

BC Biomedical



A UNIT OF BC GROUP INTERNATIONAL, INC.



2014-2015 CATALOG

NEW



ESU-2400H
ESU Analyzer
See Page 25-26

The Only Multi-Pulse
Analyzer

- ✓ Cardiac Output
- ✓ Fetal Maternal
- ✓ NIBP
- ✓ IBP
- ✓ ECG
- ✓ Arrhythmias
- ✓ Performance
- ✓ SPO2
- ✓ Temp



NEW

NIBP-1040Kit-E
Patient Simulator

See Page 21-22



Ultrasound Transducer
Leakage Tester

See Page 47-52

Are You IAC
Section 2.2.3B
Compliant?

BC Group



YOUR ONE-STOP BIOMED SHOP

BC Group International, Inc.
3081 Elm Point Industrial Dr.
St. Charles, MO 63301 USA
1-314-638-3800 or 1-888-223-6763
1-314-638-3200 Fax
Shop Online at...
www.bcgrouptl.com

History

BC Group was founded in 1988. In 2000, we began manufacturing our own product line under the now familiar Green and Gold "BC Biomedical" label.

In January of 2005, Lloyd Industries, the company that engineered and manufactured most of the BC Biomedical brand products, purchased BC Group. This acquisition has allowed our products and services to expand at an even faster pace. BC Group, under the "BC Biomedical" brand, is now the second largest manufacturer of Biomedical Test and Measurement Equipment in the world.

Our philosophy with BC Biomedical products runs counter to the current trend of "one-size-fits-all." We offer families of products that provide the users with a choice of models so they can pick the features they need at a price they can afford. We just introduced our new ESU-2400H Electrosurgery Analyzer with enhanced ability to detect waveforms with a higher sampling rate. (Upgrade path for previous models available.)

BC Group has a major commitment to Quality at all levels of our operation. The company is certified to ISO 9001:2008 and ISO 13485:2003. Our Service Center is accredited to both ANSI Z540-1 and ISO/IEC 17025:2005 with full traceability to NIST. We are Registered with and Inspected by the FDA and follow the Good Manufacturing Practices (GMP) as well as comply with the QSR (Quality Systems Regulation) 21CFR820.

Keep checking our website for the latest additions to the BC Biomedical Line.



TABLE OF CONTENTS

SAFETY ANALYZERS	1-6
PATIENT SIMULATORS	7-14
DEFIBRILLATOR ANALYZERS	15-20
NIBP SIMULATORS	21-24
ESU ANALYZERS	25-36
DIGITAL PRESSURE METERS	37-42
PULSE OXIMETRY TESTING	43-44
INFUSION PUMP ANALYZERS	45-46
ULTRASOUND LEAKAGE TESTER	47-52
ULTRASOUND WATTMETERS	53-54
DEW POINT METER	55-56
ANESTHETIC AGENT ANALYZER	57-58
MULTI GAS ANALYZER	59-60
BENCHTOP FLOW ANALYZER	61-62
HANDHELD FLOW ANALYZER	63-64
TSI CERTIFIER	63-64
LUNG SIMULATORS	67-68
TACHOMETER SERIES	69-70



Any of the trademarks, service marks or similar rights that are mentioned, used or cited within are the property of their respective owners. Their use here does not imply endorsement or affiliation with any of the holders of any such rights.

Safety Analyzer Series

Safety Analyzer Series

Features - SA-2000 Series

- ◆ Small & Lightweight Portable Analyzer
- ◆ Line Voltage Measurement
- ◆ Device Under Test Current Measurement
- ◆ Earth/Ground Lead Resistance/ Leakage Current
- ◆ Point-to-Point Testing
- ◆ Enclosure/Chassis Leakage Current
- ◆ External Resistance
- ◆ External Leakage Current
- ◆ Source Receptacle Wiring Integrity Monitor
- ◆ MAP (Isolation) Function
- ◆ Internal ECG Simulator (SA-2010S Only)
- ◆ True RMS Readings
- ◆ AAMI ES1-1993 or IEC 601 Selectable Test Loads
- ◆ 90 to 264 VAC Operation
- ◆ Touch Control Keys - No Knobs
- ◆ LED Status Indicators
- ◆ Audible Feedback
- ◆ Self-Test Points
- ◆ Externally Replaceable Ground Fuse
- ◆ Automatic Delay on Power Polarity Reversal to DUT
- ◆ Soft-Sided Carrying Case
- ◆ International Versions Available

Optional

- ◆ External Point-to-Point (Red) Cable
- ◆ Kelvin Cable (For four wire resistance testing)
- ◆ RS232 add "-R" to part number



SA-2010S

The SA-2000 Series is a Microprocessor based Electrical Safety Analyzer Family. There are 5 models that provide everything from the most basic testing functions to the most complete set of features of any handheld unit on the market.

The compact size makes the SA-2000 Family easy to hold and operate. All models operate from 90 to 264 Volts @ 50/60 Hz, with Load Currents up to 20 Amps, so there is no need to purchase 2 different analyzers to cover your testing needs. The SA-2010S is the smallest safety analyzer available with a built-in ECG Patient simulator.

The SA-2000 Family of Safety Analyzers allows the user to choose the model that best fits the application. The combination of the best features at the best price makes this Family of products a natural choice.

All models come with a soft-sided case and Chassis (Black) cable. An optional External Point-to-Point (Red) cable or a Kelvin cable is also available.

SPECIFICATIONS



Models:	SA-2000	SA-2001	SA-2005	SA-2010	SA-2010S
Voltage (Rating)	90 to 264 VAC	90 to 264 VAC	90 to 264 VAC	90 to 264 VAC	90 to 264 VAC
Current (Rating)	20 A	20 A	20 A	20 A	20 A
RS232	On "-R"				
Measures:					
Voltage (VAC)	No	90 to 264 (± 3% R)	90 to 264 (± 3% R)	90 to 264 (± 3% R)	90 to 264 (± 3% R)
Current (A)	No	0 to 19.99 (± 5% R)	0 to 19.99 (± 5% R)	0 to 19.99 (± 5% R)	0 to 19.99 (± 5% R)
Leakage Current (µA)	0 to 1999 DC & 25 to 1 kHz (± 1% R) 1 kHz to 100kHz (± 2.5% R) 100 kHz to 1 MHz (± 5% R)	0 to 1999 DC & 25 to 1 kHz (± 1% R) 1 kHz to 100kHz (± 2.5% R) 100 kHz to 1 MHz (± 5% R)	0 to 1999 DC & 25 to 1 kHz (± 1% R) 1 kHz to 100kHz (± 2.5% R) 100 kHz to 1 MHz (± 5% R)	0 to 1999 DC & 25 to 1 kHz (± 1% R) 1 kHz to 100kHz (± 2.5% R) 100 kHz to 1 MHz (± 5% R)	0 to 1999 DC & 25 to 1 kHz (± 1% R) 1 kHz to 100kHz (± 2.5% R) 100 kHz to 1 MHz (± 5% R)
Resistance (ohms)	0 to 1.99 (± 1% R) 2 to 19.99 (± 1% R) 10 mA	0 to 1.99 (± 1% R) 2 to 19.99 (± 1% R) 10 mA	0 to 1.99 (± 1% R) 2 to 19.99 (± 1% R) 10 mA	0 to 1.99 (± 1% R) 2 to 19.99 (± 1% R) 10 mA	0 to 1.99 (± 1% R) 2 to 19.99 (± 1% R) 10 mA
Patient Leads	0	0	5	10	10
MAP (Isolation)	No	No	Yes	Yes	Yes
Built-in ECG Simulator	No	No	No	No	Yes
AAMI & IEC Loads	AAMI Only	Yes	Yes	Yes	Yes
Point-to-Point	No	Yes	Yes	Yes	Yes
Test Points	No	Yes	Yes	Yes	Yes
Test Capability:					
Open Ground	Yes	Yes	Yes	Yes	Yes
Reverse Polarity	Yes	Yes	Yes	Yes	Yes
Open Neutral	Yes	Yes	Yes	Yes	Yes
Open Line	Yes	Yes	Yes	Yes	Yes
Size	8.65 x 5.73 x 1.92 Inches	8.65 x 5.73 x 1.92 Inches	8.65 x 5.73 x 2.40 Inches	8.65 x 5.73 x 2.40 Inches	8.65 x 5.73 x 2.40 Inches
Weight	≤ 2.5 Lbs (1.14kg)	≤ 3.0 Lbs (1.36kg)	≤ 3.0 Lbs (1.36kg)	≤ 3.0 Lbs (1.36kg)	≤ 3.5 Lbs (1.59kg)

← Flip for product pricing - Page A →

Safety Analyzer Series

3

Safety Analyzer Series

Features - SA-2000-INTL Series

- ◆ Five Models Available: SA-2000-INTL, SA-2001-INTL, SA-2005-INTL, SA-2010-INTL & SA-2010S-INTL
- ◆ All of the Same Features Available as the Domestic Counterpart
- ◆ Universal Power Receptacle Accepts Almost Any International Power Plug Configuration
- ◆ Detachable Power Cord Allows for use in Any Country
- ◆ Multiple International Configuration Power Cords Available
- ◆ AAMI ES1-1993 or IEC 601 Selectable Test Loads
- ◆ 90 to 264 VAC Operation
- ◆ Soft-sided Carrying Case & Chassis Cable Included

Features - CS-2000 Series

- ◆ Two Models Available: CS-2000-U (US Version; has US Plug & Socket) and CS-2000-E (European Version; has European "Schuko" Plug & Socket)
- ◆ Facilitates Testing to IEC 601 Requirements
- ◆ Interfaces Directly to BC Biomedical SA-2000 & SA-2000-INTL Series of Safety Analyzers
- ◆ Interfaces with Dale Technology® LT544D, LT544D Lite, 601 & 601E Safety Analyzers
- ◆ Universal Power Supply (90 to 264 VAC, 50/60 Hz)
- ◆ 1 Amp Current Source for Resistance Measurements
- ◆ No Protruding Push Buttons
- ◆ Light Touch Key Used to Operate
- ◆ Small Size

1-888-223-6763 - bcgroupintl.com



SA-2001-INTL

The SA-2000-INTL Series is ideal for international customers or for those that simply need a power cord configuration that is different from the standard NEMA 5-15P configuration that is standard on our SA-2000 Series. Interchangeable power cords make power input switching extremely easy and the universal configuration power receptacle is compatible with almost all countries around the world.



CS-2000

The CS-2000 Series is a 1 Amp current source for testing the ground continuity in equipment. This device facilitates testing to IEC 601 requirements, where a 1 Amp source current is required. This device interfaces directly with the BC Biomedical SA-2000 Series of Safety Analyzers as well as the Dale Technology® LT544D, LT544D Lite & 601/601E. This Series comes in 2 models, US and European plug & socket configurations.

SA-2000-INTL SERIES INFORMATION

Typical Power Cord Options Available for the SA-2000-INTL Series



BC20-20400 North America Hospital Grade



BC20-20401 Japan



BC20-20402 United Kingdom



BC20-20403 Schuko-Continental Europe



BC20-20409 India/South Africa



BC20-20410 Switzerland



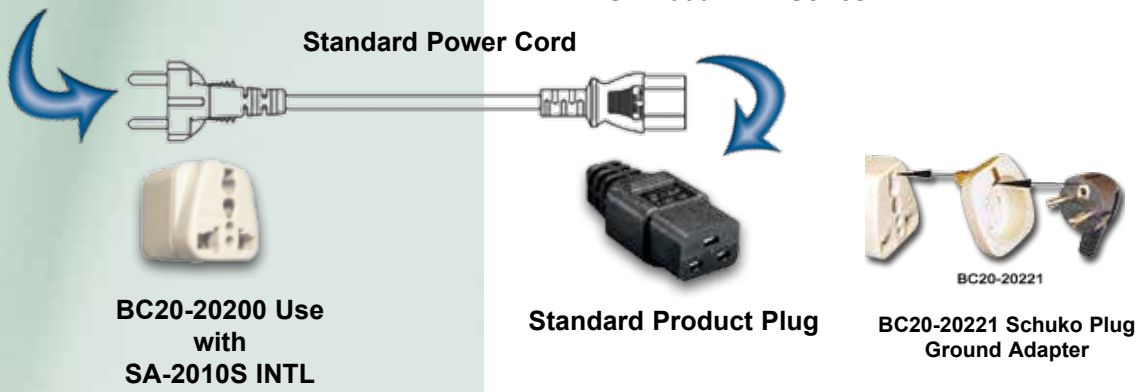
BC20-20412 Italy



BC20-20416 Australia

Pick Your Country's Connector from Above

to Connect to the SA-2000-INTL Series



CS-2000 SPECIFICATIONS

Electrical	
CURRENT SOURCE	1.00 to 1.02 A DC
OPERATING LINE VOLTAGE	90-264 VAC, 50/60 Hz
POWER CONSUMPTION	12 VA (12 W)
LOAD CURRENT	This device is an accessory to a Safety Analyzer, refer to applicable Safety Analyzer User Manual for this Rating
LINE PLUG	CS-2000-U NEMA 5-15P
	CS-2000-E European CEE 7/7 "Schuko"
DUT RECEPTACLE	CS-2000-U Hospital Grade NEMA 5-15R
	CS-2000-E European CEE 7/7 "Schuko"
CONNECTIONS	<p>LINE PLUG 3 Pin Locking Plug for Safety Analyzer Chassis Cable Connection (See Description section for Compatible Safety Analyzers)</p> <p>Detachable Kelvin Cable (BC20-20114) for DUT Ground Connection</p>
Physical	
SIZE	7.09 x 3.94 x 1.56 Inches (180 x 100 x 40 mm)
ENCLOSURE	ABS Plastic Back-printed Lexan Overlay
WEIGHT	< 1 Lbs (0.45 kg)
OPERATING RANGE	0 to 50 °C (32 to 122 °F) 10 to 90% RH, Non-Condensing
STORAGE RANGE	-40 to 60 °C (-40 to 140 °F)

Safety Analyzer Series

Features - SA-2500

- ◆ Full PC Automation with Procedures and Reports
- ◆ Small & Lightweight Portable Analyzer
- ◆ Line Voltage Measurement
- ◆ Device Under Test Current Measurement
- ◆ Earth/Ground Lead Resistance/Leakage Current
- ◆ Point-to-Point Testing
- ◆ Enclosure/Chassis Leakage Current
- ◆ External Resistance
- ◆ External Leakage Current
- ◆ Source Receptacle Wiring Integrity Monitor
- ◆ MAP (Isolation) Function
- ◆ True RMS Readings
- ◆ 90 to 240 VAC Operation
- ◆ Touch Control Keys - No Knobs
- ◆ Audible Feedback
- ◆ Automatic Delay on Power Polarity Reversal to DUT
- ◆ Soft-Sided Carrying Case
- ◆ International Versions Available

Optional

- ◆ BC20-20150 – Chassis Cable (Non-Kelvin), optional for external measurement mode
- ◆ BC20-20151 – Chassis Cable (Kelvin), one comes with the unit



NEW 

SA-2500

The SA-2500 is an Electrical Safety Analyzer with Full PC Automation.

There are 2 Modes of operation, Manual and Remote. The Manual mode allows most basic testing functions to be stepped through one at a time. With the Remote mode, measurements are controlled via a PC. The user has the possibility to integrate all measurements into the individual operator interface at the PC and to define test sequences.



PC Interface (Included)

Test report

Customer Info	Name: North Dakota	City: Grand Forks
Customer Address	BC Group International Inc. 200-5th International Drive St. Charles, MO 63043	
Customer Phone	Tel: 314-650-5500	
Customer Email	Tel: 314-650-5500	
Customer Fax	Tel: 314-650-5500	
Customer Website	Tel: 314-650-5500	
Customer Notes	Tel: 314-650-5500	
Test Details	Equipment: Isolation Probe	Test Mode: Safety
Test Results	Measurement: 1	Test Pass: Yes
Test Date	11/11/11	Test Time: 11:11
Test Location	11/11/11	
Test Operator	11/11/11	
Test Status	11/11/11	
Test Notes	11/11/11	

Test Report Summary

Item	Description	Measurement	Test Pass	Test Result
1	Line Voltage	121.0 V	121.0 V	Pass
2	Device Under Test Current	1.0 A	1.0 A	Pass
3	Earth/Ground Lead Resistance/Leakage Current	1.0 A	1.0 A	Pass
4	Point-to-Point Testing	1.0 A	1.0 A	Pass
5	Enclosure/Chassis Leakage Current	1.0 A	1.0 A	Pass
6	External Resistance	1.0 A	1.0 A	Pass
7	External Leakage Current	1.0 A	1.0 A	Pass
8	Source Receptacle Wiring Integrity Monitor	1.0 A	1.0 A	Pass
9	MAP (Isolation) Function	1.0 A	1.0 A	Pass
10	True RMS Readings	1.0 A	1.0 A	Pass
11	90 to 240 VAC Operation	1.0 A	1.0 A	Pass
12	Touch Control Keys - No Knobs	1.0 A	1.0 A	Pass
13	Audible Feedback	1.0 A	1.0 A	Pass
14	Automatic Delay on Power Polarity Reversal to DUT	1.0 A	1.0 A	Pass
15	Soft-Sided Carrying Case	1.0 A	1.0 A	Pass
16	International Versions Available	1.0 A	1.0 A	Pass

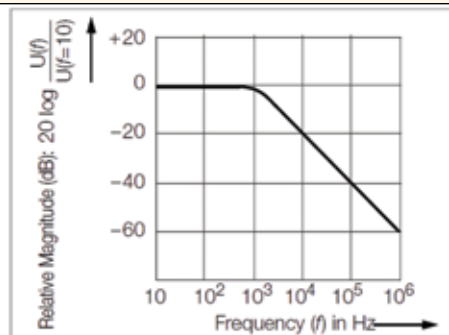
Sample Report (Included)

SPECIFICATIONS

Electrical	
Voltage (Rating)	90-240 VAC
Current (Rating)	16A
Remote Control	USB
Measurements	
Voltage (VAC)	90 - 240 (+/-5%)
Current (A)	0 to 16.00 (+/- 5%)
Leakage Current	10 to 300 uA(+/- 5%)300 uA to 30 mA (+/- 5%)
Resistance (Ohms)	0.01 to 30.00 (+/- 10%)
Patient Leads	10
MAP (Isolation)	Yes
Built-In ECG Simulator	No
Test Load	IEC
Point to Point	Yes
Test Points	No
Test Capability	
Open Ground	Yes
Reverse Polarity	Yes
Open Neutral	Yes
Open Line	Yes
Size	12.8 x 9.8 x 3.5 Inches
Weight	< 4.4 Lbs (2 kg)

Measuring Leakage Current

Frequency response is taken into consideration in accordance with the diagram to the right when leakage current is measured.



Features - PS-2200 Series

- ◆ Simple to Operate
- ◆ Independent Lead Outputs Produce a True 12 Lead ECG Signal
- ◆ 1, 2 or 4 Invasive BP Channels
- ◆ All BP Waveforms Available on all BP Channels
- ◆ 49 Arrhythmia Selections
- ◆ Respiration & Temperature Simulation
- ◆ ECG Performance Waveforms
- ◆ Dual Graphical Displays with Backlighting
- ◆ Drop Down Choice Screens List all Options for Parameters
- ◆ Special Power Up Feature Allows User to Choose to use Default, Last or Custom Settings
- ◆ Auto Sequences for BPM, Static-Pressure Levels & Performance
- ◆ 10 AHA & European Color Coded Universal Patient Lead Connectors (with Enough Space Between Posts for the Large Diameter Connectors)
- ◆ Mini DIN Connectors Compatible with Standard BP Cables (Optional Mini DIN-M to DIN-F Cable Adapter)
- ◆ % Battery Life & Low Battery Indicator
- ◆ Powered by Two 9V Batteries or Optional Battery Eliminator
- ◆ Full Remote Operation via RS232
- ◆ Flash Programmable, Field Upgradeable
- ◆ Battery Eliminator

Optional

- ◆ SpO₂ Simulation
- ◆ Cardiac Output
- ◆ Fetal/Maternal Output
- ◆ Remote PSR-2200



PS-2240

The PS-2200 Multi-Parameter Patient Simulator Series is the most comprehensive, easy to use simulator on the market. These new portable simulators are intuitive to use since there are NO MORE CODES to enter.

