

Neu bei mtk!

## DELTA 3000<sup>Mk II</sup>

Defibrillator- und  
Herzschrittmachertester für  
gepulste biphasische  
Defibrillatoren.

Unser neuer DELTA 3000<sup>Mk II</sup>  
ermöglicht einfachstes und  
schnellstes Testen von  
monophasischen, biphasischen,  
gepulsten biphasischen  
Defibrillatoren und transkutanen  
Herzschrittmachern.



- Speichert mehr als 100 Testergebnisse
- Mehr als 10 Kurven für Testauswertung
- Wiedergabe über großes Display, über Oszilliskop-Ausgang oder über Real-Time Display am PC
- Einfachstes Programmieren und Hochladen von Autosequenzen
- Darstellung der Testergebnisse über integrierte P3 PC-Software
- Übertragung der Ergebnisse auf PC
- Direktes Verbinden der AED's , von „Hands Free“- Defibrillatoren und Schrittmachern mit der Energieaufnahme möglich
- Einfaches Anschließen des Paddle-Adapters für Standard-Defibrillatoren

### Eigenschaften

- Mono-, biphasische und gepulste biphasische Messungen
- Energie- und Cardioversion-Messungen
- Messung der Höchstspannung und gegenwärtiger Messwert
- Speicherung und Wiedergabe von ausgegebenen Wellenformen
- 12-Kanal EKG-Simulation
- EKG-, Leistungs- und Arrhythmie-Simulation
- Automatische Defibrillator- Testabläufe
- Schrittmacherwiderstände von 50  $\Omega$  bis 2.300  $\Omega$
- Genauigkeitstests: Amplitude, Rate, Pulsbreite
- abgefragte Refraktärzeit
- Durchschrittene Refraktärzeit
- 60/50 Hz Immunity Test
- Pulsenergie
- Großes Grafik-Display
- RS-232 Schnittstelle und Centronic Drucker-Interface
- Batterie- und Netzbetrieb

# SPECIFICATIONS

All specifications are subject to change without notice.



