



UniPulse 400

An easy to use defibrillator analyzer with pacer



A portable comprehensive defibrillator analyzer capable of analyzing all monophasic, biphasic, standard, and pulsating waveforms...

The UniPulse 400 is designed to test all defibrillators accurately and efficiently.

An unrivalled functionality and our pacer function make the UniPulse 400 the ultimate defibrillator analyzer on the market.

Why buy the UniPulse 400?

- > Dedicated fast keys and simple to use operating system enables biomedical / clinical engineers to select the relevant test function in seconds
- > A large vibrant colour screen that displays both test results and waveforms in amazing detail
- > Large internal memory and on-board results storage will reduce test time and help work towards a modern paperless system

Key Features:

- > Light handheld, battery operation
- > Pacer functionality
- > Compatible with monophasic, biphasic and pulsed waveforms
- > Reliable and non-inductive test load of 50Ω
- > Patient simulator with ECG high-level output

Passionate about patient safety.
T: +44 (0) 191 587 8730 E: sales@rigelmedical.com



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What's in the box?

- > AC Power Supply
- > USB cable
- > ECG Snap Adapters (pack of 10)
- > Calibration Certificate
- > UniPulse 400 Analyser
- > UniPulse 400 Carry Case
- > UniPulse 400 Quick Start Guide

Optional Accessories:

- > Bluetooth barcode scanner (339A923)
- > Test 'n' Tag Elite 2 Bluetooth printer (339A989)
- > Thermal label rolls - pack of 5 (339A949)
- > Paddle adaptor box (386A950)
- > Paddle adaptor box lead - Red (386A952)
- > Paddle adaptor box lead - Black (386A953)
- > Applied part adaptor (pack of 10) (404A951)
- > AC power supply (386A011)
- > Battery pack 9.6V/2400mAh - NiMH (386A008)
- > Replacement carry case (410A950)
- > Med-eBase software (383A910)

Technical Specification:

Defib - Energy Measurement

Load Resistance	50Ω ± 1% non-inductive
Range	0 - 199.9 Joules
Accuracy	± 1% of reading ± 0.1 Joule
Range (High)	200 - 600 Joules
Accuracy	± 1% of reading ± 1 Joule
Resolution	0.1 Joules
Voltage	0 - 5000 Volts
Current	0 - 100 Amps
Sampling Rate	250 kHz sampling frequency
Maximum pulse width (capture time)	5µs - 120ms

Charge Time

Measurement is initiated by pressing the function key and simultaneously charging the defibrillator. Charge time is recorded after the defibrillator has discharged into the UniPulse 400

Clock accuracy	0.10s to 100s +/-0.05s
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AED Pulse Mode Waveforms

Normal Sinus Rhythm (NSR)	20 - 300 BPM, Amplitude 1.00mV (±2%)
Asystole (ASYS)	
Ventricular Fibrillation - Coarse (VFBC)	240 BPM, Amplitude 1.00mV (±2%)
Ventricular Fibrillation - Fine (VFBF)	240 BPM, Amplitude 1.00mV (±2%)
Monomorphic Ventricular Tachycardia (MVT)	210 BPM, Amplitude 1.00mV (±2%)
Atrial Fibrillation (AFB)	20 - 300 BPM, Amplitude 1.00mV (±2%)

ECG Simulator

ECG simulation with high-level output.

ECG Waveforms - Sinus

Normal Sinus Rhythm (NSR)	20 - 300 BPM, Amplitude 0.50 - 5.00mV (±2%)
ST Elevation (STE)	20 - 300 BPM, Amplitude 0.50 - 5.00mV (±2%)
ST Depression (STD)	20 - 300 BPM, Amplitude 0.50 - 5.00mV (±2%)
Myocardial Infarction (MI)	20 - 300 BPM, Amplitude 0.50 - 5.00mV (±2%)
Tall T (TT)	20 - 300 BPM, Amplitude 0.50 - 5.00mV (±2%)

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Service and Warranty

The UniPulse 400 comes with a free upgraded 24-month warranty, subject to terms and conditions, available at

rigelmedical.com/register

Technical Specification (Continued):

ECG Waveforms - Ventricular Arrhythmias

Premature Ventricular Contraction	80 BPM,
- Intermittent (PVCi)	Amplitude 0.50 - 5.00mV (±2%)
Bigeminy (BIG)	80 BPM,
	Amplitude 0.50 - 5.00mV (±2%)
Trigeminy (TRIG)	80 BPM,
	Amplitude 0.50 - 5.00mV (±2%)
Ventricular Flutter (VFLT)	240 BPM,
	Amplitude 0.50 - 5.00mV (±2%)
Ventricular Fibrillation - Coarse (VFBC)	240 BPM,
	Amplitude 0.50 - 5.00mV (±2%)
Ventricular Fibrillation - Fine (VFBF)	240 BPM,
	Amplitude 0.50 - 5.00mV (±2%)
Monomorphic Ventricular Tachycardia (MVT)	210 BPM,
	Amplitude 0.50 - 5.00mV (±2%)
Right-focal Premature Ventricular Contraction (RFPVC)	80 BPM,
	Amplitude 0.50 - 5.00mV (±2%)

ECG Waveforms - Atrial Conduction Arrhythmias

First Degree AV Block (FAVB)	80 BPM,
	Amplitude 0.50 - 5.00mV (±2%)
Second Degree AV Block	80 BPM,
- Mobitz I (SAVB_MI)	Amplitude 0.50 - 5.00mV (±2%)
Second Degree AV Block	80 BPM,
- Mobitz II (SAVB_MII)	Amplitude 0.50 - 5.00mV (±2%)
Third Degree AV Block (TAVB)	50 BPM,
	Amplitude 0.50 - 5.00mV (±2%)

