

INSTRUCTION MANUAL

Rigel 333

Multi Parameter Patient Simulator

Version 2.0



**Rigel Medical
Seaward Group
18 Bracken Hill
Peterlee, County Durham • SR8 2SW
England**

www.rigelmedical.com

Dear User:

We appreciate your purchase of the Rigel 333 Multi-Parameter Patient Simulator. Properly used, the instrument will deliver years of high performance and accuracy.

This instruction manual has been designed as a tool to assist you in getting the most from your Rigel 333. In order to properly use and to maintain this instrument, please read the manual carefully.

Rigel Medical, part of the Seaward Group is recognised as an innovative designer and manufacturer of advanced biomedical and industrial test instruments. Seaward Electronic Ltd is ISO 9001-2000 Registered and fully committed to a continuous improvement process. Further, we guarantee absolute satisfaction with our products.

Your business is important to us and we are dedicated to providing you with the best customer and technical service possible. Please contact us should you have any questions or concerns regarding your instrument.

We hope you will consider us again when you have a requirement for accurate, reliable, affordable test instruments.

Sincerely,

RIGEL MEDICAL

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Quality Assurance

Seaward Electronic Ltd is ISO 9001-2000 Registered. This instrument was thoroughly tested and inspected according to Seaward's ISO 9001-2000 quality standards and test procedures, and was found to meet those specifications when it was shipped from the factory.

Warranty

Rigel Medical warrants the Rigel 333 Multi-Parameter Patient Simulator against defects in materials and workmanship for one year from the date of original purchase.

During the warranty period, we will repair or, at our option, replace at no charge a product that proves to be defective, provided you return the product shipping prepaid to Rigel Medical. This warranty does not apply if the product has been damaged by accident or misuse, or as the result of service or

modification by other than Rigel Medical, or if its serial number is defaced or removed.

Rigel Medical reserves the right to discontinue the Rigel 333 at any time, and change its specifications, price, or design without notice and without incurring any obligation. Rigel Medical guarantees availability of service parts for 5 years after the manufacture of the unit is discontinued.

The warranty is void if you elect to have the unit serviced and / or calibrated by someone other than Rigel Medical.

The purchaser assumes all liability for any damages or bodily injury that may result from the use or misuse of the unit by the purchaser, his employees, agents or customers.

In no event shall Rigel Medical or Seaward Electronic be liable for consequential damages

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GENERAL DESCRIPTION

The Rigel 333 Multi-Parameter Patient Simulator is an advanced micro controller 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.

