Operating Manual

GOSSEN METRAWATT

SECULIFE NIBP

NON-INVASIVE BLOOD PRESSURE SIMULATOR

3-349-626-03
1/3.11

Contents

WARNING - USERS

The SECULIFE NIBP Simulator is for use by skilled technical personnel only.

WARNING - USE

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

WARNING - MODIFICATIONS

The SECULIFE NIBP Simulator 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.

WARNING - CONNECTIONS

All connections to patients must be removed before connecting the Device Under Test (DUT) to the Simulator. A serious hazard may occur if the patient is connected when testing with the Simulator.
Do not connect any leads from the patient directly to the Simulator or DUT.

WARNING - ADAPTER

Turn Power Off and unplug any AC Power Adapter before cleaning the surface of the Simulator.

WARNING - LIQUIDS

Do not submerge or spill liquids on Simulator. Do not operate the Simulator if internal components may have been exposed to fluid, as the internal leakage may have caused corrosion and be a potential hazard.

CAUTION - SERVICE

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

CAUTION - ENVIRONMENT

The SECULIFE NIBP Simulator is intended to function between 15 and 40 °C. Exposure to temperatures outside this range can adversely affect the performance of the Simulator.

CAUTION - CLEANING

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

CAUTION - INSPECTION

The SECULIFE NIBP Simulator should be inspected before each use for wear and the Simulator should be serviced if any parts are in question.

CE

EG - KONFORMITÄTSERKLÄRUNG
DECLARATION OF CONFORMITY

GMC-I MESSTECHNIK

Dokument-Nr./ Document.No.:	820 / 11-018
Hersteller/ Manufacturer:	GMC-I GOSSEN-METRAWATT GMBH
Anschrift / Address:	Südwestpark 15 D - 90449 Nürnberg
Produktbezeichnung/ Product name:	Blood Pressure Simulator Blood Pressure Simulator
Typ / Type:	SECULIFE NIBP
Bestell-Nr / Order No:	M695E

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 : 2011	Electrical equipment for use within certain voltage limits - Low Voltage Directive - Attachment of CE mark : 2011

EN/Norm/Standard	IEC/Deutsche Norm	VDE-Klassifikation/Classification
EN 61010-1 : 2001	IEC 61010-1 : 2001	VDE 0411-1 : 2002

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

Fachgrundnorm / Generic Standard

EN 61326-1 : 2006

Nürnberg, den 10.02.2011
Ort, Datum / Place, date:

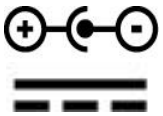
Geschäftsführung / managing director

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.

----------Vorlage: FC8F29 -10.08----------Datei : 11 Steuerdatei Sparte PM.doc

NOTICE – SYMBOLS

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

NOTICE – ABBREVIATIONS

AC	**Alternating Current**
BP	**Blood Pressure**
Bpm	**Beats per minute**
brpm	**breaths per minute**
C	**Celsius**
°	**degree**
DUT	**Device Under Test**
Dias	**Diastolic**
ECG	**Electrocardiogram**
Euro	**European**
HR	**Heart Rate**
Hz	**hertz**
k	**kilo- (10^3)**
Kg	**Kilogram**
µ	**micro- (10^{-6})**
µA	**microampere**
m	**milli- (10^{-3})**
mA	**milliampere**
mm	**millimeter**
mmHg	**millimeter mercury**
mV	**millivolt**
min	**minutes**
Neo	**Neonatal**
NSR	**Normal Sinus Rhythm**
Ω	**ohm**
lbs	**pounds**
R	**Respiration**
Sec	**seconds**
Syst	**Systolic**
US	**United States**
VDC	**Direct Current Voltage**

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Gossen Metrawatt
SECULIFE NIBP
NON-INVASIVE BLOOD PRESSURE SIMULATORS

The Model SECULIFE NIBP is a Microprocessor based, High Precision Non-Invasive Blood Pressure (NIBP) Simulator. The unit is small, easy to use and has multiple features to fit many different applications. The SECULIFE NIBP offers Invasive Blood Pressure, Temperature, Arrhythmias and a Leak Rate test mode.

The graphical display provides multiple screens containing pressure in mmHg, a plot of the overall pressure, or a close-up of the BP waveform.

The following are highlights of the main features:

- LARGE BACKLIT GRAPHICAL LCD DISPLAY WITH CURSOR SELECTION OF OPTIONS AND PARAMETERS
- FULL RANGE MANOMETER
- ADULT, NEONATAL, HYPERTENSIVE, AND HYPOTENSIVE MODES
- 0-500 mmHg PRESSURE RANGE
- +/- 1% OF READING PRESSURE ACCURACY
- DIGITAL PRESSURE ENVELOPE OFFSET
- OPTIONAL PEAK PRESSURE DETECT WITH SIMPLE RESET
- SpO_2 READY – COMPATIBLE WITH MSP-2100 MODULE
- DIGITAL CALIBRATION – NO POTS TO TURN
- SELECTABLE DISPLAY OPTIONS AND DIGIT SIZES
- SOFTWARE ADJUSTABLE CONTRAST
- FLASH PROGRAMMABLE
- BATTERY LIFE DISPLAY (0 TO 100%)
- OPTIONAL RECHARGEABLE NiMH BATTERIES
- BATTERY ELIMINATOR
- RS232 INTERFACE
- ECG OUTPUT WITH FULL NSR WAVEFORM
- SINUSOIDAL RESPIRATION SIMULATION
- ECG TEST WAVEFORMS
- PACE WAVEFORM
- OPTIONAL PEAK PRESSURE DETECT WITH ECG ALARM TEST
- ECG SYNCHRONIZED WITH BLOOD PRESSURE
- SYNCHRONIZED INVASIVE BLOOD PRESSURE OUTPUT
- SELECTABLE IBP SENSITIVITY 5/40 µV/V/mmHg
- STATIC IBP SIMULATION –10mmHg TO 400 mmHg
- LEAK RATE TEST
- ECG ARRHYTHMIA WAVEFORMS
- ECG ARRHYTHMIA SEQUENCE
- YSI 400 AND 700 SERIES TEMPERATURE SIMULATION

AVAILABLE MODELS:

M695E SECULIFE NIBP	SECULIFE NIBP; RECHARGEABLE BATTERY, CALIBRATION CERTIFICATE, BATTERY ELIMINATOR (EUROPE)
M695K SECULIFE NIBP KIT	SECULIFE NIBP, RECHARGEABLE BATTERY, 5 ADAPTERS & SOFT CARRYING CASE, CALIBRATION CERTIFICATE, BATTERY ELIMINATOR (EUROPE)

OPTIONAL ACCESSORIES:

- Z695E SOFT CARRYING CASE
- Z695F DINAMAP/CRITIKON ADAPTER
- Z695G QUICK DISCONNECT ADAPTER
- Z695H LUER ADAPTER
- Z695I MARQUETTE ADAPTER
- Z695J BULB ADAPTER
- Z695A SECULIFE OX[1] MODULE
- Z695B FINGERSIM SET (3 FingerSims 80, 90 & 97%, Soft Carrying Case & User Manual)
- Z695K FINGERSIM REPLACEMENT SET (3 FingerSims)

- BC20-40602 NIBP FITTING KIT (HP CUFF ADAPTER, PRESSURE BALL, CPC PLUG, QUICK COUPLING WITH 1/8 INCH MNPT, SILICON HOSE AND T-FITTING)
- BC20-40605 NIBP ADAPTER SET (11 PLUGS)
- BC20-40613 BATTERY ELMINATOR (US)

INVASIVE BLOOD PRESSURE AND TEMPERATURE CABLES

For a complete list consult our front office
info@gossenmetrawatt.com

OVERVIEW

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

10 Snap Patient Lead Connectors:

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

Male Quick Connect for Pressure Input

LCD Graphical Display:
Shows Test Data and Configuration Data

6 Light Touch Keys for Selecting Parameters and Settings:
POWER for Turning Unit On and Off
UP and DOWN Arrows for Scrolling Through Selected Options. (When No Options are Selected, for Changing Display Screen.)
SELECT for Choosing Setting or Parameter to Change
SETUP/RETURN for Entering and Exiting Setup Menu
RESET for resetting peak pressure reading.

