Rigel UNI-SiM

The world's smallest integrated NiBP, SpO2 and patient simulator.

The UNI-SiM is a handheld and battery-operated vital signs simulator capable of undertaking six synchronized vital signs parameters. This enables medical device engineers to quickly, easily and accurately perform NiBP, SpO2, ECG, temperature, IBP and respiration functionality tests simultaneously, using a single portable instrument.

With a fast boot up and single button simulation to repeat the last simulation value in seconds, the UNI-SiM reduces the time taken to test the correct performance of a wide range of medical devices and equipment.

It is easy-to-use and incorporates the full functionality of conventional NiBP and SpO2 simulators with a comprehensive patient simulator.

Compatibility with the Rigel PULS-R universal SpO2 simulation finger creates a truly versatile and valuable tool for every biomed engineer in need of a cost-effective and lightweight solution for testing the performance of vital signs monitors.

Key Features

- Compact and cost-effective
- 6-in-1 vital signs simulation
- Fast start up and single button simulation
- Accurate and real-life simulations
- User definable NiBP simulations
- On-board automation and data storage
- User programmable patient conditions
- Universal SpO2 simulation with PULS-R
- Easy and accurate probe placement with PULS-R

Simulation Functions

- NiBP (systolic and diastolic)
- ECG
- Respiration
- SpO2
- IBP
- Temperature

End User Types

BMETs requiring a cost-effective solution for carrying out performance checks and full PMs on vital signs monitors.

Download your **FREE** introduction to measuring and simulating Vital Signs
www.rigelmedical.com/guides

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www.rigelmedical.com/UNI-SiM

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RIGEL MEDICAL

Compact and cost-effective

A highly cost-effective and compact solution for testing 6 of the most common vital signs using a single battery-powered simulator.

6-in-1 vital signs simulation

The UNI-SiM incorporates full NiBP simulation including dynamic and static pressure simulation and leak and over-pressure testing with a comprehensive SpO2 and ECG simulator, all in a single hand-held enclosure.

Fast start up and single button simulation

Automatic power-up of the most recent settings provides simulation of all 6 vital signs with the press of a single button, saving valuable time when setting up the simulator.

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RIGEL MEDICAL

Accurate and real-life simulations

Fully synchronized simulation signals provide the closest and most accurate representation of a real patient.

User definable NiBP simulations

User configurable and physiologically correct systolic and diastolic pressures provide a truly universal and accurate NiBP simulator.

On-board automation and data storage

Simple record management for up to 5,000 asset records. The simulated values from the patient monitor can be entered directly into the UNI-SiM using the built-in keyboard, improving traceability and reducing the need for manual data recording.

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User programmable patient conditions

Patient specific physiological conditions can be created and stored in the UNI-SiM to provide a highly customisable simulator. A truly versatile tool capable of meeting even the most demanding test protocols.

Universal SpO2 simulation with PULS-R

Reduce the need for separate accessories with the universal PULS-R SpO2 simulation finger.

This compact SpO2 simulation enables accurate SpO2 simulations in 1% resolution from as low as 30%* using the pre-programmed manufacturer specific R-curves. * subject to monitor capability

Easy and accurate probe placement with PULS-R

Unique probe placement LED's ensure accurate and correct simulation for each type of SpO2 probe.

The Rigel PULS-R has status LEDs which light up to indicate whether a probe connection has been achieved.

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Technical Specifications - UNI-SiM

Non-Invasive Blood Pressure Simulation

Waveform	Oscillometric
Pulse Volume	High, Medium, Low, Paediatric
Heart Rate	20 - 300BPM
Integrated Pump	0 to 350mmHg user configurable
Leak Test	User configurable between 0-350mmHg
Chronometer	Configurable up to 999 secs
Digital Manometer	0 - 410mmHg
Pressure Accuracy	+/- 0.5% FS
Pressure Units	mmHg, inHg, kg/cm2, cmH2O, mBar, PSI, in H2O and kPa

Oxygen Saturation Simulation (PULS-R)

Range	30 to 100%
Repeatability	± 5%** of reading between 30-59% SPO2 ± 3% of reading between 60-89% SPO2 ± 1% of reading between 90-100% SPO2

Accuracy of simulation when used with the corresponding R-curves

*Based on using the same probe and monitor setup

**Note that some monitor types might not be able to display low range sats

Heart Rate	30-300BPM***
Accuracy	± 1BPM
Compatibility	Beijing Choice, Criticare, GE Tuffsat, Masimo, Mindray, Nellcor, Nellcor Oximax, Nihon Kohden, Nonin, Novametrix, Philips / HP

***Subject to monitor capability

ECG Arrhythmia Simulator

Simulation	5 lead simulation including high level output on Normal Sinus Rhythm (NSR), ST Elevation, ST Depression, Myocardial Infarction, Tall T
Heart Rate	20 – 300 BPM
Accuracy	±1 BPM
Amplitudes	Lead II : 0.5 – 5 mV (in steps of 0.5 mV). Other leads are proportional to Lead II by the following percentages: Lead I : 60 % Lead II : 100 % Lead III : 40 % V1 : 63 % [Reference LA] V2 : 71 % [Reference LA] V3 : 68 % [Reference LA] V4 : 80 % [Reference LA] V5 : 55 % [Reference LA] V6 : 49 % [Reference LA]
Accuracy	±2%
Connection high-level ECG	3.5mm jack plug

ST Elevation / Depression

Heart Rate	20 – 300BPM
Elevation %	7%, 13%, 20%
Elevation Slope	Positive, Negative, Flat

