

Technical data

BP Pump 2 Non-Invasive Blood Pressure Simulator and Tester

The BP Pump 2 provides dynamic blood-pressure simulations for testing adult and neonatal noninvasive blood pressure monitors, including both arm- and wrist-cuff types.

The analyzer features a preset mode for simulation of most patient conditions and the capability to program user-defined simulations. BP Pump 2 tests for leaks, measures static pressure, generates pressure, and tests overpressure valves. For improved testing versatility, the analyzer's recently upgraded waveform test suite includes additional physiological selections.

BP Pump 2 comes in two models: the standard BP Pump 2_L and the BP Pump 2_M, which features a high-accuracy pressure transducer. BP Pump 2 also includes an optional five-lead synchronized ECG simulations to test monitors that monitors patients ECG.



Key features

- Dynamic simulations for arm- and wrist-cuff monitors
- Physiological waveform
- Internal pump for use in high- and low-pressure release verification, leak testing and pressure sourcing
- Preset mode for simulation of most patient conditions
- User-definable systolic and diastolic values, along with heart rate and pulse volume and user-defined autosequences
- Five-leads synchronized ECG simulation
- Internal cuff volume for basic device testing
- Respiratory artifacts, including spontaneous breathing and controlled ventilation
- Arrhythmia simulations, including premature atrial contractions #1 and #2, atrial fibrillation, and PVCs
- PC based ansur test automation system to standardize testing protocol and documentation
- High-accuracy pressure transducer (Bp Pump2_M version only)
- Dynamic pressure simulation repeatability within 2 mmHg at maximal pulse size independent of device under test

Specifications

Pressure generation/measurement	
Static-pressure range	50 mmHg to 400 mmHg (53 kPa)
Difference between target pressure and actual pressure	±10 mmHg from 100-400 mmHg with a minimum volume of 300 cc
Internal leak rate	< 2 mmHg per minute with minimum volume of 300 cc
Four respiratory artifacts	3 spontaneous breathing; controlled ventilation
Three adult wrist-cuff simulations	Normal, Hyper, Hypo
Pressure source	Specified pressure generated from 50 mmHg to 400 mmHg in selectable increments of 1 mmHg
Pressure relief rest	Test for the NIBPM pressure relief valve (0 mmHg to 400 mmHg) with display of peak pressure
Neonate internal cuff simulations	Internal neonate cuff; four standard neonate pressures
Neonate simulations	
Cuff #1	Blood pressure: 35/15 Heart rate: 120 BPM Pulse volume: 0.1 cc
Cuff #2	Blood pressure: 60/30 Heart rate: 120 BPM Pulse volume: 0.1 cc
Cuff #3	Blood pressure: 80/50 Heart rate: 120 BPM Pulse volume: 0.1 cc
Cuff #4	Blood pressure: 100/70 Heart rate: 120 BPM Pulse volume: 0.1 cc
Normal sinus rhythm and arrhythmias	
BP and ECG	Healthy heart, weak pulse, mild exercise strenuous exercise, obese subject, geriatric subject, tachycardia, bradycardia irregular pulse
BP and ECG	Premature atrial contractions # 1, premature atrial contractions # 2, premature ventricular contractions, atrial fibrillation and PVCs
User-definable simulations	User-definable systolic and diastolic values, along with heart rate and pulse volume
Ranges	
Systolic pressure range	20 mmHG to 250 mmHG
Diastolic pressure range	10 mmHG to 200 mmHG
Dynamic NIBP simulation repeatability	Within 2 mmHg (at maximal pulse size independent of device under test)
Heart rate	30 BPM to 250 BPM
Pulse volume	0.1 cc to 2.4 cc in increments of 0.1 cc

Specifications (continued)

Simulation parameters performance	
Max pulse volume	2.4 cc
Max heart rate	200 BPM at 2.4 cc pulse volume; 250 BPM at 1.2 cc pulse volume
Internal neonatal cuff volume	20 cc
Internal adult cuff volume (including NN volume)	310 cc
Heart rate setting accuracy	± 1 BPM
Simulation units	kPa and mmHg (user selectable)
Pressure leak test	The pressure port is pressurized from 0 mmHg to 400 mmHg and keeps track of the pressure loss over time. Peak pressure and present pressure are displayed at all times; leak rate is displayed when it is available.
Autosequences	Nine autosequences are provided for four tests and up to five simulations
Electrical ECG (optional)	
Signals	RA, LA, RL, LL, V
Waveform	Lead II
Amplitude	1 mV peak (± 10 %) NIBP peripheral pulse synchronized with ECG signal
Connections	Optional external ECG adapter physiological synchronization with NIBP
Heart rate for NIBP simulations	
Heart rate accuracy	+ 1 BPM
Except for the following	Patient condition weak pulse, tachycardia, obese, geriatric: + 1 % + 1 BPM Patient condition mild exercise: + 1.5 % + 1 BPM Patient condition strenuous exercise: + 3 % + 1 BPM
Serial port	Bidirectional RS-232 port; baud rate of 9600 with no parity, one stop bit, and eight data bits
Pressure measurement	
Pressure-measurement units	kPa, mmHg, cmH ₂ O, cmH ₂ O and psi (user selectable)
Range	0 mmHg to 400 mmHg
Accuracy, BP Pump 2 _L (basic model)	0 mmHg to 300 mmHg: ± 0.5 % of reading ± 1 mmHg 301 mmHg to 400 mmHg: ± 2 % of reading
Accuracy, BP Pump 2 _M (high-accuracy version)	± 0.7 mmHg (0.09 kPa) throughout range
Parallel port	25-pin female connector, with D-subminiature style and pinouts conforming to IBM PC printer port (unidirectional), HP and ASCII printers