6 pin Mini-Din connector for IBP

8-Pin Mini-DIN Plug Connector for Temperature

7 pin Mini-Din connector for RS-232 and SpO_2

Power 2.1 mm Jack

KEYS

Six tactile-touch keys are provided for system operation:

 – This key turns the unit off and on. The unit will return to the screen that was active when it was turned off.

– In the DISPLAY MODE, these keys toggle the display through the available main screens.

In the SELECT MODE, if a parameter has been highlighted, these keys will scroll through the available settings.

– On the Main screen, this key sequences through the available NIBP or ECG simulations. On the Setup screen, there are a number of parameters that may be selected and changed. This key sequences the cursor (Highlight) through those parameters.

– This key is used to RESET the peak pressure reading or to begin a Leak Test.

– This key toggles the unit into and out of the Setup Mode. Depressing this key will enter the Setup screen where the configuration can be viewed and adjusted. Depressing the key again will exit the Setup Mode and return to the previously viewed main screen.

SCREENS

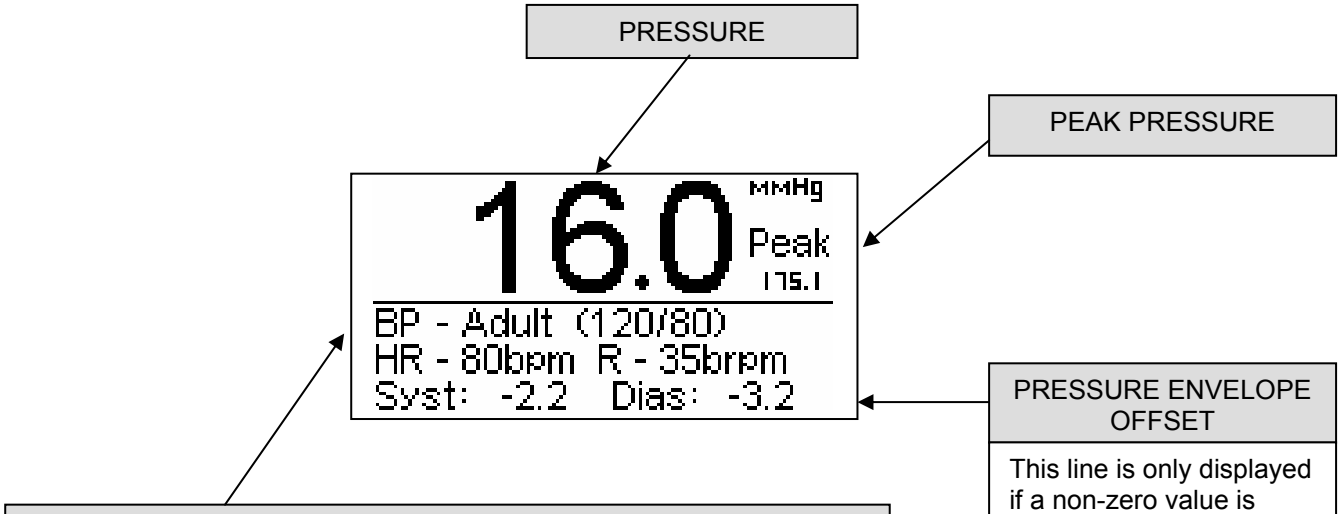
MAIN SCREENS – There are five main screens: Pressure Only, Pressure with Output Waveform, Pressure with Pressure Graph, ECG (optional) and Battery Indicator (optional).

The available screens can be toggled using 

.

PRESSURE ONLY SCREEN – This screen has a large pressure display, as shown below. Also displayed on this screen is the peak pressure and selected output waveform

The display will resemble the following:



OUTPUT SELECTION

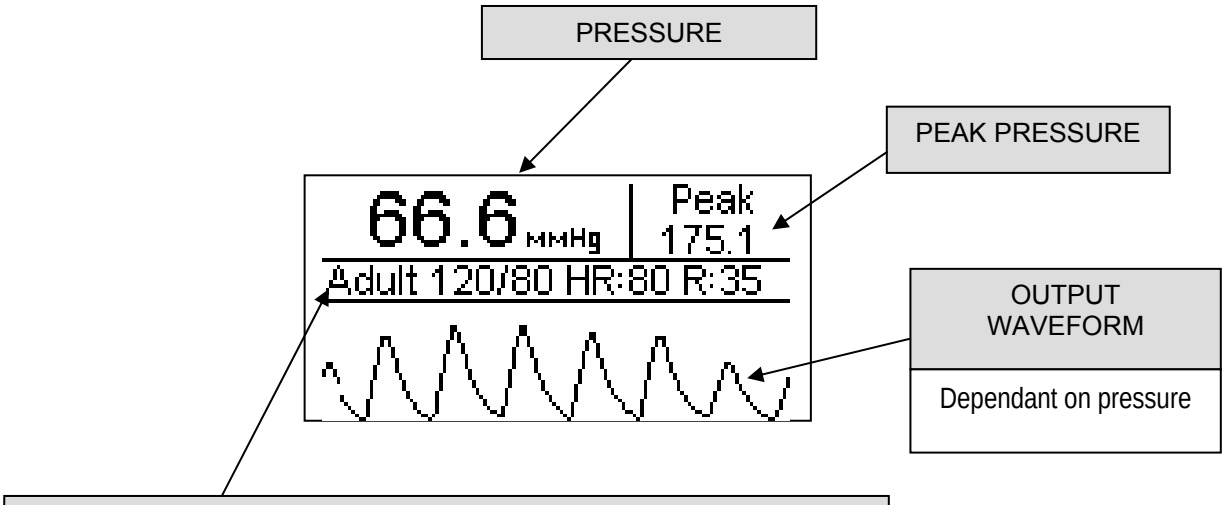
Systolic/Diastolic (mean)	Mean	Heart Rate	Respiration Rate (Optional)
Adult 120/80	93	80	35
Adult 120/80 w/Pace	93	Pacemaker 80	35
Adult High 190/120	150	80	35
Adult Low 80/40	53	80	35
Neonatal 70/40	55	94	47
Alarm Test (Optional) (Alternates every 30 sec)	-	47 160	00 80
Arrhythmia Seq	-	80	35
Leak Test	-	-	-
Manometer	-	-	-

OUTPUT WAVEFORM SCREEN – This screen shows the pressure, peak pressure, output selection, and output waveform.

NOTE

This waveform is not intended to be physiologically correct.

The display will resemble the following:



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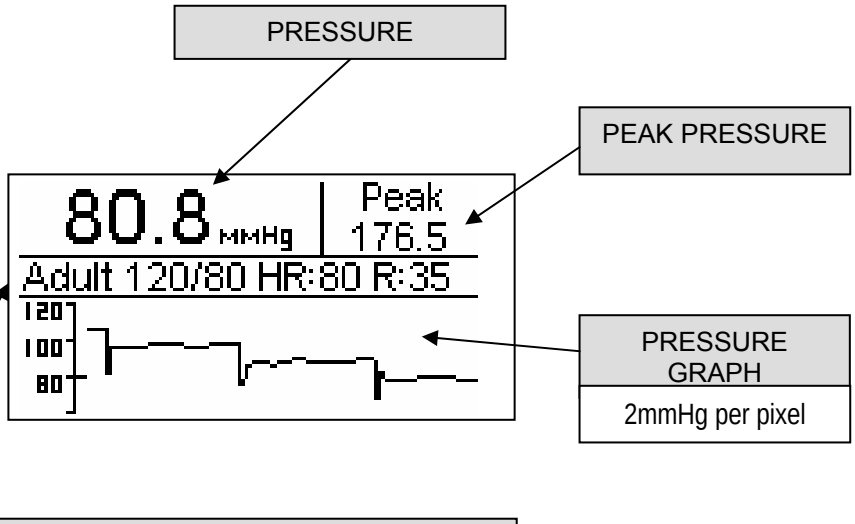
Systolic/Diastolic (mean)	Mean	Heart Rate	Respiration Rate (Optional)
Adult 120/80	93	80	35
Adult 120/80 w/Pace	93	Pacemaker 80	35
High (Adult) 190/120	150	80	35
Low (Adult) 80/40	53	80	35
Neo (Neonatal) 70/40	55	94	47
Alarm Test (Optional) (Alternates every 30 sec)	-	47 160	00 80
Arrhythmia Seq	-	80	35
Leak Test	-	-	-
Manometer	-	-	-

