MAHAMANA PANDIT MADAN MOHAN MALAVIYA CANCER CENTRE
& HOMI BHABHA CANCER HOSPITAL
महामना पंडित मदन मोहन मालवीय कैंसर सेंटर एवं होमी भाभा कैंसर अस्पताल
(Units of TATA MEMORIAL CENTRE / टाटा स्मारक केंद्र की इकाईयां)
DEPT. OF ATOMIC ENERGY, GOVT. OF INDIA / परमाणु ऊर्जा विभाग, भारत सरकार
VARANASI, UTTAR PRADESH – 221005 / वाराणसी, उत्तर प्रदेश - २२१००५

Ref. No. HBCH/MPMMCC/ST-28/29/30/31/KE **Date: 27.01.2023**

CALL FOR OBJECTION

Subject: Inviting comments/ objection (if any) regarding procurement of "ECG Simulator, Electric Safety Analyzer, Defibrillator Analyzer & Vital Sign Patient Simulator" for HBCH/ MPMMCC, Varanasi on Proprietary basis

1. Department of Biomedical Engineering, MPMMCC/ HBCH, Varanasi has requirement of the **"ECG Simulator, Electric Safety Analyzer, Defibrillator Analyzer & Vital Sign Patient Simulator"**, Proprietary article basis under GFR-166.
2. The proposal submitted by M/s Fluke Biomedical who is sole manufacturer and M/s Fluke Technologies Pvt. Ltd., Bengaluru is the local agent of these items along with Proprietary Article Certificate attached, same uploaded on TMC website.
3. The above documents are being uploaded for open information to submit objections/comments (if any) from any manufacturer/ supplier before declaring Proprietary Article of the said equipments / items to be procured. Objections/ comments to be submitted within **05 days** from the date of Issuance/ Uploading of the notification.
4. The objection should be raised in the technical compliance sheet as enclosed, if any firm claiming suitability of their product with respect to specification mentioned.
5. The comments with all relevant & supporting documents should be sent to the Purchase office at MPMMCC, Varanasi in a sealed envelop or through email on purchaseofficer@mpmmcc.tmc.gov.in, purchase@mpmmcc.tmc.gov.in within 05 working days from the date of uploading on institutional website i.e. from 27.01.2023 to 02.02.2023, failing which it will be presumed that any other manufacturer/ vendor is having no comment to offer and case will be decided on merits.

Purchase Officer
HBCH/ MPMMCC, Varanasi

Enclose: Related documents enclosed
1) PAC certification enclosed

December 7, 2022

To,
Mahamanava PT Madan Mohan Malviya Cancer Centre
SUNDARBAGIYA BANARAS HINDU UNIVERSITY CAMPUS,
AJAGARA, Varanasi Uttar Pradesh 221005, India

PROPRIETARY ARTICLE CERTIFICATE

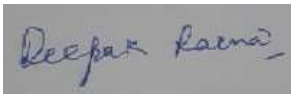
This is to certify that following instrument is a Proprietary to Fluke Biomedical, a Division of Fluke Corporation and is not manufactured by any other manufacturer with the features and specifications described in our datasheets and Catalogues.

Fluke Proim8 with Prosim spot- Vital Sign Simulator

Vital Sign Simulator including special features like
- Single instrument to perform simulations for ECG, NIBP, IBP, Cardiac output (Optional), Temperature, Fetal / Maternal-ECG Simulation, SPO2, Arrythmias.
- Masimo Rainbow Technology Waveform Test (Optional) for Pulse oximetry upgradation possibility within the same model.

All above features makes it more advanced and Proprietary.

For Fluke Biomedical



Deepak Raina
Zonal Manager

FLUKE TECHNOLOGIES PVT. LTD.
Brigade Opus, 4th Floor, Office 'B', Sy. No. 44/1, 44/4, Kodigehalli Main Road,
Sanjeevini Nagar, Bengaluru 560092. | Tel : +91 80 6715 9000
E-mail : info.india@flukebiomedical.com | www.flukebiomedical.com / www.raysafe.com

December 7, 2022

To,
Mahamanava PT Madan Mohan Malviya Cancer Centre
SUNDARBAGIYA BANARAS HINDU UNIVERSITY CAMPUS,
AJAGARA, Varanasi Uttar Pradesh 221005, India

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This is to certify that following instrument is a Proprietary to Fluke Biomedical, a Division of Fluke Corporation and is not manufactured by any other manufacturer with the features and specifications described in our datasheets and Catalogues.

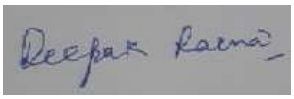
Fluke ESA612 -Electrical Safety Analyzer

Electrical Safety Analyzer including special features like

- GFCI Limits : GFCI Limits during testing is inbuilt feature for safety of Instrument as well as for operator.
- ECG Wave from Simulation availability
- Equipment Current : Mode : AC rms; Range : 0.0 A to 20.0 A

All above features makes it more advanced and proprietary.

For Fluke Biomedical



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December 7, 2022

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SUNDARBAGIYA BANARAS HINDU UNIVERSITY CAMPUS,
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PROPRIETARY ARTICLE CERTIFICATE

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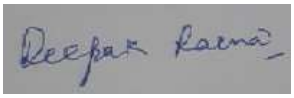
Fluke Impulse 7000DP -Defibrillator/Transcutaneous Pacemaker Analyzer

Defibrillator/Transcutaneous Pacemaker Analyzer including special features like

- **Energy output measurement**: Compatible defibrillator waveshapes: Lown, Edmark, trapezoidal, dc biphasic, and ac pulsed biphasic,
- Range : 0.1 J to 600 J**,** Accuracy 0.1 J to 360 J: ± (1 % of reading + 0.1 J) 360 J to 600 J: ± (1 % of reading + 0.1 J),
- **Arrhythmia Pacer interactive**:
  Demand: 30 BPM to 360 BPM in 1 BPM steps
  Asynchronous
  Non-capture
  Non-function
  Threshold (interactive pacing simulation only): 10 mA to 250 mA in 10mA steps.
- **Cardiac Synchronization : -120 to +380ms**

All above features makes it more advanced and Proprietary.

For Fluke Biomedical



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E-mail : info.india@flukebiomedical.com | www.flukebiomedical.com / www.raysafe.com

Specifications :

Portable ECG Simulator.

The ECG Simulator should have the following features:

- The ECG Simulator should be Handheld and should operate on AC Mains and DC Battery
- The ECG should have 12-lead ECG simulation
- The ECG Simulator should have 12 arrhythmia selections
- The ECG Simulator should have Universal ECG jacks
- The ECG Simulator should have option of Auto sequencing of performance waveforms
- The ECG Simulator should be able to simulate a full range of cardiac rhythms that includes pacemaker simulation, with at least 30 plus arrhythmia selections, and adult and paediatric normal-sinus rhythms.
- The ECG Simulator should have ateast two line LCD Display.

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Biomedical

ESA612

Electrical Safety Analyzer

Technical Data

The ESA612 Electrical Safety Analyzer represents the next generation in testers for biomedical professionals that perform field service on medical equipment throughout their facilities, in clinics, and anywhere onsite service is required. Portable, lightweight, and designed for operation in tight spaces, the ESA612 offers the functionality of a simulator, multimeter and electrical-safety analyzer in a single test tool.

With selection of two test loads, this versatile product can be used worldwide to test to preventative maintenance electrical safety standards of choice: ANSI/AAMI ES1:1993 (NFPA-99), IEC62353 (VDE 751), and AN/NZS 3551.

The versatility of the multifaceted ESA612 is further expanded with optional automation software, which speeds and simplifies testing and provides high-end-analyzer productivity at software-level investment. Ansur-automated ESA612 standardizes test procedures, compares results to standards limits, and generates and stores reports for total digital data management.