Each model provides ECG, Blood Pressure, Respiration and Temperature Simulation. Models are available with one, two or four independent blood pressure outputs. All models will support the Fetal/Maternal, SpO₂, Cardiac Output and PSR-2200 Remote options.

The PS-2200 Series makes viewing and selecting the desired waveforms and parameters quick and intuitive. All operational information is available at the same time on two cursor-based graphic displays, allowing for easy maneuvering through parameters and scrolling through available options.

SPECIFICATIONS

ECG NSR	
Rate	30,40,45,60,80,90,100,120,140,160,180,200,220,240,260,280, 300 BPM
Accuracy	± 1%
Amplitude	.05,.10,.15,.20,.25,.30,.35,.40,.45,.50,1.0,1.5,2.0,2.5,3.0,3.5,4.0,4.5,5.0 mV
Accuracy	± 2% @ Lead II
High Level	200 times Amplitude
Accuracy	± 5%
QRS Interval	Adult (80ms), Pediatric (40ms)
ST Segment (Elevation)	± 0,.05,.1,.2,.3,.4,.5,.6,.7,.8 mV
ECG Performance	
Sine Wave	0.1,0.5,5,10,40,50,60,100 Hz
Square Wave	0.125, 2.000 Hz
Triangle Wave	2.000, 2.500 Hz
Pulse Wave	30,60,120 BPM; 60 ms
Amplitude	.05,.10,.15,.20,.25,.30,.35,.40,.45,.50,1.0,1.5,2.0,2.5,3.0,3.5,4.0,4.5,5.0 mV
R-Wave (Havertriangle)	
Rate	30,60,80,120,200,250 BPM
Width	8,10,12,20,30,40,50,60,70,80,90,100,120,130,140,150,160,170,180,190,200 ms
Amplitude	.05,.10,.15,.20,.25,.30,.35,.40,.45,.50,1.0,1.5,2.0,2.5,3.0,3.5,4.0,4.5,5.0 mV
Rate Accuracy	± 1%
Amplitude Accuracy	± 2% @ Lead II
R-Wave <= 20 ms	± 5% @ Lead II
Blood Pressure	
Channels	1 – PS-2210 2 – PS-2220 4 – PS-2240
Static Pressure	-10,-5,0,20,40,50,60,80,100,150,160,200,240,250,300,320,400 mmHg
Accuracy	± (2% of Reading + 2 mmHg)
Impedance	300 Ohms
Accuracy	± 10%
Excitation Range	2 to 16 V RMS
Excitation Frequency	DC to 5 KHz
Sensitivity	5 or 40 µV/V/mmHg
Respiration Artifact	0 to 16 mmHg
Remote(Optional)	
Fully compatible with PSR-2200	

Pacemaker Waveforms	
Amplitude	1,2,3,4,5,6,7,8,9,10 mV
Accuracy	± 10%
Width	0.1,0.5,1.0,1.5,2.0 ms
Accuracy	± 5%
Rate	75 BPM
Accuracy	±1%
Respiration	
Rate	Apnea,15,20,30,40,60,80,100,120 BrPM
Accuracy	± 1%
Impedance delta	0.1,0.2,0.5,1.0,2.0,3.0 Ω
Accuracy	± 10%
Baseline	500,1000,1500,2000 Ω
Accuracy	± 5%
Lead	LA or LL
Temperature	
Temperature	0,24,30,37,40 °C (32.0,75.2,86.0,98.6,104.0 °F)
Accuracy	± 0.1 °C
Type	YSI Series 400 and 700
Fetal / Maternal	
Fetal Heart Rate	60,90,120,140,150,210,240 BPM
Inter Uterine Pressure Response Types	Uniform Deceleration Early Deceleration Late Deceleration Uniform Acceleration
IUP Wave	Bell Curve with 90 mmHg Peak and 90 Sec Width
IUP Trigger	Manual Auto: 2,3,5 Minute
Cardiac Output	
Injectate Volume	10 cc
Injectate Temperature	0 °C or 24 °C, ± 2%
Calibration Coefficient	0.542 (0 °C Inj), 0.595 (24 °C Inj)
Blood Temperature	37 °C (98.6 °F), ± 2%
Cardiac Output	2.5,5.0,10.0 l/min, ± 5%
Simulations	Normal Flow Faulty Injectate Left-to-Right Shunt Temperature Calibration Pulse
Temperature Calibration Pulse	1.5 °C Down for 1 sec, ± 1%
Catheter Type	Baxter Edwards, 93a-131-7f
SpO ₂ Simulation (MSP-2100 & Finger SIM™ Req'd.)	
Rate	30 to 300 BPM
SpO ₂ Output	80, 90 & 97%

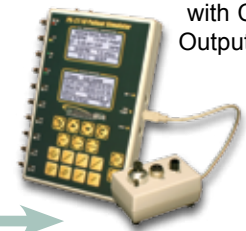


PS-2220



To Compare Patient Simulators, see chart on Page 14.

Flip for product pricing - Page D



PS-2210 with Cardiac Output Option

Features - PSR-2200 Remote

- ◆ Large Easy to Read 128 x 64 pixel Graphical LCD Display
- ◆ Small and Lightweight
- ◆ 10 Default Output Keys (adjustable)
- ◆ 18 Programmable Keys
- ◆ 25-foot Coiled Cord
- ◆ Easily Access Each and Every Output Waveform, Rate and Level of Your Patient Simulator
- ◆ Over 20 hours of Operation from a Single 9V Battery
- ◆ Up to 30 hours of Trended Data Output
- ◆ Endless Looping Capability on Trended Data
- ◆ 180 User-Programmable Steps for Waveform Output
- ◆ Virtually Unlimited User-Configured Waveform One-Touch Key Output Configurations through Use of the PSR-2200 PC Software Utility
- ◆ “Clone” a Specific Remote Control Setup to Other Remotes
- ◆ Flash Programmable, Field Upgradeable
- ◆ Powerful yet Remarkably Easy to Use Companion PC Software Setup Utility
- ◆ Can be Configured to Work With Competitive (Non BC Biomedical Brand) Patient Simulators

Optional

- ◆ USB to Serial Port Adapter



PSR-2200

The PSR-2200 Programmable Patient Simulator Remote Control with Trending Capability brings an unprecedented level of functionality and ease of use to patient simulator remote control. How would you like to have all of your patient simulators' outputs available to you on a handheld, easy to use remote control, up to 25-feet away from your simulator? There's nothing else on the market that even comes close to the PSR-2200.

You can easily access every output waveform of your patient simulator without ever touching it! Control outputs from NSR, Arrhythmias, Resp, Temp, CO, ECG and Resp artifact, ST Elevation Levels, Performance Waves, etc. Use the included PC Software utility to assign any outputs you like to any or all of the 18 programmable keys. Configure sequences (trends) to any of these keys that will run from 1 to 600 seconds per step. “Daisy-chain” the 18 programmable keys to provide up to 30 hours worth of unique trended patient data. Save a virtually unlimited number of configurations. Set up one remote and then “clone” the setup to as many remotes as you want. You can e-mail PSR-2200 configuration files. The PSR-2200 is Flash upgradeable in the field, ensuring that your device will never become outdated.

SCREEN VIEWS

Easy to read display shows current simulator outputs. Run programmed sequences & know where you are in the sequence.

Normal Sinus Rhythm	
80 BPM	1.0 mV Adult
ST: 0.0 mV	Artf: none
30 BrPM	3.0 ohms
37.0 C	98.6
SEQS:01:008	

Key Number	Sequence Step	Time until next step
------------	---------------	----------------------

Even BP outputs can be displayed with a push of one key.

1)Static	0 mmHg
2)Static	0 mmHg
3)Static	0 mmHg
4)Static	0 mmHg
Group Settings:	N/A

Assign names to each of the 18 programmable keys.

Key List	
12)	NSR 30Bpm Apnea
13)	Pace Atrial 10mV
14)	Perf Sine 50Hz
15)	Fetal Auto 5min
16)	Cardiac Faulty Inj

Select outputs from any simulator waveform or output group.

Operating Mode	
Normal Sinus Rhythm	
Arrhythmias	
Pacemaker	
Performance	
Fetal/Maternal	

Compatibility

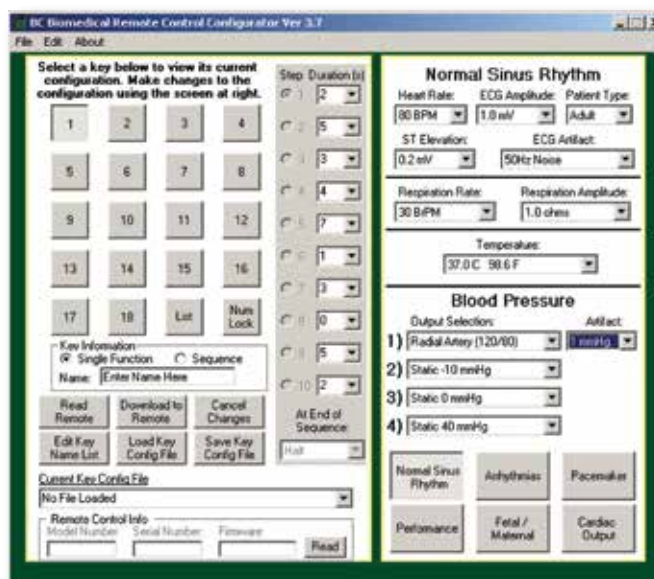
Requires a PC running Microsoft® Windows 8, Windows 7, Windows Vista, Windows XP Home Version, Windows XP Professional, Windows 2000 (Service Pack 2 or higher), Windows NT, Windows 98, with a USB Port (required optional USB to Serial Adapter).

100% compatible with the BC Biomedical PS-2200 Family of Patient Simulators (older simulators may require a Flash firmware upgrade, which can be accomplished in the field with a special software update utility). The PSR-2200 can be configured by special request to work with competitive brand patient simulators from leading manufacturers.

Specifications

Display	LCD Graphical 128 x 64 Pixels
Enclosure	5.98 x 3.27 x 1.28 Inches, ABS Plastic
Weight	< 1 Lbs
Faceplate	Lexan, Back printed
Operating Range	15 to 40 °C
Storage Range	-20 to 65 °C
Interface Cable	25' Coiled Cord
Power	One alkaline battery, 9V (NEDA 1604 - battery life > 20 hours)

PROGRAMMING SOFTWARE



The PSR-2200 comes with a Microsoft® Windows Based Application Program that allows the user to quickly and easily develop and upload almost any configuration. Complex testing and trending routines can easily be generated and saved.

The software is self-installing and designed to mimic the simulator screens, so there is almost no learning curve, just point and click. The software works with both RS232 and USB ports and will automatically find the PSR-2200 and identify it. Single click uploading (writing to) and downloading (reading from) the PSR-2200 allow for full cloning and file transfers.

Patient Simulator Series



Features - PS-2100 Series

- ◆ Simple to Operate
- ◆ Independent Lead Outputs Produce a True 12 Lead ECG Signal
- ◆ One Invasive BP Channel (PS-2110)
- ◆ Arrhythmia Selections
- ◆ Resp & Temp Simulation (PS-2110)
- ◆ ECG Performance Waveforms
- ◆ Graphical Display with Backlighting
- ◆ Drop Down Choice Screen List All Options for Parameters
- ◆ Special Power Up Feature Allows the User to Choose to use Default, Last or Custom Settings
- ◆ Auto Sequences for BPM, Static-Pressure Levels & Performance
- ◆ 10 AHA & European Color Coded Universal Patient Lead Connectors (with Enough Space Between Posts for the Large Diameter Connectors)
- ◆ Mini DIN Connectors Compatible with Standard BP Cables (Optional Mini DIN-M to DIN-F Cable Adapter)
- ◆ % Battery Life Display & Low Battery Indicator
- ◆ Powered by Two 9V Batteries or Optional Battery Eliminator
- ◆ Full Remote Operation via RS232
- ◆ Flash Programmable, Field Upgradeable
- ◆ Battery Eliminator

Optional

- ◆ SpO₂ Simulation



PS-2110

The PS-2100 Patient Simulator Series offers cost effective simulation with many features. If you only need ECG simulation, the PS-2105 offers all of the features you need. If you want basic Multi-Parameter simulation, the PS-2110 is the right choice. It provides ECG, Blood Pressure, Respiration and Temperature Simulation, plus limited Fetal/Maternal Simulation.

The PS-2100 Series makes viewing and selecting the desired waveforms and parameters quick and intuitive, with all operational information being available at the same time on the cursor-based graphic display, allowing for easy maneuvering through parameters and scrolling through available options.

PS-2105 SPECIFICATIONS

ECG Functions	
Rate	30 to 300 BPM
Amplitude	0.05 to 5mV
S-T Segment Elevation	± 0.05 to 0.8 mV
Artifacts	50 Hz, 60 Hz, Muscle, Baseline Wander, Respiration
QRS Interval	Adult (80 ms) or Pediatric (40 ms)
Arrhythmia Functions	
Arrhythmias	49 different
General Groups	Supraventricular, Premature, Ventricular, Conduction
Triggering	Manual & Automatic
Pacemaker Functions	
Waveforms	Atrial, Pacer, Asynchronous, Non-Capture, Non-Function, Demand - Occasional, Demand - Frequent, AV - Sequential
Pulse Height	1 to 10 mV
Pulse Width	0.1 to 2 ms
ECG-Performance Functions	
Sine Waves	0.1 to 100 Hz
Square Waves	0.125, 2 Hz
Triangle Waves	5, 2.5 Hz
Pulse Waves	30, 60, 120 BPM; 60 ms Width
Amplitude	0.05 to 5 mV (Lead II)
Automatic Mode	Yes
R Wave Rate	30, 60, 80, 120, 200, 250 BPM
R Wave Width	8 to 200 ms
R Wave Amplitude	0.05 to 5 mV (Lead II)
Training	
Timer	Manual, 10, 15, 20, 25, 30 s
Randomizer	Off, On
Arrhythmias	All, Subset
SpO ₂ Simulation (MSP-2100 & Finger SIM™ Req'd.)	
Rate	30 to 300 BPM
SpO ₂ Output	80, 90 & 97%

PS-2110 SPECIFICATIONS

ECG Functions	
Rate	30,60,80,120,180,240,300 BPM
Accuracy	± 1%
Amplitude	0.5, 1.0, 1.5, 2.0 mV
Accuracy	± 2% @ Lead II
High Level	200 times Amplitude
ECG Performance	
Sine Wave	0.1,0.5,5,10,40,50,60,100 Hz
Square Wave	0.125, 2.000 Hz
Triangle Wave	2.000 Hz
Rate Accuracy	± 1%
Amplitude Accuracy	± 2% @ Lead II
Blood Pressure	
Static Pressure	0,20,40,80,100,200,250,300 mmHg
Accuracy	± (2% of Reading + 2 mmHg)
Impedance	300 Ω
Accuracy	± 10%
Excitation Range	2 to 16 V RMS
Excitation Frequency	DC to 5 kHz
Sensitivity	5 or 40 μV/mmHg
Respiration	
Rate	Apnea,15,20,30,40,60,80,100,120 BrPM
Accuracy	± 1%
Impedance delta	0.1,0.2,0.5,1.0,2.0,3.0 Ω
Accuracy	± 10%
Baseline	500,1000 Ω
Accuracy	± 5%
Lead	LA or LL
Temperature	
Temperature	30,37,40 °C (86.0,98.6,104.0 °F)
Accuracy	± 0.1 °C (± 0.1 °F)
Type	YSI Series 400 and 700
SpO ₂ Simulation (MSP-2100 & Finger SIM™ Req'd.)	
Rate	30 to 300 BPM
SpO ₂ Output	80, 90 & 97%



COMPARE



PS-2110 with (optional) MSP-2100 & FingerSim™

To Compare Patient Simulators, see chart on Page 14

← Flip for product pricing - Page D →

ECG Simulators

13

Patient Simulator Series

Overview - PS-2010

The PS-2010 is the perfect tool for providing a 10 lead wire hook up for those diagnostic 12 lead ECG machines. This small, lightweight, feature packed simulator is a must for your test equipment tool box.



- ◆ 10 AHA & European Color Coded Leads
- ◆ Normal Sinus Rhythm & Performance Waveforms
- ◆ Universal Connectors
- ◆ Lead Test

PS-2010



Overview - PS-2006

The PS-2006 is unique in the market place. Many of the new monitors now being released have a six lead configuration. By popular demand, the PS-2006, six lead ECG/PVC simulator was developed. Press a button and insert PVCs into the ECG trace.

- ◆ 6 AHA & European Color Coded Leads
- ◆ Normal Sinus Rhythm & Performance Waveforms
- ◆ Snap Connectors
- ◆ PVC Insertion

PS-2006



Overview - PS-2005

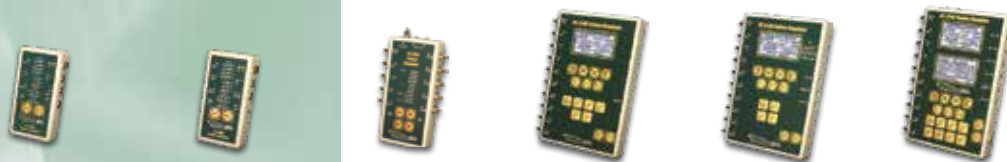
The PS-2005 is a small unit for those who need five lead ECG simulation only and are looking for a cost effective simulator. Need to check your lead wires? There is a built in lead wire tester for your convenience.

