FLUKE®

Biomedical

ProSim 3 and 2

Vital Signs Simulators

Technical Data

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) approved 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%	

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 tachy-cardia; 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); ventricu-lar tachycardia; ventricular fibrillation (coarse or fine); and asystole
Conduction defect	First-, second-, or third-degree AV block; and right- or left-bundle-branch 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)
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	
Respiration		
Rate	0 (OFF), 15, 20, 30, 40, 60, 80, 100, 120 BrPM	
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)	0.2, 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	± 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	
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

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Ordering information

Models/descriptions
ProSim 3 ProSim Vital Signs Simulator
ProSim 2 ProSim Vital Signs Simulator

Standard accessories
ProSim 2/3 Instruction Sheet (multi-language)
4253822 ProSim 2/3 Users Manual CD
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)
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.
Better products. More choices. One company.

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