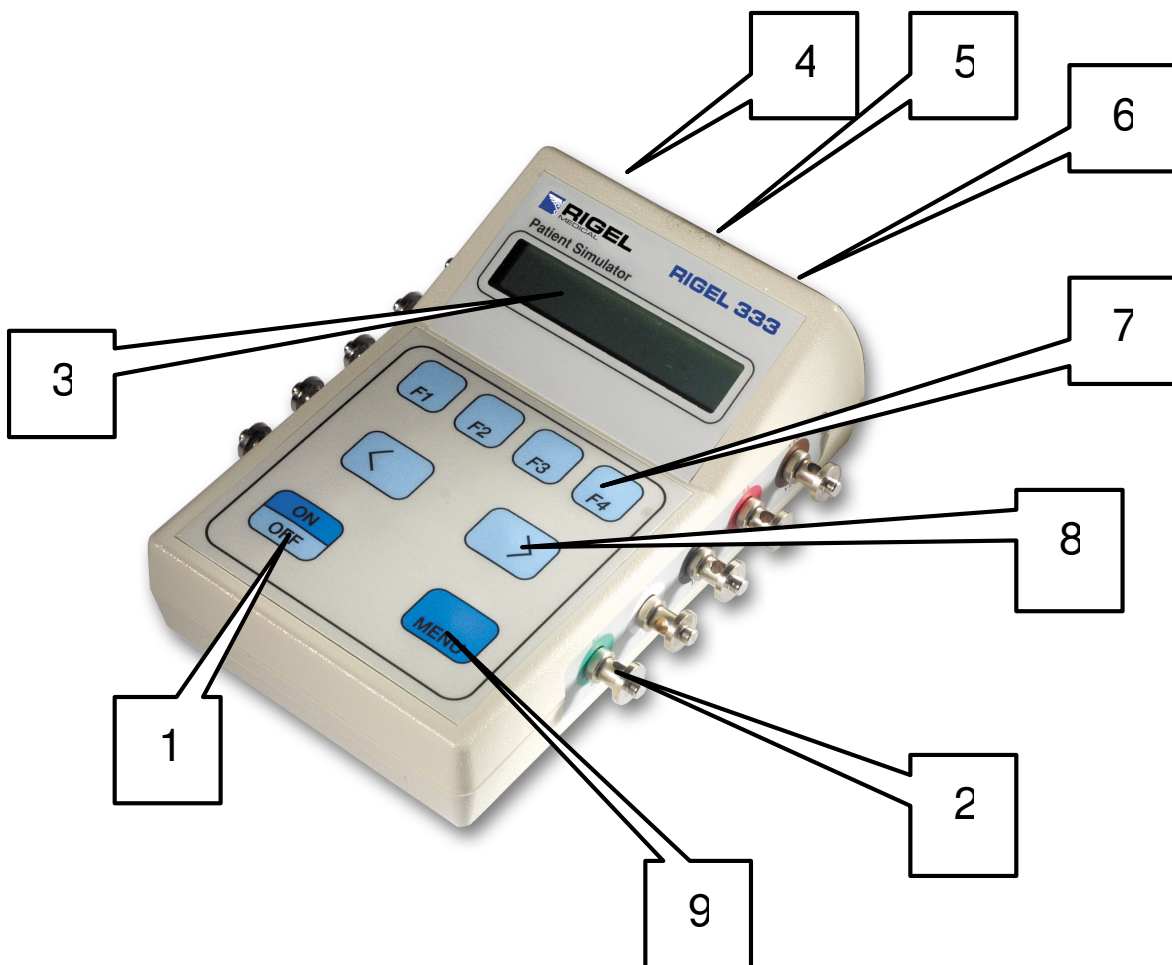
The easy to operate Rigel 333 is menu driven via eight tactile feel soft keys. All functions are displayed on a two line sixteen character LCD display.

The small hand held instrument is powered by one 9 Volt battery or an optional AC adapter. The Rigel 333 is CE marked and shipped with a Certificate of Calibration traceable to the NIST.

The Rigel 333 is a rugged instrument that performs its simulations quickly, accurately, and with ease.

CONTROLS AND INDICATORS

1. On-Off Key
2. ECG Lead Snaps
3. LCD Display
4. Temperature Connector
5. Blood Pressure Connector
6. Hi-Level ECG Output
7. Function Keys: 'F1', 'F2', 'F3', 'F4'.
8. Arrow Keys: '<' and '>'.
9. Menu Key



OPERATING INSTRUCTIONS

The operating menu of the Rigel 333 is arranged in a tree structure. When turned on, the micro controller initialises 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.

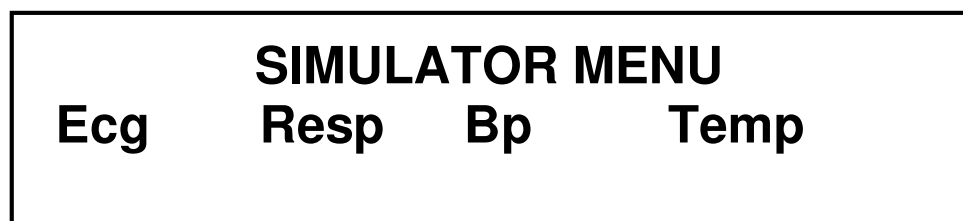
The '<' and '>' arrow keys move through the available choices under the selected parameter.

Basic Operating Instructions:

1. Connect the Rigel 333 to a patient monitor using the ECG lead snaps, correct blood pressure interface cable, and correct temperature interface cable.
2. Turn the Rigel 333 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.