PRESSURE GRAPH SCREEN – This screen provides a graph of the pressure, as well as, the pressure, peak pressure and output selection



OUTPUT SELECTION

Systolic/Diastolic (mean)	Mean	Heart Rate	Respiration Rate (Optional)
Adult 120/80	93	80	35
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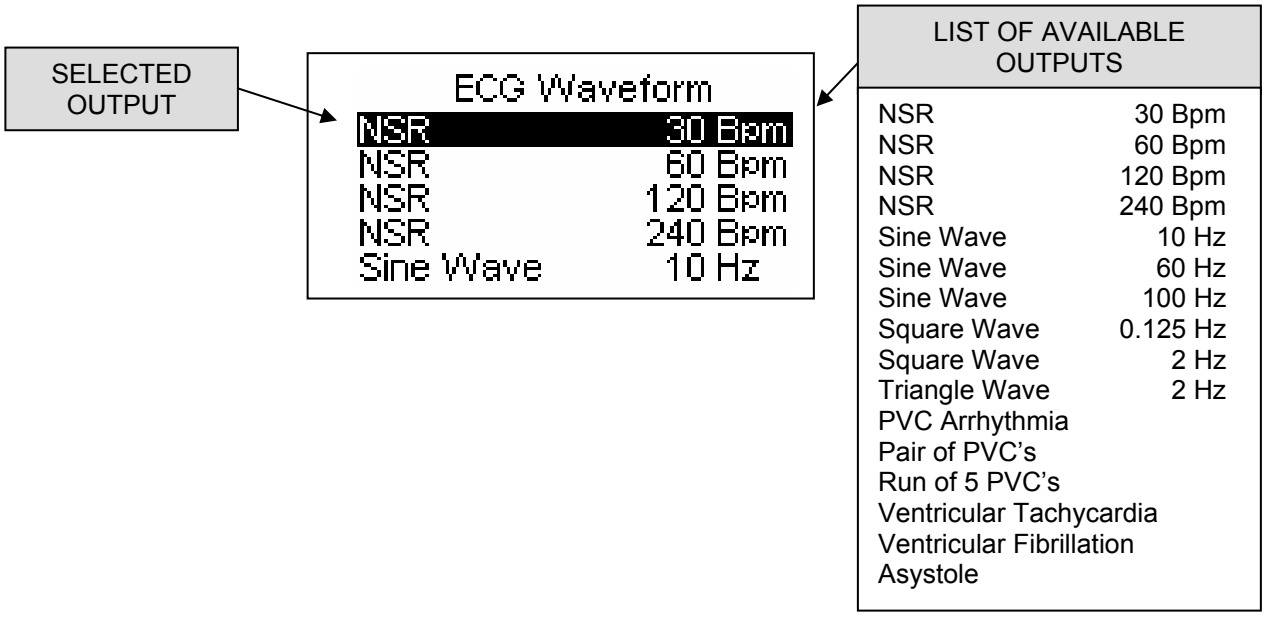
Low (Adult) 80/40	53	80	35
Neo (Neonatal) 70/40	55	94	47
Alarm Test (Optional) (Alternates every 30 sec)	-	47 160	00 80
Arrhythmia Seq	-	80	35
Leak Test	-	-	-
Manometer	-	-	-

ECG OUTPUT SCREEN – This screen shows the selected ECG output mode.

NOTE: While in this mode, the NIBP simulation does not run.

NOTE: NSR ECG output is active during NIBP testing at the rate stipulated for the selected test.

The display will resemble the following:

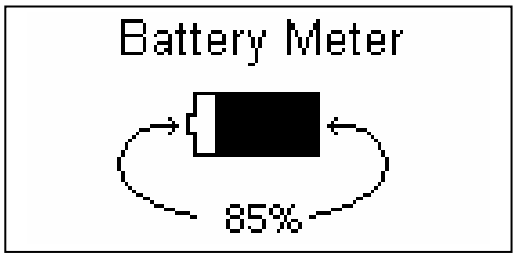


BATTERY INDICATOR SCREEN – This screen shows the status of the battery voltage level with Built-In Battery Option only.

NOTE: It is only an estimate of the battery life remaining.

When the level reaches 10%, the BP simulation mode will be disabled; however, the Manometer and ECG (optional) will continue to function. Once the battery level reaches 0%, the unit will automatically turn itself off to avoid damaging the batteries.

The display will resemble the following:



Batteries charge from provided AC power adapter. The charge time is about 4 hours from full discharge. While the batteries are charging, the display will flash “charging.”

CAUTION

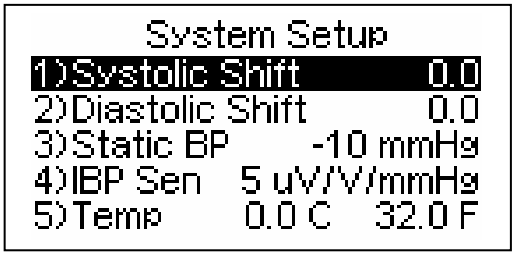
USE ONLY THE AC POWER ADAPTER PROVIDED WITH THE SECULIFE NIBP.

SETUP

The Setup Mode allows the user to adjust the configuration of the simulator. The Setup screen can be entered using the SETUP RETURN key.

The parameters can be changed by using SELECT key to highlight the line and SCREEN to toggle the available options.

The Setup screen can be exited using the SETUP RETURN key.



The following is a breakdown of the parameters available in the configuration of the unit and their available options:

System Setup Configuration		
Parameter	**Description**	**Range**
Systolic Shift	Adjusts the Systolic Output of the NIBP Simulation. This is not a direct mmHg adjustment.	±50.0
Diastolic Shift	Adjusts the Diastolic Output of the NIBP Simulation. This is not a direct mmHg adjustment.	±50.0
Static BP	Adjusts the Static Blood Pressure Output.	-10 to 400 mmHg
IBP Sens	Selects the Invasive Blood Pressure Output sensitivity.	5 µV/V/mmHg 40 µV/V/mmHg
Temp	Selects the simulated Temperature output.	0, 24, 30, 35, 37, 40, 42 C
SpO_2 Output	This parameter determines whether the SpO_2 output pulse is active. The output drives an MSP-2100 FingerSim Module.	Off/On
Auto Off Timer (Min)	Determines the period of inactivity before the unit is turned OFF. A timer is started when the unit is turned ON and is reset each time a key is pressed. When the timer reaches the value set in this parameter, the power is automatically turned OFF. (NOTE: Setting this parameter to 0 disables the Auto Off timer. When running from line power, the unit does not automatically shut off. Auto Off timer is inactive during a test.)	0-30 Minutes
Contrast Adjust	Sets the contrast of the display screen.	0-20
Backlight (Sec)	Off – Always off 1-30 sec – The elapsed time after which the backlight will automatically turn off. ON – Always ON. The Default setting is 30 seconds.	Off, 1-30 sec, ON
Battery Life	Available only with Battery Option installed. Displays current life of the battery. At 10%, a warning screen will appear. At 0%, the unit will power down automatically.	0-100% (Read Only)
Software	Displays current software program.	(Read Only)

SYSTOLIC AND DIASTOLIC SHIFT – The SECULIFE NIBP is equipped with the option to shift test results to compensate for different methods of measuring Oscillometric NIBP by various manufacturers and models of devices under test.

CAUTION

These adjustments must be used with caution as they will allow the user to adjust the output results to invalid values.

These adjustments should only be used to aid in the simplification of testing and with documented controls.

There are no absolute standards for Oscillometric NIBP readings; therefore, for a number of reasons (including patents, technology, etc.), each manufacturer has established a different method for evaluating the oscillometric pulses. Due to these varying methods, precisely the same waveforms will give different results on different manufacturer's units.

