b>(Note:</b> Lower intensities extend battery life.)	0-100 %
Contrast Adjust	Sets the contrast of the display screen.	0-20
Battery Life	Displays current life of the batteries. At 5 %, a warning screen will appear. At 0 %, the unit will power down automatically.	5-100 % (Read Only)
Power up with	Selects the values that will be used when the unit is first turned on. It is also used to Set the Custom Defaults, if used. (See Power Up Settings).	Default/Last/Custom/ Set Custom Defaults
Auto Step Time	Sets the interval that is used with the Auto increment features in BPM, BP Rate and Performance.	1 to 60 sec
Software	Displays current software program.	(Read Only)

## POWER UP SETTINGS

The SECULIFE | PS200 allows the user to tailor the settings that the unit will have on Power Up. The “Power Up With” parameter in the System Setup Menu allows for the selection of either Default, Last or Custom selections.

### Default

If this option is selected the following settings will be used every time the unit is turned on.

ECG – NSR: 80 BPM, 1.0 mV, Adult QRS, SpO<sub>2</sub> Output Disabled

ECG – Performance: 2 Hz Square Wave, 1.0 mV

Respiration: 20 BrPM, delta 1.0 Ω, 1000 Ω baseline, LA lead

Blood Pressure: 0 mmHg, 5 uV/V/mmHg sensitivity

Temperature: 37 °C (98.6 °F)

System Setup:

Auto Timer Off            30 min

Backlight Time            5 sec

Backlight Intensity      100 %

Contrast Adjust            10

Power Up With             Default

Auto Step Time            5 sec

### Last

If this option is selected, the unit will remember the settings that were being used when it was turned off and bring them back when the power is turned on.

### Custom

If this option is selected, the user may save a unique set of default parameters and the unit will recall them every time the power is turned on.

### Set Current as Custom

To create the set of custom default parameters, this fourth choice is provided in this parameter. The user simply configures the unit to the desired default conditions, selects this option and presses **ENTER**. The current configuration is then saved as the Custom Power up values.



## SPO<sub>2</sub> (Option)

The SECULIFE | PS200 has the ability to drive an external SpO<sub>2</sub> module. This module (SECULIFE OX) accepts the FingerSim family of SpO<sub>2</sub> finger simulators (fingers are available with SpO<sub>2</sub> of 80, 90 and 97 %). The output pulses the fingers at the NSR BPM rate (up to 180 BPM). The output is off in Arrhythmia and Performance Modes.

The module plugs directly into the AUX (7 pin mini din) connector and is powered from the SECULIFE | PS200. The output is only functional when the unit is powered from the Battery Eliminator provided with the SECULIFE OX Module, since the batteries do not have enough power to run this option.

The output is enabled and disabled in the Setup Output screen.

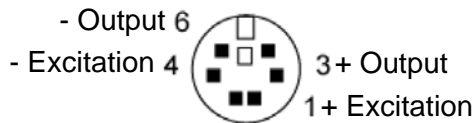


## OUTPUT CONNECTIONS

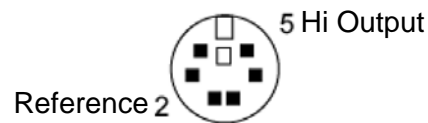
The following are representations of the socket connectors found on the unit. They are viewed as if looking at the socket in the unit, not the cable pins.

### BP CONNECTOR

#### Blood Pressure

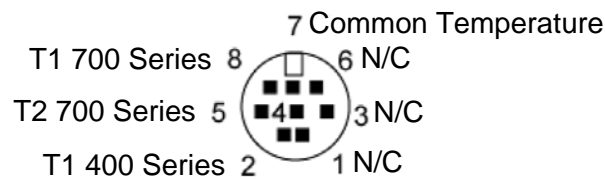


#### Hi Output



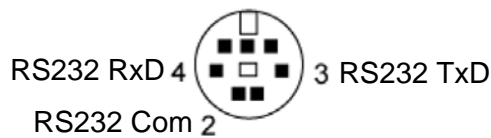
### TEMP CONNECTOR

#### Temperature

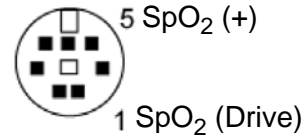


### AUX CONNECTOR

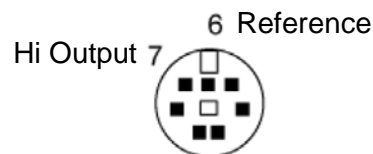
#### RS232



#### SpO<sub>2</sub>



#### Hi Output



## LIMITED WARRANTY

**WARRANTY:** GMC-I MESSTECHNIK GMBH WARRANTS ITS NEW PRODUCTS TO BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP UNDER THE SERVICE FOR WHICH THEY ARE INTENDED. THIS WARRANTY IS EFFECTIVE FOR TWELVE MONTHS FROM THE DATE OF SHIPMENT.

