



**Advanced Test Equipment Corp.**  
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**Biomedical**



## **ProSim 4**

### **Vital Signs Simulator**

### **Technical Data**

ProSim 4 Vital Signs Simulator with breakthrough touchscreen technology offers quick and simple one-tap testing for patient monitor performance checks and troubleshooting. Designed to get you in and out of most locations in 60 seconds, this quick-check device offers 12-lead ECG simulation, respiration, IBP and NIBP testing in the palm of your hand. Featuring specialized stay-connected ECG posts to ensure secure lead connections and no-hassle testing, ProSim 4 is the perfect patient simulator for first-call patient monitor quality assurance and safety professionals.

### **Key features**

- Portable multifunction tester offers 12-lead ECG, respiration, IBP and NIBP simulation
- 90 % smaller and lighter than combined technology of legacy products
- Breakthrough touchscreen technology
- One-tap testing for most performance tests and checks
- Easy quick-check patient monitor testing in one minute or less with onboard, customizable patient pre-sets and autosequences
- Integrated, easily-replaceable battery capable of running quick checks all day
- Stay-connected ECG posts for secure lead connections
- Repeatable NIBP testing within 2 mmHg independent of device under test
- Multi-language user interface offers choice of language selection
- Tilt stand design for operation in tight spaces and better viewing angle

## Specifications

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## 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)              | 18 cm x 9.3 cm x 5.5 cm (7.1 in x 3.7 in x 2.2 in)                                                                                                 |                                     |
| Display                             | LCD touch-screen color display                                                                                                                     |                                     |
| Communication                       | USB port (for calibration and firmware updates only)                                                                                               |                                     |
| Power                               | Lithium-ion rechargeable battery                                                                                                                   |                                     |
| Battery charger                     | 110 to 220 V, 50/60 Hz input, 6 V/3.5 A output. For best performance, the battery charger should be connected to a properly grounded ac receptacle |                                     |
| Battery life                        | Four hours (minimum), 40 NIBP cycles typical                                                                                                       |                                     |
| Weight                              | 0.88 kg (1.93 lb)                                                                                                                                  |                                     |
| Safety standards                    | IEC 61010-1:2001                                                                                                                                   |                                     |
| Certifications                      | CE, CSA, C-TICK N10140, RoHs                                                                                                                       |                                     |
| Electromagnetic compatibility (EMC) | IEC 61326-1:2006                                                                                                                                   |                                     |

## Detailed specifications

### Normal-sinus-rhythm waveform

|                               |                                                                                                                                                                                                                                |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ECG reference</b>          | The ECG amplitudes specified are for Lead II (calibration), from the baseline to the peak of the R wave. All other leads are proportional                                                                                      |
| <b>Normal sinus rhythm</b>    | 12-lead configuration with independent outputs referenced to right leg (RL). Output to 10 universal ECG Jacks, color-coded to AHA and IEC standards                                                                            |
| <b>Amplitude</b>              | 1.0 mV. Other leads are proportional to Lead II (reference lead) in percentage per:<br>Lead I: 70<br>Lead II: 100<br>Lead III: 30<br>Lead V1: 24<br>Lead V2: 48<br>Lead V3: 100<br>Lead V4: 120<br>Lead V5: 112<br>Lead V6: 80 |
| <b>Amplitude accuracy</b>     | ± 5 % of setting Lead II                                                                                                                                                                                                       |
| <b>ECG rate</b>               | 30 BPM, 60 BPM, 80 BPM, 90 BPM, 120 BPM, 150 BPM, 180 BPM, 210 BPM, 240 BPM, 270 BPM, 300 BPM, and 320 BPM. Preset and monitor testing sequence hypotensive condition is at 40 BPM                                             |
| <b>Rate accuracy</b>          | ± 1 % of setting                                                                                                                                                                                                               |
| <b>ECG waveform selection</b> | Adult (80 ms) or neonatal (40 ms) QRS duration                                                                                                                                                                                 |
| <b>Power-on default</b>       | 60 BPM, 1.0 mV, adult QRS                                                                                                                                                                                                      |