Specifications (continued)

Sample adult arm-cuff simulation (standard parameters)	
Standard set of blood pressures	
BP #1	Blood pressure: 120/80 (93) Heart rate: 80 Pulse volume: 0.68 cc
BP #2	Blood pressure: 150/100 (116) Heart rate: 80 Pulse volume: 0.65 cc
BP #3	Blood pressure: 200/150 (166) Heart rate: 80 Pulse volume: 0.6 cc
BP #4	Blood pressure: 255/195 (215) Heart rate: 80 Pulse volume: 0.55 cc
BP #5	Blood pressure: 60/30 (40) Heart rate: 80 Pulse volume: 0.75 cc
BP #6	Blood pressure: 80/50 (60) Heart rate: 80 Pulse volume: 0.7 cc
BP #7	Blood Pressure: 100/65 (76) Heart rate: 80 Pulse volume: 0.69 cc
Patient condition simulations	
Healthy heart	Blood pressure: 120/80 mmHg (93 MAP) Heart rate: 75 BPM Pulse volume: 0.7 cc
Weak pulse	Blood pressure: 110/80 (90) Heart rate: 95 BPM Pulse volume: 0.3 cc
Mild exercise #1	Blood pressure: 140/90 (106) Heart rate: 120 BPM Pulse volume: 1.1 cc
Strenuous exercise #2	Blood pressure: 140/90 (106) Heart rate: 162 BPM Pulse volume: 1.4 cc
Obese subject	Blood pressure: 120/80 (93) Heart rate: 90 BPM Pulse volume: 0.4 cc
Geriatric subject	Blood pressure: 150/110 (12) Heart rate: 95 BPM Pulse volume: 0.4 cc
Tachycardia	Blood pressure: 120/105 (110) Heart rate: 130 BPM Pulse volume: 0.3 cc
Bradycardia	Blood pressure: 120/60 Heart rate: 45 BPM Pulse volume: 1.1 cc

Specifications (continued)

Arrhythmia simulations	
Premature atrial cont. #1	Blood pressure: 138/53 mmHg (81 MAP) Heart rate: 80 BPM Pulse volume: varies
Premature atrial cont. #2	Blood pressure: 144/64 (90) Heart rate: 83 BPM Pulse volume: varies
Premature ventricular cont.	Blood pressure: 118/61 (80) Heart rate: 83 BPM Pulse volume: varies
Atrial Fib and PVCs	Blood pressure: 139/72 (94) Heart rate: 91 BPM Pulse volume: varies
Respiratory artifacts	
Spontaneous breathing #1	Blood pressure: 138/65 mmHg (89 MAP) Heart rate: 104 BPM Pulse volume: varies
Spontaneous breathing #2	Blood pressure 149/65 (93) Heart rate: 105 BPM Pulse volume: varies
Spontaneous breathing #3	Blood pressure: 112/47 (68) Heart rate: 86 BPM Pulse volume: varies
Controlled ventilation	
Blood pressure	132/44 (73)
Heart rate	98 BPM
Pulse volume	Varies
Wrist simulations	
Simulation #1	Blood pressure 120/80 (93) Heart rate: 80 BPM Pulse volume: 0.5 cc
Simulation #2	Blood pressure 160/100 (120) Heart rate: 80 BPM Pulse volume: 0.5 cc
Simulation #3	Blood pressure: 80/55 (63) Heart rate: 80 BPM Pulse volume: 0.5 cc
Temperature	
Operating	15 °C to 40 °C (59 °F to 104 °F)
Storage	-20 °C to 65 °C (-4 °F to 149 °F)
Relative humidity	90 ° max
Display	Bright, large 4-line x 40-character alphanumeric display with back lighting
Dimensions (WxDxH)	25.4 cm x 25.4 cm x 12.7 cm (10 in x 10 in x 5 in)
Weight	3.4 kg (7.5 lb)

Ordering information

Models/descriptions

BP Pump 2_L Non-Invasive Blood Pressure Analyzer (standard pressure transducer)

BPPUMP2L-US120V	United States, 120 V
BPPUMP2L-AUS250V	Australia, 250 V
BPPUMP2L-DEN250V	Denmark, 250 V
BPPUMP2L-SHK250V	Shuko, 250 V
BPPUMP2L-ISR250V	Israel, 250 V
BPPUMP2L-ITAL250V	Italy, 250 V
BPPUMP2L-IND250V	India, 250 V
BPPUMP2L-SWZ250V	Switzerland, 250 V
BPPUMP2L-UK250V	United Kingdom, 250 V
BPPUMP2L-BRAZ250V	Brazil, 250 V

