

DELTA 3000^{MkII} **Defibrillator / Pacer Analyzer**

**The DELTA 3000 MkII
is the first
Defibrillator/Pacer
Analyzer specifically
Designed to test
Pulsed Biphasic
Defibrillators.**



Easily and quickly test monophasic, biphasic and pulsedbiphasicdefibrillators and transcutaneouspacemakers. Store over 100 test records and include up to 10 waveforms for analysis and playback on the large graphical display, via the oscilloscope output or real-time display on your PC.

Easily program and upload auto sequences and view test records using the included P3pcsoftware, or transmit the test results to your existing PC equipment managing system.

Connect AEDs, hands-free defibrillators and pacers directly to the energy input of the **DELTA 3000 MkII**. For standard defibrillators, the paddle adapter can be easily connected, then return to the handy storage pouch after use.

FEATURES

- Monophasic, Biphasic and Pulsed Biphasic energy measurement
- Energy and cardioversion measurement
- Peak voltage and current reading
- Storage and playback of output waveform
- 12 lead ECG simulation
- ECG, Performance and Arrhythmia simulation
- Automatic defibrillator test procedures
- Pacemaker loads from 50 ohm to 2300 ohm
- Accuracy tests: Amplitude, Rate, Pulse width
- Sensed Refractory Period
- 60/50 Hz Immunity Test
- Pulse Energy
- Large graphic display
- RS-232 and Centronic printer interface

Specifications*

Tests Performed

Defibrillator Energy, Charge Time and Cardioversion
Automated External Defibrillator (AED) Performance
ECG Monitor Performance
Pacer Sensitivity, Refractory Periods and Noise Immunity
Pacer Pulse Characteristics

Energy Measurement, General

Load resistance: 50 ohms $\pm 1\%$, non-inductive
ECG amplitude at defib pads: 1 mV QRS
WAVEFORM (oscilloscope) Output
High Range: 1000:1 amplitude attenuation
Low Range: 200:1 amplitude attenuation
Waveform Playback: 200:1 time base expansion

Defibrillator High Range Energy Test

Energy Measurement: 0.0 to 400.0 Joules ($\pm 1\% \pm 2$ LSD)
Voltage Measurement: 0 to 5000 Volts ($\pm 1\% \pm 2$ LSD)
Current Measurement: 0.0 to 100.0 Amps ($\pm 1\% \pm 2$ LSD)
Pulse Width Measurement:
Range: 0.5 to 58.36 msec. ($\pm 1\% \pm 2$ LSD)
Trigger Level: 80 Volts
Playback Amplitude: 1 mV per 1000 volts on Lead II;
1 mV per 2000 volts at defib pads
Test Pulse: 126 Joules $\pm 10\%$

Defibrillator Low Range Energy Test

Energy Measurement: 0.0 to 50.0 Joules ($\pm 1\% \pm 2$ LSD)
Voltage Measurement: 0 to 1000 Volts ($\pm 1\% \pm 2$ LSD)
Current Measurement: 0.0 to 20.0 Amps ($\pm 1\% \pm 2$ LSD)
Pulse Width Measurement: 0.5 to 58.36 msec. ($\pm 1\% \pm 2$ LSD)
Trigger Level: 16 Volts
Playback Amplitude: 1 mV per 200 volts on Lead II;
1 mV per 400 volts at defib paddles
Test Pulse: 46 Joules $\pm 10\%$

Defibrillator Charge Time Test

Charge Time Measurement: 0.0 to 99.9 seconds (± 1 LSD)

Defibrillator Cardioversion Test

Sync Delay Measurement: -200 to +800 msec. (± 1 LSD)
Delay Target: 20 to 65 msec window when enabled
Sync Point: Selectable, peak of ECG Q or R wave

AED Performance Test

Test Method: Verify AED shock advisory for specified arrhythmia

Pacemaker Pulse Test

Pulse Amplitude Measurement: 4 to 250 milliamps, all loads ($\pm 1\% \pm 1$ LSD)
Pulse Rate Measurement: 20 to 220 PPM ($\pm 1\% \pm 1$ LSD)
Pulse Width Measurement: 0.5 to 58.36 msec. ($\pm 1\% \pm 2$ LSD)
Test Load Range: 50 to 1600 ohms, in 50 ohm steps
WAVEFORM output: 50 milliamps per volt, all loads
Measurement Methods: Average, leading edge, trailing edge, peak
Test Pulse: 145 mA $\pm 10\%$

Pacemaker Noise Immunity Test

Test Waveform: 50Hz or 60Hz sine wave
Noise Amplitude Range: 0.00 to 6.00 mV peak-to-peak
Noise Amplitude Precision: 0.023 mV

Pacemaker Sensitivity Test

Test Waveform: Square (SQR), Triangle (TRI) or Haversine (SSQ) pulse
Waveform Width: 10, 25, 40, 100, or 200 msec.
Amplitude Range: 0.00 to 3.00 mV peak