- ◆ 5 AHA & European Color Coded Leads
- ◆ Normal Sinus Rhythm & Performance Waveforms
- ◆ Snap Connectors
- ◆ Lead Test

PS-2005



Comparison Chart



Models	PS-2005	PS-2006	PS-2010	PS-2105	PS-2110	PS-2200
General						
Display	11 LED	11 LED	11 LED	1 LCD Graphical 128x64 pixels	1 LCD Graphical 128x64 pixels	2 LCD Graphical 128x64 pixels
Backlight	No	No	No	Yes	Yes	Yes
Lead Test Terminals	Yes	No	Yes	No	Yes	Yes
RS232	No	No	No	Yes	Yes	Yes
Power	1-9 Volt Battery	1-9 Volt Battery	1-9 Volt Battery	2-9 Volt Batteries	2-9 Volt Batteries	2-9 Volt Batteries
Battery Eliminator	No	No	Yes	Yes	Yes	Yes

ECG-NSR	Yes	Yes	Yes	Yes	Yes	Yes
Leads	5	6	10	10	10	10
Rates	4	4	4	17	7	17
Amplitudes	1	1	1	4	4	19
QRS Interval	Adult	Adult	Adult	Adult & Pediatric	Adult	Adult & Pediatric
ST Segment Elevation	No	No	No	19	No	19

ECG-Performance	Yes	Yes	Yes	Yes	Yes	Yes
Sine Waves	3	3	3	8	8	8
Square Waves	2	2	2	2	2	2
Triangle Waves	1	1	1	2	1	2
Pulse Waves	--	--	--	3	--	3

Respiration	No	No	No	No	Yes	Yes
Rate	--	--	--	--	8	8
Baseline	--	--	--	--	2	4
Delta Impedance	--	--	--	--	6	6

Pacemaker	No	No	No	Yes	No	No
Arrhythmias	No	PVC on Demand	No	49	12	49
Blood Pressure	No	No	No	No	1 Channel	1, 2, or 4 Channel
Temperature	No	No	No	No	YSI 400/700	YSI 400/700

Special Modes						
SpO ₂ Simulation	No	No	No	w/MSP-2100	w/MSP-2100	w/MSP-2100
Fetal/Maternal	No	No	No	No	Yes	Optional
Cardiac Output	No	No	No	No	No	Optional
Training Mode	No	No	No	Yes	No	Yes
Lead Test	Yes	No	Yes	No	Yes	Yes

Physical	ABS Plastic Case	ABS Plastic Case	ABS Plastic Case	ABS Plastic Case	ABS Plastic Case	ABS Plastic Case
Size	5.12" x 2.56" x .97"	5.15" x 2.89" x 1.06"	7.26" x 4.46" x 1.51"	8.63" x 5.5" x 1.63"	8.63" x 5.5" x 1.63"	8.63" x 5.5" x 1.63"
Weight	< 1 Lbs	≤ 0.5 Lbs (0.23 kg)	< 1 Lbs	< 2 Lbs	< 2 Lbs	< 2 Lbs

Features - DA-2006 Series

- ◆ Pulsed Biphasic, Biphasic and Monophasic Compatible
- ◆ Fully AED Compatible
- ◆ Graphical Display with Backlighting & Simultaneous Details of Parameters with Scrolling Option Control
- ◆ On-Screen Viewing of Defib & Pace Waveforms
- ◆ 5000 V, 1000 Joule Capacity
- ◆ High & Low Ranges
- ◆ Cardioversion Delay Measurement
- ◆ Charge Time Measurement
- ◆ Waveform Storage & Playback
- ◆ 10 AHA & European Color Coded Universal Patient Lead Connectors
- ◆ 25 Pin Connector for Centronics Printer
- ◆ Power, two 9 V Batteries (Battery Eliminator Furnished)
- ◆ Low Battery Indicator
- ◆ Flash Programmable, Field Upgradeable
- ◆ Auto Sequence Testing
- ◆ PC Utility Software for Auto Sequence Development & Maintenance
- ◆ Storage for 50 Custom Sequences

Features - DA-2006P

- ◆ 26 Selectable Internal Loads
- ◆ Full Pulse Analysis
- ◆ On-Screen Viewing of Pace Waveform
- ◆ Demand Sensitivity Test
- ◆ Refractory Period Tests
- ◆ 50/60 Hz Interference Test Signals
- ◆ Pacer Input Defib Protection



DA-2006P

The DA-2006 and DA-2006P Defibrillator Analyzer Series take advantage of the latest electronic technology and deliver accurate, consistent test results on all defibrillators, regardless of manufacturer or model.

Whether you need to test output energy, cardioversion delay time, maximum energy charge time, or test your AED, the DA-2006 and DA-2006P will deliver. You can even capture and view the actual output energy and pacer waveforms to check for any abnormalities.

With 26 internal test loads, the DA-2006P delivers a full range of capabilities for testing the Transcutaneous Pacemaker function of your advanced level defibrillators, including tests like demand sensitivity, refractory period, rate, pacer pulse width, pacer pulse amplitude, etc. Test pacer functionality with the peace of mind that the Pacer Input terminals on the DA-2006P are internally protected against accidental defibrillator discharge.

The DA-2006 & DA-2006P offers automated testing. Create and store up to 50 unique testing "auto sequences", including both defibrillator and pacer tests. You can easily edit existing sequences and create new ones with our unique PC-based utility software. You can also "clone" a specific set of auto sequences to multiple analyzers.

SPECIFICATIONS

ENERGY OUTPUT MEASUREMENT	
METHOD	Monophasic, Biphasic or Pulsed Biphasic
LOAD RESISTANCE	50 Ω ± 1%, Non-Inductive (< 1 μH)
DISPLAY RESOLUTION	0.1 J
MEASUREMENT TIME WINDOW	100 ms
ABSOLUTE MAX PEAK VOLTAGE	6000 V
PULSE WIDTH	100 ms
CHARGE TIME MEASUREMENT	0.1 to 99.9 s

	HIGH RANGE	LOW RANGE
VOLTAGE	≤ 5000 V	≤ 1000 V
CURRENT	≤ 100 A	≤ 20 A
ENERGY	≤ 1000 J	≤ 50 J
ACCURACY	≤ 100 J ± 2 J	≤ 20 J ± 0.4 J
	> 100 J ± 2% of reading	> 20 J ± 2% of reading
TRIGGER LEVEL	100 V	20 V
PLAYBACK AMPLITUDE	1 mV / 1000 V Lead 1	1 mV / 1000 V Lead 1
TEST PULSE	125 J ± 20%	5 J ± 20%
OSCILLOSCOPE OUTPUT ATTENUATION	1000:1	200:1
CARDIOVERSION	DELAY	0 to 6000 ms
	RESOLUTION	0.1 ms
	ACCURACY	± 2 ms
WAVEFORM PLAYBACK	OUTPUT	LEAD I & PLATES
	SCREEN	200:1 Time Base Expansion
SYNC TIME MEASUREMENTS	TIMING WINDOW	Starts at peak of each R-wave
	TEST WAVEFORMS	All waveform simulations available
	DELAY TIME ACCURACY	± 1 ms

PATIENT SIMULATOR		
ECG WAVEFORM RATES	ECG NSR	30, 40, 45, 60, 80, 90, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280, 300 BPM
	SINE	0.1, 0.2, 0.5, 5, 10, 40, 50, 60, 100 Hz
	SQUARE	0.125, 2.000 Hz
	TRIANGLE	2.000, 2.500 Hz
	PULSE WAVE	30, 60, 120 BPM; 60 ms width
AMPLITUDE	0.5, 1.0, 1.5, 2.0 mV (Lead II)	
ACCURACY	RATE	± 1%
	AMPLITUDE	± 2% @ Lead II
HIGH LEVEL	OUTPUT	200 times Amplitude
	ACCURACY	± 5%
QRS DURATION	80 ms	
LEAD TO LEAD IMPEDANCE	1000 Ω	
ECG ARRHYTHMIA SELECTIONS	Ventricular Fibrillation	
	Atrial Fibrillation	
	Second Degree A-V Block	
	Right Bundle Branch Block	
	Premature Atrial Contraction	
	PVC Early	
	PVC Standard	
	PVC R on T	
	Multifocal PVC	
	Bigeminy	
ECG SHOCK ADVISORY ALGORITHM TEST SELECTIONS	Run of 5 PVCs	
	Ventricular Tachycardia	
	Asystole	
	Coarse Ventricular Fibrillation	
	Fine Ventricular Fibrillation	
	Multifocal Ventricular Tachycardia @ 140 BPM	
	Multifocal Ventricular Tachycardia @ 160 BPM	
	Polyfocal Ventricular Tachycardia @ 140 BPM	
	Polyfocal Ventricular Tachycardia @ 160 BPM	
	Supraventricular Tachycardia @ 90 BPM	



DA-2006-VL

TRANSCUTANEOUS PACEMAKER ANALYZER				
PULSE RATE	RANGE	30 to 800 ppm		
	ACCURACY	± 1% or 2 ppm (whichever is greater)		
PULSE WIDTH	RANGE	0.6 to 80 ms		
	ACCURACY	± 1% or ± 0.3 ms (whichever is greater)		
VOLTAGE	VARIABLE LOAD INPUT	200 V		
	FIXED LOAD INPUT	15 V		
OSCILLOSCOPE OUTPUT	AMPLITUDE ATTENUATION	0 – 15 V	10.24:1	
		15 – 60 V	41:1	
		> 60 V	164:1	
DEMAND SENSITIVITY	MAX OUTPUT	200 V		
	WAVEFORMS	Square, Triangle, Haversine		
	WIDTH	10, 25, 40, 100, 200 ms		
	OUTPUT AMPLITUDE	ECG OUTPUT	0 to 4 mV	
		PACER INPUT (50 TO 400 OHMS)	0 to 10 mV / 50 Ω	
		PACER INPUT (500 TO 2300 OHMS & OPEN)	0 to 100 mV	
	OUTPUT RESOLUTION	DEFIBRILLATOR PLATES	0 to 10 mV	
		ECG OUTPUT	40 μV	
		PACER INPUT (50 TO 400 OHMS)	40 μV	
		PACER INPUT (500 TO 2300 OHMS & OPEN)	1 mV	
OUTPUT ACCURACY	DEFIBRILLATOR PLATES	0.1 mV		
		± 2%		
INPUT RATE	ECG OUTPUT	N/A		
	PACER INPUT	30 to 100 ppm		
	DEFIBRILLATOR PLATES	30 to 100 ppm		
REFRACTORY PERIOD	PACING	20 to 500 ms		
	SENSING	20 to 500 ms		
	ACCURACY	± 2 ms		
50/60 HZ INTER FERENCE TEST SIGNAL	ECG OUTPUT	0, 0.4, 0.8, 1.2, 1.6, 2.0, 2.4, 2.8, 3.2, 3.6, 4.0 mV		
	PACER INPUT	50 Ω	0.1, 2, 3, 4, 5, 6, 7, 8, 9, 10 mV	
		50 Ω	0.2, 4, 6, 8, 10, 12, 14, 16, 18, 20 mV	
		150 Ω	0.3, 6, 9, 12, 15, 18, 21, 24, 27, 30 mV	
		200 Ω	0.4, 8, 12, 16, 20, 24, 28, 32, 36, 40 mV	
		300 Ω	0.6, 12, 18, 24, 30, 36, 42, 48, 54, 60 mV	
		400 Ω	0.8, 16, 24, 32, 40, 48, 56, 64, 72, 80 mV	
	≥ 500 Ω	0.10, 20, 30, 40, 50, 60, 70, 80, 90, 100 mV		
	DEFIB PLATES	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 mV		
	TEST LOAD	LOAD VALUES	50, 100, 150, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2100, 2200, 2300 Ω	
ACCURACY		50 to 1300 Ω	± 1%	
PULSE CURRENT	RANGE	4 to 300 mA (100 Ω load)		
	ACCURACY	± 5% or ± 0.5 mA (whichever is greater)		
	LIMIT	50 – 600 Ω	300 mA	
		700 Ω	286 mA	
		800 Ω	250 mA	
		900 Ω	222 mA	
		1000 Ω	200 mA	
		1100 Ω	182 mA	
		1200 Ω	167 mA	
		1300 Ω	154 mA	
		1400 Ω	143 mA	
		1500 Ω	133 mA	
		1600 Ω	125 mA	
		1700 Ω	118 mA	
		1800 Ω	111 mA	
1900 Ω		105 mA		
2000 Ω	100 mA			
2100 Ω	95 mA			
2200 Ω	91 mA			
2300 Ω	87 mA			

Our DA-2006-VL, works in conjunction with our DA-2006 Series Defibrillator Analyzers, providing Variable Loads used when testing Defibrillators to assure the proper electrical current is delivered to the heart, per IEC 60601-2-4 and AAMI DF80 standards. See page 19.



Programmable Autosequence

- ◆ PC Based Software
- ◆ Create up to 50 Autosequence
- ◆ Up to 20 Steps Per Autosequence
- ◆ Autosequences can be cloned to Multiple Units
- ◆ Easily Share Autosequence Files via Email



DA-2006

The BC Biomedical DA-2006 and DA-2006P defibrillator analyzers take autosequence test development to new levels. Never before has it been so easy to create new automated testing sequences, or edit existing ones. Our unique PC-based autosequence development software allows you to build and edit these automated testing sequences on your PC under the power and utility of the Windows operating system, rather than having to work on a cryptic small instrument display like other analyzers. You can create up to 50 autosequences to download to your DA-2006 or DA-2006P.

A starter set of 19 autosequences is provided. Autosequences can be defibrillator-only, transcutaneous pacer-only, or a combination of both. Each autosequence can support up to 20 output energy test steps, a maximum energy test (including charging time), a cardioversion test (at up to three different power levels), and transcutaneous pacer tests. You can take an existing autosequence and copy it to a new one, rename it, and make any minor changes necessary to have a brand new sequence for a different make and model defibrillator.

You can “clone” multiple DA-2006 or DA-2006P analyzers by downloading the same autosequence file to multiple analyzers. You can e-mail autosequence file sets for use in field or district offices away from the main office when changes are made. You can even save your DA-2006 or DA-2006P autosequence setup and easily put it back exactly the same way it was, prior to repair and calibration of your instrument.

PROGRAMMING AUTO SEQUENCES OVERVIEW

Program Menu Bar

File Control
This section is utilized to load/save configuration files on the PC as well as read/write the auto configuration in the DA-2006/P

ECG Sequence Programming
Use this section to easily configure each step of the ECG Auto Sequence

Sequence Selection
Use this list to select which sequence to view /edit.

Status Message

Com Port being used

Sequence Configuration
Use this section to configure each Auto Sequence test.

Task Progress Indicator

Today's Date

Current Time

Compatibility
Requires a PC running Microsoft® Windows 8, Windows 7, Windows Vista, Windows XP Home Version, Windows XP Professional, Windows 2000 (Service Pack 2 or higher), Windows NT, Windows 98, with a USB Port (required optional USB to Serial Adapter).

BC Group makes defibrillator autosequence development and editing easier than competitive analyzers that offer such capability. Why struggle with limited on-instrument displays and cryptic development tools? Our DA-2006 and DA-2006P autosequence capability is in a class of its own.

Features - DA-2006-VL

- ◆ Pulsed Biphasic, Biphasic and Monophasic Compatible
- ◆ Fully AED Compatible
- ◆ 5000 V, 1000 Joule Capacity
- ◆ Smart Loads, no Settings to Change in DA-2006 or DA-2006P
- ◆ 25-200 ohm Loads, 25 ohm Steps



NEW



DA-2006-VL

Our DA-2006-VL, works in conjunction with our DA-2006 Series Defibrillator Analyzers, providing Variable Loads used when testing Defibrillators to assure the proper electrical current is delivered to the heart, per IEC 60601-2-4 and AAMI DF80 standards.

Automatic detection of loads, no settings to change or configure in the DA-2006/P. Ensure that the correct load is selected in the Defibrillator output pulse measurement.



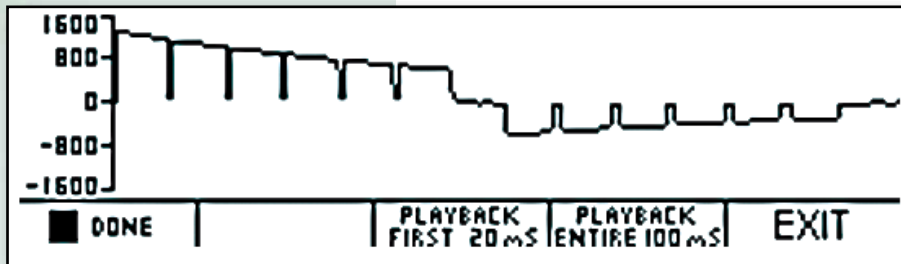
Are you testing your defibrillator with the right loads?

The DA-2006 series and DA-2006-VL are the right answer for you. Not all patients are the same, use the DA-2006-VL to test your defibrillator with test loads from 25 to 200 ohms, as required by IEC 60601-2-24 and AAMI DF80 standards.

CONFIGURATION		TEST RESULTS		
High Range 1000J Max		Energy:	0.0 Joules	
Status: Ready for Defib		Peak V:	0.0 Volts	
ECG : Disabled		Peak I:	0.0 Amps	
Variable Load: 100Ω				
ECG WAVEFORMS	PLAYBACK LAST PULSE	START CHARGE TIMER	PRINT HEADER	MORE KEYS →

Do you need to measure Pulsed Biphasic waveforms?

If you already have a DA-2006, there is no need to purchase a new analyzer in order to measure pulsed biphasic waveforms. Simply update the software in your DA-2006/P and you will be ready for testing.



Need to calibrate any Defibrillator?



Typical DA-CS-06 Setup
Defibrillator Analyzer Calibration System

Features - NIBP-1040-BE

- ◆ NIBP, IBP, ECG, Temp, Arrhythmias, Respiration, Leak Detect & Much More
- ◆ Small, Hand-Held, Lightweight
- ◆ Cardiac Output
- ◆ Fetal Maternal
- ◆ Simple One Key Operation
- ◆ ± 500 mmHg Manometer
- ◆ Digital Pressure Envelope Offset
- ◆ Total Pressure & BP Waveform Displays
- ◆ Adult, Neonatal, Hypertensive & Hypotensive Modes
- ◆ SpO₂ Ready-Compatible with MSP-2100 Module & FingerSims™
- ◆ Multiple Display Screens & Digit Sizes
- ◆ Flash Programmable, Field Upgradeable
- ◆ Peak Pressure Detection with Easy Reset
- ◆ ECG Output with Full NSR Waveform
- ◆ Sinusoidal Respiration Simulation
- ◆ ECG Performance Test Waveforms
- ◆ Pace Waveform
- ◆ ECG Alarm Test
- ◆ Synchronized Invasive Blood Pressure Output
- ◆ Selectable IBP Sensitivity - 5 or 40 μ V/V/mmHg
- ◆ Leak Rate Test
- ◆ ECG Arrhythmia Waveforms
- ◆ ECG Arrhythmia Sequence
- ◆ YSI 400 & 700 Simulation Temperature



Shown with
NIBP-1040-BE
Cardiac Output

NIBP-1040-BE

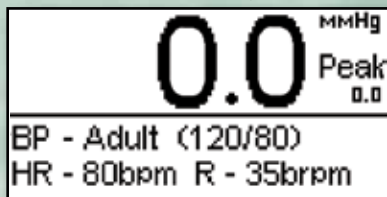
The NIBP-1040-BE is the newest member of the NIBP-1000 family of high quality, low cost, high function microprocessor-based NIBP simulators. The NIBP-1040-BE comes with the Cardiac Output and Fetal Maternal feature built-in. It is designed to meet the demand for a small, easy to use unit with multiple features to fit your exact needs. Though small, this complete Multiparameter Simulator makes no compromise on providing true outputs. There is no other NIBP Simulator on the market that offers all the features of the NIBP-1040-BE in this price range. The ability to provide offsets for various manufacturers NIBP'S can only be found in units costing twice as much.

The graphic display not only allows you to see what is going on digitally, it also allows you to view a plot of the overall pressure or a close-up of the BP waveform.

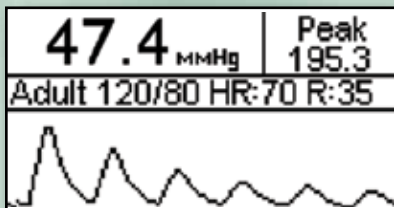
The Flash Memory allows for field upgrades with downloads from our website.

