

# UniPulse 400

An easy to use defibrillator analyzer with pacer.



## Technical Specifications

### Defib - Energy Measurement

Load Resistance	50Ω ± 1% non-inductive
Range	0 - 199.9 Joules
Accuracy	± 1% of reading ± 0.1 Joule
Range (High)	200 - 360 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	5µs - 120ms

### 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 full 12-lead simulation including hi-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)	
Asystole (ASYS)	

### ECG Waveforms - Ventricular Arrhythmias

Premature Ventricular Contraction - Intermittent (PVCi)	80 BPM, 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 - Mobitz I (SAVB_MII)	80 BPM, Amplitude 0.50 - 5.00mV(±2%)
Second Degree AV Block - Mobitz II (SAVB_MII)	80 BPM, Amplitude 0.50 - 5.00mV(±2%)
Third Degree AV Block (TAVB)	50 BPM, Amplitude 0.50 - 5.00mV(±2%)

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## 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%)

## 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	12-lead ECG and on Paddles
Hi Level	Output Jack

## ECG Accuracy

Rate	± 1%
Amplitude	± 2% (LA-LL), ± 10% (Paddles)

## 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) NSR, VFibC, VFibF, MVT, AFib, Missing Beat, R-Wave detection
Wave form selection	
Pulse Current Amplitude	5.00 - 200mA
Accuracy	+/- (1% rdg +0.02mA)

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## Current Measurements

Pulse Width  
Accuracy  
Pulse Energy  
Accuracy

Average (RMS), Leading edge, Trailing edge, Peak  
(the highest during the pulse)  
1.00 - 100ms  
+/- (0.5% rdg + 0.01ms)  
1  $\mu$ J - 2.00J  
+/- 4% + 10  $\mu$ J

## Pacer Manufacturer Algorithms

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

## Pacer Refractory Periods

Refractory Period test  
Accuracy

15 - 500mS (Paced and sensed)  
+/- 1ms

## Pacer Sensitivity Test

Wave form  
Polarity

R Wave  
Normal and Reversed, selectable

## Pacer Interference Test (Immunity)

Heart rate  
Frequency  
Noise level in mV

20-300 bpm  
50 or 60 Hz  
0-15.0mV

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