Pacemaker Refractory Period Test

Paced Refractory Period (PRP): 50 to 750 msec. (± 1 LSD)
Sensed Refractory Period (SRP): 50 to 750 msec. (± 1 LSD)

ECG Simulator

Performance Test Waveforms

DC Pulse, 4 seconds, Square Wave, 2 Hz, Triangle Wave, 2 Hz
Sine Wave @ 0.1, 0.5, 10, 20, 40, 50, 60, 70, or 100 Hz

Normal Sinus Rhythm

30, 60, 90, 120, 150, 180, 240 or 300 BPM

Cardioversion, Shock Advisory and AED Test Waveforms

Atrial Fibrillation, Coarse
Atrial Fibrillation, Fine
Asystole 1 (random, low-frequency baseline fluctuation)
Asystole 2 (flat line/zero volts)
Supraventricular Tachycardia (SVT-140)
Polymorphic Ventricular Tachycardia at 140 BPM (PVT-140) / 160 BPM (PVT-160)
Monomorphic Ventricular Tachycardia at 140 BPM (MVT-140) / 160 BPM (MVT-160)
Coarse Ventricular Fibrillation (CVF) / Fine Ventricular Fibrillation (FVF)

Arrhythmia Simulations

Second Degree A-V Block, Premature Atrial Contraction (PAC), R-on-T PVC, Right Bundle Branch Block (RBBB), Premature Ventricular Contraction (PVC)
Multifocal PVC, Run of 5 PVC, Bigeminy, Trigeminy

Pacemaker Test Waveforms

SQR (square) Pacer Trigger, width = 10, 25, 40, 100 or 200 msec
TRI (triangle) Pacer Trigger, width = 10, 25, 40, 100 or 200 msec
SSQ (haversine) Pacer Trigger, width = 10, 25, 40, 100 or 200 msec

Performance Specifications

Output Level: Selectable, 1 mV, 2 mV or 0.5 mV into ECG Lead II
Impedance: 500 ohms ($\pm 0.2\%$), Amplitude: $\pm 2\%$

Non-Volatile Memory

Memory Type:

EEPROM

Data Capacity

80 Test Records, 10 Defibrillator Waveform Records, 32 Autosequences

Test Record Content

Device ID, Time/date of test, Test type (Manual or Auto), Device type (defib. or AED)
Up to 10 defibrillator energy tests (or 32 AED energy tests)
1 defibrillator charge time test
Up to 4 defibrillator cardioversion tests
Up to 12 ECG performance tests
Up to 10 pacer pulse tests
1 pacer noise immunity test
Up to 2 pacer sensitivity tests
Up to 2 pacer refractory period tests

Interface

User Interface
LCD (5.2" x 1.5"; 40 characters x 8 lines text; 240 x 64 pixel graphics)
Defibrillator Input: Molex 42820-3212
Pacemaker Input: 2 x safety-style banana jack (red (+)/black (-))
ECG Simulator Outputs: 10 x safety banana jack (RA; RL; LA; LL; V1-V6)
Defibrillator/Pacer Waveform Output: 1/8" mono phono jack
High-Level ECG Output: 1/8" mono phono jack
USB Port: Type "B", USB 1.1 or USB 2.0 compatible, 64 bytes per msec.
Serial (RS-232) Port: DB9 Male, RS-232C, bi-dir, CTS handshaking, 9600 baud, 8-N-1
Keyboard Port: PS/2 (6-pin miniDIN female)

Power Supply:

Internal 12.5V/1.4A-h NiCad, 24 hours of use between charges

Environment

15°C to 40°C, 10% to 90% RH, Altitude: 2000m max., Indoor Use Only, Category II

Dimensions

9.5" W x 8" H x 5.5" D (24cm W x 20cm H x 14cm D)

Weight

3 lbs. (1.4 kg)

Standard Accessories

Adult Paddle Adapter (P/N 7400-442)
Adult Paddle Adapter Cable (P/N 7200-444)
USB Cable (A-B Male) (P/N 3140-440)
Phase3pc Software on CDROM (P/N 6950-004)
Operator's Manual on CDROM
AC Adapter (region-specific)

Optional Accessories

ECG-to-Banana Adapter Set (P/N 7500-425 - Set of 10)
Internal Paddle Adapter Set (P/N 7400-443)
Variable Load Module (P/N 7900-460)
Variable Load Module Software on CDROM (P/N 6950-005)
Unterminated Defibrillator Adapter Cable (P/N 7200-445)
Unterminated Pacemaker Adapter Cable (P/N 7200-446)
Computer Interface Cable (RS-232), DB9F - DB9F (P/N 3140-400)
Computer Interface Adapter (RS-232), DB9M - DB25F (P/N 3140-401)
Printer Interface Adapter, DB9M - DB25M (P/N 3140-402)
Citizen iDP-3110 Serial Printer (P/N 7050-055)
Barcode Pen Reader, RS-232 (P/N 7050-050)
Barcode CCD Scanner, RS-232 (P/N 7600-051)
Barcode CCD Scanner, PS/2 (P/N 7600-052)

*All specifications subject to change without notice.