Screen Views

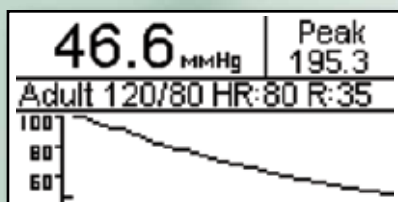
Main Display



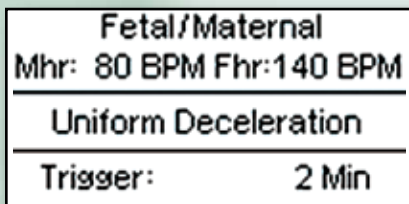
Output Waveform Screen
(NOTE: The output Waveform is NOT Physiologically Correct)



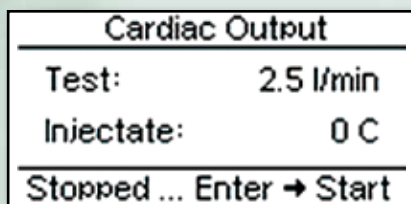
Pressure Graph Screen



FETAL/MATERNAL



CARDIAC OUTPUT



MODEL SUMMARY

NIBP-1040Kit-E - Includes MCO-2100, built-in rechargeable battery and Universal Patient Lead Connectors

Main Test Modes: Other Modes/Features:

Adult 120/80	Peak Detect
Adult 120/80 w/Pace	ECG Performance Waves
Adult High 190/120	Individual Arrhythmias
Adult Low 80/40	Synchronized Dynamic IBP
Neonatal 70/40	Static IBP
Alarm Test	RS232
Arrhythmia Sequence	
Leak Test	
Manometer	
Cardiac Output	
Fetal Maternal	

SPECIFICATIONS

Blood Pressure

Pressure Range: ± 500 mmHg @ 20 °C
Accuracy: ± (1% of Reading + 0.5 mmHg)
Simulation Rate: 80, 94 BPM (synchronized to ECG)
Accuracy: ±1%

Invasive Blood Pressure

Static Pressure: -10, -5, 0, 20, 40, 50, 60, 80, 100, 120, 150, 160, 200, 240, 250, 300, 320, 400 mmHg
Accuracy: ± (1% Full Range + 1 mmHg) or ± (2% Setting + 2 mmHg)
Impedance: 300 Ω (± 10% Accuracy)
Excitation Range: 2 to 16 Vrms
Excitation Frequency: DC to 5 kHz
Sensitivity: 5 or 40 μV/V/mmHg

ECG NSR

Rate: 30, 60, 120, 240 BPM (± 1% Accuracy)
Amplitude: 2.75 mV (± 2% @ Lead II Accuracy)

ECG Performance

Sine Wave: 10, 60, 100 Hz
Square Wave: 0.125, 2.000 Hz
Triangle Wave: 2.000 Hz
Rate Accuracy: ± 1%
Amplitude: 2.75 mV (± 2% @ Lead II Accuracy)

Pacemaker Waveforms

Amplitude: 3 mV (± 10% Accuracy)
Width: 6 ms (± 5% Accuracy)

Respiration

Rate Accuracy: ± 1%
Impedance: Delta 3.0 Ω (± 10% Accuracy)
Baseline: 1000 Ω (± 5% Accuracy)

Temperature

Settings: 0, 24, 30, 37, 40 °C (± 0.1 °C Accuracy) (32.0, 75.2, 86.0, 98.6, 104.0 °F)
Type: YSI Series 400 and 700

Fetal/Maternal

Fetal heart rate: 60, 90, 120, 140, 150, 210, 240 BPM
IUP Period: Single Contraction (Manual) 2, 3, 5, Min (AUTO)

FHR

(During Contraction): Uniform Deceleration
Early Deceleration
Late Deceleration
Uniform Acceleration

Cardiac Output

Injectate Temperature: 0, 24 °C
Injectate Flow: 2.5, 5.0, 10.0 L/MIN
Other Outputs: Faulty – Injectate
Left-to-Right Shunt
Calibrated Temperature Pulse

Overview - NIBP-1030-BE

The NIBP-1000 Series is a Family of high quality, low cost, high function Microprocessor based NIBP Simulators. They are designed to meet the demand for a small, easy to use unit with multiple features to fit your exact needs.

You have the option of operating by power cord or you can add the optional internal rechargeable NiMH Battery. You can perform hundreds of test on a fully charged battery.

Though small, this Family makes no compromise on providing true outputs. The optional ECG waveforms are full QRS and the respiration waveforms look real.

The graphic display not only allows you to see what is going on digitally, it also allows you to view a plot of the overall pressure or a close-up of the BP waveform.

All models have the ability to adjust the output depending on the manufactures algorithm. (operators choice)

The Flash Memory allows for field upgrades with downloads from our website.

NIBP-1030-BE NIBP, Peak Detect, Full Range Manometer, IBP, ECG, Pace, Temperature, Arrhythmias, Respiration, Leak Detect and Performance waveforms. (Extended ECG post optional)

NIBP-1020 NIBP, Peak Detect, Full Range Manometer, ECG, Pace Respiration and Performance waveforms.

NIBP-1010 NIBP, Peak Detect and Full Range Manometer

NIBP-1030-BE



NIBP-1020

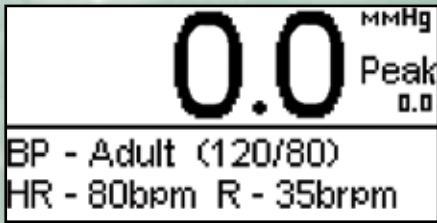


NIBP-1010

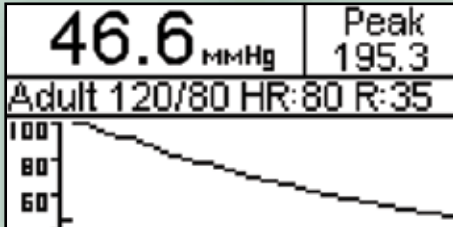


Screen Views

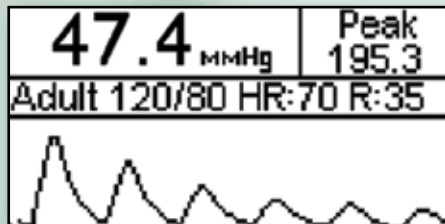
Main Display



Composite Pressure Display



Output Pressure Display
(NOTE: The output Waveform is NOT Physiologically Correct.)



NIBP-1010 with (optional) MSP-2100 & FingerSim™

SPECIFICATIONS

Blood Pressure

Pressure Range: ± 500 mmHg @ 20 °C
Accuracy: $\pm (1\% \text{ of Reading} + 0.5 \text{ mmHg})$
Simulation Rate: 80, 94 BPM (synchronized to ECG)
Accuracy: $\pm 1\%$

ECG NSR

Rate: 30, 60, 120, 240 BPM; $\pm 1\%$
Amplitude: 2.75 mV; $\pm 2\%$ @ Lead II

ECG Performance

Sine Wave: 10, 60, 100 Hz; $\pm 1\%$
Square Wave: 0.125, 2.000 Hz; $\pm 1\%$
Triangle Wave: 2.000 Hz; $\pm 1\%$

Pacemaker Waveforms

Amplitude: 3 mV; ($\pm 10\%$ Accuracy)
Width: 6 ms; ($\pm 5\%$ Accuracy)

Respiration

Impedance: Delta 3.0 Ω ($\pm 10\%$ Accuracy)
Baseline: 1000 Ω ($\pm 5\%$ Accuracy)

MODEL SUMMARY

AVAILABLE MODELS:

NIBP-1010	Basic unit
NIBP-1010-P	+ Peak
NIBP-1010-BP	+ Battery & peak
NIBP-1010-KIT	NIBP-1010-BP, 5 adapters & soft carrying case
NIBP-1020	Basic unit with ECG
NIBP-1020-PA	+ Peak & alarm
NIBP-1020-BPA	+ Battery, peak & alarm
NIBP-1020-KIT	NIBP-1020-BPA, 5 adapters & soft carrying case
NIBP-1030	Base unit
NIBP-1030-B	+ built-in rechargeable battery
NIBP-1030-BE	+ Universal Patient Lead Connectors
NIBP-1030Kit	NIBP-1030-B, soft carrying case and 5 adapters
NIBP-1030Kit-E	Same as above with Universal Patient Lead Connectors
NIBP-1040Kit-E	NIBP-1040-BE with Cardiac Output & Fetal Maternal, Universal Patient Lead Connectors soft carrying case and 5 adapters

Optional Accessories

Soft Carrying Case	Luer Adapter
Bulb Adapter	Marquette Adapter
DINAMAP/Critikon Adapter	Pulse Oximetry Module
Quick Disconnect Adapter	FingerSim™ Replacement Set



Features - ESU-2400H

- ◆ The Industry's Most Comprehensive and Most Accurate Full-Featured Analyzer
- ◆ Measure Advanced Generator Outputs with Pulsed RF at Up to 3 Different Amplitudes
- ◆ Up to 16 million samples
- ◆ 1% Measurement Accuracy
- ◆ Based Upon Years of Collaborative Work with Leading Electrosurgery Industry Manufacturers
- ◆ Industry Standard RF Current Measurement
- ◆ DFA™ Technology Ultra High Speed Digitization of The Complex RF Waveform
- ◆ Compatible with The Latest ESU Generator Platforms by The Major ESU Manufacturers
- ◆ Continuous & Pulsed Output Waveform Compatible
- ◆ Embedded Real-Time Operating System with ¼ VGA Color Touch Screen Display
- ◆ Displays Up to 15 Different Measurement Parameters with User Selectable and Definable Screens
- ◆ Internal Precision Test Loads From 0 Ω to 6400 Ω in 1 Ω Increments
- ◆ External Test Load Compatibility
- ◆ Automated Power Load Curves with Multiple Power Settings Per Load Setting
- ◆ Automated User-Definable Testing Sequences
- ◆ Print test Reports to PDF format or USB Printer
- ◆ USB (3), RS232, and Ethernet Communications Ports
- ◆ External Keyboard and Mouse Compatible Via Dedicated Ports
- ◆ Automatic or Manual Activation of ESU Generator During Power Load Curve Tests
- ◆ Remote Communications Capability with ESU Generators
- ◆ 100% Compatible with Covidien/Valleylab Force Triad & Ligasure Generators, Conmed System 5000 Generators, and All Legacy Generators by Other Manufacturers
- ◆ REM/ARM/CQM Testing Via 500 Ω Adjustable Load in 1 Ω Increments
- ◆ RF Leakage Current Measurement
- ◆ Capture, Store, Print RF Waveform

NEW 

ESU-2400H

The ESU-2400H offers an unprecedented buffer depth of over 16 million samples. This allows for ultra-stable measurements of ESU Generator output waveforms and provides future-proofing for new generator outputs modes such as multiple pulsed waveforms.

The ESU-2400H uses the same base platform as the ESU-2400. This means that you can upgrade your existing analyzer without having to purchase a whole new unit. You have the freedom to get started with the ESU-2400 and then upgrade as the need arises.

The low impedance internal load bank has a range of 0 to 6400 ohms in 1 ohm increments. It is microprocessor based and utilizes a combination of unique hardware and software to provide accurate and reliable test results, even from "noisy" Electrosurgical Generator waveforms such as "Spray". The DFA™ Technology utilized in the ESU-2400H allows the system to aggressively digitize the complex RF waveforms produced by Electrosurgical Generators. Each data point is analyzed to provide highly accurate measurement results.

The ESU-2400H, unlike most conventional ESU Analyzers, has internal high voltage setup relays to control the measurement path. This allows the user to switch between Power measurements, Leakage measurements, REM/ARM/CQM testing, or even run an autosequence that could include any or all of these tests – without even moving wires around.

The current transformer internal to the ESU-2400H senses the RF current flowing through the internal test load and produces a ratiometric voltage, which is digitized and analyzed by the microprocessor. Combining the standard and low ranges of the ESU-2400H with the use of the current transformer, the user has full control over the ability to get high accuracy and high resolution readings from all types of Electrosurgical Generators

ESU-2400H

Advanced Pulsed Mode Measurements

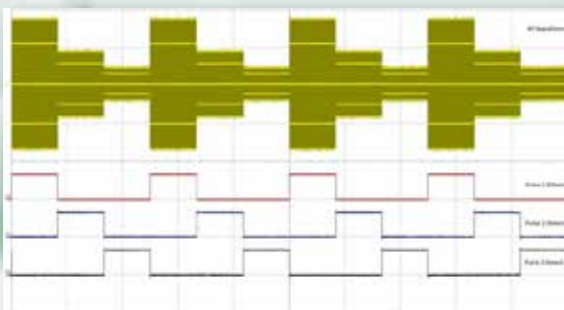
Pulse Mode Config

Pulse Mode

Pulse Mode 2

Pulse Mode 3

Pulse Mode 3 Scope Capture



SPECIFICATIONS

MEASUREMENTS	
A/D Resolution	14 Bits
A/D Speed	64 MSPS
Bandwidth	50 kHz – 10 MHz
Measurement Accuracy	± 1% Reading
Current Range	2.0 to 700.0 mA RMS (Low Range) 20 to 7000 mA RMS (High Range)
Current Resolution	0.1 mA RMS (Low Range) 1 mA RMS (High Range)
Power Range (Watts)	500 Watts
Power Resolution (Watts)	0.1 Watt
Crest Factor Range	1.4 to 500
Crest Factor Resolution	0.1
Input Voltage Range	0.20 to 70.00 mV RMS (Low Range) 2.0 to 700.0 mV RMS (High Range)
Voltage Resolution	0.01 mV (Low Range) 0.1 mV (High Range)
mV Peak/Peak-to-Peak Range	0.0 to 1.0
mV Peak/Peak-to-Peak Resolution	0.1

Load Bank Specifications	
Internal Setup/Load Selection Relays	10kV, 5A rated Reed Relays
Internal Load Selection	
Internal Load Range	0 to 6400 Ω
Internal Load Accuracy	± 1% Non-inductive
Internal Load Power Ratings	1 Ω: 25 W 2 Ω: 50 W 4 Ω: 100 W Remaining Loads: 225 W
Load Bank Duty Cycle	10 seconds on, 30 seconds off
Load Cooling	Dual 120mm Variable Speed DC Fans
External Load Selection	
External Load Range	0 to 6400 Ω
External Load Resolution	1 Ω

SCREEN SIZE	5.7" QVGA 18 bit color touch screen
SETUP MEMORY	EEPROM, All Parameters
MEMORY RETENTION	10 Years w/o Power
OPERATING RANGE	15 to 30 °C (59 to 86 °F)
STORAGE RANGE	-20 to 60 °C (-4 to 140 °F)
CONSTRUCTION	Enclosure – Aluminum Face – Lexan, Back Printed
SIZE	7.8 x 15.0 x 22.5 inches 198.1 x 381 x 571.5 mm
WEIGHT	31 lbs. (14 kg)
CONNECTIONS	Input: I/O 4mm Safety Jacks 3xUSB, 1xSerial, 1xEthernet 1xPS/2 Keyboard/Mouse Output: 1xBNC Scope Hypertronics 25-pin Footswitch connector
POWER SUPPLY ADAPTER	Input: Universal 100-240 VAC, 50-60 Hz Output: 12 VDC (Specify power cord see page Z)

Features - ESU-2400

- NEW**
- ◆ Automated One Button Force Triad Autosequence included
 - ◆ Industry Standard RF Current Measurement
 - ◆ DFA™ Technology Ultra High Speed Digitization of The Complex RF Waveform
 - ◆ 1% Measurement Accuracy
 - ◆ Compatible with The Latest ESU Generator Platforms by The Major ESU Manufacturers
 - ◆ Continuous & Pulsed Output Waveform Compatible
 - ◆ Embedded Real-Time Operating System with ¼ VGA Color Touch Screen Display
 - ◆ Displays Up to 15 Different Measurement Parameters with User Selectable and Definable Screens
 - ◆ Internal Precision Test Loads From 0 Ω to 6400 Ω in 1 Ω Increments
 - ◆ External Test Load Compatibility
 - ◆ Automated Power Load Curves with Multiple Power Settings Per Load Setting
 - ◆ Automated User-Definable Testing Sequences
 - ◆ Print test Reports to PDF format or USB Printer
 - ◆ USB (3), RS232, and Ethernet Communications Ports
 - ◆ External Keyboard and Mouse Compatible Via Dedicated Ports
 - ◆ Automatic or Manual Activation of ESU Generator During Power Load Curve Tests
 - ◆ Remote Communications Capability with ESU Generators
 - ◆ 100% Compatible with Covidien/Valleylab Force Triad & Ligasure Generators, Conmed System 5000 Generators, and All Legacy Generators by Other Manufacturers
 - ◆ REM/ARM/CQM Testing Via 500 Ω Adjustable Load in 1 Ω Increments
 - ◆ RF Leakage Current Measurement
 - ◆ Capture, Store, Print RF Waveform



ESU-2400

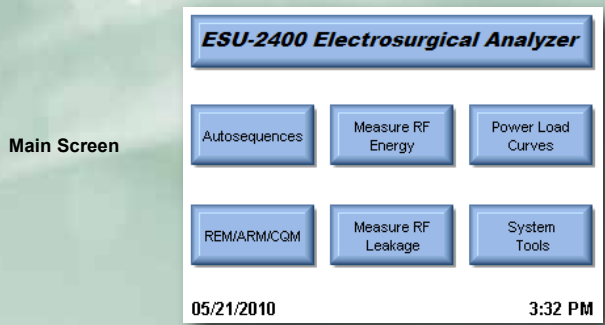
The ESU-2400 ElectroSurgical Unit Analyzer is a high-accuracy, True RMS RF Measurement system designed to be used in the calibration and routine performance verification of ElectroSurgical Generators. It offers a higher degree of accuracy than previously attainable with conventional ElectroSurgical Unit Analyzer designs. The ESU-2400 provides an advanced low inductance internal load bank with a range of 0 to 6400 ohms in 1 ohm increments. It is microprocessor based and utilizes a combination of unique hardware and software to provide accurate and reliable test results, even from “noisy” ElectroSurgical Generator waveforms such as “Spray”. The DFA™ Technology utilized in the ESU-2400 allows the system to aggressively digitize the complex RF waveforms produced by ElectroSurgical Generators, analyze each individual digital data point, and provide highly accurate measurement results.

The ESU-2400, unlike most conventional ESU Analyzers, has internal high voltage setup relays to control the measurement path, allowing the user to switch between Power measurements, Leakage measurements, REM/ARM/CQM testing, or even run an autosequence that could include any or all of these tests – without even moving wires around.

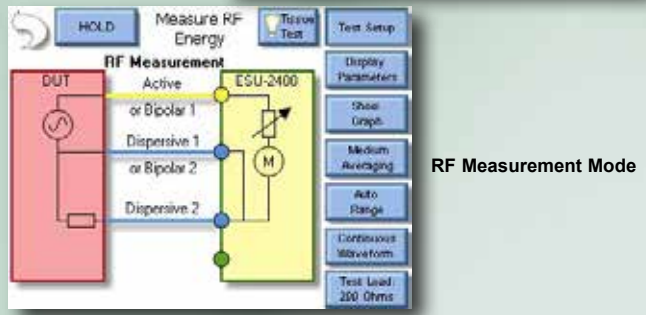
The current transformer internal to the ESU-2400 senses the RF current flowing through the internal test load and produces a ratiometric voltage, which is digitized and analyzed by the microprocessor. Combining the standard and low ranges of the ESU-2400 with the use of the current transformer, the user has full control over the ability to get high accuracy and high resolution readings from all types of ElectroSurgical Generators.