The normal technique used is to run the monitor against a fixed source like the SECULIFE NIBP, with the understanding that each manufacturer has a predictable error from this norm. While this is generally the most direct method, users have asked for a method to correct for this difference, making the monitors read the same as the test unit. The Systolic and Diastolic Shift settings allow for just such correction.

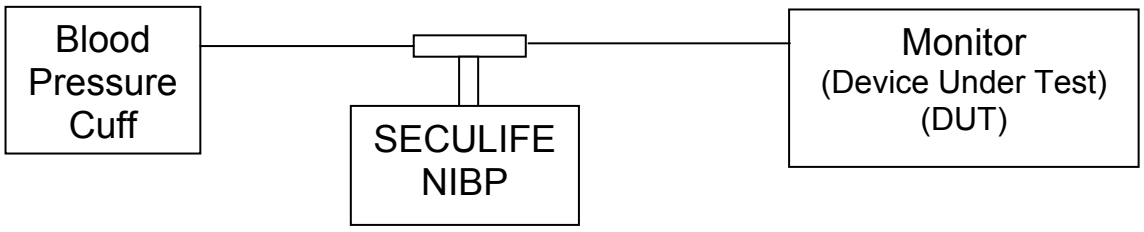
These adjustments are indicated in a line added to the main display to inform the user of any shift that has been programmed into the system. This is done so there is no misunderstanding of the meaning of the results.

OPERATIONS

CONNECTING PRESSURE CUFFS

The SECULIFE NIBP Blood Pressure Simulator is connected between the blood pressure cuff and the monitor (Device Under Test, DUT).

The blood pressure cuff should be disconnected from the DUT and a ‘T’ adapter inserted between the cuff and the DUT. The NIBP simulator is then connected to the open side.



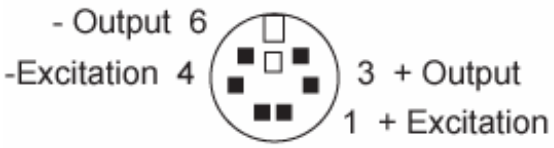
Roll the cuff tightly on itself or around a mandrel.

CONNECTING PATIENT LEADS

For the models with ECG output, test snaps are provided along the sides and are identified by the markings on the overlay.

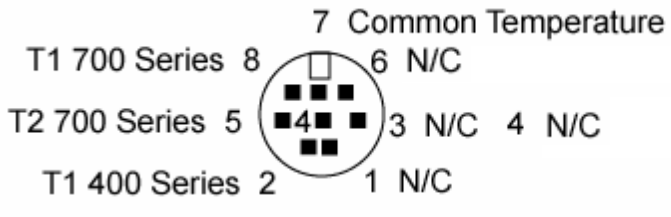
IBP CONNECTOR

Connect a standard BP test cable (mini-din to monitor connector) between the SECULIFE NIBP and the DUT (Device Under Test). The pin-out shown below for the mini-din is the industry standard configuration that is used on most modern simulators.



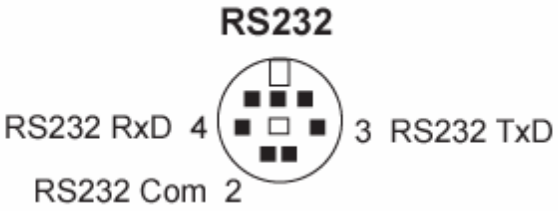
TEMPERATURE CONNECTOR

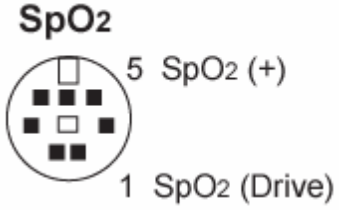
Connect a standard Temperature test cable (mini-din to monitor connector) between the SECULIFE NIBP and the DUT (Device Under Test). The pin-out is shown below.



AUX CONNECTOR

The Aux connector is used for both serial communications and SpO_2. The SECULIFE OX[1] module plugs directly into the Aux port and provides the SpO_2 function.





THEORY OF OPERATIONS

NIBP (Non-Invasive Blood Pressure) Function

A digital stepping motor and piston assembly is used to generate the output waveforms. A differential pressure sensor is used to measure the pressure of the cuff. The pressure sensor is read by a 16-bit differential Analog to Digital converter.

The cuff pressure is monitored and the motor/piston assembly reacts to provide the correct response based on the selected mode.

IBP (Invasive Blood Pressure) Function

A 12-bit Digital to Analog converter is used to generate the IBP waveforms. The output circuit is fully isolated and capable of switching between the two standard sensitivities (5 µV/V/mmHg and 40 µV/V/mmHg).

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 seven different temperatures selectable for each.

ECG Function

The ECG output is performed by a 12-bit Digital to Analog converter. All waveforms for the standard ECG and Arrhythmias are generated via data stored in the program.

Respiration Function

A 12-bit Digital to Analog converter is used to generate the respiration waveform. The respiration output is present on the LA ECG lead only. Refer to Monitor manual to determine which lead the Monitor uses for respiration. It may be necessary to reverse the LA and LL leads for respiration to be detected.

RUNNING A TEST

The SECULIFE NIBP includes 9 Basic Test Modes and 3 Sub-Test Modes. This section will walk through each of the tests and their basic operation.

The Main Tests are accessible with a single key. The 

key will scroll through the following tests in a continuous loop:

Adult 120/80
Adult 120/80 w/Pace
Adult High 190/120
Adult Low 80/40
Neonatal 70/40
Alarm Test
Arrhythmia Seq
Leak Test
Manometer

BASIC TEST MODES

NIBP:

The first 5 test modes deal with various NIBP setups. To run an NIBP simulation, the cuff and monitor are connected to the pressure input. Then the measurement is initiated by the monitor and the SECULIFE NIBP unit will output the proper waveform based on the cuff pressure provided by the monitor and the selected simulation.

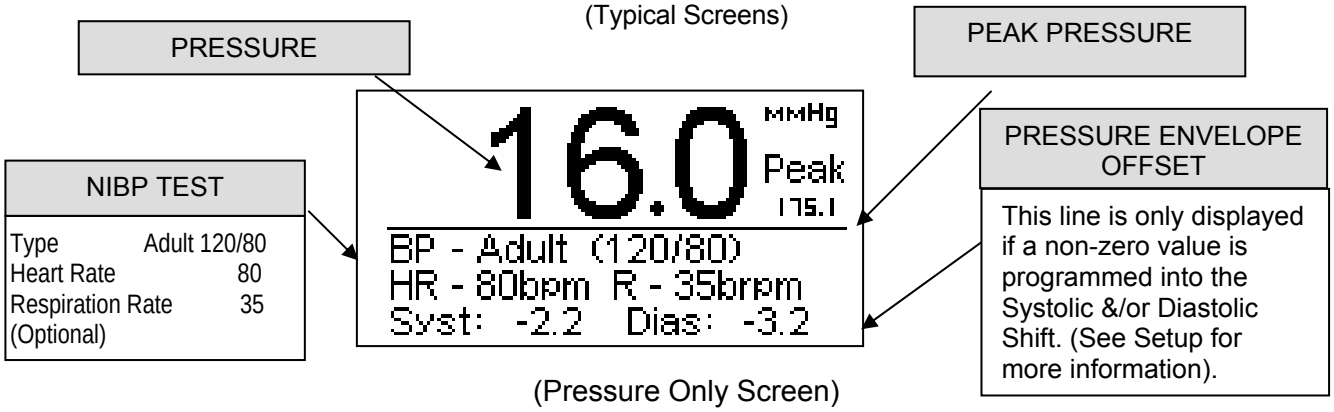
The NIBP output mode can be changed by pressing the 

key. Once the desired operating mode is selected, the output will automatically begin when the correct pressure is detected.