ECG Waveforms - Atrial Arrhythmias

Sinus Arrhythmia (SAR)	20 - 300 BPM,
	Amplitude 0.50 - 5.00mV (±2%)
Missing Beat (MB)	20 - 300 BPM,
	Amplitude 0.50 - 5.00mV (±2%)
Atrial Flutter (AFLT)	300 BPM,
	Amplitude 0.50 - 5.00mV (±2%)
Atrial Fibrillation (AFB)	20 - 300 BPM,
	Amplitude 0.50 - 5.00mV (±2%)
Paroxysmal Atrial Tachycardia (PAT)	180 BPM,
	Amplitude 0.50 - 5.00mV (±2%)
Premature Junctional Contraction (PJC)	20 - 300 BPM,
	Amplitude 0.50 - 5.00mV (±2%)

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Technical Specification (Continued):

ECG Pacer Waveforms

Synchronous Atrial (AAI)	20 - 300 BPM, Pulse amplitude 0.50 - 5.00mV, Pulse width 0.1 - 2.0ms
Asynchronous Atrial (AOO)	20 - 300 BPM, Pulse amplitude 0.50 - 5.00mV, Pulse width 0.1 - 2.0ms
Pacer (PCR)	20 - 300 BPM, Pulse amplitude 0.50 - 5.00mV, Pulse width 0.1 - 2.0ms
Ventricular Pacer (VVI)	20 - 300 BPM, Pulse amplitude 0.50 - 5.00mV, Pulse width 0.1 - 2.0ms
Atrial & Ventricular Pacer (DDD)	20 - 300 BPM, Pulse amplitude 0.50 - 5.00mV, Pulse width 0.1 - 2.0ms
R-Wave Detection (RWD)	20 - 300 BPM, Pulse amplitude 0.50 - 5.00mV

ECG Performance Waveforms

Sine (SINE)	0.1 - 300Hz, 1.00 - 10.00mV
Square (SQ)	0.1 - 300Hz, 1.00 - 10.00mV
Triangle (TRI)	0.1 - 300Hz, 1.00 - 10.00mV
Sawtooth (SAW)	0.1 - 300Hz, 1.00 - 10.00mV
Inverse Sawtooth (INVSAW)	0.1 - 300Hz, 1.00 - 10.00mV
Pulse (PULSE)	0.1 - 300Hz, 0.50 - 5.00mV

ECG Noise Selection

Amplitude	0 - 10.00mV
Frequency	50 - 60Hz

ECG Waveform Output

Low Level	5-lead ECG and on Paddles
Hi Level	Output Jack

ECG Accuracy

Rate	± 1% bpm
Amplitude	± 2% (LA-LL), ± 10% (Paddles) Lead II: 1 - 10 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 %

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Technical Specification (Continued):

ECG Accuracy (Continued)

V1: 63 % [Reference LA]
 V2: 71 % [Reference LA]
 V3: 68 % [Reference LA]
 V4: 80 % [Reference LA]
 V5: 55 % [Reference LA]
 V6: 49 % [Reference LA]

Pacer Input

Fix Load	50Ω
Accuracy	1 %, non-inductive
Over voltage protection	5000V
Variable Load	50 to 1600Ω in 50Ω steps
Accuracy	1 %, non-inductive
Pulse Rate	5.0 to 800 ppm
Accuracy	+/- (0.5% rdg + 0.1ppm)
Heart rate selection	20 - 300 bpm
Under & overdrive	85% (20 bpm min) and 115% (300 bpm max)
Wave form selection	NSR, VFibC, VFibF, MVT, AFib, Missing Beat, R-Wave detection
Pulse Current Amplitude	5.00 - 200mA
Accuracy	+/- (1% rdg +0.02mA)
Current Measurements	Average (RMS), Leading edge, Trailing edge, Peak (the highest during the pulse)
Pulse Width	1.00 - 100ms
Accuracy	+/- (0.5% rdg + 0.01ms)
Pulse Energy	1μJ - 2.00J
Accuracy	+/- 4% + 10μJ

Pacer Manufacturer Algorithms

CU Medical, GE, HP, Laerdal, Mindray, Philips, PhysioControl, Schiller, WelchAllyn, Zoll

Pacer Refractory Periods

Refractory Period test	15 - 500ms (Paced and sensed)
Accuracy	+/- 1ms

Pacer Sensitivity Test

Wave form, R Wave	Polarity Normal and Reversed, selectable
Dynamic Sensitivity	0.05mV to 5.00mV in 50μV steps

Pacer Interference Test (Immunity):

Heart rate	20-300 bpm
Frequency	50 or 60 Hz
Noise level in mV	0-15.0mV

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General Specifications:

Dimensions	220mm x 150mm x 90mm (L x W x H)
Weight	1.5kg
Operation	9.6V/2400mAh Nickel Metal Hydride battery pack
Battery charge time	2.5 hours
Battery capacity (fully charged)	12 hours
Mains Supply	110/230V AC; 48 to 66Hz, 35VA power supply
Storage Environment	-15°C to +60°C
Operating Conditions	0°C to +40°C
Environmental Protection	IP 40
Communication	USB
Display	LCD colour graphic display 1/4" VGA
Memory	100 test results including graphs
Impact rating	5J

Rev 2

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