Key features

- Portable, ergonomic, lightweight and easy to use
- Large, easy-to-read display with adjustable contrast
- Human-factors-designed user interface
- Tilt stand design for stand-up testing in field environments
- Five applied parts jacks and easy ECG snap connection with optional expander box
- ECG waveform tests and dual-lead measurements combine the functionality of a simulator, multimeter and electrical-safety analyzer in a single test tool
- Replaceable mains fuses keep the device in the field and out of the repair shop
- Internal memory for 100 test records
- 20 A at 120 V current capability
- USB connection for use with Ansur and Data Viewer software (for memory download to PC)
- Two-year extended warranty (no-cost, available after first-year calibration at the Fluke Biomedical Cleveland Service Center)
- Optional Ansur automation software standardizes test procedures, compares results to standards limits, generates/stores reports and provides total digital data management
- Rigorously tested for rugged field applications, with CE and CSA in addition to the Fluke-quality-design stamp of approval

Specifications

Voltage		
Range (mains voltage)	90 V ac to 132 V ac rms	
	180 V ac to 264 V ac rms	
Range (accessible voltage)	0 V ac to 300 V ac rms	
Accuracy	± (2 % of reading + 0.2 V)	
Voltage tests	Mains and point-to-point	
Earth resistance		
Mode	Two terminal	
Test current	> 200 mA ac	
Range	0 Ω to 2 Ω	
Accuracy	± (2 % of reading + 0.015 Ω)	
Resistance tests	Earth resistance and point-to-point	
Equipment current		
Mode	AC rms	
Range	0 A to 20 A	
Accuracy	± 5 % of reading + (2 counts or 0.2 A, whichever is greater)	
Duty cycle	15 A to 20 A, 5 min on/5 min off 10 A to 15 A, 7 min on/3 min off 0 A to 10 A continuous	
Leakage current		
Modes*	AC + DC (true-rms)	
	AC only	
	DC only	
*Modes are available in all leakage tests with the exception of MAP leakages that are available only in true-rms.		
Patient load selection (input impedance)	AAMI ES1-1993 Fig.1	
	IEC 60601-1: Fig 15	
Crest factor	≤ 3	
Ranges	0 µA to 199.9 µA	
	200 µA to 1999 µA	
	2 mA to 10 mA	
Frequency response/accuracy	DC to 1 kHz	± (1 % of reading + (1 µA or 1 LSD, whichever is greater))
	1 kHz to 100 kHz	± (2 % of reading + (1 µA or 1 LSD, whichever is greater))
	1 kHz to 5 kHz (current > 1.6 mA)	± (4 % of reading + (1 µA or 1 LSD, whichever is greater))
	100 kHz to 1 MHz	± (5 % of reading + (1 µA or 1 LSD, whichever is greater))
Note: Accuracy for Isolation, MAP, Direct AP, Alternative AP, and Alternative Equipment leakage tests all ranges are + (2.5 µA or 1 LSD, whichever is greater)		
Leakage tests	Ground wire (earth)	
	Chassis (enclosure)	
	Lead to ground (patient)	
	Lead to lead (patient auxiliary)	
	Lead isolation (mains on applied part)	
	Direct equipment	
	Direct applied part	
	Alternative equipment	
	Alternative applied part	
	Point to point	

Mains on applied part test voltage	100 % of mains	
Differential leakage		
Ranges	75 µA to 199 µA	
	200 µA to 2000 µA	
	2 mA to 20 mA	
Accuracy	± 10 % of reading + (2 counts or 20 µA, whichever is greater)	
Insulation resistance		
Ranges	0.5 MΩ to 20 MΩ	
	20 MΩ to 100 MΩ	
Accuracy	± (2 % of reading + 0.2 MΩ)	
	± (7.5 % of reading + 0.2 MΩ)	
Source test voltage	500 V dc	
	250 V dc	
Insulation resistance tests	Mains–PE, AP–PE, Mains– PE, Mains–NE (non–earthed accessible conductive part) and AP– NE (non–earthed accessible conductive part)	
ECG performance waveforms		
Accuracy	± 2 %	
	± 5 % for amplitude of 2 Hz square wave only, fixed at 1 mV Lead II configuration	
Waveforms	**Rates**	
	ECG complex (BPM)	30, 60, 120, 180, and 240
	Ventricular fibrillation	
	Square wave (50 % duty cycle) (Hz)	0.125 and 2
	Sine wave (Hz)	10, 40, 50, 60, and 100
	Triangle wave (Hz)	2
	Pulse (63 ms pulse width)	30 BPM and 60 BPM
Power ratings		
Mains voltage outlet	120 V ac or 230 V ac	
Mains voltage inlet power range	90 to 132 V ac rms	180 to 264 V ac rms
Maximum current	20 A	16 A
Hz	50 or 60	50 or 60
Physical case		
Dimensions (L x W x H)	17.63 cm x 8.38 cm x 28.45 cm (6.94 in x 3.30 in x 11.20 in)	
Weight	1.6 kg (3.5 lb)	
Environmental specifications		
Operating temperature	10 °C to 40 °C (50 °F to 104 °F)	
Storage temperature	–20 °C to 60 °C (–4 °F to 140 °F)	
Operating humidity	10 % to 90 % non–condensing	
Altitude	120 V ac mains supply voltage up to 5,000 m	
	230 V ac mains supply voltage up to 2,000 m	
General		
Warranty	Two–year extended warranty (no–cost, available after first–year calibration at the Fluke Biomedical Cleveland Service Center, otherwise standard one–year warranty applies)	

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Ordering information

Item numbers/Descriptions
ESA612 Electrical Safety Analyzer

ESA612 ESA612 United States, 115 V, 20 A
ESA612-01 ESA612 France, 230 V
ESA612-02 ESA612 Europe, 230 V
ESA612-03 ESA612 Israel, 230 V
ESA612-05 ESA612 Australia, 230 V
ESA612-06 ESA612 United Kingdom, 230 V
ESA612-07 ESA612 Switzerland, 230 V
ESA612-08 ESA612 Thailand, 230 V
ESA612-09 ESA612 Japan, 100 V
ESA612-10 ESA612 North America, 220 V
TA-ESA612-USA ESA612 United States, 115 V, 20 A with test automation
TA-ESA612-EUR ESA612 Europe, 230 V with test automation
TA-ESA612-FR ESA612 France, 230 V with test automation
TA-ESA612-ISR ESA612 Israel, 230 V with test automation
TA-ESA612-AUS ESA612 Australia, 230 V with test automation
TA-ESA612-UK ESA612 United Kingdom, 230 V with test automation
TA-ESA612-SWI ESA612 Switzerland, 230 V with test automation
TA-ESA612-THAI ESA612 Thailand, 230 V with test automation
TA-ESA612-JAPAN ESA612 Japan, 100 V with test automation
TA-ESA612-NA220V ESA612 North America, 220 V with test automation

Standard accessories

CD-ROM Operator's Manual (multilingual CD)
MANUAL Getting-Started Guide (hard copy, multilingual)
CD-ROM Ansur ESA612 Plug-In, CD with demo version
CABLE ASSEMBLY Data Transfer Cable
ESA T/L KIT USA US Accessory Kit (included for US, Australia, Israel, Thailand, and Japan versions only):
- Test Lead Set
- TP1 Test Probe Set
- AC285 Alligator Clip Set

ESA T/L KIT EUR EUR Accessory Kit (included for Europe, France, United Kingdom, and Switzerland versions only)
- Test Lead Set
- TP74 Test Probe Set
- AC285 Alligator Clip Set

2719-0154 15 A to 20 A Adapter (US only)
ESA620-NPA Null Post Adapter
ESA612-2016 5-to-5 Banana Jack to ECG (BJ2ECG) Adapter
9530-0075 Carry Case
Power Cord, one included, country specific by model number
LINE CORD US
75026 Europe
75024 UK
75025 Australia
LINE CORD Israel
75026 France/Belgium
75033 Thailand
75058 Japan
FBC-ESA620-4420 Switzerland

Optional accessories

6358 Retractable Test Leads
9503-0004 Ground Pin Adapter (US receptacle testing ground lug)
1210 ECG 1210 Adapter Box Assembly
ANSUR ESA612 Ansur ESA612 Plug-In License Key

About Fluke Biomedical

Fluke Biomedical is the world's leading manufacturer of quality biomedical test and simulation products. In addition, Fluke Biomedical provides the latest medical imaging and oncology quality-assurance solutions for regulatory compliance. Highly credentialed and equipped with a NVLAP Lab Code 200566-6 accredited laboratory, Fluke Biomedical also offers the best in quality and customer service for all your equipment calibration needs.

Today, biomedical personnel must meet the increasing regulatory pressures, higher quality standards, and rapid technological growth, while performing their work faster and more efficiently than ever. Fluke Biomedical provides a diverse range of software and hardware tools to meet today's challenges.