| Arrhythmia                               |                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Atrial fibrillation                      | Coarse or fine                                                                                                                                                                                                                                                                                                                    |
| Premature ventricular contraction        | Left ventricular                                                                                                                                                                                                                                                                                                                  |
| Ventricular tachycardia                  | 160 BPM or 200 BPM                                                                                                                                                                                                                                                                                                                |
| Ventricular fibrillation                 | Coarse or fine                                                                                                                                                                                                                                                                                                                    |
| Transvenous pacer pulse                  | 75 BPM, left arterial, 3 mV amplitude on lead II, accuracy $\pm 10\%$ , 1.0 ms width                                                                                                                                                                                                                                              |
| 2nd degree AV block                      | Type 1                                                                                                                                                                                                                                                                                                                            |
| 3rd degree AV block                      | 3rd degree AV block                                                                                                                                                                                                                                                                                                               |
| Asystole                                 | Asystole                                                                                                                                                                                                                                                                                                                          |
| ECG performance testing                  |                                                                                                                                                                                                                                                                                                                                   |
| Amplitude                                | 1 mV. Other leads are proportional to Lead II (reference lead) in percentage per:<br><div> <div>Lead I: 70</div> <div>Lead II: 100</div> <div>Lead III: 30</div> <div>Lead V1: 24</div> <div>Lead V2: 48</div> </div> <div> <div>Lead V3: 100</div> <div>Lead V4: 120</div> <div>Lead V5: 112</div> <div>Lead V6: 80</div> </div> |
| Square wave                              | 60 ms at 2 Hz                                                                                                                                                                                                                                                                                                                     |
| Respiration                              |                                                                                                                                                                                                                                                                                                                                   |
| Rate                                     | 0 (OFF), 10 BrPM to 100 BrPM in 10 BrPM steps                                                                                                                                                                                                                                                                                     |
| Impedance variations ( $\Delta \Omega$ ) | 1 $\Omega$                                                                                                                                                                                                                                                                                                                        |
| Accuracy delta                           | $\pm (10\% + 0.05 \text{ ohm})$                                                                                                                                                                                                                                                                                                   |
| Baseline                                 | 500 $\Omega$ to circuit common, giving 1000 $\Omega$ between any two leads                                                                                                                                                                                                                                                        |
| Accuracy baseline                        | $\pm 5\%$                                                                                                                                                                                                                                                                                                                         |
| Respiration lead                         | LA or LL (default)                                                                                                                                                                                                                                                                                                                |



| Invasive blood pressure       |                                                                                               |                                              |
|-------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------|
| Channels                      | 1 electrically isolated from all other signals                                                |                                              |
| BP output                     | Circular DIN 5-pin                                                                            |                                              |
| Input/output impedance        | 300 $\Omega \pm 10\%$                                                                         |                                              |
| Exciter input range           | 2 to 16 V peak                                                                                |                                              |
| Exciter-input frequency range | DC to 5000 Hz                                                                                 |                                              |
| Transducer sensitivity        | 5 $\mu\text{V/V/mmHg}$                                                                        |                                              |
| Pressure accuracy             | $\pm (1\% \text{ of setting} + 1 \text{ mmHg})$<br>Accuracy guaranteed for dc excitation only |                                              |
| Static pressure               | 0 mmHg, 80 mmHg, 160 mmHg, and 250 mmHg                                                       |                                              |
| Dynamic waveforms             | Synchronization                                                                               | To ECG heartrate                             |
|                               | Chambers simulated and systolic/diastolic pressure:                                           |                                              |
| Type                          | IBP (arterial)                                                                                | IBP (left ventricular)                       |
| Adult                         | 60/30                                                                                         | 60/0                                         |
| Adult                         | 120/80                                                                                        | 120/0                                        |
| Adult                         | 150/100                                                                                       | 150/0                                        |
| Adult                         | 200/150                                                                                       | 200/0                                        |
| Neonatal                      | 35/15                                                                                         | 35/0                                         |
| Neonatal                      | 70/40                                                                                         | 70/0                                         |
| Non-invasive blood pressure   |                                                                                               |                                              |
| Pressure units                | mmHg                                                                                          |                                              |
| Manometer (pressure meter)    | Range                                                                                         | 10 mmHg to 400 mmHg                          |
|                               | Resolution                                                                                    | 0.1 mmHg (for display purposes)              |
|                               | Accuracy                                                                                      | $\pm (1\% \text{ reading} + 1 \text{ mmHg})$ |
| Pressure source               | Inflation bulb or device under test                                                           |                                              |