**EXCLUSIONS:** THIS WARRANTY IS **IN LIEU OF** ANY OTHER WARRANTY EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF **MERCHANTABILITY** OR FITNESS FOR A PARTICULAR PURPOSE.

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NO PERSON OTHER THAN AN OFFICER IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR ASSUME ANY LIABILITY.

**REMEDIES:** THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY SHALL BE: (1) THE REPAIR OR REPLACEMENT OF DEFECTIVE PARTS OR PRODUCTS, WITHOUT CHARGE. (2) AT THE OPTION OF **GMC-I MESSTECHNIK GMBH**, THE REFUND OF THE PURCHASE PRICE.

## SPECIFICATIONS



ECG SIMULATION			
RATE	NORMAL SINUS RHYTHM	30, 60, 80, 120, 180, 240, 300 BPM	
	PERFORMANCE WAVEFORMS	SINE	0.1, 0.5, 5, 10, 40, 50, 60, 100 Hz
		SQUARE	0.125, 2.0 Hz
		TRIANGLE	2.0 Hz
	ACCURACY	$\pm 1\%$	
AMPLITUDE	0.5, 1.0, 1.5, 2.0 mV (Lead II)		
	ACCURACY	$\pm 2\%$ @ Lead II	
HIGH LEVEL	OUTPUT	200 times Amplitude	
	ACCURACY	$\pm 5\%$	
LEAD TO LEAD IMPEDANCE	RL, LL, RA, LA	500, 1000 $\Omega$	
	V1-V6	1000 $\Omega$	

IBP SIMULATION		
STATIC PRESSURE	0, 20, 40, 80, 100, 200, 250, 300 mmHg	
	Accuracy	$\pm (2\% \text{ of Reading} + 2 \text{ mmHg})$
IMPEDANCE	300 $\Omega$	
	Accuracy	$\pm 10\%$
EXCITATION RANGE	2 to 16 V RMS	
EXCITATION FREQUENCY	DC to 5 kHz	
SENSITIVITY	5 or 40 $\mu\text{V/V/mmHg}$	

RESPIRATION		
RATE	Apnea, 15, 20, 30, 40, 60, 80, 100, 120 BrPM	
	Accuracy	$\pm 1\%$
IMPEDANCE DELTA	0.1, 0.2, 0.5, 1.0, 2.0, 3.0 $\Omega$	
	Accuracy	$\pm 10\%$
BASELINE	500, 1000 $\Omega$	
	Accuracy	$\pm 5\%$
LEAD	LA or LL	

TEMPERATURE SIMULATION	
SELECTION	30, 37, 40 $^{\circ}\text{C}$ (86.0, 98.6, 104.0 $^{\circ}\text{F}$ )
ACCURACY	$\pm 0.1\text{ }^{\circ}\text{C}$
TYPE	YSI Series 400 and 700

PHYSICAL & ENVIRONMENTAL		
DISPLAY	128 X 64 Pixels Graphical LCD, White LED Backlight	
CONSTRUCTION	ENCLOSURE	ABS Plastic
	FACE PLATE	Lexan, Back printed
ENCLOSURE	8.97 x 6.04 x 1.72 Inches (227.8 x 153.4 x 43.7 mm)	
WEIGHT	< 2 Lbs (0.91 kg)	
OPERATING RANGE	15 to 40 °C (59 to 104 °F)	
STORAGE RANGE	-20 to 65 °C (-4 to 149 °F)	

ELECTRICAL		
BATTERY	9V Alkaline Battery (2 Required) (ANSI/NEDA 1604A or equivalent)	
BATTERY ELIMINATOR	WITHOUT SECULIFE OX	9 VDC, 200 mA 
	WITH SECULIFE OX	10 VDC, 500 mA 
LEAD TEST IMPEDENCE	< 1000 Ω	

<b>NOTES</b>
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## Repair and Replacement Parts Service Calibration Center\* and Rental Instrument Service

If required please contact:

GMC-I Service GmbH  
Service-Center  
Thomas-Mann-Strasse 16-20  
90471 Nürnberg • Germany  
Phone:+49 911 817718-0  
Fax: +49 911 817718-253  
E-mail [service@gossenmetrawatt.com](mailto:service@gossenmetrawatt.com)  
[www.gmci-service.com](http://www.gmci-service.com)

This address is only valid in Germany. Please contact our representatives or subsidiaries for service in other countries.

\* DAkkS Calibration Laboratory for Electrical Quantities  
D-K-15080-01-01 accredited per DIN EN ISO/IEC 17025:2005

Accredited quantities: direct voltage, direct current value, direct current resistance, alternating voltage, alternating current value, AC active power, AC apparent power, DC power, capacitance, frequency and temperature

## Product Support

If required please contact:

GMC-I Messtechnik GmbH  
**Product Support Hotline**  
Phone:+49-911-8602-0  
Fax: +49 911 8602-709  
E-mail:[support@gossenmetrawatt.com](mailto:support@gossenmetrawatt.com)

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