Fluke Biomedical Regulatory Commitment

As a medical test device manufacturer, we recognize and follow certain quality standards and certifications when developing our products. We are ISO 9001 certified and our products are:

- CE Certified, where required
- NIST Traceable and Calibrated
- UL, CSA, ETL Certified, where required
- NRC Compliant, where required

Fluke Biomedical.
Better products. More choices. One company.

Fluke Biomedical
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Fluke Biomedical Europe
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Email: sales@flukebiomedical.com
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4/2010 3456744C D-EN-N

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Impulse 6000D/7000DP

Defibrillator/External Pacer Analyzer

Technical Data

The Impulse 6000D Defibrillator Analyzer and Impulse 7000DP Defibrillator/Transcutaneous Pacer Analyzer Test Systems are rugged, portable precision test instruments that ensure proper operation and ultimate performance of critical life-support cardiac-resuscitation equipment.

The Impulse 6000D and Impulse 7000DP test capabilities encompass the spectrum of worldwide-established pulse shapes, showcase breakthrough AED technology compatibility, and outperform in accuracy and standards. Additionally, the Impulse 7000DP incorporates the tests and the extensive range of test loads and measurement algorithms needed to test external transcutaneous pacemakers.

In conjunction with an Impulse 7000DP, the Impulse 7010 Defibrillator Selectable Load Accessory provides multiple loads of 25 Ω, 50 Ω, 75 Ω, 100 Ω, 125 Ω, 150 Ω, 175 Ω, and 200 Ω for defibrillator performance testing. A standard USB interface enables computer control and data transfer, and optional Ansur PC-based automation software increases productivity by outfitting users with an easy-to-use method to standardize testing procedures and capture, print and document data.

Key features

- Impulse 7010 Defibrillator Selectable Load Accessory provides multiple loads of 25 Ω, 50 Ω, 75 Ω, 100 Ω, 125 Ω, 150 Ω, 175 Ω, and 200 Ω to comply with IEC 60601-2-4 standard (optional)
- Lown, Edmark, trapezoidal, biphasic and pulsed-biphasic defibrillation technology compatibility
- AED technology compatibility
- First-class measurement accuracy ± 1 % of reading + 0.1 J
- Intuitive user interface and backlight, easy-to-read display
- Portable, rugged, easy to carry
- Long-lasting, rechargeable battery
- Pacer brand selections
- Pacer input protected against defibrillator output (7000DP only)
- 10 independent ECG outputs that provide 12 lead combinations for standardized clinical signals
- Flexible heart-rate settings (1 BPM step) facilitate rate meter accuracy and alarm testing
- DSP-based measurements enable future firmware and waveforms upgrade
- Unique integrated posts for secure connections
- Two-year extended warranty (no-cost extended warranty available after first-year calibration at any Fluke Biomedical authorized service center)
- Optional Ansur test automation software to standardize testing procedures, capture waveforms and test results, and print and document test results
- Designed, tested, and built to incomparable Fluke quality standards

General specifications

Operating temperature
10 °C to 40 °C (50 °F to 104 °F)

Storage temperature
–20 °C to 60 °C (–4 °F to 140 °F)

Humidity
10 % to 90 % non-condensing

Display
LCD display

Communications
USB device port for computer control

Modes of operation
Manual and remote

Power
Internal rechargeable NiMH battery pack for nine hours (typical) operation after full charge or the battery charger can operate the analyzer and charge the battery simultaneously

Battery charger
100 V to 240 V input, 15 V/1.5 A output. For best performance, the battery charger should be connected to a properly grounded ac receptacle

Enclosure
ABS plastic housing

Dimensions (WxDxH)
32 cm x 24 cm x 13 cm
(13 in x 9.5 in x 5 in)

Weight
3.02 kg (6.6 lb, 0.1 oz)

Safety standards
CE: IEC/EN61010-1 2nd Edition; Pollution degree 2
CAN/CSA-C22.2 No 61010-1; UL61010-1
C-Tick: Australian EMC

Electromagnetic compatibility standards (EMC)
European EMC: EN61326-1

Defibrillator analyzer technical specifications

Energy output measurement

Compatible defibrillator waveshapes
Lown, Edmark, trapezoidal, dc biphasic, and ac pulsed biphasic

Note: AC pulsed biphasic waveform has not been approved in the United States.

Autoranged measurement
0.1 J to 600 J

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

Note: For pulsed biphasic 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 ms to 50 ms
Accuracy: ± 0.1 ms

Voltage
Range: 20 V to 5000 V
Accuracy: ± (1 % of reading + 2 V)

Current
Range: 0.4 A to 100 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 (pulsed 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 depending on range

Waveform playback
- Output: BNC
- Output impedance: 50 Ω
- Amplitude accuracy: ± 5 %

Charge time measurement
Range: 0.1 s to 100 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 ms 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 BPM to 180 BPM in 1 BPM steps
- Atrial fibrillation: Coarse and fine
- Monomorphic ventricular tachycardia: 120 BPM to 240 BPM in 5 BPM steps
- Asystole: Flat line

Automated defibrillator test ECG waves

Normal sinus: 10 BPM to 300 BPM in 1 BPM steps
Ventricular fibrillation: Coarse and fine
Monomorphic ventricular tachycardia: 120 BPM to 300 BPM in 5 BPM steps
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 % nominal

ECG amplitudes

Reference lead: Selectable, Lead II (default) or Lead I
Settings: 0.05 mV to 0.45 mV by 0.05 mV steps and 0.5 mV to 5 mV by 0.5 mV steps
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 #	Ref. amp.
I	70 %
II	100 %
III	30 %
V1	100 %
V2	100 %
V3	100 %
V4	100 %
V5	100 %
V6	100 %

Normal sinus waves:

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

Lead I reference

Performance waves and R wave detection:

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

Normal sinus waves:

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

ECG normal sinus

Rates: 10 BPM to 360 BPM in 1 BPM steps

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 Hz and 0.125 Hz
Triangular wave: 2 Hz and 2.5 Hz
Sine waves: 0.05, 0.5, 5, 10, 40, 50, 60, 100, 150, and 200 Hz
Pulse: 30 BPM and 60 BPM, 60 ms pulse width

R-wave detection

Waveform: Haver-triangle
Amplitude: 0.05 mV to 0.45 mV in 0.05 mV steps and 0.5 mV to 5 mV in 0.5 mV steps
Rate: 30, 60, 80, 120, 200, and 250 BPM
Widths: 8, 10, 12 ms, and 20 ms to 200 ms in 10 ms steps
Accuracy: ± (1 % setting + 1 ms)

Noise immunity

Wave: Sine
Line frequency: 50 Hz or 60 Hz (± 0.5 Hz)
Amplitude:
- Range: 0.0 mV to 10 mV in 0.5 mV steps
- Accuracy: ± 5 %

Transvenous pacer pulse simulation

Widths
- Range: 0.1 ms, 0.2 ms, 0.5 ms, 1 ms, and 2 ms
- Accuracy: ± 5 % of setting

Amplitudes:
- Range: 0 (off) and ± 2 mV, ± 4 mV, ± 6 mV, ± 8 mV, ± 10 mV, ± 12 mV, ± 14 mV, ± 16 mV, ± 18 mV, ± 20 mV, ± 50 mV, ± 100 mV, ± 200, ± 500, and ± 700 mV
- Accuracy: ± (10 % setting + 0.2 mV)

Amplitude of transvenous pacer pulse simulation signals relative to amplitude setting (in percent)

Lead II reference

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

Lead I reference

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

Arrhythmia selections

Pacer interactive (7000DP only)

- Demand: 30 BPM to 360 BPM in 1 BPM steps
- Asynchronous
- Non-capture
- Non-function
- Threshold (interactive pacing simulation only): 10 mA to 250 mA in 10 mA steps

Supraventricular

- Artrial fibrillation course
- Atrial fibrillation fine
- Atrial flutter
- Sinus arrhythmia
- Missed beat
- Atrial tachycardia
- Paroxysmal atrial tachycardia (PAT)
- Nodal rhythm
- Supraventricular tachycardia