SCREEN VIEWS

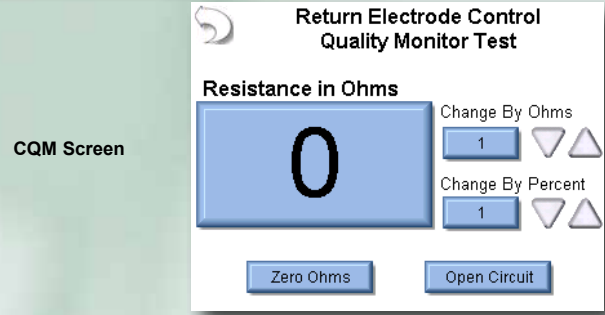
(NOTE: User can select measurement values & locations to be displayed on each screen choosing from RMS Current, RMS Voltage, RMS Power, Peak Voltage & Crest Factor)



Main Screen

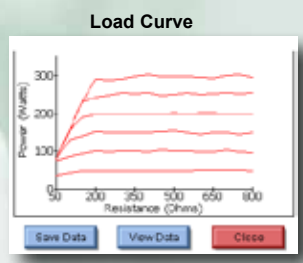


RF Measurement Mode



CQM Screen

ESU-2400 Graph Mode Example

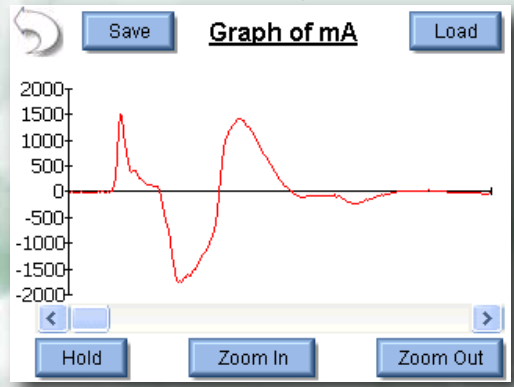


Load Curve



RF Leakage Mode

On - Screen Graphing

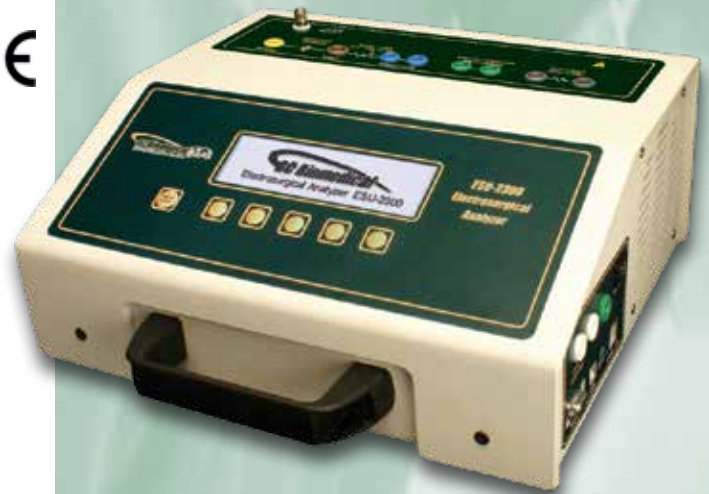


SPECIFICATIONS

MEASUREMENTS	
A/D Resolution	14 Bits
A/D Speed	64 MSPS
Bandwidth	50 kHz – 10 MHz
Measurement Accuracy	± 1% Reading
Current Range	2.0 to 700.0 mA RMS (Low Range) 20 to 7000 mA RMS (High Range)
Current Resolution	0.1 mA RMS (Low Range) 1 mA RMS (High Range)
Power Range (Watts)	500 Watts
Power Resolution (Watts)	0.1 Watt
Crest Factor Range	1.4 to 500
Crest Factor Resolution	0.1
Input Voltage Range	0.20 to 70.00 mV RMS (Low Range) 2.0 to 700.0 mV RMS (High Range)
Voltage Resolution	0.01 mV (Low Range) 0.1 mV (High Range)
mV Peak/Peak-to-Peak Range	0.0 to 1.0
mV Peak/Peak-to-Peak Resolution	0.1

Load Bank Specifications	
Internal Setup/Load Selection Relays	10kV, 5A rated Reed Relays
Internal Load Selection	
Internal Load Range	0 to 6400 Ω
Internal Load Accuracy	± 1% Non-inductive
Internal Load Power Ratings	1 Ω: 25 W 2 Ω: 50 W 4 Ω: 100 W Remaining Loads: 225 W
Load Bank Duty Cycle	10 seconds on, 30 seconds off
Load Cooling	Dual 120mm Variable Speed DC Fans
External Load Selection	
External Load Range	0 to 6400 Ω
External Load Resolution	1 Ω

SCREEN SIZE	5.7" QVGA 18 bit color touch screen
SETUP MEMORY	EEPROM, All Parameters
MEMORY RETENTION	10 Years w/o Power
OPERATING RANGE	15 to 30 °C (59 to 86 °F)
STORAGE RANGE	-20 to 60 °C (-4 to 140 °F)
CONSTRUCTION	Enclosure – Aluminum Face – Lexan, Back Printed
SIZE	7.8 x 15.0 x 22.5 inches 198.1 x 381 x 571.5 mm
WEIGHT	31 lbs. (14 kg)
CONNECTIONS	Input: I/O 4mm Safety Jacks 3xUSB, 1xSerial, 1xEthernet 1xPS/2 Keyboard/Mouse Output: 1xBNC Scope Hypertronics 25-pin Footswitch connector
POWER SUPPLY ADAPTER	Input: Universal 100-240 VAC, 50-60 Hz Output: 12 VDC (Specify power cord see page Z)



Features - ESU-2300

- ◆ **Measurements via Industry Standard Current Sensing Method**
- ◆ **Built-In RF Current Transformer (Pearson® Coil)**
- ◆ **True RMS Readings Using DFA™ Technology**
- ◆ **Performs Output, RF Leakage & CQM Tests**
- ◆ **Main Test Loads from 50 to 750 Ohms In 50 Ohm Steps**
- ◆ **External Test Loads Supported**
- ◆ **Auxiliary Test Load – 200 Ohms**
- ◆ **Independent Variable CQM Test Load 1 to 500 Ohms In 1 Ohm Steps**
- ◆ **Non-Inductive Internal Load Resistors**
- ◆ **Graphical Display With Simultaneous Details of Parameters & Scrolling Option Control**
- ◆ **Bright-White Display Backlight**
- ◆ **Rechargeable Battery or Line Powered Operation**
- ◆ **Isolated Oscilloscope Output**
- ◆ **Full Remote Operation**
- ◆ **USB Port**
- ◆ **Digital Battery Monitor**
- ◆ **Flash Programmable, Field Upgradeable**
- ◆ **Soft Touch Keys With Audible Feedback**

ESU-2300

The ESU-2300 Analyzer is for users who prefer a conventional instrument with internal, selectable test loads. Utilizing the same Patent-Pending DFA™ Technology as our ESU-2050, the ESU-2300 uses industry standard current sensing technology rather than relying on less accurate voltage measurement techniques employed by some competitive products.

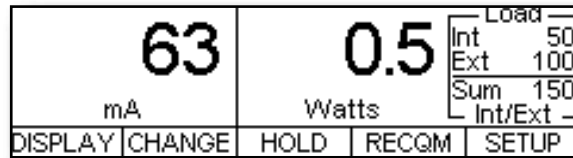
The ESU-2300 uses advanced high-speed waveform sampling techniques to accurately analyze even the most complex electrosurgery generator waveforms. You can easily analyze Coag waveforms like Desiccate, Fulgurate or even Spray with the same accuracy as pure sinusoidal Cut waveforms. RMS current (mA) and power (watts) can be easily read from the large LCD graphical display, as well as other parameters such as mV, mV peak, and CF. A whisper quiet fan keeps the internal non-inductive load resistors running cool.

Added features like CQM Testing, RF Leakage Current measurement, a Rechargeable Battery, USB and RS232 com ports, oscilloscope output, universal power supply and the ability to easily update the instrument's firmware in the field via our unique Flash Update Utility Software put the ESU-2300 in a class of its own.

SPECIFICATIONS

Measurement	
Method	Industry Standard Current Sensing, using RF Current Transformer (Pearson Coil)
Power	
Range	1.0 to 400.0 Watts RMS
Resolution	0.1 Watts
Accuracy	± 5% Reading or ± 3 Watts (whichever is greater)
Current	
Range	20 to 2500 mA RMS
Resolution	± 1 mA
Accuracy	± 2.5% Reading or ± 15 mA
Limits	
Bandwidth	10 kHz to 10 MHz
Crest Factor	1.4 to 500
Voltage	10,000 V Peak
Main Test Load	
Range	50 to 750 Ω
Resolution	50 Ω
Accuracy	± 1% (DC)
Duty Cycle	(10 SEC ON, 30 SEC OFF)
Auxiliary Test Load	
Fixed	200 Ω
Accuracy	± 1% (DC)
CQM Test Load	
Range	1 to 500 Ω
Resolution	1 Ω
Accuracy	± 2% or ± 2 Ω

Physical	
Enclosure	High Impact Plastic, UL 94 V-0 Face-Lexan, Back Printed
Size	6.30 x 13.50 x 13.40 inches 160.0 x 342.9 x 340.4 mm
Weight	≤ 17.5 Lbs (7.95 kg)
Electrical	
Power Supply	Input: Universal 100-240 VAC, 50-60 hz Output: 9 VDC
Battery	Sealed Lead Acid 6 VDC, 7.2 AH
General	
Display	LCD Graphical 240 x 64 Pixels, Backlight
Ventilation	Variable speed internal fan
Oscilloscope Output	Isolated (uncalibrated), BNC Connector
Setup Memory	EEPROM, All Parameters
Memory Retention	10 years w/o Power
Operating Range	15 to 30 °C (59 to 86 °F)
Storage Range	-20 to 60 °C (-4 to 140 °F)
Humidity Limit	20 to 80% RH, Non-Condensing
Connections	Communications USB, DB9 Loads: 4mm safety jacks



INTERNAL LOAD VALUES NOT EXACTLY WHAT YOU NEED?

The ESU-2300 allows for the use of External or a combination of Internal & External Load Resistors to cover ranges outside the provided Internal Load Range. Setup Parameters allow the user to tell the unit about External Loads. This ensures the continued accurate measurement & display of power.



Optional: External Load Precision Power Resistor
(See Page F for a listing of available values)

← Flip for product pricing - Page F →



Features - ESU-2050 & ESU-2050P

- ◆ True RMS Readings Using DFA™ Technology
- ◆ mV, mV Peak, mA, Crest Factor and Wattage Displays
- ◆ Large Graphical Display with Backlighting & Cursor Selection of Options and Setup of Parameters
- ◆ 1% Measurement Accuracy
- ◆ Digital Data Output Via USB and RS232
- ◆ Digital Calibration - No Pots to Turn
- ◆ Display Contrast is Software Adjustable
- ◆ On-Screen Graphical Representation of Generator Waveform with Scroll & Zoom Capabilities
- ◆ Standard Range Uses 0.1:1 RF Current Transformer
- ◆ Special Low Range Uses 1:1 RF Current Transformer
- ◆ Internally Protected Input Circuitry
- ◆ Capture, Store & Print ESU Generator Output Waveforms with up to 32,768 Discrete Data Points through the Specialized PC Software
- ◆ Internal Data Storage for Three Full ESU Waveform Data Sets
- ◆ Create Customized Load Resistor Table within the Instrument Based Upon the Load Resistors Commonly Used
- ◆ User Selectable Data Display Screens
- ◆ Smallest & Lightest Weight ESU
- ◆ Pulsed Output Waveform Compatible (ESU-2050P Only)

ESU-2050

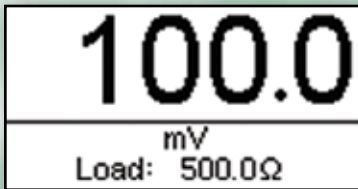
The ESU-2050 ESU Analyzer is the first instrument of its kind on the market. Designed through extensive collaboration with several of the world's leading electrosurgery generator manufacturers (including the worldwide market leader), the ESU-2050 is a highly accurate calibration-quality instrument intended for use by OEM factory technicians and field service engineers, as well as customers who desire to test their ESU generators in the exact same way the medical device manufacturers do. It is the only ESU Analyzer on today's market with a 1% of reading level of accuracy.

DFA™ Technology achieves the high level of accuracy and functionality demanded by ESU manufacturers worldwide, and replaces the Fluke® Model 8920A instrument previously utilized in such applications. The ESU-2050 uses external precision load resistors and an external wide band toroidal current transformer to take industry standard RF current measurements. It can function as a stand-alone meter or in conjunction with our optional PC Utility Software.

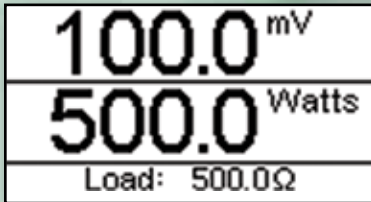
Measurement data, including RMS current, RMS voltage, Peak voltage, Power (watts), and Crest Factor are displayed on a series of user configurable screens. You can even display all of these values on a single screen, including the load resistance. Digitized ESU waveforms with up to 32,768 data points can be stored, displayed on screen, or exported to a PC for analysis. Our companion PC Utility Software will create an Excel® graph of even the most complex output waveforms for viewing.

SCREEN VIEWS

(NOTE: User can select measurement values & locations to be displayed on each screen choosing from RMS Current, RMS Voltage, RMS Power, Peak Voltage & Crest Factor)

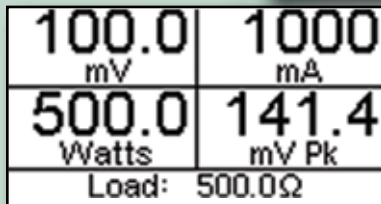
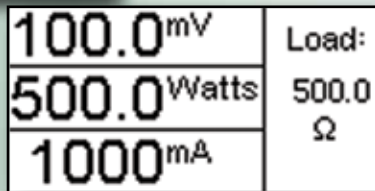


One Display Zone Screen with mV Parameter Selected



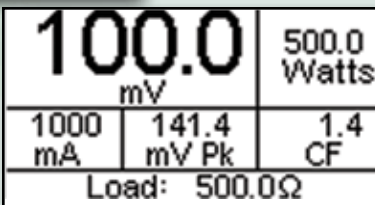
Two Display Zone Screen with mV & Watts Parameters Selected

Three Display Zone Screen with mV, Watts & mA Parameters Selected



Four Display Zone Screen with mV, Watts, mA & mV Peak Parameters Selected

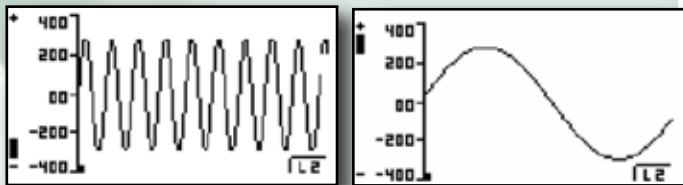
Five Display Zone Screen with mV, Watts, mA, mV Peak & CF Parameters Selected



ESU-2050 Graph Mode Example

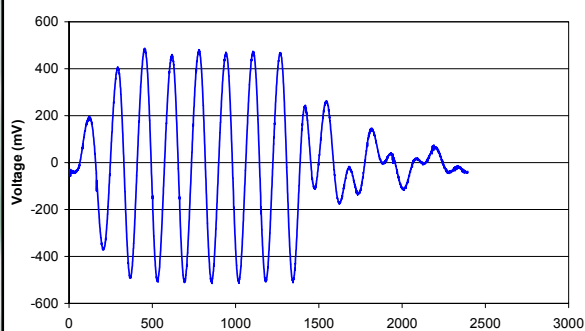
Fully Zoomed Out

Fully Zoomed In



PC Software Waveform Example created from the Excel® graphing function using the over 32,000 discrete datapoints exported from the ESU-2050

Valleylab Force FX Blend Cut Waveform



SPECIFICATIONS

INPUT RANGE	
Voltage (RMS)	2.0 – 700.0 mV RMS
Input Resolution	0.1 mV RMS
Voltage (Peak)	1000.0 mV
Resolution	0.1 mV
Frequency	10 KHz – 10 MHz
Accuracy	1% reading
Maximum Input Voltage	3.3 V p-p Internally Protected

CALCULATED RANGES	
Current (with 0.1:1 CT)	7000 mA RMS
Resolution	1 mA
Current (with 1:1 CT)	700.0 mA RMS
Resolution	0.1 mA
Wattage	10 KHz – 10 MHz
Resolution	0.1 Watt
Crest Factor	1.4 to 500
Resolution	0.1

INPUT IMPEDANCE	
50 Ω	

INPUT COMPATIBILITY	
RF Current Transformer (50ohm)	Pearson Electronics 411 OR 4100 (Typical)
RF Current Transformer Attenuation	0.1: 1 1: 1 User Selectable

DISPLAY	LCD Graphical 128 X 64 Pixels
SETUP MEMORY	EEPROM, All Parameters
MEMORY RETENTION	10 Years w/o Power
OPERATING RANGE	15 to 30 °C (59 to 86 °F)
STORAGE RANGE	-20 to 60 °C (-4 to 140 °F)
CONSTRUCTION	Enclosure – ABS Plastic Face – Lexan, Back Printed
SIZE	3.4" x 9.1" x 8.0" 86.4 x 231.4 x 203.2 mm
WEIGHT	≤ 3 lbs. (1.36 kg)
CONNECTIONS	Input: BNC Output: Serial DB-9 or USB
POWER SUPPLY ADAPTER	Input: Universal 100-240 VAC, 50-60 Hz Output: 6 VDC
POWER CONSUMPTION	ON: less than 150 mA OFF: less than 40 μA
DATA STORAGE (Internal)	3 Sets of 32768 Data Points

The ESU-2050 & ESU-2400 are used and recommended by the world's leading electrosurgery generator manufacturer

Features - ESU-2000A

- ◆ Small & Simple to Use
- ◆ Lightweight
- ◆ 6 Selectable Loads from 50 to 500 ohms
- ◆ No Load Switching Relays
- ◆ Return Contact Monitor Test with 1 ohm Steps
- ◆ RF Power, Current & Leakage Measurement
- ◆ No Batteries or Power Cords
- ◆ Easy-to-Read Color-Coded Meter
- ◆ High Speed Fuse Protects Meter

Accessories Included

- ◆ ESM-1 Switching Module
- ◆ Red, Black & Green Patch Cords
- ◆ Insulated Alligator Clips & Ground adapter
- ◆ Spare Fuse
- ◆ Operator Manual



ESU-2000A

The ESU-2000A ESU Tester is full-featured & versatile. Test modes include RF output power and leakage, measured with a large analog meter. There are different color codes for each range at the input connector and on the meter, making measurements quick & easy. For Return Contact Monitor (CQM, REM, ARM, PSS) testing, we've built in a 0 to 1000 ohm variable resistance with 1 ohm digital resolution. Even more expensive ESU testers generally don't offer this much range or resolution.

To improve reliability and accuracy, the ESU-2000A has no front-panel switches. Instead, the user simply changes the position of our unique ESM-1 Switching Module to select either RF Power or RF Leakage mode. For safety, the module also blocks access to unused input connectors, virtually eliminating worry about improper connections & resultant equipment damage. Plus you won't lose the switching module because it is conveniently stored on the front panel at all times.

