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Biomedical

Technical data

# ProSim 3 and 2 Vital Signs Simulators

Don't need a comprehensive patient monitor tester? The 6-in-1 ProSim 3 and 4-in-1 ProSim 2 Vital Signs Simulators are clear choices for biomedical engineers and field service technicians that need a quality, feature-rich device with high portability. Choose one of these modern vital signs simulators for preventive maintenance, troubleshooting and repair.


The ProSim 3 and 2 feature the perfect amount of features for testing in the field. We like to call it the Just Right feature set, and it includes:

- ECG
- Pacemaker
- Arrhythmia and performance testing
- Respiration
- Invasive blood pressure
- Temperature
- Cardiac output (ProSim 3 only)
- Fetal/maternal (ProSim 3 only)

## Key features

- Portable, for evaluating the performance of patient monitors in the field
- 20 % lighter and 25 % smaller than preceding technology
- Just Right feature set includes: ECG, pacemaker, arrhythmia and performance testing, respiration, invasive blood pressure, temperature, cardiac output (ProSim 3 only), fetal/maternal (ProSim 3 only)
- 43 high-quality waveforms
- With four IBP channels, ProSim 3 tests even the highest acuity scenarios
- Stay-connected ECG posts for secure lead connections
- Improved user interface and online Advantage Training demos
- Upgraded DIN connectors ensure consistency with the ProSim family; minimize cable compatibility issues
- Field upgradeable, and easily paired with other devices for comprehensive testing
- ProSim 3 and 2 are 510(k) cleared products

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## Specifications

| General specifications | | |
|---|---|---|
| Temperature | Operating | 10 °C to 40 °C (50 °F to +104 °F) |
| | Storage | -25 °C to +50 °C (-13 °F to +122 °F) |
| Humidity | 10 % to 80 % non-condensing | |
| Altitude | 2,000 meters (6,562 ft) | |
| Dimensions (LxWxH) | 14.0 cm x 20.6 cm x 4.5 cm (5.5 in x 8.2 in x 1.8 in) | |
| Display | LCD greyscale display | |
| Communication | USB device upstream port | |
| Power | Two 9 V alkaline batteries | |
| Battery life | 8 hours continuous operation | |
| Weight | 0.47 kg (1 lb, 4 oz) | |
| Safety standards | IEC 61010-1, Pollution degree 2 | |
| Certifications | CE, CSA, C-TICK N 10140, RoHS | |
| Electromagnetic compatibility (EMC) | IEC 61326-1; 2006 | |
| **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 | |
| Amplitude | 0.05 mV to 0.45 mV (0.05 mV steps); 0.5 mV to 5.5 mV (0.5 mV steps) | |
| Amplitude accuracy | ± 2 % of setting Lead II. All other leads ± 5 % | |
| ECG rate | 30, 40, 45, 60, 80, 90, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280 and 300 BPM | |
| 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 | 80 BPM, 1.0 mV, adult QRS, ST-segment elevation of 0 mV, and a P-R interval of 0.16 seconds | |
| Pacemaker waveform | | |
| Pacer pulse | Amplitude | 0 (off), 1, 2, 5, 10 mV ± 10 % for lead II (reference lead) with other leads proportional as for performance waves. |
| | Accuracy | Reference lead II: ± (5 % setting + 0.2 mV) |
| Pacer pulse width | 0.1, 0.5, 1.0, 1.5, 2.0 ms ±5% | |

## Specifications continued

| | |
|---|---|
| Paced arrhythmias | Atrial 75 BPM |
| | Asynchronous 75 BPM |
| | Demand with frequent sinus beats |
| | Demand with occasional sinus beats |
| | Atrio-ventricular sequential |
| | Noncapture (one time) |
| | Nonfunction |
| Power-on default | Off |
| 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 tachycardia; nodal rhythm; and supraventricular tachycardia |
| Premature arrhythmia | (All one-time events) Premature atrial contraction (PAC); premature nodal contraction (PNC); PVC1 left ventricular; PVC1 left ventricular, early; PVC1 left ventricular, R on T; PVC2 right ventricularl 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); ventricular tachycardia; ventricular fibrillation (coarse or fine); and asystole |
| Conduction defect | First-, second-, or third-degree AV block; and right- or left-bundlebranch block |
| Power-on default | None (off) |
| ECG performance testing | |
| Amplitude | 0.05 to 0.45 mV (0.05 mV steps), 0.5 to 5.5 mV (0.5 mV steps) |
| Pulse wave | 30, 60 BPM, with 60 ms pulse width |
| Square wave | 2.0, 0.125 Hz |
| Triangle wave | 2.0, 2.5 Hz |
| Sine wave | 0.5, 5, 10, 40, 50, 60, 100 Hz |
| R-wave detection waveform | Haver-Triangle |
| R-wave rate | 30, 60, 80, 120, 200, and 250 BPM |
| R-wave width | 20 to 200 ms (10 ms steps) Additional Steps: 8, 10, and 12 ms |
| Rate accuracy | ± 1 % |
| Amplitude accuracy | ± 2 %, Lead II (Exception: ± 5 % for R waves ≤ 20 ms) |
| Power-on default | None (off) |