Premature

- Atrial PAC
- Nodal PNC
- PVC1 left ventricle
- PVC1 LV early
- PVC1 LV R on T
- PVC2 right ventricle
- PVC2 RV early
- PVC2 RV R on T
- Multifocal PVCs

Ventricular

- PVCs 6/min
- PVCs 12/min
- PVCs 24/min
- Freq multifocal
- Trigeminy
- Bigeminy
- Pair PVCs
- Run 5 PVCs
- Run 11 PVCs
- Monomorphic ventricular tachycardia: 120 BPM to 300 BPM in 5 BPM steps
- Polymorphic ventricular tachycardia: 1 to 5
- Ventricular fibrillation: coarse and fine
- Asystole

Conduction

- 1° Block
- 2° Block Type I
- 2° Block Type II
- 3° Block
- Right bundle branch block RBBB
- Left bundle branch block LBBB

Transvenous Paced with selectable pacer spike amplitudes and widths

- Atrial 80 BPM
- Async 75 BPM
- Demand with frequent sinus beats
- Demand with occasional sinus beats
- AV sequential
- Non-capture
- Non-function

Selections for all waves in group

Atrial pacer pulse

Width: 0.1, 0.2, 0.5, 1, 2 ms
Polarity: + or –
Amplitude: 0 (off), 2 to 20 (by 2), 50, 100, 200, 500, 700 mV

Ventricular pacer pulse

Width: 0.1, 0.2, 0.5, 1, 2 ms
Polarity: + or –
Amplitude: 0 (off), 2 to 20 (by 2), 50, 100, 200, 500, 700 mV

R-wave detection

Rate: 30, 60, 80, 120, 200, 250 BPM
Width: 8, 10, 12, 20 to 200 (by 10) ms
Amplitude: 0.05 to 0.45 (by 0.05), 0.5 to 5 (by 0.5) mV

Transcutaneous pacemaker analyzer technical specifications

(7000DP only)

Test load Selections

Defibrillator input
Fixed load: 50 Ω
Accuracy: ± 1 %, non-inductive (<2 µH)
Power rating: 10 defib pulses of 360 J every 5 minutes

Pacemaker input
Variable load: 50 Ω to 1500 Ω in 50 Ω steps
Accuracy: ± 2 %, non-inductive (< 2 µH)
Power rating: 5 Ω (average), 40 Ω (peak) @ 1000 Ω

Measurements

Manufacturer specific algorithms

- GE Responder (1500 and 1700)
- MDE 300 (Medical Data Electronics)
- Medtronic ERS/Physio Control LIFEPAK
- MRL (Medical Research Laboratory/Welch Allyn)
- Philips/Agilent/HP
- Schiller Medical
- ZOLL Medical

(plus a general purpose Default Algorithm selection)

Current
Range: 4 mA to 250 mA
Accuracy: ± 1 % of reading + 0.02 mA

Pulse rate
Range: 5 PPM to 800 PPM
Accuracy: ± 0.5 % of reading + 0.1 PPM

Pulse width
Range: 1 ms to 100 ms
Accuracy: ± 0.5 % of reading + 0.01 ms

Energy
Range: 1 µJ to 2 J
Accuracy: ± 4 % of reading + 10 µJ

Demand and asynchronous mode test

Input pacer pulse rates
30 PPM to 200 PPM

ECG NSR wave
Rate: 10 BPM to 300 BPM in 1 BPM steps
Amplitude: 1 mV
Underdrive rate: 10 BPM minimum
Overdrive rate: 300 BPM maximum

Sensitivity test

Automatic interactive threshold detection
Compatible pacer rates: 30 PPM to 120 PPM

ECG R wave
Waveforms: Square, triangle, sine
Width: 1 ms to 19 ms (by 1 ms), 20 ms to 95 ms (by 5 ms), 100 ms to 300 ms (by 25 ms)
Accuracy: ± 5 % of setting
Amplitude: 0.05 mV to 0.95 mV (by 0.05 mV), 1 mV to 5 mV (by 0.5 mV)
Accuracy: ± 5 % of setting

Refractory period tests

Paced refractory period
20 ms to 500 ms

Sensed refractory period
15 ms to 500 ms

Accuracy
± 1 ms

Pacer pulse rate
20 PPM to 200 PPM

ECG
Waveform: Triangle wave
Pulse width: 40 ms
Amplitude: 1 mV

Impulse 7010 Defibrillator Selectable Load Accessory

General specifications

Maximum voltage
5000 V

Maximum continuous power
12 W, equivalent to 10 defib pulses of 360 J every 5 minutes

Inductance
< 2 µH, @25 Ω
< 3 µH, @50 Ω
< 4 µH, @75 Ω and 100 Ω
< 5 µH, @125 Ω
< 6 µH, @150 Ω
< 7 µH, @175 Ω
< 8 µH, @200 Ω

Temperature
Operating: 10 °C to 40 °C (50 °F to 104 °F)
Storage: –20 °C to 60 °C (–4 °F to 140 °F)

Humidity
10 % to 90 % non-condensing

Dimensions (WxDxH)
154 mm x 272 mm x 138.7 mm (6.07 in x 10.71 in x 5.46 in)

Weight (net)
1.54 kg (3 lb 6.2 oz)

Safety class
Complies with EN61010-1 2nd Edition, Class II product

Safety and EMC marks
C US N10140

Warranty
Two-year extended warranty (no-cost extended warranty available after first-year calibration at any Fluke Biomedical authorized service center)

Calibration interval
One-year

Electrical specifications (for Load Accessory and Analyzer together)

Load settings
25 Ω, 50 Ω, 75 Ω, 100 Ω, 125 Ω, 150 Ω, 175 Ω, and 200 Ω ± 1 %

Accuracy
Energy (all except pulsed biphasic): 2 % of reading + 0.1 J with 25, 75 Ω though 200 Ω loads, 1 % of reading + 0.1 J with 50 Ω load
Energy (pulsed biphasic): 2.5 % of reading + 0.3 J with 25, 75 Ω though 200 Ω loads, 1.5 % of reading + 0.3 J with 50 Ω load
Voltage: 1 % of reading + 2 V with 25 Ω and 50 Ω loads, 2 % of reading + 2 V with 75 Ω through 200 Ω loads
Current: 2 % of reading + 0.1 A with 25 Ω load, 1 % of reading + 0.1 A with 50 Ω through 200 Ω loads

Ordering information

Models

2811928 Impulse 6000D Defibrillator Analyzer 120 V (US)

3077031 Impulse 6000D Defibrillator Analyzer (Schuko)

3077046 Impulse 6000D Defibrillator Analyzer (UK)

3077054 Impulse 6000D Defibrillator Analyzer (Japan)

3085270 Impulse 6000D Defibrillator Analyzer (Australia)

3085281 Impulse 6000D Defibrillator Analyzer (India)

2811919 Impulse 7000DP Defibrillator/ Transcutaneous Pacemaker Analyzer 120 V (US)

3077005 Impulse 7000DP Defibrillator/ Transcutaneous Pacemaker Analyzer (Schuko)

3077010 Impulse 7000DP Defibrillator/ Transcutaneous Pacemaker Analyzer (UK)

3077022 Impulse 7000DP Defibrillator/ Transcutaneous Pacemaker Analyzer (Japan)

3085296 Impulse 7000DP Defibrillator/ Transcutaneous Pacemaker Analyzer (Australia)

3085308 Impulse 7000DP Defibrillator/ Transcutaneous Pacemaker Analyzer (India)

3326874 TA-IMP7KDP Impulse 7000DP Defibrillator/Transcutaneous Pacemaker Analyzer with test automation 120 V (US)

3326888 TA-IMP7KDP-01 Impulse 7000DP Defibrillator/Transcutaneous Pacemaker Analyzer with test automation (Schuko)

3326895 TA-IMP7KDP-02 Impulse 7000DP Defibrillator/Transcutaneous Pacemaker Analyzer with test automation (UK)

3326901 TA-IMP7KDP-03 Impulse 7000DP Defibrillator/Transcutaneous Pacemaker Analyzer with test automation (Japan)

3326912 TA-IMP7KDP-04 Impulse 7000DP Defibrillator/Transcutaneous Pacemaker Analyzer with test automation (Australia)

3326920 TA-IMP7KDP-05 Impulse 7000DP Defibrillator/Transcutaneous Pacemaker Analyzer with test automation (India)

Standard accessories

1626219 USB Computer Communication Cable

3028681 User Manual CD

3028662 Getting-Started Guide

Battery Eliminator (country specific)