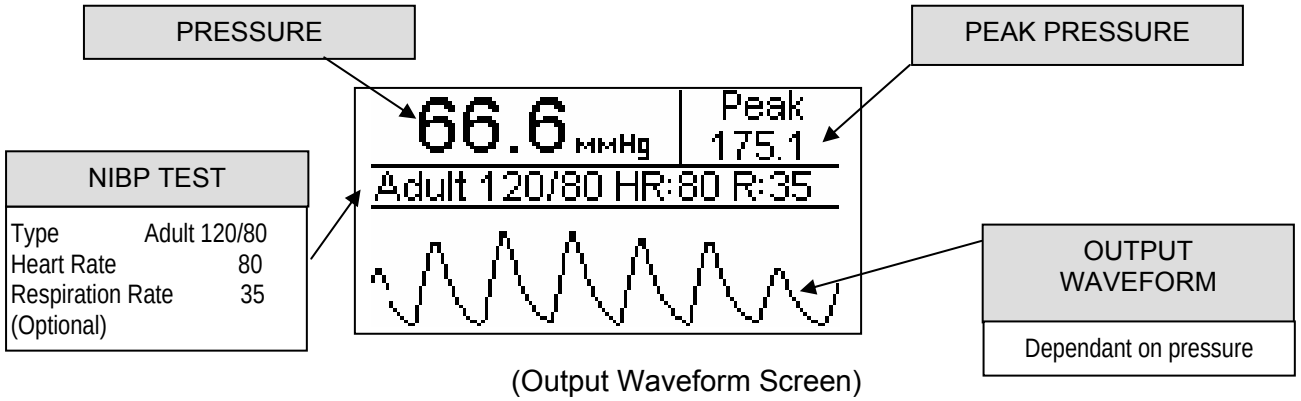
There are 5 selectable NIBP Basic Test Modes; Adult, Adult w/pace, Adult High, Adult Low and Neonatal. The displays will resemble the following examples:

NOTE: The screens for the first test will have the individual components labeled. The component labels for subsequent tests are the same.

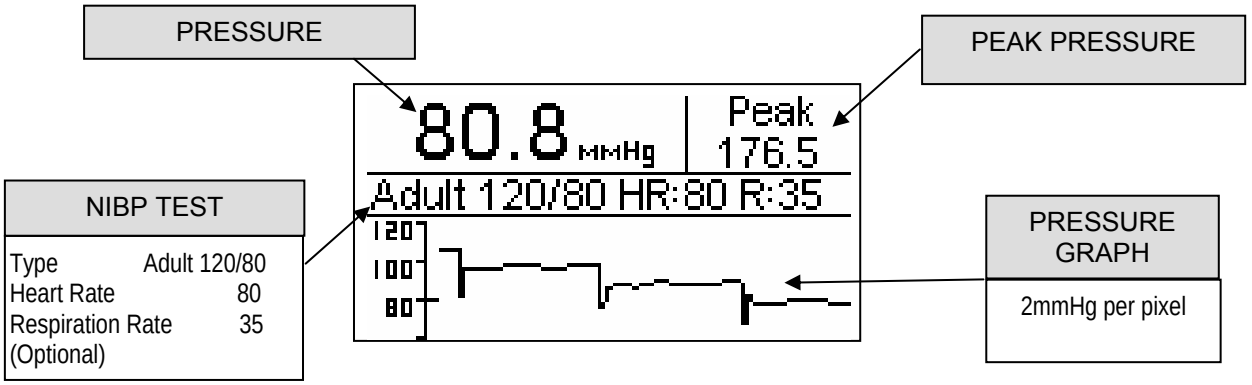
Adult 120/80
(Typical Screens)



(Pressure Only Screen)

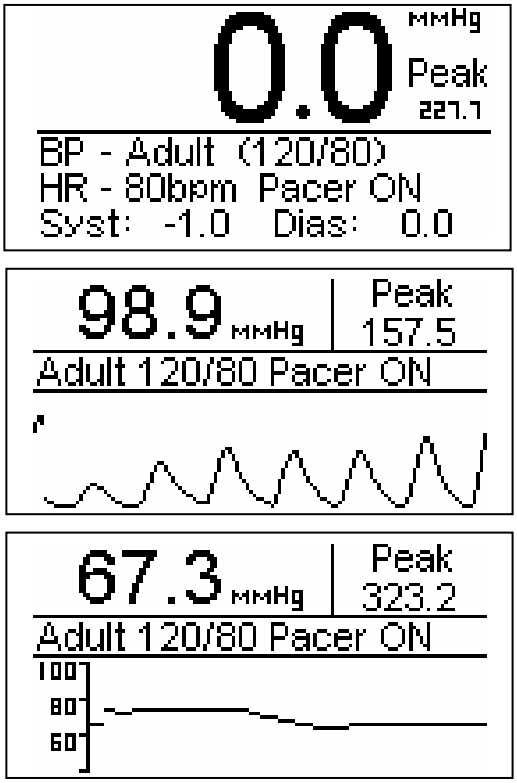


(Output Waveform Screen)

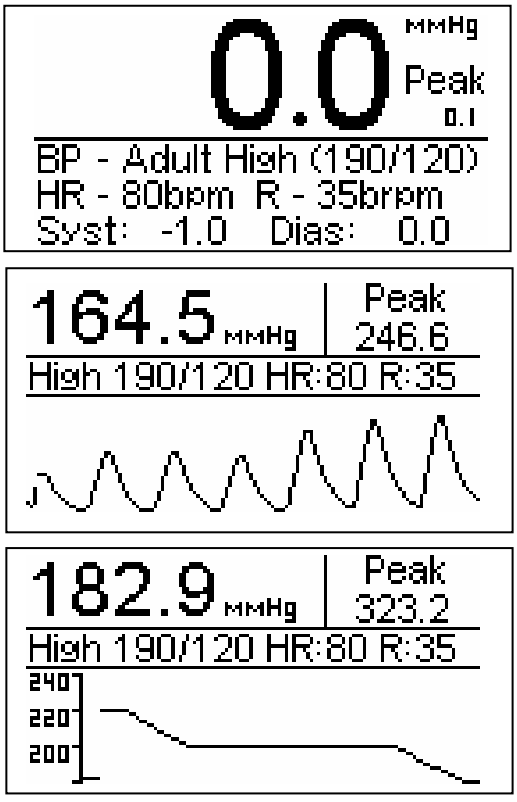


(Pressure Graph Screen)

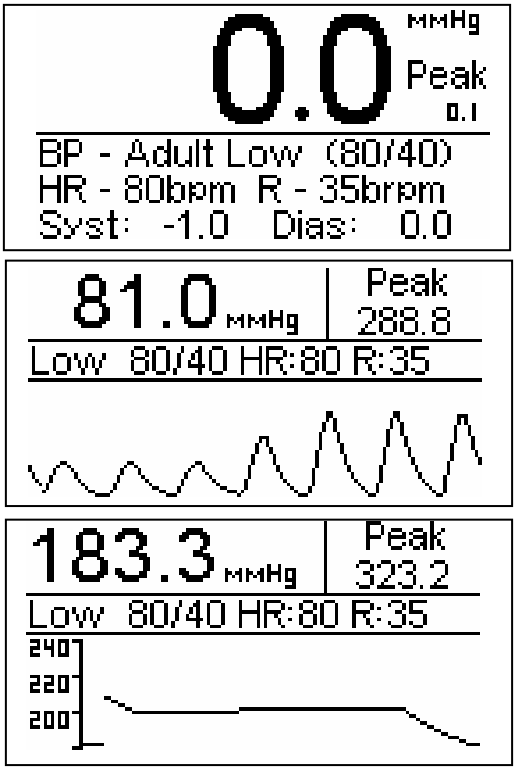
Adult 120/80 with Pace
(Typical Screens)



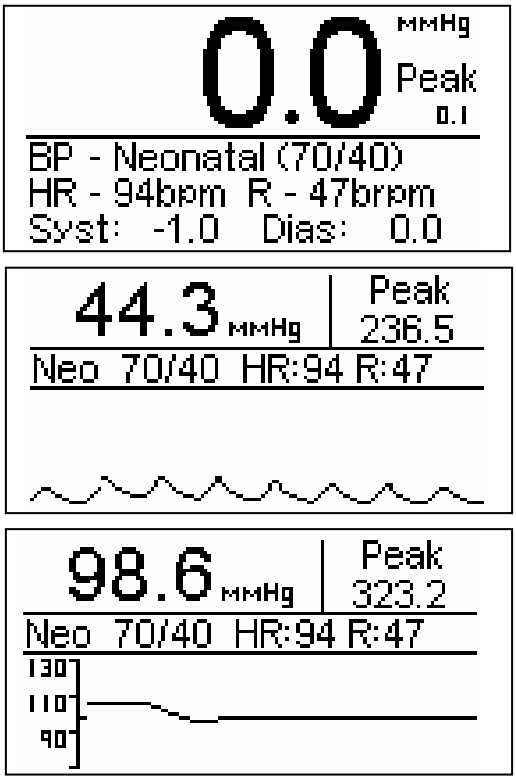
Adult High 120/80
(Typical Screens)



