Manual Supplement

Manual Title:	Impulse 6000D/7000DP Getting Started	Supplement Issue:	**7**
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This supplement contains information necessary to ensure the accuracy of the above manual.

FLUKE® Biomedical

Change #1, 43260, 43305, 45041, 44082, 46470, 46697, 47714, 48007, 49680

Replace pages 15 through 19, 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 ..... ±(1 % of reading + 0.1 J)

360 to 600 J ..... ±(1 % of reading + 0.1 J), typical

Note

For Pulsed Bi-Phasic defibrillator, specified accuracy is ±(1.5 % of reading + 0.3 J) on both ranges.

Load resistance

Resistance ..... 50 Ω

Accuracy ..... ±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 ..... ±(1 % of reading + 2 V)

Current

Range ..... 0.4 to 100.0 A

Accuracy ..... ±(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 ..... ±1 % of reading

Duty cycle (pulse biphasic only)

Range ..... 1 % to 99 %

Accuracy ..... ±1 digit

Sample rate ..... 250 kHz (4 μs 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 impedance	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 ..... ±(1 % setting + 1 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 ..... ±5 %

Transvenous Pacer Pulse Simulation

- Widths
  - Range ..... 0.1, 0.2, 0.5, 1.0, and 2.0 ms
  - Accuracy ..... ±5 % of setting
- Amplitude
  - Range ..... 0 (off) and ±2, ±4, ±6, ±8, ±10, ±12, ±14, ±16, ±18, ±20, ±50, ±100, ±200, ±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 1, under ***Intended Use***, replace the current paragraph with following:

The Analyzer is used to determine if defibrillators and transcutaneous pacemakers are performing within their performance specifications through measurement of energy output.

Change #3, 48038

On page 22, under **Pacemaker Input,** change:

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

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

Change #4

On page 3 add the following Caution:

⚠Caution

To avoid damage to the product or defibrillator under test, do not use adhesive pads on the Analyzer. For defibrillators with metal paddles, use Fluke Biomedical electrode adapters.

Change #5, 63282, 65427

On page 2, delete CAT I from the **Symbols** table and add:

	Conforms to relevant South Korean EMC Standards.

On page 14, under ***General Specifications*** remove **Safety Standards** and **Electromagnetic Compatibility Standards (EMC)** and add:

Safety ..... IEC 61010-1: CAT II 300 V, Pollution Degree 2
Altitude ..... 2000 m
IP Rating..... IEC 60529: IP20
Electromagnetic Environment..... IEC 61326-1: Basic
Electromagnetic Compatibility ..... Applies to use in Korea only. Class A Equipment (Industrial Broadcasting & Communication Equipment) [1]

[1] This product meets requirements for industrial (Class A) electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and is not to be used in homes.