2814980 Carrying Case

3156262 Defib Paddle Contact Plates

Optional accessories

3091370 Ansur Impulse 6000D/7000DP Plug-In

3065489 MedtronicERS/Physio-Control (FAST PATCH) (set of two): 4 mm defibrillator adapters

3065450 Kimberly Clark/R2 Darox MRL/MDE/ NK: 4 mm defibrillator adapters

3065438 Internal discharge paddle contacts (set of two)

3065477 Medtronic ERS/Physio-Control (QUIK PACE) (set of two): 4 mm pacer adapters

3065527 Zoll Medical NTP/PD1400: 4 mm pacer adapters

3065461 Medtronic ERS/Physio-Control (QUIK COMBO): 4 mm defib/pacer adapters

3065492 Philips/Agilent/HP (CODEMASTER Series-Round): 4 mm defib/pacer adapters

3065509 Philips/Agilent HEARTSTART FR2/ MRX: 4 mm defib/pacer adapters

3065511 Zoll PD-2200 Multi-Function PD-Series, M-Series, M-Series CCT, AED PRO and AED Plus™ defib/pacer adapters

3065423 GE Marquette (RESPONDER1500/1700 Series) (set of two): 4 mm defib/pacer adapters

3158544 Impulse 7010 Defibrillator Selectable Load Accessory

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About Fluke Biomedical

Fluke Biomedical is the world's leading manufacturer of quality biomedical test and simulation products. In addition, Fluke Biomedical provides the latest medical imaging and oncology quality-assurance solutions for regulatory compliance. Highly credentialed and equipped with a NVLAP Lab Code 200566-0 accredited laboratory, Fluke Biomedical also offers the best in quality and customer service for all your equipment calibration needs.

Today, biomedical personnel must meet the increasing regulatory pressures, higher quality standards, and rapid technological growth, while performing their work faster and more efficiently than ever. Fluke Biomedical provides a diverse range of software and hardware tools to meet today's challenges.

Fluke Biomedical Regulatory Commitment

As a medical test device manufacturer, we recognize and follow certain quality standards and certifications when developing our products. We are ISO 9001 certified and our products are:

- CE Certified, where required
- NIST Traceable and Calibrated
- UL, CSA, ETL Certified, where required
- NRC Compliant, where required

Fluke Biomedical.

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ProSim 8

Vital Signs Simulator

Technical Data

The 8-in-1 ProSim 8 Vital Signs Simulator offers fast and comprehensive preventative maintenance (PM) testing for your entire patient monitor fleet. Designed to get you in and out of most PM locations in minutes, this multifunction simulator tests ECG (including fetal ECG and arrhythmias), respiration, temperature, IBP, cardiac output, NIBP, SpO_2, and is capable of testing Rainbow multi-wavelength waveforms. Featuring specialized stay-connected ECG posts for secure lead connections, physiologically-synchronized pulses across all parameters, and customizable patient pre-sets and autosequences, the ProSim 8 patient simulator provides unbeatably fast and easy complete monitor testing. Barcode-scanner compatibility and wireless PC interface, direct printing, data transfer and reporting, along with advanced, integrated technologies and works-every-time performance allow top confidence in patient monitor fleet performance and supports passing regulatory audits with ease.

Key features

- All-in-one complete monitor testing 80 % smaller and 17 lbs/7.7 kilos lighter than predecessor technology
- 8-in-1 multifunction simulator tests ECG (including fetal ECG and arrhythmias), respiration, temperature, IBP, cardiac output, NIBP, SpO_2, and Rainbow multi-wavelength waveforms
- Stay-connected ECG posts for easy/secure ECG snap and lead connections
- Custom SpO_2 r-curve for accurate testing of the latest and future oximetry technologies
- Static pressure linearity testing
- Repeatable NIBP simulation (+/- 2 mmHg) for dynamic pressure repeatability testing
- Physiologically synchronized pulses across all parameters
- Barcode scanning and direct data capture and printing functionality
- Onboard, customizable patient pre-sets and autosequences for fast/easy testing
- Multi-language user interface offers choice of language selection
- Integrated, easily-replaceable long-life battery
- Optional PC-interface software offers customizable procedures/checklists to replace bulky service manuals and automated data capture/storage*
- Wireless communication for remote PC control of test device, as well as data transfer and automated regulatory reporting*

**You must have Ansur Test Executive version 2.9.6 or greater on your PC to communicate with the product*

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Specifications

General specifications		
Temperature	Operating	10 °C to 40 °C (50 °F to 104 °F)
	Storage	–20 °C to +60 °C (–4 °F to 140 °F)
Humidity	10 % to 90 % non-condensing	
Altitude	3,000 meters (9,843 ft)	
Dimensions (L x W x H)	14.5 cm x 30.2 cm x 8.6 cm (5.7 in x 11.9 in x 3.4 in)	
Display	LCD color display	
Communication	USB device upstream port	Mini-B connector for control by a computer
	USB host controller port	Type A, 5 V output, 0.5 A max load. Connector for keyboard, barcode reader, and printer
	Wireless	IEEE 82.15.4 for control by a computer
Power	Lithium-ion rechargeable battery	
Battery charger	100 V to 240 V input, 15 V/2.0 A output. For best performance, the battery charger should be connected to a properly-grounded ac receptacle	
Battery life	9 hours (minimum), 100 NIBP cycles typical	
Weight	1.87 kg (4.2 lb)	
Safety standards	IEC/EN 61010-1 3rd Edition; Pollution degree 2 CAT None	
Certifications	CE, CSA, C-TICK N10140 , RoHS	
Electromagnetic compatibility (EMC)	IEC 61326-1:2006	

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Detailed specifications		
Normal-sinus-rhythm waveform		
ECG reference	The ECG amplitudes specified are for Lead II (calibration), from the baseline to the peak of the R wave. All other leads are proportional	
Normal sinus rhythm	12-lead configuration with independent outputs referenced to right leg (RL). Output to 10 universal ECG jacks, color-coded to AHA and IEC standards	
High-level output	0.5 V/mV ± 5 % of the ECG amplitude setting available on a BNC connector	
Amplitude	0.05 mV to 0.5 mV (0.05 mV steps); 0.5 mV to 5.0 mV (0.25 mV steps) Other leads are proportional to Lead II (reference lead) in percentage per: Lead I: 70 Lead II: 100 Lead III: 30 Lead V1: 24 Lead V2: 48 Lead V3: 100 Lead V4: 120 Lead V5: 112 Lead V6: 80	
Amplitude accuracy	± (2 % of setting + 0.05 mV)	
ECG rate	10 BPM to 360 BPM in 1 BPM steps	
Rate accuracy	± 1 % of setting	
ECG waveform selection	Adult (80 ms) or pediatric (40 ms) QRS duration	
ST-segment elevation	Adult mode only. -0.8 mV to +0.8 mV (0.1 mV steps). Additional steps: + 0.05 mV and – 0.05 mV	
Power-on default	60 BPM, 1.0 mV, adult QRS and ST-segment elevation of 0 mV	
Pacemaker waveform		
Pacer pulse	Amplitude	0 (off), ± 2, ± 4, ± 6, ± 8, ± 10, ± 12, ± 14, ± 16, ± 18, ± 20, ± 50, ± 100, ± 200, ± 500, and ± 700 mV for lead II (reference lead)
	Accuracy	Reference lead II: ± (5 % setting + 0.2 mV)
		All other leads: ± (10 % setting + 0.4 mV)
Pacer pulse width	0.1 ms, 0.2 ms, 0.5 ms, 1 ms, and 2 ms ± 5 %	
Paced arrhythmias	Atrial 80 BPM	
	Asynchronous 75 BPM	
	Demand with frequent sinus beats	
	Demand with occasional sinus beats	
	Atrio-ventricular sequential	
	Noncapture (one time)	
	Nonfunction	
Power-on default	Amplitude 5 mV, width 1 ms, atrial waveform	