Adult Low 80/40
(Typical Screens)



Neonatal 70/40
(Typical Screens)

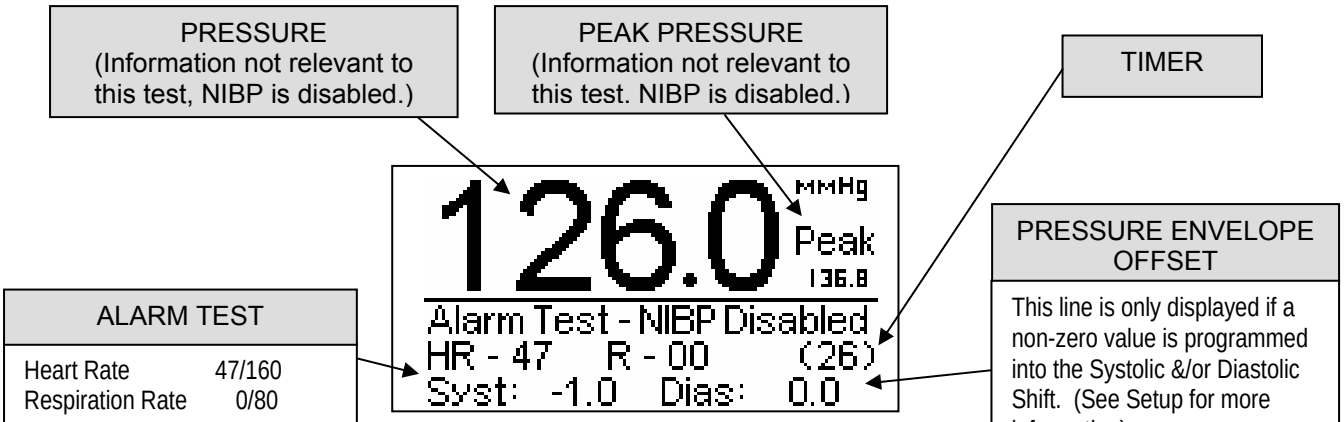


ALARM TEST:

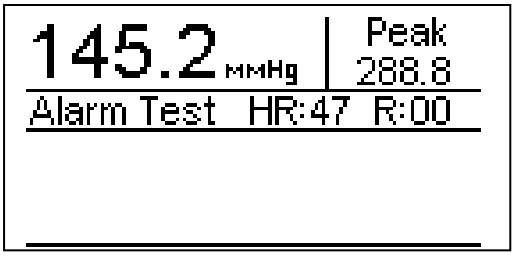
Use the SELECT key to cycle through the Test Modes until Alarm Test appears. The purpose of this function is to help test the alarms of the monitor under test. The ECG output will alternate from a 47 BPM NSR with apnea respiration (0 brpm) to 160 BPM NSR with 80 brpm respiration. The time interval between alternations is 30 seconds. A count down timer is displayed to indicate the time still remaining for the current output.

NOTE: While in this mode, the NIBP simulation output is disabled.

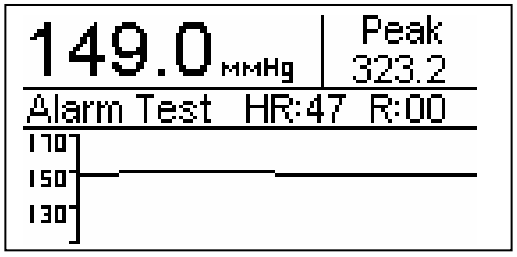
The displays will resemble the following examples: (Typical Screens)



(Pressure Only Screen)



(Output Waveform Screen)



(Pressure Graph Screen)

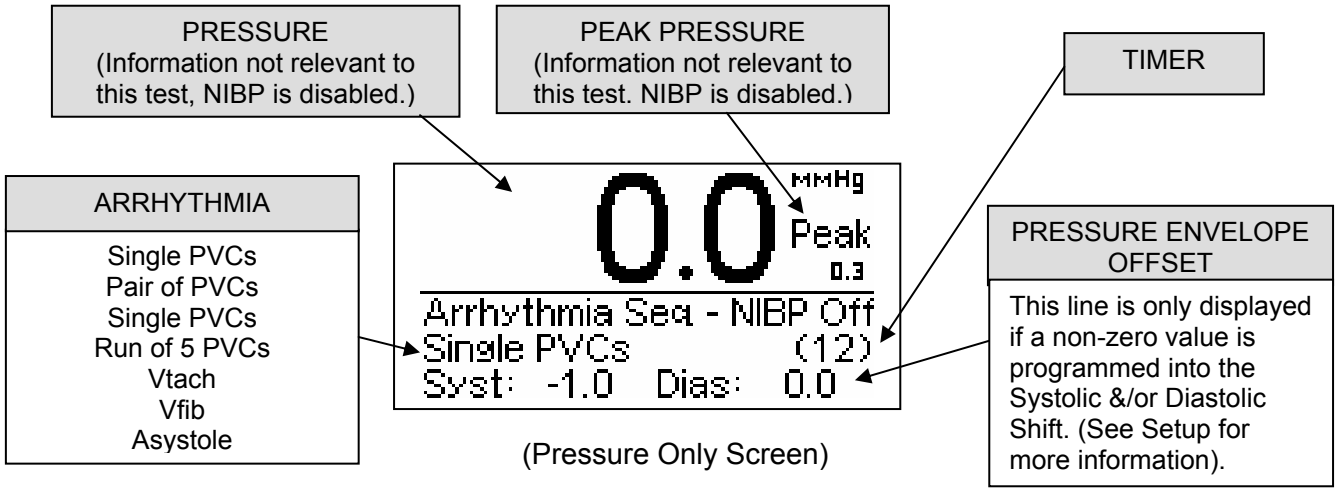
ARRHYTHMIA SEQUENCE:

Use the SELECT key to cycle through the Test Modes until Arrhythmia Sequence appears. The purpose of this function is to provide a timed sequence of some of the more common Arrhythmias. The test will continually cycle through the 6 arrhythmias in the sequence listed below. A count down timer is displayed to indicate the time still remaining in each step.

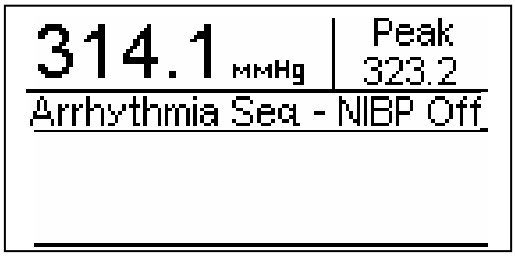
NOTE: While in this mode, the NIBP simulation output is disabled.