|                            |                          |                                                                          |
|----------------------------|--------------------------|--------------------------------------------------------------------------|
| NIBP simulations           | Pulse                    | 2 mmHg max into 500 ml NIBP system                                       |
|                            | Volume of air moved      | 1 ml max                                                                 |
|                            | Simulations              | Adult: 60/30 (40), 120/80 (93); 150/100 (117); and 200/150 (167)         |
|                            |                          | Neonatal: 35/15 (22) and 70/40 (50)                                      |
|                            | Repeatability            | Within ± 2 mmHg (at maximal pulse size independent of device under test) |
|                            | Synchronization          | To ECG heartrate (maximal rate 120 BPM)                                  |
| Leak test                  | Target pressure          | 20 mmHg to 400 mmHg                                                      |
|                            | Elapse time              | 0:30 minutes to 5:00 minutes: seconds in 30 second steps                 |
|                            | Leakage rate             | 0 to 200 mmHg/minute                                                     |
| Pressure relief test range | 100 mmHg to 400 mmHg     |                                                                          |
| Presets and autosequences  |                          |                                                                          |
| Presets                    | Normal                   |                                                                          |
|                            | Hypertensive             |                                                                          |
|                            | Hypotensive              |                                                                          |
| Autosequences              | Cardiac failure sequence |                                                                          |
|                            | Exercise sequence        |                                                                          |
|                            | Respiration sequence     |                                                                          |
|                            | Monitor testing sequence |                                                                          |

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## Ordering information

### Models/descriptions

**ProSim 4** ProSim 4 Vital Signs Simulator

### Standard accessories

ProSim 4 Getting Started Manual

**3931519** ProSim 4 Users Manual CD

**2461946** Manual Inflation Bulb

**2780003FG** Accessory Kit (tubings and fittings)

**4026823** ProSim 4 Battery Pack

**4026773** ProSim 4 Power Supply

**Line Cord** ProSim 4 Line Cord (country-specific)

**4026799** ProSim 4 Carrying Case



### Optional accessories

**3984878** PS4 ACC KIT, PROSIM 4 ACCESSORY KIT (Includes: Universal Unter BP Cable (2392173), HP/Phillips Intellivue IBP cable(2198902), GE Marquette Eagle/Dash/Solar IBP cable, Welch Allyn ProPac/SpaceLabs Ultraview IBP cable (2198879), ProSim NIBP Mandrel Set (4308086), Cable Assembly, 4 Con, USB-A(M), USB-Mini-B(M) Cable (4034393), ProSIM4-4403, Adapter-4MM to Snap Connector Set (4026551), BPPS4, PROSIM 4 Battery Pack (4026823)

**4308086** ProSim NIBP Mandrel Set

**4026551** ECG Snap Adapter 4 mm and 3.2 mm ECG Banana Adapter Converter Modules (2 sets required)

### Line cords

**284174** ProSim 4 line cord US  
**769422** ProSim 4 line cord Schuko  
**769455** ProSim 4 line cord UK  
**284174** ProSim 4 line cord Japan  
**658641** ProSim 4 line cord Australia  
**284174** ProSim 4 line cord Brazil

### 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)

### 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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