Arrhythmia		
Baseline NSR	80 BPM	
PVC focus	Left focus, standard timing (except where specified)	
Supraventricular arrhythmia	Atrial fibrillation (coarse or fine); atrial flutter; sinus arrhythmia; missed beat (one time); atrial tachycardia; paroxysmal atrial tachcardia; nodal rhythm; and supraventricular tachycardia	
Premature arrhythmia	Premature atrial contraction (PAC); premature nodal contraction (PNC); PVC1 left ventricular; PVC1 left ventricular, early; PVC1 left ventricular, R on T; PVC2 right ventricular; PVC2 right ventricular, early; PVC2 right ventricular, R on T; and multifocal PVCs	
Ventricular arrhythmia	PVCs 6, 12, or 24 per minute; frequent multifocal PVCs; bigeminy; trigeminy; multiple PVCs (one-time run of 2, 5, or 11 PVCs); monoventricular tachycardia (120 to 300 BPM in 5 BPM steps); polyventricular tachycardia (5 types); ventricular fibrillation (coarse or fine); and asystole	
Conduction defect	First-, second-, or third-degree heart block; and right- or left-bundle-branch block	
Advanced cardiac life support	Shockable pulseless arrest rhythms	Ventricular fibrillation (coarse), ventricular fibrillation (fine), unstable polymorphic ventricular tachycardia
	Non-shockable pulseless arrest rhythms	Asystole
	Symptomatic bradycardia	Sinus bradycardia (< 60 BPM)
		2nd degree AV block, mobitz type I
		2nd degree AV block, mobitz type II
		Complete/3rd degree AV block
		Right bundle branch block
		Left bundle branch block
Advanced cardiac life support cont.	Symptomatic tachycardia: regular narrow-complex tachycardia (QRS < 0.12 seconds)	Sinus tachycardia > 150 BPM
		Supraventricular Tachycardia
	Symptomatic tachycardia: regular wide-complex tachycardias (QRS ≥ 0.12 seconds)	Sinus tachycardia > 150 BPM
		Supraventricular tachycardia SVT with aberrancy
	Irregular tachycardia	Atrial fibrillation (coarse and fine), atrial flutter, unstable monomorphic ventricular tachycardia (120 BPM to 300 BPM), torsade de pointes/polymorphic ventricular tachycardia (long QT interval)

ECG Performance testing		
Amplitude	0.05 mV to 0.5 mV (0.05 mV steps); 0.5 mV to 5.0 mV (0.25 mV steps) Other leads are proportional to Lead II (reference lead) in percentage per: Lead I: 70 Lead III: 30 Lead II: 100 Lead V1 through V6: 100	
Pulse wave	30 BPM, 60 BPM, with 60 ms pulse width	
Square wave	0.125 Hz, 2 Hz, 2.5 Hz	
Triangle wave	0.125 Hz, 2 Hz, 2.5 Hz	
Sine wave	0.05 Hz, 0.5 Hz, 1, 2 Hz, 5 Hz, 10 Hz, 25 Hz, 30 Hz, 40 Hz, 50 Hz, 60 Hz, 100 Hz, and 150 Hz	
R-wave detection	Waveform	Triangular pulse
	Rate	30 BPM, 60 BPM, 80 BPM, 120 BPM, 200 BPM, and 250 BPM
	Width	8 ms to 20 ms in 2 ms steps, and 20 ms to 200 ms in 10 ms steps
	Width accuracy	± (1 % of setting + 1 ms)
QRS detection	Widths	8 ms to 20 ms in 2 ms steps, and 20 ms to 200 ms in 10 ms steps
	Width accuracy	± (1 % of setting + 1 ms)
	Rate	30 BPM, 60 BPM, 80 BPM, 120 BPM, 200 BPM, and 250 BPM
	R-Wave up slope	0.875 amplitude, 0.4375 x width
	R-Wave down slope	Full amplitude, 0.5 x width
	S-Wave up slope	0.125 amplitude, 0.0625 x width
Tall T-wave rejection	Waveform	QT Interval 350 ms
		T-Wave width 180 ms
		T-Wave shape ½ sinewave
	Amplitude	0 % to 150 % reference lead amplitude in 10 % steps
	Rate	80 BPM
Rate accuracy	± 1 % of setting	
Amplitute accuracy	± (2 % of setting + 0.05 mV)	
ECG artifact		
Type	50 Hz, 60 Hz, muscular, baseline wander, respiration	
Size	25 %, 50 %, 100 % of the normal sinus R-Wave for each lead	
Lead select	All, RA, LL, LA, V1, V2, V3, V4, V5, V6	

Fetal/Maternal ECG		
Fetal heart rate (fixed)	60 BPM to 240 BPM in 1 BPM steps	
Fetal heart rate (IUP)	140 BPM at beginning, then varies with pressure	
Intrauterine-pressure waveforms	Early deceleration, late deceleration, and acceleration	
Wave duration	90 seconds, bell-shaped pressure curve, from 0 mmHg to 90 mmHg and returning to 0	
IUP period	2 min, 3 min, or 5 minutes; and manual	
Default settings	FHR 140 BPM, early deceleration wave, manual	
Invasive blood pressure		
Channels	2, each independently settable with identical parameters and are individually electrically isolated from all other signals	
Input/output impedance	300 Ω ± 10 %	
Exciter input range	2 to 16 V peak	
Exciter-input frequency range	DC to 5000 Hz	
Transducer sensitivity	5 (default) or 40 µV/V/mmHg	
Pressure accuracy	± (1 % of setting + 1 mmHg) accuracy guaranteed for dc excitation only	
Static pressure	– 10 to + 300 mmHg in 1 mmHg steps	
Pressure units	mmHg or Kpa	
Dynamic waveforms	Types (default pressures	Arterial (120/80)
		Radial artery (120/80)
		Left ventricle (120/00)
		Right ventricle (25/00)
		Pulmonary artery (25/10)
		Pulmonary-artery wedge (10/2)
		Right atrium (central venous or CVP) (15/10)
	Pressure variability	Systolic and diastolic pressures are independently variable in 1 mmHg steps
Swan-Ganz sequence	Right atrium, right ventrical (RV), pulmonary artery (PA), pulmonary artery wedge (PAW)	
Cardiac catheterization	Chambers	Aortic, pulmonary valve, and mitral valve
Respiration artifact	Arterial, radial artery, and left ventricle	5 % to 10 % multiplication
	Other	5 mmHg or 10 mmHg
BP output	Circular DIN 5-Pin	
Power-on default	0 mmHg	

Respiration		
Rate	0 (OFF), 10 BrPM to 150 BrPM in 1 BrPM steps	
Waves	Normal or ventilated	
Ratio (inspiration:expiration)	Normal	1:1, 1:2, 1:3, 1:4, 1:5
	Ventilated	1:1
Impedance variations (Δ Ω)	0.00 Ω to 1.00 Ω in 0.05 Ω steps and 1 Ω to 5 Ω in 0.25 Ω steps	
Accuracy delta	± (5 % of setting + 0.1 Ω)	
Baseline	500 Ω, 1000 Ω (default), 1500 Ω, 2000 Ω, Leads I, II, III	
Accuracy baseline	± 5 %	
Respiration lead	LA or LL (default)	
Apnea selection	12 sec, 22 sec, or 32 seconds (one-time events), or continuous (Apnea ON = respiration OFF)	
Power-on default	20 BrPM, delta 1.0 Ω	
Temperature		
Temperature	30 °C to 42.0 °C in 0.5 °C steps	
Accuracy	± 0.4 °C	
Compatibility	Yellow Springs, Inc. (YSI) Series 400 and 700	
Output	Circular DIN 4-Pin	
Cardiac output		
Catheter type	Baxter Edwards, 93a-131-7f	
Calibration coeffecient	0.542 (0 °C injectate), 0.595 (24 °C injectate)	
Blood temperature	36 °C (98.6 °F) to 38 °C (100.4 °F) ± 0.2 °C in 1 °C steps	
Injectate volume	10 cc	
Injectate temperature	0 °C or 24 °C	
Cardiac output	2.5, 5, 10 liters per minute ± 7.5 %	
Faulty-injectate curve	Waveform for simulation available	
Left-to-right-shunt curve	Waveform for simulation available	
Calibrated pulse	1.5 ° for 1 second	
Connector	Circular DIN 7 pin	
Power-on default	5 liters per minute, 0 °C injectate, 37 °C blood temperature	