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



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

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 ele dep MI TalT

ST segment analysis waveforms are divided into four classes:

ele: **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	Inj	Inf	linf

lsc: **Ischemia**
Inj: **Injury**
Inf: **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 **TalT** branches to:

TalT/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 350 ms.

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

Rate: 80 BPM
Amplitude:
0.0 0.1 0.2 0.3
0.4 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

70 80 90 100
110 120
10 40 50 60

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
 0.1 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:



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 80 BPM. 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 50 BPM.

RBB: Right Bundle Branch Block: A prolonged QRS (>0.12 sec) is generated at 80 BPM. 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 80 BPM.

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 210 BPM.

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

Selecting **Aut** branches to:

<Auto Sequence>			
RWD	TaIT	PPR	TAC

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.

TaIT: 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 (BPM)	Amp (mV)	Width (ms)	Rate (BPM)	Amp (mV)
80	1	100	206	1.0
80	1	100	206	0.5
80	1	100	206	2.0

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 $\frac{1}{2}$ 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

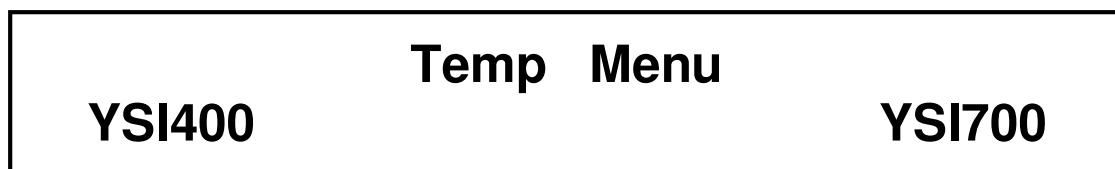
50/10 60/20
70/30 80/40

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.

CALIBRATION

The Rigel 333 is shipped from the factory fully calibrated with a Certificate of Calibration traceable to the NIST. Annual calibration is recommended. Contact the Customer Service Department for

instructions for returning the instrument to Rigel Medical for either calibration or repair.

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: 10%.

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.

TEMPERATURE

Compatibility: YSI 400 and 700 Series.

Temperature: 25 and 37 degrees Centigrade.

Accuracy: 2% of setting

POWER REQUIRMENTS:

One 9 Volt alkaline battery or optional AC adapter.

PHYSICAL CHARACTERISTICS:

Dimensions: 13.9 X 8.9 X 3.8 cm.

Weight: 0.3 kg

TEMPERATURE REQUIREMENTS:

Operating: 15 to 35°C.

Storage: 0 to 55°C.

CALIBRATED DC OUTPUTS:

10 Calibrated DC outputs from 0.04 to 2 mV.

OUTPUT CONNECTIONS:

Part # 303, 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 # 304, Open Ended temperature Cable:

3.5 mm Stereo Jack

YSI 400	Tip, 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.

ACCESSORIES

Description	Part Number
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User Manual	
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OPTIONAL ACCESSORIES

Description	Part Number
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Soft Carrying Case	301
110 VAC Adapter	302
220 VAC Adapter	302-220
ECG Snap Studs	1000
Open Ended Temperature Cable	304
Pressure Cables:	
Open Ended	303
Space Labs Dual	305
Space Labs Single	305-S
Datascope Dual	306
Datascope Single	310
Hewlett Packard Dual	307
Hewlett Packard Single	308
Fukuda Denshi Dual	309
Bard Dual	311
Bard Single	311-S
Mennen Medical Single	312
Ivy Biomedical Single	314

APPENDIX



Designing and Manufacturing Innovative
Biomedical and Industrial Test Instruments in
the United Kingdom Since 1982.

- Electrical Safety Analysers
- Pacemaker Analysers
- SPO2 Analysers
- NIBP Simulators
- Defibrillator Testers
- Patient Simulators

For a full list of products, please order a free copy of our
product catalogue online at www.rigelmedical.com

Rigel Medical
Seaward Group
18 Bracken Hill, Peterlee, County Durham
SR8 2SW, England
Phone: +44 191 5863511 • Fax: +44 191 5860227
www.rigelmedical.com