## Tests Performed

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

## Performance Specifications

- Energy Measurement, General
    - o Load resistance: 50 ohms  $\pm 1\%$ , non-inductive
    - o Signal sampling interval: 11.4 microseconds
    - o Measurement time window: 58.368 milliseconds
    - o ECG amplitude @ defib pads: 1 mV QRS
    - o WAVEFORM (oscilloscope) Output
      - High Range: 1000:1 amplitude attenuation
      - Low Range: 200:1 amplitude attenuation
    - o Waveform Playback: Captured discharge can be viewed via ECG outputs and paddles, with 200:1 time base expansion
  - Defibrillator High Range Energy Test
    - o Energy Measurement:
      - Range: 0.0 to 400.0 Joules
      - Accuracy:  $\pm 1\%$   $\pm 2$ LSD
    - o Voltage Measurement:
      - Range: 0 to 5000 Volts
      - Accuracy:  $\pm 1\%$   $\pm 2$ LSD
    - o Current Measurement:
      - Range: 0.0 to 100.0 Amps
      - Accuracy:  $\pm 1\%$   $\pm 2$ LSD
    - o Pulse Width Measurement:
      - Range: 0.10 to 58.36 milliseconds
      - Accuracy:  $\pm 1\%$   $\pm 2$ LSD
    - o Trigger Level: 80 Volts
    - o Playback Amplitude: 1 millivolt per 1000 volts on Lead II; 1 millivolt per 2000 volts at defib pads
    - o Test Pulse: 126 Joules  $\pm 10\%$
  - Defibrillator Low Range Energy Test
    - o Energy Measurement:
      - Range: 0.0 to 50.0 Joules
      - Accuracy:  $\pm 1\%$   $\pm 2$ LSD
    - o Voltage Measurement:
      - Range: 0 to 1000 Volts
      - Accuracy:  $\pm 1\%$   $\pm 2$ LSD
    - o Current Measurement:
      - Range: 0.0 to 20.0 Amps
      - Accuracy:  $\pm 1\%$   $\pm 2$ LSD
    - o Pulse Width Measurement:
      - Range: 0.10 to 58.36 milliseconds
      - Accuracy:  $\pm 1\%$   $\pm 2$ LSD
    - o Trigger Level: 16 Volts
    - o Playback Amplitude: 1 millivolt per 200 volts on Lead II; 1 millivolt per 400 volts at defib paddles
    - o Test Pulse: 46 Joules  $\pm 10\%$
  - Defibrillator Charge Time Test
    - o Energy, Voltage, Current and Pulse Width specifications per 1.2.1.
  - Charge Time Measurement:
    - Range: 0.0 to 99.9 seconds
    - Accuracy:  $\pm 1$ LSD
  - Defibrillator Cardioversion Test
    - o Energy, Voltage, Current and Pulse Width specifications per 1.2.1, 1.2.2.
  - Sync Delay Measurement:
    - Range: -150 to +380 milliseconds
    - Accuracy:  $\pm 1$ LSD
  - Delay Target: +20 to +65 msec window when enabled
  - Sync Point: Selectable, peak of ECG Q or R wave
- ## AED Performance Test
- o Test Method: Verification of AED shock advisory for specified arrhythmia
- ## Pacemaker Pulse Test
- o Pulse Amplitude Measurement:
    - Range: 4 to 250 milliamps, all loads
    - Accuracy:  $\pm 1\%$   $\pm 1$ LSD
  - o Pulse Rate Measurement:
    - Range: 20 to 220 pulses per minute (PPM)
    - Accuracy:  $\pm 1\%$   $\pm 1$ LSD
  - o Pulse Width Measurement:
    - Range: 0.10 to 58.36 milliseconds
    - Accuracy:  $\pm 1\%$   $\pm 2$ LSD
  - o Test Load Range: 50 to 1600 ohms, in 50 ohm steps
  - o WAVEFORM output: 50 milliamps per volt, all loads
  - o Measurement Methods: Average, leading edge, trailing edge, peak
  - o Test Pulse: 125 mA  $\pm 10\%$
- ## Pacemaker Noise Immunity Test
- o Test Waveform: 50Hz or 60Hz sine wave
  - o Noise Amplitude Range: 0.00 to 6.00 millivolts peak-to-peak
  - o Noise Amplitude Precision: 0.023 millivolts
- ## Pacemaker Sensitivity Test
- o Test Waveform: Square (SQR), Triangle (TRI) or Haversine (SSQ) pulse
  - o Waveform Width: 10, 25, 40, 100, or 200 milliseconds
  - o Amplitude Range: 0.00 to 3.00 millivolts peak
- ## Pacemaker Refractory Period Test
- o Paced Refractory Period (PRP):
    - Range: -500 to +500 milliseconds
    - Accuracy:  $\pm 1$ LSD