Non-invasive blood pressure		
Pressure units	mmHg or kPa	
Manometer (pressure meter)	Range	10 mmHg to 400 mmHg
	Resolution	0.1 mmHg
	Accuracy	± (0.5 % reading + 0.5 mmHg)
Pressure source	Target pressure range	20 mmHg to 400 mmHg
	Resolution	1 mmHg
NIBP simulations	Pulse	2 mmHg max into 500 ml NIBP system
	Volume of air moved	1.25 ml max
	Simulations (systolic/diastolic [MAP])	Adult: 60/30 (40), 80/50 (60); 100/65 (77); 120/80 (93); 150/100 (117); and 200/150 (167) and 255/195 (215)
		Neonatal: 35/15 (22); 60/30 (40); 80/50 (60); 100/65 (77); 120/80 (93) and 150/100
		Pressure variability: systolic and diastolic pressures are variable by 1 mmHg
NIBP simulations cont.	Repeatability	Within ± 2 mmHg (at maximum pulse size independent of device under test)
	Synchronization: normal Sinus heart rates: 30 BPM to 240 BPM	Maximum rate at 1 ml: 240 BPM achievable with pulses up to 1 ml
		Maximum rate at 1.25 ml: 180 BPM
	Synchronization: arrhythmias	Premature atrial contraction (PAC), premature ventricular contrac–tion (PVC), atrial fibrillation, and missed beat
Leak test	Target pressure	20 mmHg to 400 mmHg
	Elapse time	0:30 min to 5:00 minutes: sec–onds in 30 second steps
	Leakage rate	0 mmHg/minute to 200 mmHg/ minute
Pressure relief test range	100 to 400 mmHg	

Oximeter SpO_2 optical emitter and detector (optional)		
% O_2	Range	30 % to 100 %
	Resolution	1 %
% O_2 accuracy	With oximeter manufacturer's R-curve	Saturation within UUT specific range: ± (1 count + specified accuracy of the UUT)
		Saturation outside UUT specific range: monotonic with unspecified accuracy
	With Fluke Biomedical R-curves	91 % to 100 % ± (3 counts + specified accuracy of the UUT)
		81 % to 90 % ± (5 counts + specified accuracy of the UUT)
		71 % to 80 % ± (7 counts + specified accuracy of the UUT)
		Below 71 % monotonic with unspecified accuracy
Heart rate	30 BPM to 300 BPM in 1 BPM steps. Oximeter SpO_2 optical emitter and detector is synchronized with ECG rate delayed by 150 ms.	
Transmission: ratio of detector current to LED current, expressed in parts per million (ppm)	Range	0 ppm to 300.00 ppm
	Resolution	0.01 ppm
	Accuracy	+ 50 %/– 30 % for compatible monitors, unspecified for others. Selected by finger size and color: dark, thick finger, medium finger, light, thin finger, neonatal foot.
Pulse amplitude	Range	0 % to 20.00 %
	Resolution	0.01 %
Artifact	Respiration	Range: 0 % to 5 % of transmission
		Resolution: 1 %
		Rate: all ProSim respiration simulation settings
	Ambient light	Range: 0 to 5X transmitted light
		Resolution: 1X
		Frequency: DC, 50 Hz, 60 Hz, and 1 kHz to 10 kHz in 1 kHz steps
Masimo Rainbow technology	Masimo Rainbow technology with an optional adapter cable supplied by Masimo that allows the ProSim two wavelength to test the Rainbow multiple wavelength system	
Compatible manufacturer products	With manufacturer R-curve	Nellcor, Masimo, Nonin, and Nihon Kohden
	With Fluke R-curve	Mindray, GE-Ohmeda, Philips/HP, and BCI

Pre-Defined Simulations
Normal
Hypertensive
Hypotensive
Tachycardic
Bradycardic
Ventricular fibrillation
Asystole
Autosequences (default)
Monitor testing sequence
Medical training sequence
Oximeter testing sequence
Cardiac failure sequence
Arrhythmia sequence
Exercise sequence
Respiration sequence
Performance wave test
IBP testing sequence
Temperature sequence

Ordering information

Models/descriptions
3979409 ProSim 8 Vital Signs Simulator
3985658 ProSim SpO_2 Test Module
4034609 ProSim Rainbow Test Cable

Standard accessories
3980671 ProSim 6/8 Users Manual
3980667 ProSim 6/8 Getting start manual
4021085 ProSim 6/8 Battery Pack
4034393 USB Cable
2392173 IBP Cable, unterminated
4034597 ProSim 6/8 Carrying Case
4308086 ProSim NIBP Mandrel Set
2391882 Set of NIBP Cuff Adapters
2184298 AC/DC Power Supply
Power cord (country-specific)

AC Power cords
2201437 ProSim 8 AC power cord Schuko
2201455 ProSim 8 AC power cord USA
2201428 ProSim 8 AC power cord UK
2201419 ProSim 8 AC power cord Japan
2201443 ProSim 8 AC power cord Australia
3930831 ProSim 8 AC power cord Brazil

Optional accessories
2392199 CI-3 Cardiac Output Box
3408564 Mini-DIN to DIN IBP Adapter
4034611 NIBP Rigid Test Chamber 500ML
4034627 Ansur Test Software ProSim 8 Plug-In
3341333 USB Wireless Dongle

Cable kits
3984910 ProSim 8 Accessory Kit (includes DIN to minDin adapter, HP/Philips Intellivue IBP cable, GE Marquette Eagle/Dash/Solar IBP cable, Welch Allyn Propaq/SpaceLabs Ultraview IBP cable, USB wireless dongle, YSI400 series temperature cable, YSI700 series temperature cable, CI-3 Cardiac Output Box, spare battery pack)
3984922 HP/Phillips intellivue Cable Set (includes: HP-3 BP Cable (2198902) two, HPT-2 Tamp/C.O. Injct Cable Assembly (2199257), COA-1 Cable Assembly (2199240), UT-4, Low profile 1/4 inch phone plug, YSI 400 Series Compatible 2 conductor (2523334)
3984968 GE Marquette Eagle/Dash/Solar Cable Set (Includes: MQ-3 BP Cable (2199627) two, UT-4 Low profile 1/4 inch phone plug, YSI 400 series Compatible 2 conductor (2523334), UT-2 Tamp Cable 700 series YSI (2199019), PROSIM8-4402GECO, Din cardiac Output Marq Eagle (4022300)
3984946 ProSim 8 SpaceLabs Ultraview Cable Set (Includes: TK-1 BP Cable (2198879) two, UT-4 Low profile 1/4 inch phone plug, YSI 400 series compatible 2 conductor (2523334), UT-2 Tamp Cable 700 Series YSI (2199019)
3984979 Welch Allyn/Propaq Cable Set (Includes: TK-1 BP Cable (2198879) two, UT-4 Low profile 1/4 inch phone plug, YSI 400 Series Compatible 2 conductor (252334), UT-2 Tamp cable 700 series YSI (2199019)
3984993 Drager Infinity Cable Set (Includes: SM-1 BP Cable (2198925) two, UT-4, Low profile 1/4 inch phone plug, YSI 400 series compatible 2 conductor (2523334)
3985009 ProSim 8 Nihon Kohden Cable Set (Includes: Nihon Kohden-NK-1, BP Cable (5M) (2462263) two, DIN to mindin adapter (3408564), UT-4, Low profile 1/4 inch phone plug, YSI 400 Series Compatible 2 conductor (2523334)

Blood pressure cables
2198879 BCI International TK-1 (6M)
2198879 Criticare Systems Inc. (1100) TK-1 (6M)
2198879 Critikon (Dinamap Plus) TK-1 (6M)
2198887 Datascope DS-1 (6F)
2200955 Datex (AS/3, CS/3, Compact, Cardio Cap II, Critical Care, Light) DX-1 (10F)
2199387 Fakuda Denshi (DS3300 series) FD-2 (12M)
2199682 GE Marquette Medical Corametrics (115, 116, 142, 145, 556) CM-3 (Nicolet round – 12M)
2198893 GE Marquette Medical (PPG/E for M DR) EM-1 (6F)
2198978 GE Marquette Medical (7000 and TRAM-AR series only) MQ-2 (8M round)