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## Specifications continued

| | |
|---|---|
| Fetal/Maternal ECG (ProSim 3 only) | |
| Fetal heart rate (Fixed) | 60, 90, 120, 140, 150, 210 and 240 BPM |
| Fetal heart rate (IUP) | 140 BPM at beginning, then varies with pressure |
| Intrauterine-pressure waveforms | Early deceleration, late deceleration, and uniform acceleration |
| Wave duration | 90 seconds, bell-shaped pressure curve, from 0 to 90 mmHg and returning to 0 |
| IUP period | 2, 3, or 5 minutes; and manual |
| Power-on default | FHR 120 BPM, early deceleration, manual |
| Invasive blood pressure | |
| Channels | 4, each independently settable with identical parameters and are individually electronically isolated from other signals |
| Input/output impedance | 300 Ω ± 10 % |
| Exciter input range | 2.0 to 16.0 V rms |
| Exciter-input frequency range | DC to 5000 Hz |
| Transducer sensitivity | 5 or 40 µV/V/mmHg |
| Pressure accuracy | ± 2 % of setting + 2 mmHg (valid for dc excitation only) |
| Static Levels, Channel 1 | -10, 0, 80, 160, 240, 320, 400 mmHg |
| Static Levels, Channel 2 | -10, 0, 50, 100, 150, 200, 240 mmHg |
| Static Levels, Channel 3 (ProSim 3 only) | -5, 0, 20, 40, 60, 80, 100 mmHg |
| Static Levels, Channel 4 (ProSim 3 only) | -5, 0, 20, 40, 60, 80, 100 mmHg |
| Dynamic waveforms, Channel 1 | Arterial: 120/80, Radial Artery: 120/80, Left ventricle: 120/00, Right ventricle: 25/00 |
| Dynamic waveforms, Channel 2 | Arterial: 120/80, Radial artery: 120/80, Left ventricle: 120/00, Right atrium (central venous or CVP): 15/10, Right ventricle: 25/00, Pulmonary artery: 25/10, Pulmonary-artery wedge: 10/2, Left atrium: 14/4 |
| Dynamic waveforms, Channel 3 | Arterial: 120/80, Radial artery: 120/80, Left ventricle: 120/00, Right atrium (central venous or CVP): 15/10, Right ventricle: 25/00, Pulmonary artery: 25/10, Pulmonary-artery wedge: 10/2, Left atrium: 14/4 |
| Dynamic waveforms, Channel 4 | Swan-Ganz sequence, Right atrium (CVP), Right ventricle (RV), Pulmonary artery (PA), Pulmonary-artery wedge (PAW) |
| Respiration artifact | BP delta changes from 3 to 16 mmHg |
| Output connector | DIN 5-Pin |
| Power-on default | 0 mmHg |

## Specifications continued

| | |
|---|---|
| Respiration | |
| Rate | 0 (OFF), 15, 20, 30, 40, 60, 80, 100, 120 BrPM |
| Waves | Normal or ventilated |
| Ratio (inspiration: expiration) | 1:1 |
| Impedance variations (Δ Ω) | 0.2, 0.5, 1 or 3 Ω peak-to-peak variation of lead impedance |
| Accuracy delta | ± 10 % |
| Baseline | 500, 1000, 1500, 2000 Ω, Leads I, II, III |
| Accuracy baseline | ± 5 % |
| Respiration lead | LA or LL |
| Apnea selection | OFF, 12, 22 or 32 seconds (one-time events), or continuous (Apnea ON = respiration OFF) |
| Power-on default | 20 BrPM, delta 1.0 Ω, 1000 Ω baseline |
| Temperature | |
| Temperature | 0 °C (32 °F), 24 °C (75.2 °F), 37 °F (98.6 °C), and 40 °C (104 °F) |
| Accuracy | 0.1 °C |
| Compatibility | Yellow Springs, Inc. (YSI) Series 400 and 700 |
| Output connector | Circular DIN 4-pin |
| Power-on default | 0 °C (42 °F) |
| Cardiac output (ProSim 3 only) | |
| Catheter type | Baxter Edwards, 93a-131-7f |
| Calibration coefficient | 0.542 (0 °C) injectate), 0.595 (24 °C injectate) |
| Blood temperature | 37 °C (98.6 °F) ± 2 % |
| Injectate volume | 10 cc |
| Injectate temperature | 0 °C or 24 °C ± 2 % value |
| Cardiac output | 2.5, 5, 10 liters per minute ± 5 % |
| Faulty-injectate curve | Waveform for simulation available |
| Left-to-right shunt curve | Waveform for simulation available |
| Calibrated pulse | 1.5 |
| Output connector | DIN 7-PIN |
| Power-on default | 2.5 liters perminute, 0 °C injectate |

# Ordering information


## Item numbers/Descriptions

| | |
|---|---|
| ProSim 3 | ProSim Vital Signs Simulator |
| ProSim 2 | ProSim Vital Signs Simulator |

## Standard accessories

ProSim 2/3 Instruction Sheet (multi-language)

| | |
|---|---|
| 614487 | Two 9-volt alkaline batteries (minimum 8 hours continuous use) |
| 2392173 | IBP Cable, unterminated |
| 2392199 | 3010-0289FG, CI-3 Cable Assembly (Cardiac Output Box; ProSim 3 only) |
| 1671807 | USB cable |
| 2248623 | ProSim 2/3 Carrying Case |

## AC power cords

| | |
|---|---|
| 4219453 | AC/DC Power Supply |
| 769422 | AC Power Cord (Schuko) |
| 284174 | AC Power Cord (USA) |
| 769455 | AC Power Cord (UK) |
| 658641 | AC Power Cord (Australia) |
| 2200218 | AC Power Cord (Denmark) |
| 2200229 | AC Power Cord (India) |
| 2200241 | AC Power Cord (Israel) |
| 2198785 | AC Power Cord (Italy) |
| 769448 | AC Power Cord (Switzerland) |

## Optional accessories

| | |
|---|---|
| 2523334 | YSI 400 Series (UT-4) |
| 2199019 | YSI 700 Series (UT-2) |
| 4022300 | Cardiac output switch for GE |

## 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**

*We empower our everyday heroes to focus only on protecting lives.*

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