## Sensed Refractory Period (SRP):

- Range: -500 to +500 milliseconds
  - Accuracy:  $\pm 1$ LSD
- ## ECG Simulator
- Performance Test Waveforms
    - o DC Pulse, 4 seconds
    - o Square Wave, 2 Hz
    - o Triangle Wave, 2 Hz
    - o Sine Wave @ 0.1, 0.5, 10, 20, 40, 50, 60, 70, or 100 Hz
  - Normal Sinus Rhythm
    - o 30, 60, 90, 120, 150, 180, 240 or 300 BPM
  - Cardioversion, Shock Advisory and AED Test Waveforms
    - o Atrial Fibrillation, Coarse
    - o Atrial Fibrillation, Fine
    - o Asystole 1 (random, low-frequency baseline fluctuation)
    - o Asystole 2 (flat line/zero volts)
    - o Supraventricular Tachycardia (SVTa-90)
    - o Polymorphic Ventricular Tachycardia at 140 BPM (PVT-140)
    - o Polymorphic Ventricular Tachycardia at 160 BPM (PVT-160)
    - o Monomorphic Ventricular Tachycardia at 140 BPM (MVT-140)
    - o Monomorphic Ventricular Tachycardia at 160 BPM (MVT-160)
    - o Coarse Ventricular Fibrillation (CVF)
    - o Fine Ventricular Fibrillation (VVF)
  - Arrhythmia Simulations
    - o Second Degree A-V Block
    - o Premature Atrial Contraction (PAC)
    - o Right Bundle Branch Block (RBBB)
    - o Premature Ventricular Contraction (PVC)
    - o R-on-T PVC
    - o Multifocal PVC
    - o Run of 5 PVC
    - o Bigeminy
    - o Trigeminy
  - Pacemaker Test Waveforms
    - o SQR Pacer Trigger, width = 10, 25, 40, 100 or 200 msec
    - o TRI Pacer Trigger, width = 10, 25, 40, 100 or 200 msec
    - o SSQ Pacer Trigger, width = 10, 25, 40, 100 or 200 msec
- ## Performance Specifications
- o Output Level: Selectable, 1 millivolt, 2 millivolt, or 0.5 millivolt into ECG Lead II
  - o Impedance: 500 ohms
  - o Accuracy:
    - Rate:  $\pm 0.2\%$
    - Amplitude:  $\pm 2\%$
- ## Memory Type
- o EEPROM
- ## Data Capacity
- o 80 Test Records
  - o 10 Defibrillator Waveform Records
  - o 32 Automated Test Sequences
- ## Test Record Content
- o Device ID (equipment control number)
  - o Time/date of test
  - o Test type (manual or AutoSequence test)
  - o Device type (standard defibrillator, or AED)
  - o Up to 10 defibrillator energy tests (or 32 AED energy tests)
  - o 1 defibrillator charge time test
  - o Up to 4 defibrillator cardioversion tests
  - o Up to 12 ECG performance tests
  - o Up to 10 pacer pulse tests
  - o 1 pacer noise immunity test
  - o Up to 2 pacer sensitivity tests
  - o Up to 2 pacer refractory period tests
- ## Waveform Record Content
- o Device ID (equipment control number)
  - o Time/date of test
  - o Energy, voltage, current, and pulse width of captured discharge
  - o Discharge waveform data
- ## User Interface
- o LCD (5.2" x 1.5"; 40 characters x 8 lines text; 240 x 64 pixel graphics)
  - o 4 front panel soft-keys
  - o Audio beeper
  - o LCD contrast adjustment (side panel)
- ## Defibrillator Input
- o Molex 42820-3212
- ## Pacemaker Input
- o 2 x safety-style banana jack (red (+)/black (-))
- ## ECG Simulator Outputs
- o 10 x safety-style banana jack (RA; RL; LA; LL; V1-V6)
- ## Defibrillator/Pacer Waveform Output
- o 1/8" monaural phono jack with signal on tip, sleeve ground
- ## High-Level ECG Output
- o 1/8" monaural phono jack with signal on tip, sleeve ground
- ## USB Port
- o Connector: Type "B"
  - o Protocol: USB 1.1 or USB 2.0 compatible
  - o Data Transfer Rate: 64 bytes per millisecond
- ## Serial (RS-232) Port
- o Connector: DB9 Male
  - o Protocol: RS-232C; bidirectional; CTS handshaking; 9600 baud; 8 data bits; no parity bit; 1 stop bit
- ## Keyboard Port
- o Connector: PS/2 (6-pin miniDIN female)
  - o Protocol: Per PS/2 standard
- ## Power Supply
- o Battery: Internal 12.5V/1.4A-h NiCad
  - o Battery Life: 24 hours of use between charges
- ## Dimensions
- o 9.5" (24cm) W x 8" (20cm) H x 5.5" (14cm) D
  - o Weight 3 lbs. (1.4 kg)