BP Pump 2_M Non-Invasive Blood Pressure Analyzer (high-accuracy pressure transducer)

BPPUMP2M-US120V	United States, 120 V
BPPUMP2M-AUS250V	Australia, 250 V
BPPUMP2M-DEN250V	Denmark, 250 V
BPPUMP2M-SHK250V	Shuko, 250 V
BPPUMP2M-ISR250V	Israel, 250 V
BPPUMP2M-ITAL250V	Italy, 250 V
BPPUMP2M-IND250V	India, 250 V
BPPUMP2M-SWZ250V	Switzerland, 250 V
BPPUMP2M-UK250V	United Kingdom, 250 V
BPPUMP2M-BRAZ250V	Brazil, 250 V

BPPM2M/ECG-NIM Includes a BPPUMP2M-AUS250V, a ECG Adapter Block, 100 ml and 500 ml rigid aluminum chambers and a manual pressure pump (700PMP)

BPPM2M-NIM Includes a BPPUMP2M-AUS250V, 100 ml and 500 ml rigid aluminum chambers and a manual pressure pump (700PMP)

BP Pump 2_L Non-Invasive Blood Pressure Analyzer with Test Automation (standard pressure transducer)

TA-BPPMP2L-US	United States, 120 V
TA-BPPMP2L-AUS	Australia, 250 V
TA-BPPMP2L-DEN	Denmark, 250 V
TA-BPPMP2L-SHK	Shuko, 250 V
TA-BPPMP2L-ISR	Israel, 250 V
TA-BPPMP2L-ITAL	Italy, 250 V
TA-BPPMP2L-IND	India, 250 V
TA-BPPMP2L-SWZ	Switzerland, 250 V
TA-BPPMP2L-UK	United Kingdom, 250 V
TA-BPPMP2L-BRAZ	Brazil, 250 V

BP Pump 2_M Non-Invasive Blood Pressure Analyzer with Test Automation (high-accuracy pressure transducer)

TA-BPPMP2LM-US	United States, 120 V
TA-BPPMP2M-AUS	Australia, 250 V
TA-BPPMP2M-DEN	Denmark, 250 V
TA-BPPMP2M-SHK	Shuko, 250 V
TA-BPPMP2M-ISR	Israel, 250 V
TA-BPPMP2M-ITAL	Italy, 250 V
TA-BPPMP2M-IND	India, 250 V
TA-BPPMP2M-SWZ	Switzerland, 250 V
TA-BPPMP2M-UK	United Kingdom, 250 V
TA-BPPMP2M-BRAZ	Brazil, 250 V

BP Pump 2_M Non-Invasive Blood Pressure Analyzer (high-accuracy pressure transducer)

BPPM2L/ECG-US	United States, 120 V
BPPM2L/ECG-AUS	Australia, 250 V
BPPM2L/ECG-DEN	Denmark, 250 V
BPPM2L/ECG-SHK	Shuko, 250 V
BPPM2L/ECG-ISR	Israel, 250 V
BPPM2L/ECG-ITAL	Italy, 250 V
BPPM2L/ECG-IND	India, 250 V
BPPM2L/ECG-SWZ	Switzerland, 250 V
BPPM2L/ECG-UK	United Kingdom, 250 V

Quick NIBP monitor testing bundles

PS420/DPM1B Bundle	PS420/DPM1B Bundle Kit (includes PS420, DPM1B, all accessories, and a custom carrying case)
PS410/DPM1B Bundle	PS410/DPM1B Bundle Kit (includes PS410, DPM1B, all accessories, and a custom carrying case)

Standard accessories

2780003FG	Accessory Kit (tubings and fittings)
Operators Manual	
Power Cord (country specific)	

Optional accessories

ANSUR BP PUMP 2	Ansurs BP Pump 2 Plug-in
5022010	Soft-Sided Vinyl Carrying Case
2780512FG	ECG Adapter Block (allows simulation of 5-lead ECG waveforms)
71072	Parallel Printer Cable, D25M-C36M
PRINTR/414-US120V	Printer, Seiko DPU-414-30B, 120 V power supply
PRINTR414-SHK220V	Printer, Seiko DPU-414-30B, 220 V power supply
61096	Printer, 120 V power supply
61097	Printer, 220 V power supply
97116	Printer Paper (7 rolls min)
75034	Serial Cable, D9M-D9F
5215-0269FG	Adult Cuff Mandrel Spacer Block (three required)
5215-0268FG	Adult Cuff Mandrel End Block (two required)
5027-0203FG	Neonatal/External Cuff Mandrel (truncated plastic cylinder diameters: 7.6 cm, 10 cm, and 14 cm)
98175FG	Wrist Cuff Mandrel (adult)
BPPM2M-2001	500 ML Rigid Aluminum Chamber for NIBP Testing
BPPM2M-2002	100 ML Rigid Aluminum Chamber for NIBP Testing
700PMP	External Pressure Pump



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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