2199627 GE Marquette Medical (Dash, Eagle, Solar, Tram, and MacLab) MQ-3 (rectangular – 11M)
2198902 Hewlett Packard/Philips (78-300, 78-500, 78-800, Merlin/Viridia/ Omnicare (HP/Philips M1006B iBP module has a sensitivity of 5 uV/V/mmHg only. The HP-3 cable should be selected for this application.) HP-3 (12M 5 µV)
2198916 Hewlett Packard/Philips (78-300, 78-500, 78-800, Merlin/Viridia/Omnicare) HP-4 (12M 40 µV)
2199694 Hewlett Packard/Philips (8040A, M1350A) HP-8 (intrauterine pressure only – 12M 40 µV)
2198879 Invivo Research TK-1 (6M)
2198879 Ivy Biomedical (400 and 700 series) TK-1 (6M)
2198940 Medical Data Electronics (Escort series) PC-1 (6M)
2198933 Mennen Medical (Horizon series) MM-1 (6M)
2198879 North American Drager (Vitalert 2000) TK-1 (6M)
2198940 Physio Control (VSM series) PC-1(6M)
2198879 Protocol System (Propaq series) TK-1 (6M)
2190955 Puritan Bennett PB 240 DX-1 (10F)
2199176 Quinton (Q Cath series) QM-1 (6M)
2198925 Siemens (SIRECUST series) [SM-1 and Siemens Medical Transducer Adapter (3368-383-E530U) used to run a single invasive BP channel on the Siemens Medical SC6000 and SC9000 series monitors] SM-1 (10M)
2199666 Siemens (Micor/Mingo) SM-3 (15M)
2198879 SpaceLabs (1050, 1700, PCMS series) (SpaceLabs adapters 700-0028-00 and 0120-0551-00 with TK-1 used when testing the new UltraView Command Module) TK-1 (6M)
2392173 Universal unterminated UU-1 (5-Pin DIN one end only)
2198893 Witt Biomedical EM-1 (6F)

Temperature cables
2199019 UT-2 standard 1/4 in phone plug (compatible with YSI 700 series – 3 conductor)
2199291 UT-3 unterminated cable (DIN plug on one end only)
2523334 UT-4 Low profile, 1/4 in phone plug, YSI 400 series compatible, two conductor
2199257 HPT-2 temperature adapter (Hewlett Packard) (2 pin, used with UT-1 for HP monitors)

Cardiac output bath/injectate adapters
2392199 CI-3 cable assembly
2392158 General purpose connector
2199240 COA-1 Cardiac output adapter (Hewlett Packard) (HPT-2 also required for cardiac output simulation on HP patient-monitoring systems)
2199257 HPT-2 Temperature adapter (Hewlett Packard) (2 pin) (COA-1 also required for cardiac output simulation on HP patient-monitoring systems)
4022300 DIN Cardiac Output MARQ EAGLE

The ProSim 8 does not provide simulation for all types of fetal heart rate tracings and contraction patterns, including the following:
- **variable decelerations**
- **sinusoidal pattern**
- **reactive tracing**
- **variations in FHR variability**
- **tachysystole**

About Fluke Biomedical

Fluke Biomedical is the world's leading manufacturer of quality biomedical test and simulation products. In addition, Fluke Biomedical provides the latest medical imaging and oncology quality-assurance solutions for regulatory compliance. Highly credentialed and equipped with a NVLAP Lab Code 200566-0 accredited laboratory, Fluke Biomedical also offers the best in quality and customer service for all your equipment calibration needs.

Today, biomedical personnel must meet the increasing regulatory pressures, higher quality standards, and rapid technological growth, while performing their work faster and more efficiently than ever. Fluke Biomedical provides a diverse range of software and hardware tools to meet today's challenges.

Fluke Biomedical Regulatory Commitment

As a medical test device manufacturer, we recognize and follow certain quality standards and certifications when developing our products. We are ISO 9001 and ISO 13485 medical device certified and our products are:
- CE Certified, where required
- NIST Traceable and Calibrated
- UL, CSA, ETL Certified, where required
- NRC Compliant, where required

Fluke Biomedical.
Better products. More choices. One company.

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FLUKE®
Biomedical

PS410
Patient Simulator

Technical Data

The PS410 is a compact high-performance simulator for patient monitor testing.

This handheld device simulates a full range of cardiac rhythms and a wide variety of ECG conditions. It includes pacemaker simulation, 35 arrhythmia selections, and adult and pediatric normal-sinus rhythms.

Small enough to fit in a pocket, the handy PS410 weighs less than a pound and is easy to operate. Technicians simply connect the simulator to the device under test and use the PS410 keypad to enter the code presets. The simulator then transmits the selected preset simulations to the device.

Key features

- Handheld
- 12-lead ECG simulation
- 12 arrhythmia selections
- Universal ECG jacks
- Auto sequencing of performance waveforms
- Battery operated
- PS410/DPM1B Bundle kit with custom carrying case for quick ECG/NIBP patient monitor testing

FLUKE®
Biomedical

Specifications

Normal sinus rhythm (12-lead with independent outputs referenced to RL)		
Normal rate	80 BPM	
Selectable rates	30, 40, 60, 80, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280, and 300 BPM	
Accuracy	± 1 %	
Output impedance	940 Ω between leads	
ECG amplitudes	0.5, 1, and 2 mV	
Amplitude accuracy	± 2 % Lead II	
High-level output	1000x Lead II	
Adult or pediatric ECG waveform		
ECG performance (Lead II)		
Square wave	2, and 0.125 Hz	
Pulse	30, 60, and 120 BPM; 60 ms pulse width	
Sine waves	0.5, 5, 10, 40, 50, and 60 Hz (1 mV amplitude only, lead II)	
Triangle wave	2 Hz	
ST segment analysis		
Elevated or depressed	-0.6 mV to 6 mV in, 0.2 mV steps	
Pacemaker		
Pacemaker rhythm Pacer non-capture* Pacer non-function	Demand pacer with occasional sinus	Demand pacer with frequent sinus A-V sequential
Artifact selections		
50 Hz artifact 60 Hz artifact	Muscle artifact Baseline artifact	Respiration artifact
Arrhythmia selections		
PVC1 left ventricular focus* PVC1 early, LV focus* PVC1 R on T, LV focus* Pair of PVCs* Run of 5 PVCs* Run of 11 PVCs* Multi-focal PVCs* Frequent multi-focal PVCs* PVC2 right ventricular focus* PVC2 early, RV focus* PVC2 R on T, RV focus* Bigeminy	Trigeminy PVCs at a rate of 6 per minute PVCs at a rate of 12 per minute PVCs at a rate of 24 per minute Ventricular tachycardia Ventricular fibrillation Ventricular fibrillation 1/2 size Supraventricular tachycardia Premature atrial contraction* Premature nodal contraction* Asystole Missed beat*	Nodal rhythm Irregular rhythm Atrial flutter Atrial fibrillation Atrial fibrillation 1/2 size Atrial tachycardia First-degree block Second-degree block Third-degree block Right-bundle-branch block Left-bundle-branch block
*Event occurs once. To repeat, enter the selection again.		

General specifications		
Operation	Outputs are easily selected or adjusted using top-panel controls and the large two-digit numeric display	
Controls	Display	2-line LCD
	Control	6 control keys; ON/OFF power switch
Power	9 V battery/battery eliminator	
Housing	ABS plastic case	
Dimensions	11.3 cm L x 7 cm W x 3.4 cm H (6.1 in L x 3.7 in W x 1.3 in H)	
Weight	0.4 kg (0.9 lb)	
Temperature	Operating	15 °C to 35 °C (59 °F to 95 °F)
	Storage	0 °C to 50 °C (32 °F to 122 °F)

Ordering information

Item numbers/descriptions

PS410 PS410 Patient Simulator

PS410/DPM1B Bundle PS410/DPM1B Bundle Kit (includes PS410, DPM1B, all accessories, and a custom carrying case)

Standard accessories

MANUAL PS410 Users Manual (printed)

CD-ROM PS410 Users Manual (CD)

BE-UNVSL-IEC320C14 Battery Eliminator 100 V ac to 240 V ac

9 V Battery

Optional accessories

17024 Universal Banana Adapter

17191 Carrying Case, single pocket

17192 Carrying Case, double pocket

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- NIST Traceable and Calibrated
- UL, CSA, ETL Certified, where required
- NRC Compliant, where required

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