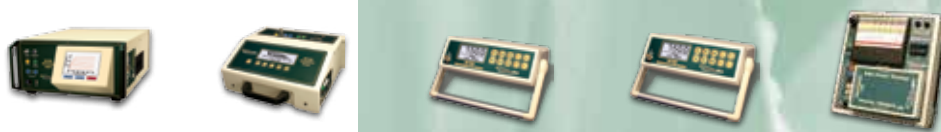
SPECIFICATIONS

RF MEASUREMENT			
RANGE	CURRENT	0 to 1000 mA RMS	
	POWER	0 to 500 W	
ACCURACY	CURRENT	± 2% FS	
	POWER	± 5% FS	
FREQUENCY	0 to 10 MHz		
FUSE	500 mA Fast-Blow FWH-1/2		
OSCILLOSCOPE OUTPUT	OUTPUT	Isolated, Uncalibrated	
	CONNECTION	BNC (50 Ω)	
VARIABLE LOAD	VALUES	50 Ω, 100 Ω, 200 Ω, 300 Ω, 400 Ω 500 Ω	
	TYPE	Non-Inductive	
	ACCURACY	± 2% ± 1 Ω	
	POWER RATING (MAX)	50 Ω	50 W
		100 Ω	100 W
		200 Ω	200 W
		300 Ω	300 W
400 Ω		400 W	
500 Ω	500 W		
DUTY CYCLE	10 seconds on, 20 seconds off		
LEAKAGE LOAD	VALUE	200 Ω	
	TYPE	Non-Inductive	
	ACCURACY	± 2% ± 1 Ω	
	POWER RATING	50 W	
CONNECTIONS	4mm Banana		

RETURN ELECTRODE MONITOR TEST LOAD	
RANGE	0 to 999 Ω
RESOLUTION	1 Ω
ACCURACY	± 3% + 3 Ω
CONNECTIONS	4mm Banana

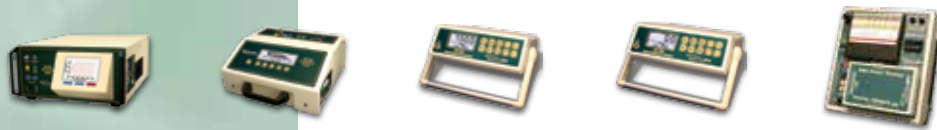
PHYSICAL & ENVIRONMENTAL		
DISPLAY	4-1/2" Analog Meter, Color-coded display (W and mA)	
CONSTRUCTION	ENCLOSURE	ABS Plastic
	FACE PLATE	Back-printed Lexan
SIZE	5.36 x 8.68 x 9.10 Inches (136.1 x 220.5 x 231.1 mm)	
WEIGHT	≤4 Lbs (1.82 kg)	
OPERATING RANGE	15 to 30 °C (59 to 86 °F) 20 to 80% RH, Non-Condensing	
STORAGE RANGE	-40 to 60 °C (-40 to 140 °F)	

Comparison Chart



Models:	ESU-2400/H	ESU-2300	ESU-2050	ESU-2050P	ESU-2000A
Industry-standard RF current measurement	Yes	Yes	Yes	Yes	Yes
Test Loads	1 to 6400 Ohms, 1 ohm increments, internal load bank	50 to 750 Ohms, 50 ohm increments, internal load bank	Requires external precision non-inductive test loads, 1-9999 Ohms compatible	Requires external precision non-inductive test loads, 1-9999 Ohms compatible	50, 100, 200, 300, 400, 500 Ohms
RF Current Range	<2 ma to 7,000 mA	20 ma to 2,500 mA	<2 ma to 7,000 mA	<2 ma to 7000 mA	0 - 1000 mA
RF Power (Watts RMS) Range	To 999.9 Watts	To 400 Watts	To 999.9 Watts	To 999.9 Watts	To 500 Watts
Bandwidth	50 kHz to 10 MHz	10 kHz to 10 MHz	10 kHz to 10 MHz	10 kHz to 10 MHz	0 - 10 MHz
Display	QVGA Color Touch Screen	260 x 64 pixel LCD Graphical Display with Backlight	128 X 64 Pixels LCD Graphical with Backlight	128 X 64 Pixels LCD Graphical with Backlight	4.5 inch Analog Meter
External Test Load Compatible	Yes, can use internal + external or external only, or internal only	Yes, can use internal + external or external only, or internal only	Yes, requires external test loads	Yes, requires external test loads	Yes
External Current Transformer Required	No	No	Yes	Yes	No
Continuous Output Waveform Compatibility	Yes	Yes	Yes	Yes	Yes
Pulse Output Waveforms Compatibility	Yes	No	No	Yes	Yes
Multiple Pulsed Waveforms Compatibility	2400H Only	No	No	No	No
Measurement accuracy	1 % of reading on RMS Current	2.5 % of reading on RMS Current, 5 % for reading RMS Power	1% reading, > 50 mV, up to 1 MHz, 3% reading, > 50 mV, 1 to 10 MHz	1% reading, > 50 mV, up to 1 MHz, 3% reading, > 50 mV, 1 to 10 MHz	± 5% of Full Scale
Calibration level accuracy	Yes	No	Yes	Yes	No
Crest Factor Range	1.4 to 500	1.4 to 500	1.4 to 500	1.4 to 500	N/A
Covidien/Valleylab Force Triad Calibration Procedure Compatibility	Yes	No	Yes	Yes	No
Covidien/Valleylab Ligasure Generator Calibration Compatibility	Yes	No	Yes	Yes	No
Number of parameters measured/displayed	15	5	15	15	x 2
Internal REM/ARM/CQM Testing	Yes, 500 ohm load adjustable in 1 ohm increments	Yes, 500 ohm load adjustable in 1 ohm increments	No, requires external CQM Test Box (CQM-2000)	No, requires external CQM Test Box (CQM-2000)	Yes
Automated power-load curves	Yes, "x" to "y" Ohms in "z" ohm increments OR by user-defined load table values, multiple power levels @ each load possible	No	No	No	No

Comparison Chart



ESU ANALYZER SERIES

Models:	ESU-2400/H	ESU-2300	ESU-2050	ESU-2050P	ESU-2000A
Auto-activation of ESU generator for power load curve testing	Yes	No	No	No	No
User definable testing autosequences	Yes, unlimited steps with unlimited ascii text description per step, embedded measurement capability within sequence	No	No	No	No
Communication ports	USB, RS232, Ethernet, PS/2	USB, RS232	USB, RS232	USB, RS232	No
Capture & Store RF Waveform	Yes	No	Yes	Yes	No
RF Leakage Current Measurement	Yes	Yes	Yes, with external 200 ohm test load and CT	Yes, with external 200 ohm test load and CT	Yes
Remote control compatibility of ESU generator	Yes	No	No	No	No
User definable data screens	Yes	Yes	Yes	Yes	No
FLASH field upgrade of firmware	Yes	Yes	Yes	Yes	No
Test load temperature monitor	Yes	Yes	No	No	No
Oscilloscope Output Jack	Yes	Yes	No	No	Yes
User-adjustable signal averaging	Yes	Yes	Yes	Yes	No
Test form printout	Yes	No	No	No	No
Browse Internet	Yes	No	No	No	No
Battery Operation	No	Yes	No	No	N/A
External keyboard & mouse compatible	Yes	No	No	No	No
Fan Cooling of Internal Load Resistor Bank	Yes	Yes	No	No	No
Size	7.8 x 15.0 x 22.5 inches 198.1 x 381 x 571.5 mm	6.30 x 13.50 x 13.40 inches 160.0 x 342.9 x 340.4 mm	3.4 x 9.1 x 8.0 inches 86.4 x 231.4 x 203.2 mm	3.4 x 9.1 x 8.0 inches 86.4 x 231.4 x 203.2 mm	5.36 x 8.68 x 9.10 inches 136.1 x 220.5 x 231.1 mm
Weight	31 lbs. (14 kg)	≤ 17.5 lbs (7.95 kg)	≤ 3 lbs. (1.36 kg)	≤ 3 lbs. (1.36 kg)	≤ 4 lbs (1.82 kg)

← Flip for product pricing - Page E-F →

Pressure Meters



Features - DPM 2300 Series

- ◆ Large Graphics Display With Cursor Selection Of Options And Setup
- ◆ High Resolution 24 Bit Measurement
- ◆ $\pm 0.05\%$ FS Pressure Accuracy
- ◆ Standard Pressure Scales Include 13 Different Engineering Unit Ranges
(PSI, mmHg@0 °C, mmHg@20 °C, inHg@0 °C, inHg@20 °C, cmH₂O@20 °C, inH₂O@4 °C, inH₂O@20 °C, inH₂O@60 °F, kg/cm², kPa, mBar, Bar)
- ◆ MAX And MIN Pressure Value Capture And Storage
- ◆ Digital Calibration & Zero Adjust
- ◆ Selectable Display Options & Digit Sizes
- ◆ Battery Life Display (0 To 100%)
- ◆ Programmable Digital Averaging Filter
- ◆ Display Contrast Is Software Adjustable
- ◆ Digital Zero Adjustment

DPM-2302 Adds:

- ◆ RS232 Serial Communications

Second Pressure Sensor Adds:

- ◆ Independent Pressure Channel
- ◆ Separate And Combined Display Option

Temperature Option Adds:

- ◆ YSI 700 or 100 Ω RTD Temperature Probe Interface
- ◆ -20.0 to 100.0 °C (-4.0 to 212.0 °F) Range
- ◆ $\pm 0.5\%$ FS Accuracy

Analog Output Option Adds:

- ◆ DC Output Proportional to the Displayed Pressure or Temperature
- ◆ $\pm 0.1\%$ FS Output Accuracy





DPM-2300

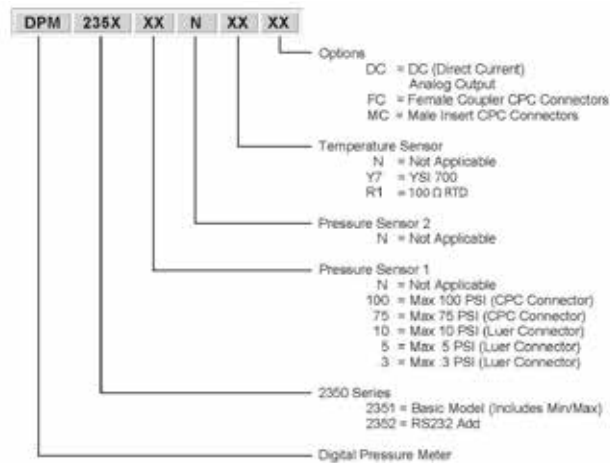
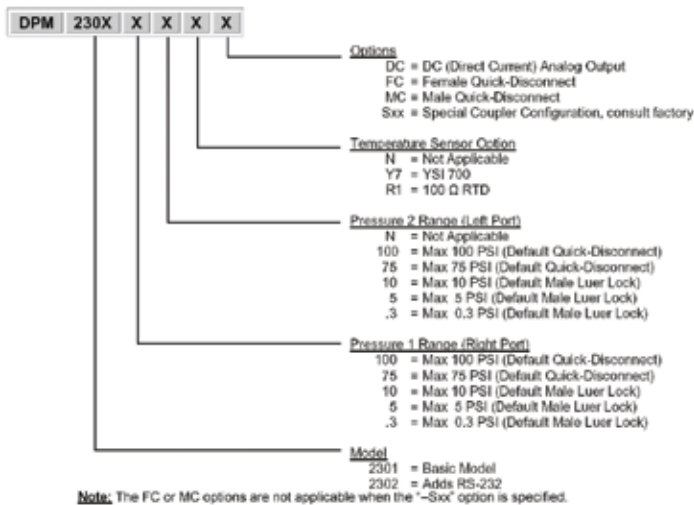
The DPM-2300 Series is a microprocessor based, High Precision, High Resolution Digital Pressure Meter Family. These meters measure both gas and liquid pressures and provide multiple engineering unit displays for the results. The unit may have one or two pressure sensors and an optional temperature sensor input to measure pressure and temperature all in one meter.

There are five standard pressure ranges. Models are available with any combination of ranges. The DPM-2350 Subset provides a differential pressure option using a single sensor in any of the five ranges. Optional features allow the addition of RS232 communication, Temperature measurement and DC Analog Outputs.

SPECIFICATIONS

PRESSURE MEASUREMENT (GAUGE)			
RANGE	100 PSI SENSOR	-13.5 TO 100.0 PSI	
	75 PSI SENSOR	-13.5 TO 75.0 PSI	
	10 PSI SENSOR	-10.0 TO 10.0 PSI	
	5 PSI SENSOR	-5.0 TO 5.0 PSI	
	0.3 PSI SENSOR	-0.3 TO 0.3 PSI	
RESOLUTION	100 PSI SENSOR	0.001 PSI	
	75 PSI SENSOR	0.001 PSI	
	10 PSI SENSOR	0.0001 PSI	
	5 PSI SENSOR	0.0001 PSI	
	0.3 PSI SENSOR	0.00001 PSI	
MAXIMUM OVERPRESSURE	100 PSI SENSOR	200 PSI	
	75 PSI SENSOR	200 PSI	
	10 PSI SENSOR	45 PSI	
	5 PSI SENSOR	15 PSI	
	0.3 PSI SENSOR	5 PSI	
ACCURACY	± 0.05% FS		
DIGITAL FILTER	0 to 10 seconds, Selectable		
COMPATIBLE MEDIA	Only non-corrosive, non-ionic, or otherwise pure fluids and/or gases that are compatible with sensor materials including glass, silicon, ceramic, epoxy, RTV, gold, aluminum and nickel.		
CONNECTIONS	See Model Number Breakdown		
PHYSICAL & ENVIRONMENTAL			
DISPLAY	128 X 64 Pixels Non-Backlit Graphical LCD		
CONSTRUCTION	ENCLOSURE	ABS Plastic	
	OVERLAY	Back-printed Lexan	
SIZE	7.69 x 3.97 x 1.80 Inches (195.3 x 100.8 x 45.7 mm)		
WEIGHT	< 1 Lbs (0.45 kg)		
OPERATING RANGE	15 to 30 °C (59 to 86 °F)		
STORAGE RANGE	-40 to 60 °C (-40 to 140 °F)		
ELECTRICAL & MISC.			
BATTERY	9V Alkaline Battery (ANSI/NEDA 1604A or equivalent)		
BATTERY ELIMINATOR	9 VDC, 200 mA		
	 BC20-21110 BATTERY ELIMINATOR (UNIVERSAL)		
POWER CONSUMPTION	ON	< 35 mA	
	OFF	< 40 µA	
BATTERY LIFE	CONTINUOUS	80 hours	
	OFF	1 year	
RS-232 COMMUNICATIONS	BAUD	115200	
	DATA BITS	8	
	START BITS	1	
	STOP BITS	1	
	PARITY	None	
	HANDSHAKING	None	
	CONNECTIONS	Seven (7) pin Mini-DIN Receptacle Pinout:  NOTE: As Viewed from Unit Exterior	

MODEL SUMMARY



SPECIAL MODEL:
 Recommended model for use with TSI
 Certifier-FA Respiratory Vent Test System:
DPM-235175NNFC
 or **DPM-23017510NFC**



**DPM-2350
w/Female CPC**

Digital Pressure Meter Series

Pressure Meters



Features - DPM-2200 Series

- ◆ Single or Dual Pressure Sensors
- ◆ Large Graphics Display with Cursor Selection of Options & Parameters Setup
- ◆ $\pm 0.05\%$ FS Pressure Accuracy
- ◆ 16 Bit Measurement
- ◆ Standard Pressure Scales Include 13 Different Engineering Unit Ranges
(PSI, mmHg@0 °C, mmHg@20 °C, inHg@0 °C, inHg@20 °C, cmH₂O@20 °C, inH₂O@4 °C, inH₂O@20 °C, inH₂O@60 °F, kg/cm², kPa, mBar, Bar)
- ◆ Digital Calibration & Zero Adjust
- ◆ Selectable Display Options & Digit Sizes
- ◆ Battery Life Display (0 to 100%)
- ◆ Programmable Digital Filter
- ◆ Display Contrast is Software Adjustable
- ◆ Flash Programmable, Field Upgradeable
- ◆ Optional DC or High Frequency (up to 100 Hz Cycle Rate) Outputs
- ◆ Pressure & Vacuum
- ◆ Liquids & Gases

DPM-2202 Adds:

- ◆ Min/Max Pressure Value Capture and Storage
- ◆ RS232 Serial Communications

Second Pressure Sensor Adds:

- ◆ Independent Pressure Channel
- ◆ Separate & Combined Display Option

Temperature Option Adds:

- ◆ YSI 700 or 100 Ω RTD Temperature Probe Interface
- ◆ -20.0 to 100.0 °C (-4.0 to 212.0 °F) Range
- ◆ $\pm 0.5\%$ FS Accuracy

Analog Output Option Adds:

- ◆ DC Output Proportional to the Displayed Pressure or Temperature
- ◆ $\pm 0.1\%$ FS Output Accuracy




DPM-2200

The DPM-2200 Series is a Microprocessor-based, High Precision, Digital Pressure Meter Family. They measure both gas and liquid pressures and provide multiple engineering unit displays for the results. The unit may have one or two pressure sensors and an optional temperature sensor input to measure pressure and temperature all in one meter. An analog output option is also available.

There are five standard pressure ranges. Models are available with any combination of ranges. The DPM-2250 Subset provides a differential pressure option using a single sensor in any of the five ranges. Optional features allow the addition of RS232 communication, Temperature measurement and DC Analog Outputs.

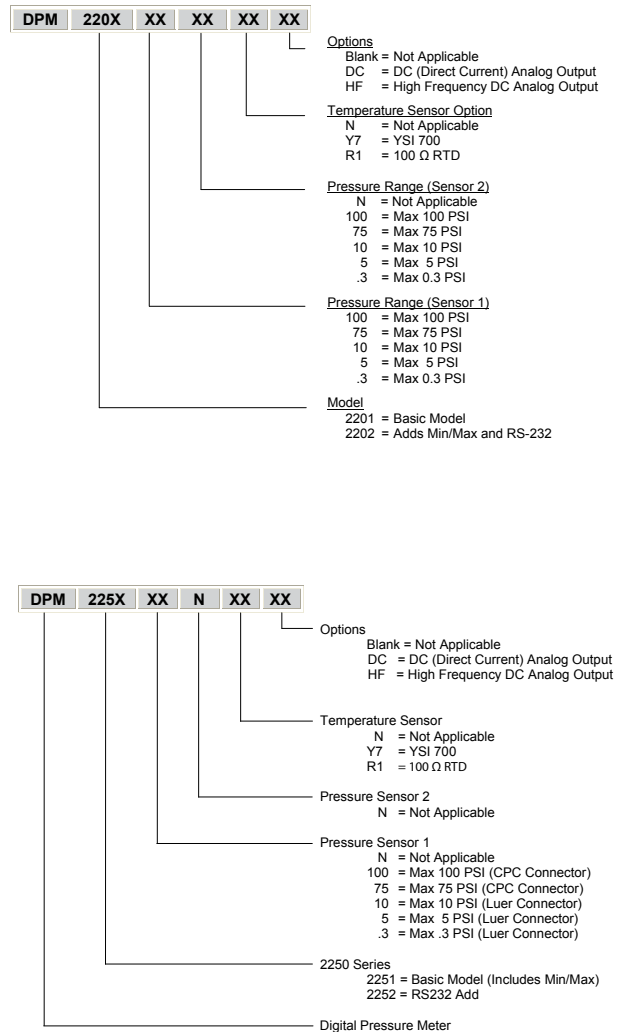
SPECIFICATIONS

PRESSURE MEASUREMENT (GAUGE)		
RANGE	100 PSI SENSOR	-13.5 TO 100.0 PSI
	75 PSI SENSOR	-13.5 TO 75.0 PSI
	10 PSI SENSOR	-10.0 TO 10.0 PSI
	5 PSI SENSOR	-5.0 TO 5.0 PSI
	0.3 PSI SENSOR	-0.3 TO 0.3 PSI
RESOLUTION	100 PSI SENSOR	0.01 PSI
	75 PSI SENSOR	0.01 PSI
	10 PSI SENSOR	0.001 PSI
	5 PSI SENSOR	0.001 PSI
	0.3 PSI SENSOR	0.0001 PSI
ACCURACY	± 0.05% FS	
DIGITAL FILTER	0 to 10 seconds, Selectable	
COMPATIBLE MEDIA	Only non-corrosive, non-ionic, or otherwise pure fluids and/or gases that are compatible with sensor materials including glass, silicon, ceramic, epoxy, RTV, gold, aluminum and nickel.	
CONNECTIONS	Male Luer Coupler	
PHYSICAL & ENVIRONMENTAL		
DISPLAY	128 X 64 Pixels Non-Backlit Graphical LCD	
CONSTRUCTION	ENCLOSURE	ABS Plastic
	OVERLAY	Back-printed Lexan
SIZE	7.69 x 3.97 x 1.80 Inches (195.3 x 100.8 x 45.7 mm)	
WEIGHT	< 1 lbs (0.45 kg)	
OPERATING RANGE	15 to 30 °C (59 to 86 °F)	
STORAGE RANGE	-40 to 60 °C (-40 to 140 °F)	
ELECTRICAL & MISC.		
BATTERY	9V Alkaline Battery (ANSI/NEDA 1604A or equivalent)	
BATTERY ELIMINATOR	9 VDC, 200 mA	
	BC20-21110 BATTERY ELIMINATOR (UNIVERSAL)	
POWER CONSUMPTION	ON	< 35 mA
	OFF	< 40 µA
BATTERY LIFE	CONTINUOUS	80 hours
	OFF	1 year
RS-232 COMMUNICATIONS	BAUD	115200
	DATA BITS	8
	START BITS	1
	STOP BITS	1
	PARITY	None
	HANDSHAKING	None
	CONNECTIONS	Seven (7) pin Mini-DIN Receptacle Pinout: 

DPM-2250



MODEL SUMMARY



OPTIONAL ACCESSORIES FOR DPM SERIES

BC20 - 21110	BATTERY ELIMINATOR (UNIVERSAL)
BC20 - 41361	RS232 COMMUNICATION CABLE, USB(A/M) TO MINI DIN MALE
BC20 - 30106	BC BIOMEDICAL SMALL SOFT SIDED CARRYING CASE
BC20 - 01005	UNIVERSAL PRESSURE ADAPTER KIT
BC20 - 01006	YSI TEMPERATURE PROBE
BC20 - 01008	RTD (100 Ω) TEMPERATURE PROBE

40

Digital Pressure Meter Series

Features - DPM-2000 Series

- ◆ Pressure Ranges:
 - 13.50 to 100.00 PSI
 - 701 to 5190 mmHg @ 20 °C
 - 951 to 7043 cmH₂O @ 20 °C
 - 374 to 2773 inH₂O @ 20 °C
- ◆ ± 0.1% FS Pressure Accuracy
- ◆ 5 Digit LCD Display
- ◆ Programmable Digital Filter
- ◆ Digital Calibration & Zero Adjust
- ◆ Male Luer Connector
- ◆ Battery Life Display (0 to 100%)
- ◆ Liquids & Gases

DPM-2001PLUS Adds:

- ◆ Min/Max Value Capture
- ◆ RS232 Serial Communications

DPM-2100 Adds:

- ◆ YSI-700 Temperature Probe Interface
- ◆ 0.0 to 100.0 °C (32.0 to 212.0 °F) Range
- ◆ ± 0.5% FS Accuracy



DPM-2001PLUS

The DPM-2000 Series is a Microprocessor based Family of Meters that offers not only positive and negative pressure sensing of compatible liquids and gases, but also has models with Temperature and RS232.

