

Manual Supplement

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This supplement contains information necessary to ensure the accuracy of the above manual. This manual is distributed as an electronic manual on the following CD-ROM:

CD Title:	6000D/7000DP
CD Rev. & Date:	1, 2/2008
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FLUKE®

Biomedical

Change #1, 46470, 46697, 47714, 48007, 49680

Replace pages 31 through 35, with the following:

Defibrillator Analyzer Specifications

Energy Output Measurement

Compatible Defibrillator Waveshapes Lown, Edmark, Trapezoidal, DC Bi-phasic, and AC Pulsed Bi-phasic

Note

AC Pulsed Biphasic waveform has not been approved in the United States.

Autoranged Measurement..... 0.1 to 600 J

Accuracy

0.1 to 360 J $\pm(1\% \text{ of reading} + 0.1 \text{ J})$

360 to 600 J $\pm(1\% \text{ of reading} + 0.1 \text{ J})$, typical

Note

For Pulsed Bi-Phasic defibrillator, specified accuracy is $\pm(1.5\% \text{ of reading} + 0.3 \text{ J})$ on both ranges.

Load resistance

Resistance 50 Ω

Accuracy $\pm 1\%$, non-inductive (<2 μH)

Pulse trigger level 20 V

Pulse width

Range 1.0 to 50.0 ms

Accuracy ± 0.1 ms

Voltage

Range 20 to 5000 V

Accuracy $\pm(1\%$ of reading + 2 V)

Current

Range 0.4 to 100.0 A

Accuracy $\pm(1\%$ of reading + 0.1 A)

Tilt (biphasic and pulsed biphasic)

Range 1 % to 99 %

Accuracy ± 1 digit

Interphase delay (biphasic and pulsed biphasic)

Range 0.1 ms to 9.9 ms

Accuracy ± 0.1 ms

Frequency (pulsed biphasic only)

Range 2000 Hz to 8000 Hz

Accuracy $\pm 1\%$ of reading

Duty cycle (pulse biphasic only)

Range 1 % to 99 %

Accuracy ± 1 digit

Sample rate 250 kHz (4 μ s sample)

Maximum Average Power 12 W, equivalent to 10 defib pulses of 360 J every 5 minutes

Scope Output

Autorange 2000:1, 400:1 and 80:1: dependant on the range
 Waveform Playback
 Output BNC
 Output impedence..... 50 Ω
 Amplitude Accuracy ±5 %

Charge Time Measurement

Range 0.1 to 100.0 s
 Accuracy ±0.05 s, typical

Synchronization Test (Elective Cardioversion)

Delay Time Measurement

 Timing window ECG R-wave peak to the defib pulse peak
 Range -120 to +380 ms; measures timing from 120 ms prior to the R-wave peak to up to 380 ms following the R-wave peak.
 Resolution 1 ms
 Accuracy ±1 ms

ECG waves

 Normal Sinus Rhythm (NSR)..... 10 to 180 (by 1) BPM
 Atrial fibrillation..... Coarse and fine
 Monomorphic Ventricular Tachycardia 120 to 240 (by 5) BPM
 Asystole Flat line

Automated Defibrillator Test ECG Waves

 Normal Sinus 10 to 300 (by 1) BPM

- Ventricular Fibrillation Coarse and fine
- Monomorphic Ventricular Tachycardia 120 to 300 (by 5) BPM
- Polymorphic Ventricular Tachycardia 5 types
- Asystole Flat line

ECG Waves

ECG General

- Lead configuration 12-lead simulation. RA, LL, LA, RL, V1-6 with independent outputs
- Lead to lead impedance 1000 Ω (nominal)
- Rate accuracy ±1 % of nominal

ECG Amplitudes

- Reference Lead Selectable, Lead II (default) or Lead I
- Settings 0.05 to 0.45 (by 0.05) mV
0.5 to 5.0 (by 0.5) mV

Accuracy (All Performance waves and Normal Sinus R waves)

- Lead II ±2 %
- All other leads ±5 %
- Defib paddles ±5 %

Amplitude of ECG signals relative to amplitude setting (in percent)

Lead II reference

Performance waves and R wave detection

Lead #	I	II	III	V1	V2	V3	V4	V5	V6
Ref. Amp.	70 %	100 %	30 %	100 %	100 %	100 %	100 %	100 %	100 %

Normal Sinus waves

Lead #	I	II	III	V1	V2	V3	V4	V5	V6
Ref. Amp.	70 %	100 %	30 %	24 %	48 %	100 %	120 %	112 %	80 %

Lead I reference

Performance waves and R wave detection

Lead #	I	II	III	V1	V2	V3	V4	V5	V6
Ref. Amp.	100 %	150 %	50 %	100 %	100 %	100 %	100 %	100 %	100 %

Normal Sinus waves

Lead #	I	II	III	V1	V2	V3	V4	V5	V6
Ref. Amp.	100 %	150 %	50 %	24 %	48 %	100 %	120 %	112 %	80 %

ECG Normal Sinus

Rates 10 to 360 (by 1) BPM

ECG High Level Output (BNC Jack)