Step	Display	Total Time	ECG Output
1	Single PVCs	18 sec	11 NSR, 1 PVC, 11 NSR, 1 PVC
2	Pair of PVCs	9 sec	10 NSR, Pair of PVCs
3	Single PVCs	18 sec	11 NSR, 1 PVC, 11 NSR, 1 PVC
4	Run of 5 PVCs	12 sec	11 NSR, Run of 5 PVCs
5	Vtach	30 sec	15 NSR, VTach
6	Vfib	30 sec	15 NSR, VFib
7	Asystole	30 sec	15 NSR, Asystole

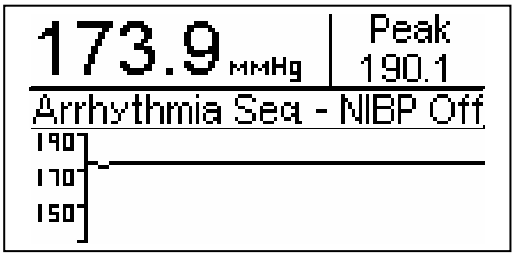
The displays will resemble the following examples: (Typical Screens)



(Pressure Only Screen)



(Output Waveform Screen)



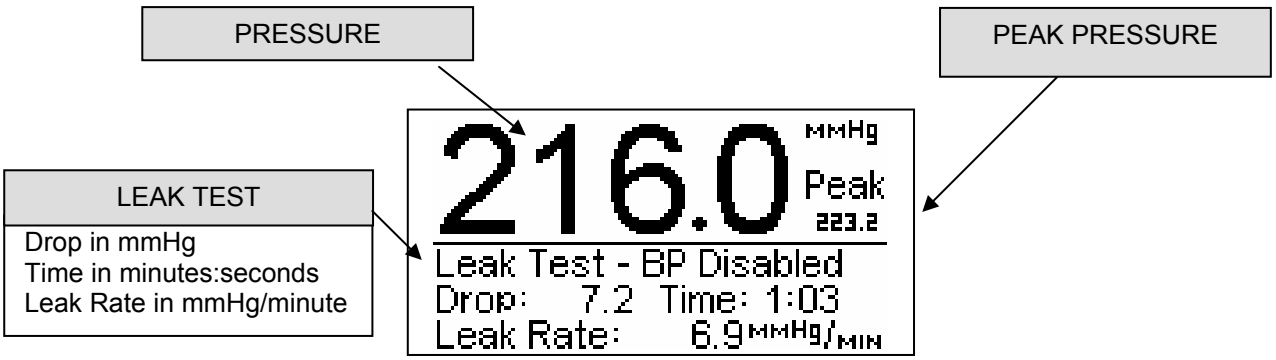
(Pressure Graph Screen)

LEAK TEST:

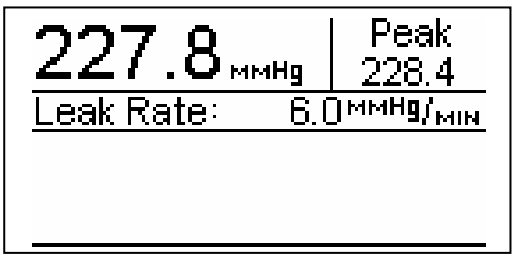
Use the SELECT key to cycle through the Test Modes until Leak Test appears. The purpose of this function is to provide a standard pressure leak test. The pressure input is connected to the system that is to be monitored. Pressure is then applied to the system. The Leak Test is initiated by pressing the RESET key. The unit traces and displays the pressure drop and the time since the test was initiated. It also, calculates and displays the leak rate in mmHg per minute.

NOTE: While in this mode, the BP simulation outputs are disabled.

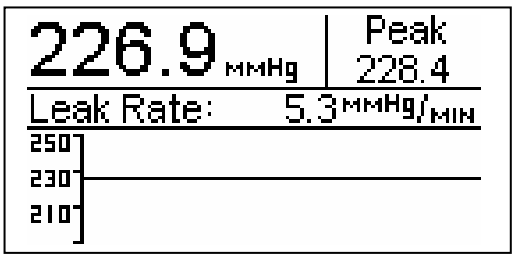
The displays will resemble the following examples: (Typical Screens)



(Pressure Only Screen)



(Output Waveform Screen)



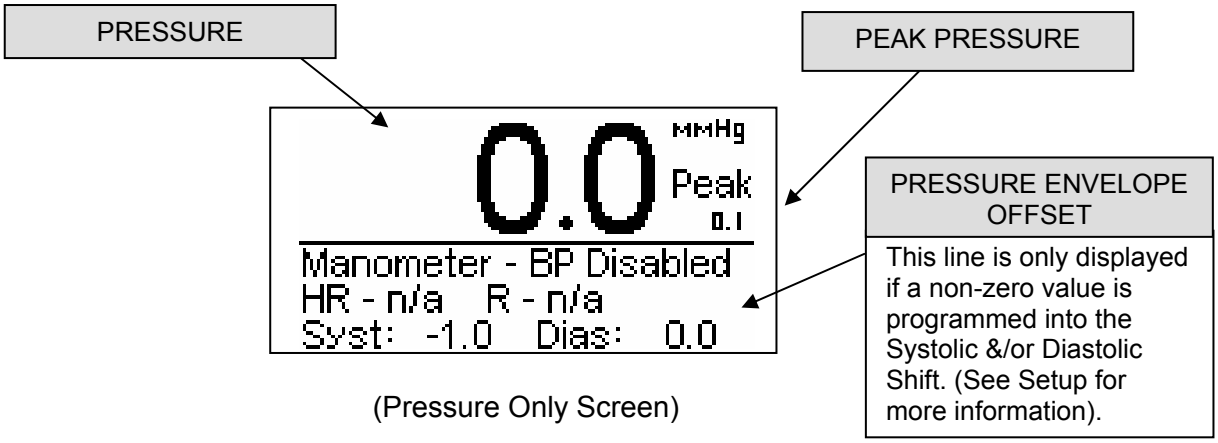
(Pressure Graph Screen)

MANOMETER:

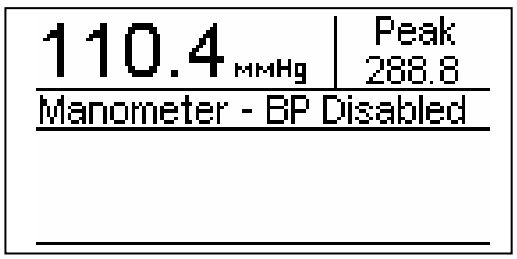
Use the SELECT key to cycle through the Test Modes until Manometer appears. The purpose of this function is to allow the unit to be used strictly as a Manometer with a full scale range of +/- 500 mmHg.

NOTE: The Graphic Screens are also available in this mode for maximum flexibility

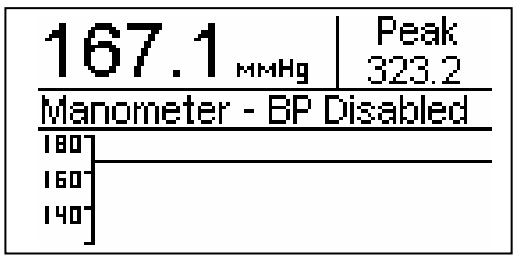
The displays will resemble the following examples: (Typical Screens)



(Pressure Only Screen)



(Output Waveform Screen)



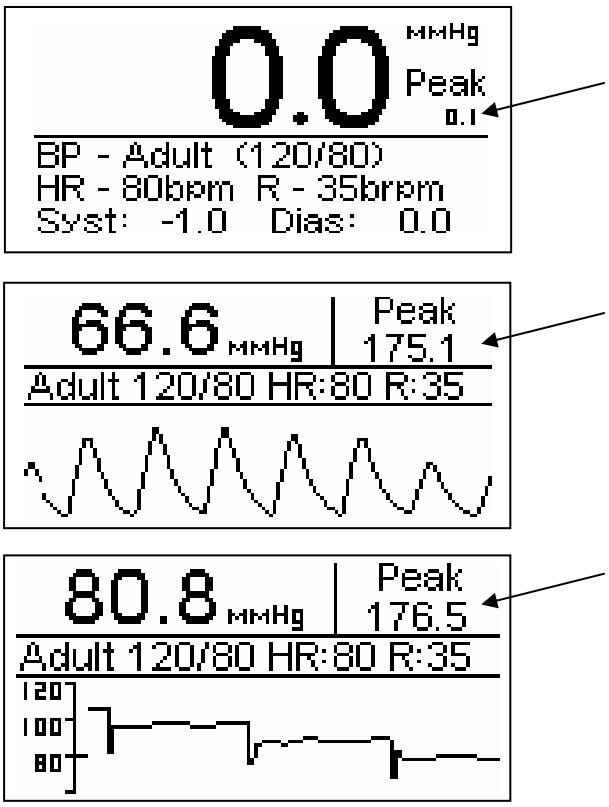
(Pressure Graph Screen)

SUB TEST MODES

PEAK: (Optional)

The optional Peak test feature is available whenever the display is in a pressure mode. It will continuously monitor the pressure input and display and hold the maximum value. This value may be reset at any time by pressing the RESET key.