The DPM-2001 is the base model. The DPM-2001PLUS adds a "Min/Max" feature plus a RS232 port. The top-of-the-line DPM-2100 is a pressure/temperature meter. It has all the features of the PLUS model and also includes a YSI 700 temperature probe interface.

Each model has a battery life display (0 to 100%), Software adjustable LCD contrast, digital calibration (no pots to turn), .1% of full scale accuracy, -13.50 to 100.00 PSI range, digital zero adjust and four pressure scales: PSI, inH₂O, cmH₂O and mmHg.

SPECIFICATIONS

PRESSURE		
RANGE	-13.50 to 100.00 PSI -701 to 5190 mmHg @ 20 °C -374 to 2773 inH2O @ 20 °C -951 to 7043 cmH2O @ 20 °C	
RESOLUTION	0.01 PSI 1 mmHg @ 20 °C 1 inH2O @ 20 °C 1 cmH2O @ 20 °C	
MAXIMUM OVERPRESSURE	200 PSI	
ACCURACY	± 0.1% FS	
DIGITAL FILTER	1 – 255 samples	
COMPATIBLE MEDIA	Only non-corrosive, non-ionic, or otherwise pure fluids and/or gases that are compatible with sensor materials including glass, silicon, ceramic, epoxy, RTV, gold, aluminum and nickel.	
CONNECTIONS	Male Luer Coupler	
PHYSICAL & ENVIRONMENTAL		
DISPLAY	5 Digit, 7-Segment Non-Backlit LCD	
CONSTRUCTION	ENCLOSURE ABS Plastic	
	OVERLAY Lexan, Back Printed	
MEMORY	SETUP EEPROM, All Parameters	
	RETENTION 10 Years w/o Power	
SIZE	7.69 x 3.97 x 1.82 Inches (195.3 x 100.8 x 46.2 mm)	
WEIGHT	≤ 1 Lbs (0.45 kg)	
OPERATING RANGE	0 to 50 °C (32 to 122 °F)	
STORAGE RANGE	-40 to 60 °C (-40 to 140 °F)	
ELECTRICAL & MISC.		
BATTERY	9V Alkaline Battery (ANSI/NEDA 1604A or equivalent)	
BATTERY ELIMINATOR	9 VDC, 200 mA	
	BC20-21110 BATTERY ELIMINATOR (UNIVERSAL)	
POWER CONSUMPTION	ON < 15 mA	
	OFF < 40 µA	
BATTERY LIFE	CONTINUOUS 80 hours	
	OFF 1 year	
RS-232 COMMUNICATIONS	BAUD 115200	
	DATA BITS 8	
	START BITS 1	
	STOP BITS 1	
	PARITY None	
	HANDSHAKING None	
	CONNECTIONS	1/8 Stereo Receptacle for use with BC20-21102 RS-232 Cable

MODEL SUMMARY

BC Model	Description
DPM-2001	Basic Unit
DPM-2001PLUS	Basic Unit + Capture and RS232
DPM-2100	Basic Unit + Capture, RS232 and Temp

Optional Accessories

BC20 - 21110	Battery Eliminator (Universal)
BC20 - 21102	RS232 Communication Cable
BC20 - 30106	Soft Carrying Case
BC20 - 01005	Universal Adapter Kit



DPM-2001



DPM-2100

Features - FingerSims™

- ◆ Easy to Use SpO₂ Simulator
- ◆ Quick Testing of Pulse Oximetry Systems including Sensors
- ◆ 80, 90 & 97% Saturation Levels
- ◆ Inexpensive & Accurate

Features - MSP-2100

- ◆ Accepts the FingerSims™ to Provide SpO₂ Outputs
- ◆ Pulse Synchronized with PS-2100, PS-2200 & NIBP-1000 Series Products via Aux Port
- ◆ Powered via Aux Port

Features - SPO-2000

- ◆ Accepts the FingerSims™ to Provide SpO₂ Outputs
- ◆ 30, 60, 90, 120, 150 & 180 BPM Pulse Rates
- ◆ External AC Adapter
- ◆ Compact & Cost-Effective
- ◆ Maintenance Free



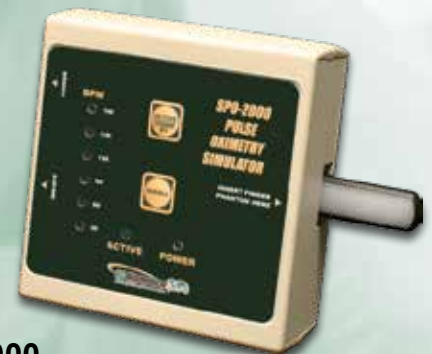
**FingerSims™
Replacement Set
FS-1000RS**

The FingerSims™ tests your SpO₂ monitor and finger sensor as a system and works very similar to a human finger, providing for variable absorption and reflectance of visible red and infrared light. The dye-based technology of the FingerSims™ is a proven simulation technique for generating accurate SpO₂ saturation levels. Plus FingerSims™ work with any style Pulse Oximetry Finger Sensor. The FingerSims™ provide SpO₂ outputs of 80, 90 & 97%. Simply push on the FingerSims™ to generate a “pulse” or include a calibrated pulse rate by adding the SPO-2000 or the MSP-2100 Pulse Oximetry Module.



**MSP-2100
with FingerSims™**

The MSP-2100 can plug into the Auxiliary port of BC Biomedical's PS-2100, PS-2200 & the NIBP-1000 Series providing a calibrated pulse rate. *(FingerSims™ Required, but Not Included.)*



**SPO-2000
with FingerSims™**

The SPO-2000 is a stand-alone device that provides a calibrated pulse rate for the FingerSims™. This allows the FingerSims™ to be used as a hands-free test system. *(FingerSims™ Required, but Not Included.)*



**FingerSims™ Starter Kit
FS-1000-SK**

FINGERSIMS™ SPECIFICATIONS

Saturation Nominal Values	80,90 & 97%
<i>These are the nominal Red-to-Infrared Ratios (AC) @ 72.5 F & 660 nM/910 nM</i>	
Light Absorption	Infrared: 10 to 40 dB Red: 15 to 40 dB
Typical Infrared Percent Modulation when Squeezed	0 to 5%
Long Term Storage Temp Range	32 to 104 °F
Operating Temp.	65 to 90 °F

MSP-2100 SPECIFICATIONS

Accuracy	±1 BPM
Power	Aux Port
Weight	≤ 1 Lbs (0.45 kg)
Size	2.3 x 3.6 x 1.5 Inches

SPO-2000 SPECIFICATIONS

Accuracy(Rate)	± 1%
Power	AC Adapter
Weight	≤ 1 Lbs (0.45 kg)
Size	5.2 x 5.2 x 2.5 Inches (132.1 x 132.1 x 63.5 mm)

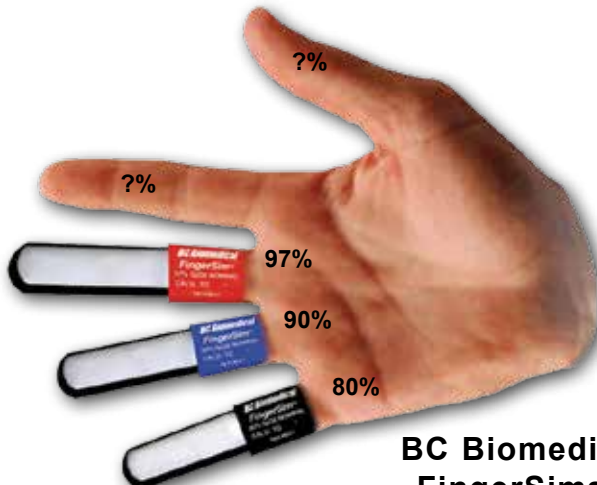


NIBP-1010 with MSP-2100 & FingerSims™



PS-2110 with MSP-2100 & FingerSims™

Wouldn't it be nice to have calibrated fingers?



**BC Biomedical
FingerSims™**

Features - IPA-1000 Series

- ◆ Easy to Use
- ◆ Easy to Clean
- ◆ Simultaneous Operation of Two Chambers
- ◆ Large Graphics Display with Cursor Selection of Options & Setup of Parameters
- ◆ Auto Chamber Recognition
- ◆ 2 Chamber Sizes (3.5 & 35 mL)
- ◆ Out of Sequence Sensing
- ◆ Battery Display (0 to 100%)
- ◆ Similar Function to Dynatech Nevada Model 404A
- ◆ Ranges 0 to 999.9 mL/hr & 0 to 9999 mL/hr
- ◆ $\pm 1\%$ of Reading Flow Accuracy
- ◆ Digital Calibration – No Pots to Turn
- ◆ Software Adjustable Contrast
- ◆ Replaceable Tubes
- ◆ Sealed Level Sensors
- ◆ Programmable End of Test Audio
- ◆ Programmable Auto or Manual Test Start

Optional

- ◆ Battery Eliminator



The IPA-1000 Infusion Pump Analyzer Family is designed to test the flow rates of intravenous infusion pumps to ensure their correct operation. It is able to test up to two pumps simultaneously by the volumetric method in milliliters per hour. All tests are controlled by a Microprocessor, which calculates and displays the results.

The fluid path is unobstructed, making them easy to clean. The tubes are plastic, not glass so they are rugged. The cables and chambers are interchangeable. The unit auto-identifies each chamber when it is plugged in. The chamber calibration is stored electronically in each chamber, so all units are interchangeable. This unit is designed to be tough, simple, portable & very user friendly.

MODEL SUMMARY

BC Model	Description
BC10-03103	IPA-1000, (1) 3.5 mL Chamber, (1) Interconnect cable
BC10-03104	IPA-1000, (1) 35 mL Chamber, (1) Interconnect cable
BC10-03105	IPA-1000, (2) 3.5 mL Chambers, (2) Interconnect cables
BC10-03106	IPA-1000, (2) 35 mL Chambers, (2) Interconnect cables
BC10-03107	IPA-1000, (1) 3.5 mL Chamber, (1) 35 mL Chamber, (2) Interconnect cables

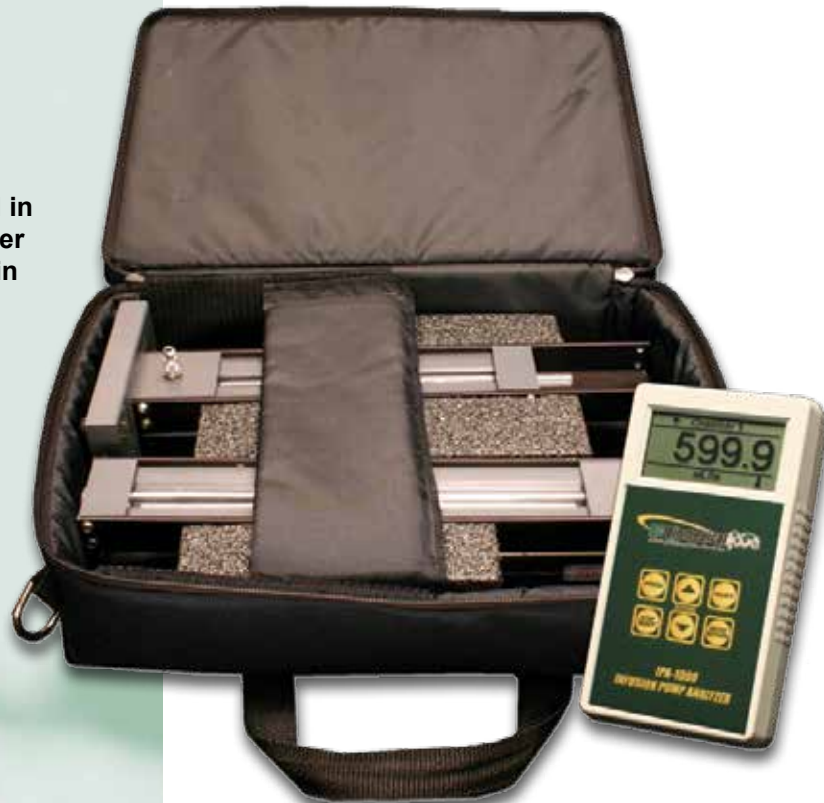
Individual Components

IPA-1000	Infusion Pump Analyzer Base Unit
MC3.5-1000	3.5 mL Chamber
MC35-1000	35 mL Chamber

Optional Accessories

BC20-30109	Soft Carrying Case
BC20-40607	IPA-1000 Interconnect Cable
BC20-21110	Battery Eliminator (Universal)

Optional Soft Carrying Case
shown with Chambers mounted in
shock-resistant inserts. Analyzer
& Accessories may be stored in
upper compartment.



SPECIFICATIONS

Flow Rate Tests

- ◆ Performs two independent tests simultaneously
- ◆ Controls tests automatically, starting, stopping & resetting according to the position of fluid in chamber
- ◆ Ranges: Automatically selected when chamber is plugged in 0-999.9 mL/hr with 3.5 mL chamber 0-9999 mL/hr with 35 mL chamber
- ◆ Accuracy: Volumetric chamber: 3.5 or 35 mL(nominal)
Overall: $\pm 1\%$ of reading ± 1 digit

Display

- ◆ Graphic LCD, 128 X 64 pixel

Power Requirements

- ◆ 9V Alkaline
- ◆ Optional AC adapter

Ultrasound Leakage Tester



Features - ULT-2000 Series

- ◆ Tests the Upper & Lower Leakage Current Limits per Ultrasound Mfr. Specifications
- ◆ Range 0.5 to 500 μ A - Designed to Meet Mfr. Transducer Specifications
- ◆ Large Graphic Display with Backlighting Allows Easy Selection of Options & Setup of Parameters
- ◆ User-Selectable Challenge (Test) Voltage (90 to 275 VAC) & Frequency (50 or 60 Hz)
- ◆ User-Selectable Test Limits
- ◆ Programmable Test Limits Based on Ultrasound Transducer Mfr. & Type
- ◆ $\pm 1\%$ F.S. Range Accuracy
- ◆ Auto Ranging for Enhanced Accuracy Over Entire Range
- ◆ Single Button Press for Full System Test
- ◆ Selectable Pass/Fail or Numerical Test Results
- ◆ User-Selectable Display Options
- ◆ Programmable Backlight Timer
- ◆ Flash Programmable, Field Upgradeable
- ◆ Compatible with Dale Technology® & Fluke Biomedical® Adapters & Probes
- ◆ RS232 Interface
- ◆ PC Utility Software for Configuration Setup & Remote Control
- ◆ Test Results Printable w/Optional Printer
- ◆ On-Board Clock & Calendar Function for Date/Time Stamp of Test Records
- ◆ On-Board Storage for up to 99 Test Records
- ◆ Meter Mode
- ◆ Audio-Visual Test Status Indication

Are You IAC
Section 2.2.3B
Compliant?



ULT-2000

The ULT-2000 Series is specifically designed to test the electrical safety of all types of diagnostic ultrasound transducers, totally independent of the ultrasound machines on which they are typically used. Although the ULT-2000 can be used on virtually any type of ultrasound transducer, it is especially recommended in the testing of TEE (Transesophageal Echocardiography) transducers prior to each use; as recommended by many TEE ultrasound device manufacturers. The ULT-2000 tests the integrity of the outer insulation barrier of the transducer as well as the capacitive leakage currents that exist.

The ULT-2000 Series is the most advanced instrument of its kind on the market today and adds a totally new dimension to diagnostic ultrasound transducer electrical safety testing. With features and functionality that far surpasses competitive products from other manufacturers, the ULT-2000 is easy to set up and use. Operating modes include a simple PASS/FAIL mode as well as a QUANTITATIVE mode that offers actual readings. You can print test results to an optional printer.

Compatibility with Dale Technology® DALE800, Fluke Biomedical® ULT800 adapters and Dual Conductivity Probes allow you to upgrade to the very latest technology platform, while safeguarding your prior investment in adapters and probes. A wide variety of BC Biomedical adapters and accessories are available.

1-888-223-6763 - bcgroupintl.com

SCREEN VIEWS

Typical Passing Results Display

Test Procedure:
 SOURCE TEST to verify voltage used during test.
 CIRCUIT TEST to verify measurement circuitry.
 BATH CONDUCTIVITY TEST to validate cleaning solution.
 PROBE LEAKAGE TEST to measure the leakage current of the DUT.