Myocardial Infarction

Type	Ischemia, Injury, Infarction, Inferior Infarction
Heart rate	20 – 300 BPM

Tall T

Heart Rate	80 bpm
T wave Amplitude	0 – 1.2mV (steps of 0.1mV)

Arrhythmia Waveforms (Atrial)

Simulation	5 lead simulation
Amplitudes	0.5 / 1 / 1.5 / 2 / 2.5 / 3 / 3.5 / 4 / 4.5 / 5 mV.
Heart rate (where applicable)	20 – 300 BPM

Atrial

Sinus Arrhythmia (SA), Missing beat, Atrial Flutter (AFLT), Atrial Fibrillation (AFB), Paroxysmal Atrial Tachycardia (PAT), Junctional Premature Contraction

Atrial Conduction

First Degree AV Block, Second Degree AV Block - Mobitz I, Second Degree AV Block - Mobitz II, Third Degree AV Block, Right Bundle Branch Block (RBB), Left Bundle Branch Block (LBB), Left Anterior Hemiblock

Ventricular

Premature Ventricular Contraction - Intermittent Premature Ventricular Contraction – Continuous, Bigeminy, Trigeminy, Ventricular Flutter (VFLT), Ventricular Fibrillation Fine (VFBF), Ventricular Fibrillation Coarse (VFBC),Monomorphic Ventricular Tachycardia (MVT), Polymorphic Ventricular Tachycardia (PVT) Right Focal (PVC).

Performance Waveforms

Shape	Sine, Square, Triangle
Rate	0.1 to 0.9Hz (in steps of 0.1Hz) 1 to 100Hz (in steps of 1Hz)
Amplitude	Lead II : 0.5 – 5 mV (in steps of 0.5 mV). Other leads as above.
Accuracy	2%
Shape	Pulse
Rate	20 ms pulse duration, 4 second delay
Amplitude	Lead II : 1 mV. Other leads as above
Accuracy	2 %

Pacer Waveforms

Available	synchronous atrial, asynchronous atrial, paver only, ventricular pacer, atrial & ventricular pacer
QRS	1mV
Pacer Pulse Amplitude	0.1 – 2 mV
Pacer pulse Polarity	positive, negative
Pacer pulse width	0.1 – 2ms

R Wave Detection

Heart Rate	70 bpm
R wave width	10 – 120 ms (steps of 10ms)

Temperature Simulation

Simulation	YSI 400 / 700 Static
Range	preset at 25, 33, 37and 41°C
Accuracy	±0.1 °C
Default setting	YSI 400 37°C

Respiration Simulation

Rates	5, 10, 15, 30, 60, 120, 180 Breaths per Minute
Base resistances	250, 500, 750, 1000 ohms
Accuracy	±5%
Resistance Variations	0.1, 0.5, 1.0, 1.5 ohms
Accuracy	±10%
Default Settings	15bpm / 250Ω / 0.1Ω
Apnoea Simulation	0 – 60 seconds duration 0 – 300 seconds interval.

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Technical Specifications - UNI-SiM (Continued)

Invasive Blood Pressure Simulation

Channels	2 channels (Channel 2 set at 50% of Channel 1)
Static	0 to 300mmHg
Dynamic	0-300mmHg for Systolic & Diastolic
Accuracy	± 1mmHg
Excitation Voltage	2 – 16V
Impedance	350Ω
Nominal Simulated Sensitivity	5µV / V / mmHg

General Specifications - UNI-SiM

Operation	Battery cell, in-situ charge
Battery Charger	100-240VAC, 50/60Hz
Supply	12VDC centre positive
Battery Life	8 hours standby or a maximum of 200 NiBP simulations
Memory Capacity	Approx. 5,000 records
Communication	via Bluetooth
Display	Monochrome, ¼ VGA full graphics
Keypad	Alpha-numeric
Weight	<1.5kg, <3.5lbs
Size (L x W x D)	270 x 110 x 75mm / 10.5 x 4 x 3"
Operating Conditions	10-30ºC, 0-90% RH - NC
Storage Environment	-15º - +60ºC
Environmental Protection	IP 40

Service & Warranty

UNI-SiM comes with a free upgraded 24 month warranty (subject to terms and conditions, available at www.rigelmedical.com/register-product)

Standard Accessories (supplied with UNI-SiM)

- Carry case
- NiBP tubing kit
- ECG adaptor module
- ECG snap-on adaptors
- Quick start guide
- Power supply

Optional Accessories

- IBP connect cables
- NiBP accessories
- Temperature connect cables
- ECG cables and leads

To find out more, visit www.rigelmedical.com/sim-accessories

Specifications - PULS-R

Supported Default R Curves

Beijing Choice	Criticare
GE Tuffsat	Masimo
Mindray	Nellcor
Nellcor Oximax	Nihon Kohden
Nonin	Novametrix
Philips / HP	

Heart Rate Setting	30-300BPM (subject to Monitor Compatibility)

Standard Accessories (supplied with PULS-R)

PULS-R universal SpO2 simulation finger
Quick Start Guide

Accuracy of Simulation when used with the Corresponding R Curves		
Resolution	**Range**	**Repeatability***
1% steps	30-59%	±5%**
1% steps	60-89%	±3%
1% steps	90-100%	±1%

Part Numbers

UNI-SiM	370A930
PULS-R	399A910

Rev 2.1, 2019

Technical specification subject to change without notice.

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