Amplitude

Range 0.5 V per mV of reference lead setting

Accuracy ±5 %

Output Impedance 50 Ω

ECG on Defibrillator Input Load

Same as the LEAD II amplitude but limited to ±4 mV

ECG Performance Waves

Square wave 2.0 and 0.125 Hz

Triangular wave 2.0 and 2.5 Hz

- Sine waves 0.05, 0.5, 5, 10, 40, 50, 60, 100, 150, and 200 Hz
- Pulse..... 30 and 60 BPM, 60 ms pulse width

R-Wave Detection

- Waveform Haver-triangle
- Amplitude..... 0.05 to 0.45 (by 0.05) mV
0.5 to 5.0 (by 0.5) mV
- Rate 30, 60, 80, 120, 200, and 250 BPM
- Widths..... 8, 10, 12 ms, and 20 to 200 (by 10) ms
- Accuracy..... $\pm(1\% \text{ setting} + 1 \text{ ms})$

Noise Immunity

- Wave..... Sine
- Line Frequency..... 50 or 60 Hz (± 0.5 Hz)
- Amplitude
 - Range 0.0 to 10.0 (by 0.5) mV
 - Accuracy..... $\pm 5\%$

Transvenous Pacer Pulse Simulation

- Widths
 - Range 0.1, 0.2, 0.5, 1.0, and 2.0 ms
 - Accuracy..... $\pm 5\%$ of setting
- Amplitude
 - Range 0 (off) and $\pm 2, \pm 4, \pm 6, \pm 8, \pm 10, \pm 12, \pm 14, \pm 16, \pm 18, \pm 20, \pm 50, \pm 100, \pm 200, \pm 500$, and ± 700 mV

Accuracy ±(10 % of setting + 0.2 mV)

Amplitude of Transvenous Pacer Pulse Simulation signals relative to amplitude setting (in percent)

Lead II reference

Lead #	I	II	III	V1	V2	V3	V4	V5	V6
Ref. Amp.	67 %	100 %	33 %	67 %	67 %	67 %	67 %	67 %	67 %

Lead I reference

Lead #	I	II	III	V1	V2	V3	V4	V5	V6
Ref. Amp.	100 %	150 %	50 %	100 %	100 %	100 %	100 %	100 %	100 %

Arrhythmia Selections

Pacer Interactive (Transcutaneous pacer, Impulse 7000DP only)

Demand 30 to 360 (by 1) BPM

Asynchronous

Non-Capture

Non-Function

Threshold (Interactive pacing simulation only) 10 to 250 (by 10) mA

Supraventricular

Atrial Fibrillation Coarse

Atrial Fibrillation fine

Atrial Flutter

Sinus Arrhythmia

Missed Beat

Atrial Tachycardia

Change #2

On page 12, prior to *Analyzing Pacemakers (7000DP only)*, add the following section:

SCOPE OUTPUT

Each time a defibrillator is fired into the Analyzer during an active defibrillator test, a delayed representation of the defibrillator pulse is sent to the Scope Output jack on the rear panel of the Analyzer. The Scope Output is an isolated signal and should not present any problems when connected to the input of an oscilloscope.

To assist with the displaying of the defibrillator pulse, synchronizing marker pulses appear on the scope output jack along with the defibrillator pulse. Table 3A list these markers and describes their purpose.

Table 3A. Synchronizing Marker Pulses

Marker	Pulse Characteristics	Purpose
Defib fire	+2 V, 50 ms	Indicates when the defibrillator was fired.
Ranging	-4 V, 0.4 ms, 1 ms apart	Indicates the scaling used to output the pulse image: 1 pulse.....each volt out equals 80 volts pulse amplitude. 2 pulses.....each volt out equals 400 volts pulse amplitude. 3 pulses.....each volt out equals 2000 volts pulse amplitude.

Pulse playback	+4 V, 1 ms pulse	Start of defibrillator pulse playback ^[1]
[1] Pulse playback includes 0.4 ms before the pulse was detected and therefore displays any early transitional signals.		

Use the synchronizing marker pulses to display specific information from the Scope Output signal. To see when the defibrillator fires, set the oscilloscope trigger level to +2 V. To get the ranging information, set the oscilloscope to trigger on the -4 V markers. To ignore the ranging information and see only the defibrillator pulse, set the oscilloscope to trigger on levels above +2 volts.

On page 26, prior to ***Controlling the Analyzer Remotely***, add the following section:

Setting the ECG Reference Lead

ECG signal amplitude is set by designating either lead I or lead II as the reference lead. Lead II is the default selection. To change the reference lead, do the following:

Press \ominus to reveal the main setup menu. Next press the softkey labeled **More** for additional setup selections. Press the softkey labeled **ECG Ref Lead** to toggle between lead I and lead II. Once the reference lead is set, press the softkey labeled **Back** or one of the other functions to store the selection in non-volatile memory.

Change #3, 48038

On page 38, under **Pacemaker Input**, change:

From: Accuracy±1 % non-inductive (<2 μH)

To: Accuracy.....±2 % non-inductive (<2 μH)

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