The displays will resemble the following examples: (Typical Screens)



ECG PERFORMANCE TEST:

The ECG output is selected by pressing 

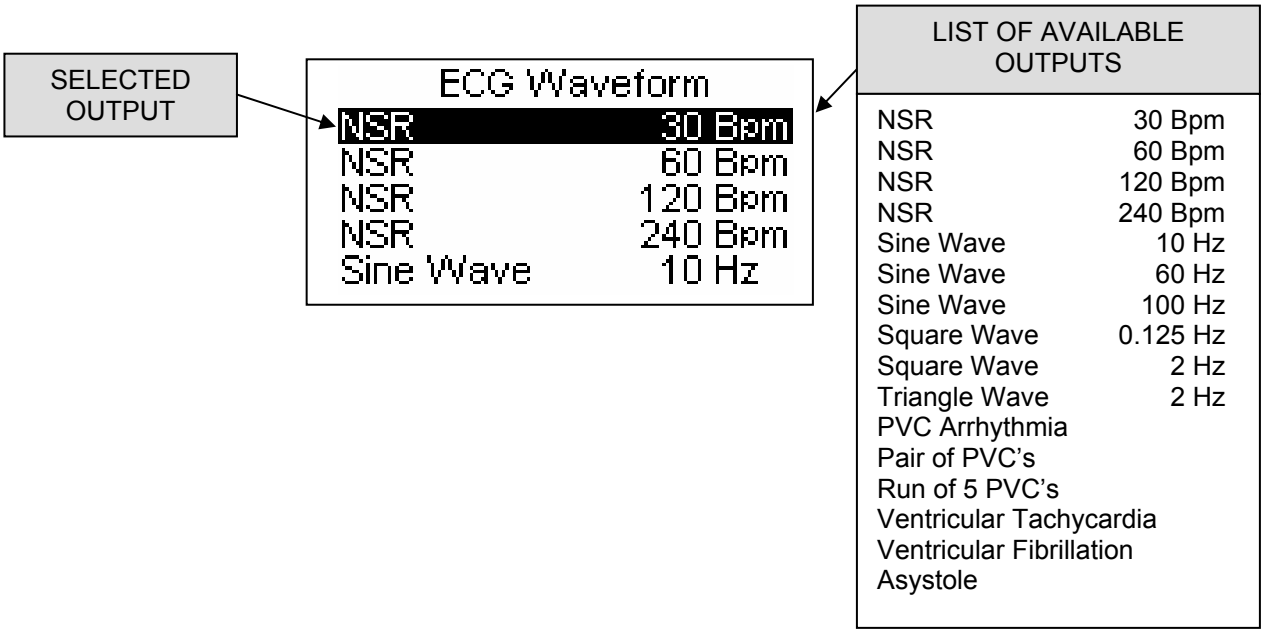
until the ECG Waveforms menu is displayed.

The 

key is used to choose the desired ECG output. There are 16 fixed waveforms available.

NOTE: While in this mode the NIBP simulation is disabled, but the IBP simulation is active.

The display will resemble the following example:



DYNAMIC IBP:

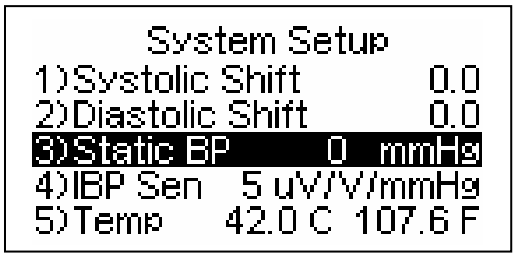
The IBP output matches the NIBP setting in the NIBP mode or the ECG setting in the ECG Waveform mode.

NOTE: The IBP sensitivity (5 μV/V/mmHg or 40 μV/V/mmHg) must be correctly selected in the SETUP Mode before using IBP. (See Setup section for more information.)

STATIC IBP:

A static Blood Pressure output may be selected in the SETUP mode. This fixed value will remain on the IBP output until changed.

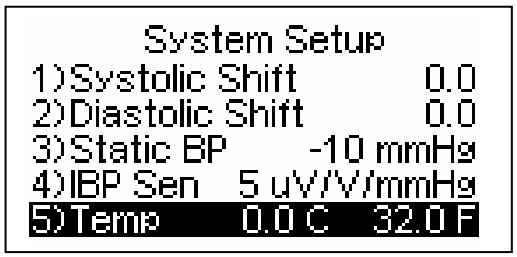
NOTE: The IBP sensitivity (5 μV/V/mmHg or 40 μV/V/mmHg) must be correctly selected in the SETUP Mode before using IBP. (See Setup section for more information.)



TEMPERATURE SIMULATION:

The temperature setting can be selected in the SETUP mode. This fixed value will remain on the Temperature output until changed. The output will simulate both YSI 400 and YSI 700 Temperature probes.

NOTE: Both outputs are available at the output connector simultaneously.



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.

GMC-I MESSTECHNIK GMBH IS NOT LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

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SPECIFICATIONS

SECULIFE NIBP

Blood Pressure	
RANGE	+/- 500 mmHg @ 20°C
ACCURACY	+/- (1% of Reading + .5 mmHg)
RATE	80, 94 bpm (synched to ECG)
ACCURACY	+/- 1%

Invasive Blood Pressure	
STATIC PRESSURE	-10,-5,0,20,40,50,60,80,100,120,150, 160,200,240,250,300,320,400 mmHg
ACCURACY	+/- (1% Full Range + 1 mmHg) or +/- (2% Setting + 2 mmHg) whichever is better
IMPEDANCE	300 ohms
ACCURACY	+/- 10%
EXCITATION RANGE	2 to 16 V RMS
EXCITATION FREQUENCY	DC to 5 KHz
SENSITIVITY	5 or 40 µV/V/mmHg

ECG NSR	
RATE	30,60,120,240 BPM
ACCURACY	+/- 1%
AMPLITUDE	2.75 mV
ACCURACY	+/- 2% @ Lead II

ECG Performance	
SINE WAVE	10,60,100 Hz
SQUARE WAVE	0.125, 2.000 Hz
TRIANGLE WAVE	2.000 Hz
RATE ACCURACY	+/- 1%
AMPLITUDE	2.75 mV
AMPLITUDE ACCURACY	+/- 2% @ Lead II

Pacemaker Waveforms	
AMPLITUDE	3 mV
ACCURACY	+/- 10%
WIDTH	6 ms
ACCURACY	+/- 5%

Respiration	
RATE ACCURACY	+/- 1%
IMPEDANCE DELTA	3.0 ohms
ACCURACY	+/- 10%
BASELINE	1000 ohms
ACCURACY	+/- 5%

Temperature	
Temperature	0,24,30,37,40 C (32.0, 75.2,86.0,98.6,104.0 F)
Accuracy	+/- 0.1 C
Type	YSI Series 400 and 700

Physical	
DISPLAYS	LCD Graphical 128 X 64 Pixels
ENCLOSURE	7 x 5 x 4 Inches (177.8 x 127.0 x 101.6 mm) ABS Plastic
WEIGHT	< 3 Lbs (< 1.36 Kg)
FACE PLATE	Lexan, Back printed
OPERATING RANGE	15 to 40 C
STORAGE RANGE	-20 to 65 C

Electrical	
AC POWER ADAPTER	12VDC, 500mA 
BATTERY (OPTIONAL)	6 AA NiMH Rechargeable (Not user serviceable)
BATTERY RUNTIME	500 Test Cycles between charges
BATTERY STORAGE LIFE	1 Year from full charge

NOTES

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

Service Center

Repair and Replacement Parts Service
Calibration Center *
and Rental Instrument Service
When you need service, please contact:
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Service Center
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90471 Nürnberg • Germany
Phone +49 911 817718-0
Fax +49 911 817718-253
E-Mail service@gossenmetrawatt.com
www.gmci-service.com
This address is only valid in Germany.
Please contact our representatives or subsidiaries for service in other countries.

*DKD Calibration Laboratory
for Electrical Quantities DKD – K – 19701
accredited per DIN EN ISO/IEC 17025:2005

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

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