Progress Indicator

Test Measurements

```

Full Test  Sonosite: TEE
Source Voltage 119V 
Circuit Test 96  $\mu$ A 
Bath Cond 252  $\mu$ A 
Probe Leakage 51  $\mu$ A 
    
```

Typical Passing Results Display Choices

Quantitative Mode

```

Full Test  Sonosite: TEE
Source Voltage 119V 
Circuit Test 97  $\mu$ A 
Bath Cond 252  $\mu$ A 
Probe Leakage 51  $\mu$ A 
TEST PASSED
    
```

Pass/Fail Mode

```

Full Test  Sonosite: HST
Source Voltage Test 
Circuit Test 
Bath Conductivity Test 
Probe Leakage Test 
TEST PASSED
    
```

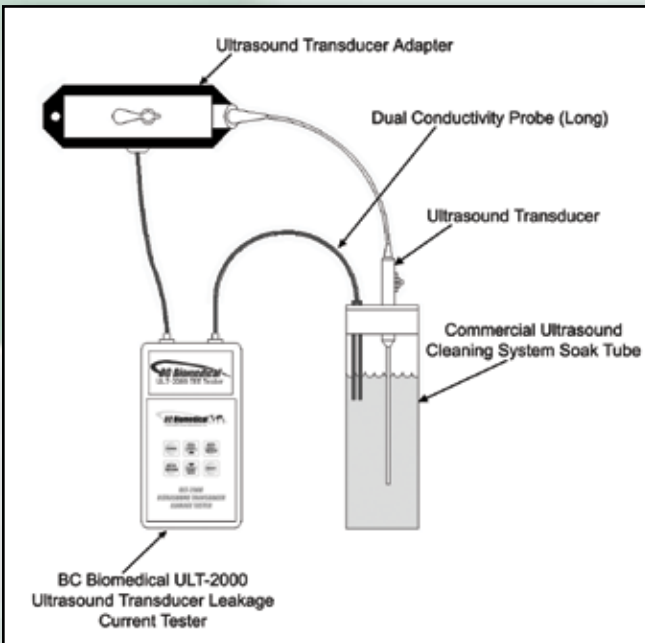
Typical Failed Results Display

```

Full Test  Sonosite: TEE
TEST FAILED 
Leakage too High 
Limit: 100  $\mu$ A 
Reading: 107  $\mu$ A 
    
```

Quantitative Mode & Pass/Fail Mode

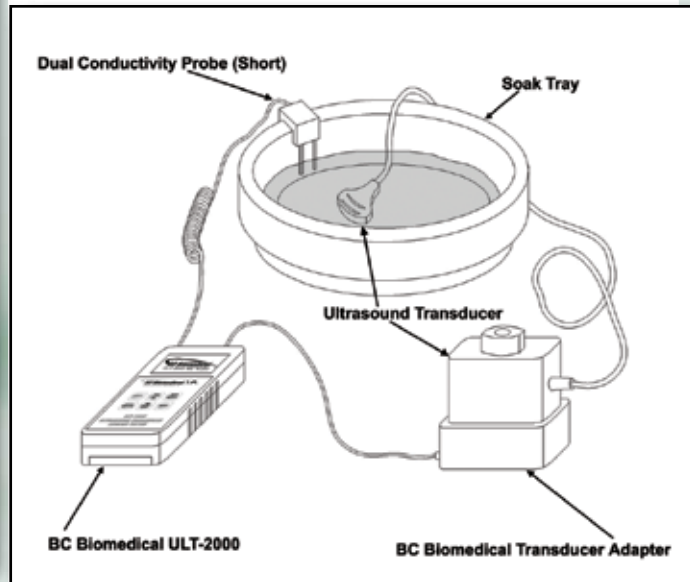
Test your TEE Transducers While They are being Disinfected in a Commercial Cleaner



SPECIFICATIONS

Source Voltage	90 to 275 VAC, \pm 1% FS
Leakage Current	0.50 to 10.00 μ A, \pm 0.5 μ A 10 to 250 μ A, \pm 1% FS 250 to 500 μ A, \pm 1% FS
Conductivity Current	0.5 to 500 μ A, \pm 1% FS
Display	LCD Graphical w/Backlighting 128 x 64 Pixels
Setup Memory	EEPROM, All Parameters
Memory Retention	10 years w/o Power
Operating Range	15 to 30 °C (59 to 86 °F)
Storage Range	-40 to 60 °C (-40 to 140 °F)
Construction	Enclosure - ABS Plastic Face - Lexan, Back Printed
Size	7.27 x 3.97 x 1.80 Inches (184.7 x 100.8 x 45.7 mm)
Weight	\leq 1.1 lbs (0.68 kg)
Power Consumption	On: < 300 mA Off: < 250 μ A
Battery	9V Lithium (ANSI/NEDA 1604LC or equivalent)
Battery Life	Continuous: > 100 Full Tests (Note: Backlight set to OFF) OFF: > 1 Year
Battery Eliminator (Optional)	BC20-21110 Battery Eliminator (Universal)

Typical Test Setup for Testing Your Ultrasound Transducers with a Transducer-Specific Adapter & a Soak Tray.








BC20-42300
Optional
ULT-2000 Printer



ULT-PA-29 Adapter

Flip for product pricing - Page C









Ultrasound Transducer Adapter Cross Reference

BC Adapter Part #	Manufacturer	Transducer Compatibility	Ultrasound Platform	Connector Key
ULT-PA-10	Siemens/ Acuson	V5M (TEE), V7M (TEE), EV8-C4, etc.	Sequoia	Micro-pinless (PC board) 
ULT-PA-11	SonoSite	ICT7-4, ITC8-5, C60, etc.	180/180+, Titan	Micro-pinless (PC board) 
ULT-PA-12	Siemens	6.5EV13, EC9-4, etc.	Call for Details	260-pin ITT Cannon ZIF 
ULT-PA-13	Siemens/ Acuson	Acuson/Siemens 156-pin and V510B Transducers, and ATL UM4, UM9 and ATL 5MHz Bi Plane	128XP	156-pin ITT Cannon ZIF
ULT-PA-14	Philips/ATL	HP/Agilent/Philips 21311A, 21369A, 21378A, 21381A Transducers	Philips/HP 4500, Sonos 5500/7500	260-pin ITT Cannon ZIF 
ULT-PA-16	GE	GE LogiQ (for use with GE LogiQ Transducers 3, 5, 7, 9 and GE Vivid Transducers 3, 5, 7, 6T, 9T and GE P9603AU Transducers), 6T (TEE), 9T (TEE), E8C)	LOGIQ, Vivid & GE P9603AU	260-pin ITT Cannon ZIF 
ULT-PA-17	Philips/ATL	Philips iE33 and iU22 diagnostic ultrasound TEE transducers - S7-2 (TEE), S7-3t (TEE), S3-1, C8-4v, C9-5, etc. with belled housing	iE33/iU22	260-pin ITT Cannon ZIF 
ULT-PA-18	Philips/HP	HP/Agilent/Philips (no center post on transducer connector) 21202A, 21364A, 21365A, 21366A, 21367A Transducers	Call for Details	Micro-pinless (PC board)

To download the current cross reference sheet in PDF format, go to:
<http://testequipmentandtools.com/acatalog/ULT2000SeriesReference.pdf>

1-888-223-6763 - bcgroupintl.com

Ultrasound Transducer Adapter Cross Reference

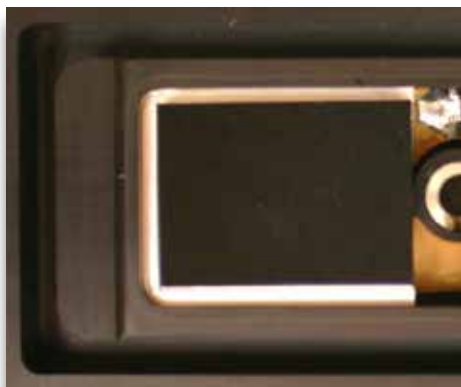
BC Adapter Part #	Manufacturer	Transducer Compatibility	Ultrasound Platform	Connector Key
ULT-PA-19	Philips	All Philips CX50 Laptop System based transducers	CX50 Platform	260-pin Tyco Electronics Mini Connector 
ULT-PA-20	Acuson/ Toshiba	Acuson/Toshiba (for use with Acuson/Siemens XP, Aspen, Capasee, 3-Needle Guide C3 Transducers; ATL 3.5 DFT Transducers; Toshiba PSF-37HT and F Series Transducers)	Toshiba PVF Series, 2B701-753E, etc.	156-pin ZIF
ULT-PA-21	Hitachi	HI VISION 900, 5500, 6500, 8500, EUB-2000, EUB-525, EUB-405 Plus	EUP-ES52M, EUP-Series Probes in general	260-pin ITT Cannon ZIF 
ULT-PA-22	Ultraschallkopf - Aloka	UST-934N/9395, UST-945BP/945BP, ASU-32-3-M, ASU-32-WSJ, UST-556/5512, UST-5514DTU	SSD-620, SSD-650	260-pin ITT Cannon ZIF 
ULT-PA-23	ALL	ALL Transducers	All Platforms	ALL Configurations
ULT-PA-24	Philips/ ATL	L7-4 and similar 260-pin transducers with belled housing	Call for Details	260-pin ITT Cannon ZIF 
ULT-PA-25	GE	GE LogiqBook Probes - GE VIVID I 6T, 9T, etc. Probes	Vivid	260-pin Tyco Electronics Mini Connector 
ULT-PA-26	Acuson	For use with Acuson/Siemens 360-pin Transducers	Antares	360-pin ITT Canon ZIF 
ULT-PA-27	GE	GE YMS/RT (for use with GE YMS/RT Transducers)	Call for Details	Call for Details
ULT-PA-29	Zonare	Zonare Medical Systems (all transducers)	All Zonare Platforms	168-pin Proprietary Custom Connector 
ULT-PA-30	GE Vivid E9	GE Vivid E9	Call for Details	

To download the current cross reference sheet in PDF format, go to:
<http://testequipmentandtools.com/acatalog/ULT2000SeriesReference.pdf>

“Soft Touch” ULT Adapter Family Continues to Grow



Old Rubber Pad



New “Soft Touch” Connector


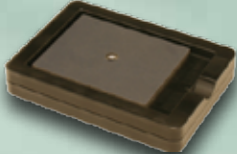


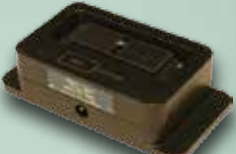













Did you know that all ultrasound transducer adapters are not created equally? There are basically two types of adapters available in the market today. The traditional adapters available from other manufacturers utilize a conductive rubber pad within a rigid body that captures the center mounting post of the transducer and pushes the pins of the transducer electrical connector into the surface of this relatively rigid conductive rubber pad. This action creates stress on the individual pins of the transducer connector and can actually bend or break pins under certain conditions.

Ultrasound manufacturers are aware of the existence of this type of adapter, and they will typically not provide warranty repairs to transducers with bent or broken pins caused by the use of these adapters. In fact, most ultrasound manufacturers frown upon the use of this type of adapter because of the physical stress placed upon the pins of the electrical connector. Replacement of a transducer electrical connector due to bent or broken pins can be a very costly experience.

The ULT line of second generation “Soft Touch” transducer adapters, available from BC Group International, completely eliminates the possibility of costly damage. Our second generation adapters utilize the actual multi-pin mating connector for the ultrasound transducer to be tested. The transducer electrical connector is subjected only to the same level of insertion and locking force that is normally seen when the transducer is connected to the ultrasound machine. There are no other undesired mechanical forces on the transducer electrical connector, or the individual pins within it. So why not take steps to avoid unnecessary and costly transducer electrical connector damage as a result of using older generation adapters? Second generation improved design adapters are now available from BC Group International.

Ultrasound Transducer Adapter Reference

			
ULT-PA-10	ULT-PA-11	ULT-PA-12	ULT-PA-13
			
ULT-PA-14	ULT-PA-16	ULT-PA-17	ULT-PA-18
			
ULT-PA-19	ULT-PA-20	ULT-PA-21	ULT-PA-22
			
ULT-PA-23	ULT-PA-24	ULT-PA-25	ULT-PA-27

Conductivity Probes

			
ULT-PA-29	ULT-PA-30	ULT-PC-10	ULT-PC-15
			
ULT-PC-20	ULT-PC-25	ULT-PC-30	

Features - USP-100A

- ◆ Digital Reading
- ◆ Continuous or Pulsed Power
- ◆ Integrated Carrying Case
- ◆ 0.2 to 30.0 Watt Range
- ◆ Accuracy = $\pm 3\%$ +One Count Reading
- ◆ 0.5 to 10 MHz Frequency Response
- ◆ 3" Max Transducer Diameter
- ◆ Built-in Transducer Holder
- ◆ Degassed Water is the Testing Medium
- ◆ Line Power or Battery Operation

Features - USP-50SP

- ◆ Digital Reading
- ◆ 0 to 30 Watts Range
- ◆ $\pm 3\%$ + One Count Accuracy
- ◆ 2.5 Second Integration
- ◆ 0.05 Watt Display Sensitivity

Features - USP-30

- ◆ Analog Reading
- ◆ 0.15 to 30.0 Watt Range
- ◆ Continuous or Pulsed Power
- ◆ 1 to 10 MHz Frequency Response
- ◆ Integrated Carrying Case
- ◆ Built-in Transducer Holder



USP-100A

The USP-100A Ultrasound Power Meter was developed to test therapeutic transducers according to AIUM, JCAHO, FDA and NIST guidelines. The compact and light weight USP-100A meets all the requirements of a portable test instrument with the reliability and proven performance of the Series.

The USP-50SP is designed to measure the ultrasound power output of diagnostic or therapeutic transducers up to 30 watts. The water tank requires only one pint of de-gassed distilled water. If de-gassed water is not available, use distilled water. The principle of measurement is the radiant force method.

The USP-30 is designed to measure the ultrasonic power output of diagnostic or therapeutic transducers up to 30 Watts using the radiation force balance method. The USP-30 consists of a precision mechanical balance, which measures from 0.01 to 10.00 grams, a conical target suspended on a triangular hanger, a water tank, a transducer support rod with clamp and a carrying case. The transducer to be tested is center mounted over the conical target with the transducer's radiating area immersed facedown in the water medium. This system provides a sturdy instrument with good measurement accuracy and economical cost.

USP-100A SPECIFICATIONS

Measure Range	0.2 to 30 Watts
Resolution	± 200 mW
Accuracy	± 3% +One Count Reading
Transducer Frequency	0.5 to 10 MHz
Maximum Transducer Diameter	3"
Test Medium	Degassed, distilled water at normal room temp
Stabilization Time	2.5 sec
Display	3-Digit LCD, 1.3" High
Line Power	120 or 240 VAC Plug-in AC Adapter
Battery	4-AA, 20 hrs. continuous battery life
Dimensions	8.5" H x 12" L x 8.75" W
Weight	11 Lbs



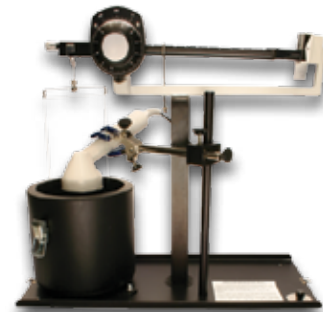
USP-50SP SPECIFICATIONS

Power Range	0 to 30 Watts
Resolution	+ 50 mW, ± .01 gram
Minimum Detectable Power	0.05 Watts
Display Sensitivity	0.05 Watts
Accuracy	± 3% @10 Watts
Stabilization	2.5 Second Integration
Maximum Transducer Diameter	4 1/2" Inches
Transducer Operating Frequency	0.5 to 10 MHz
Test Media	Degassed Water
Display	7 segment 6 Digit 0.6" (15mm) high LCD
Battery	4-AA: battery life over 40 hrs.; "Lo-Bat" Indicator
Power Supply	120 VAC to 12 VAC 500 mA adapter with 6 Ft. cord
Size	7.0" x 10.5" x 8.5" (H x L x W)
Weight	10 Lbs



USP-30 SPECIFICATIONS

Power Range	150 mW to 30 Watts
Resolution	± 150 mW
Minimum Detectable Power Level	± 150 mW
Minimum Accuracy	± 5%
Expected Accuracy	± 4%
Display	Vernier Dial
Display Sensitivity	± 0.01g or ± 150mW
Zeroing Method	Manually Adjusted
Test Tank Lining	0.5" neoprene rubber
Test	Medium Degassed, distilled water at normal room temp
Test Tank Liquid Capacity	1,350 mL
Test Tank Dimensions	Outside 5.75" Dia. x 5.55"
Inside	4.5" Dia. x 5.25" D
Cone Target	3.5" Dia. x 2" H
Dimensions(w/Case)	19" H x 17" L x 7" W
Power	Not required
Weight(w/Case)	18 Lbs



Features - AMM-15

- ◆ Microprocessor Based Portable Battery Operated Instrument
- ◆ Digital Display - 40 to +80 °F Dew Point
- ◆ ± 2 °F From + 20 TO +80 °F
- ◆ ± 4 °F From - 40 TO +20 °F
- ◆ Samples Compressed Air Up to 120 PSIG
- ◆ Quick Connect Fittings, Connection Tubing and Other Adapters Supplied
- ◆ Utilizes Connect Fittings, Filter, Connection Tubing and Other Adapters Supplied
- ◆ Utilizes HC-610 Thin Film Polymer Integrated Water Vapor Sensor
- ◆ RS-232 Computer Interface, Data Logger
- ◆ Logs 2,860 Readings, Selectable Logging Rate



AMM-15

AMM-15 portable Dew Point Meter (Air-Line Moisture Monitor) is designed to measure the performance of drying systems for air, nitrogen and other compressed gases.

The model AMM-15 measures dew point by utilizing microprocessor circuitry to convert the voltage output of OHMIC's HC-610 precision water vapor sensor and a temperature sensor to dew/frost point temperature by the use of psychrometric equations. Assembled in a rugged hand-held ABS plastic enclosure and equipped with quick disconnect tubing couplings and an internal sensor manifold. An orifice maintains line pressure for true pressure dew point readings. Air or industrial gases are sampled from receivers, pipes, and hoses up to 120 PSIG and 185°F.

In addition, heat sink tubing is available for sampling from drying systems and ovens up to 550°F (depending on ambient temperature). The AMM-15 can also be connected to a vacuum pump for sampling from piping, ovens, tanks or manifolds operating at ambient or low pressure.

AMM-15 SPECIFICATIONS

Water Vapor Sensor	HC-610 (Integrated Thin Film Polymer)
Temperature Sensor	10K NTC Thermistor
Dew Point Range	-40 to +80 °F (-40 to +27°C)
Dry Bulb Temperature Range	0-200 °F (-18 to 93°C)
Dew Point Accuracy	±4 °F Dew point from -40 to +20°F ±2 °F Dew point from +20 to +80°F
Dry Bulb Accuracy	±1 °F
Maximum Inlet Temperature	185°F. Heat Sink Tubing Permits Maximum Inlet Temperature to 550 °F (depending on ambient temp.)
Sensor Response Time	10 Seconds for 63% Step Change
Display Type	3-1/2 Digit LCD; 0.5"
Analog Outputs	0 to 1 Vdc
Power	6 VDC, (4) AA Batteries & 120 Vac Adapter
Battery Life	35 Hours Nominal
Inlet Sample Port	Quick Disconnect for 1/4" OD Tubing
Inlet Pressure	120 PSIG Max
Computer Interface	Bi-Directional RS-232. ASCII Delimited Format, 9600 Baud, 8 Bits, 1 Stop, 1 Start, No Parity
Software Required	HyperTerminal or PROCOMM
Data Logger	32 KByte, Non-Volatile Memory
Internal Clock	MM:DD:YY HH:MM:SS Military Time Format
Dimensions	8.25" x 4.0" x 1.6", ABS Plastic Enclosure
Weight	2 Lbs Net

ORDERING INFORMATION

AMM-15: Portable Dew-Point Meter/Logger with carrying case, connection parts, filter, 120 Vac adapter.

In addition, OHMIC Instruments has dew/frost point station monitoring units with alarm features, portable dew point monitors with built-in sampling pumps, and kits for economically testing and installation in OEM dryer panels.

Anesthetic Agent Analyzer

57

Anesthetic Agent Analyzer



Features - AA-2005

- ◆ State-of-the-art non-dispersive infrared (NDIR) technology identifies and measures five anesthetic agent gases:
Halothane, Enflurane, Isoflurane, Desflurane, and Sevoflurane
- ◆ Also measures O₂, CO₂, and N₂O
- ◆ Automatic or manual modes
- ◆ Gas flow sampled at 100, 150 and 200 ml/min
- ◆ Measurement accuracy is not affected by alcohol or ketones
- ◆ Fast warm-up time ensures full accuracy within minutes
- ◆ Auto-calibration
- ◆ Bright, real-time display of waveforms and numerical values provided
- ◆ Lightweight, portable design provides flexible workspace options
- ◆ Service tool for anesthesia service application (NOT FOR CLINICAL USE)
- ◆ VSI-1466 Now Available

AA-2005

A powerful monitoring tool – proprietary state-of-the-art digital 5-agent gas analysis technology. Versatile, reliable, and incredibly compact. Designed for testing Anesthetic vaporizer output concentration in hospitals and outpatient surgical centers.

The system's reliable performance, ease of use, flexible design, and affordable cost makes it the ideal service tool for anesthesia service applications in hospitals and surgical centers.

- Automatically identifies and quantifies five anesthetic agents.
- Detects and quantifies mixed agents.
- Compatible with color VGA displays and has large screen output capability.

SPECIFICATIONS

<p>Gas Monitoring</p> <p>Method: Sidestream; Non-dispersive infrared (NDIR)</p> <p>Identified Gases: Halothane, Enflurane, Isoflurane, Desflurane, Sevoflurane, CO₂, N₂O, Oxygen</p> <p>Concentration Units: Vol%, Torr, kPa, mmHg</p> <p>Flow Rates: 100 ml/min, 150 ml/min, 200 ml/min</p> <p>Agent Detection</p> <p>Measurement Range:</p> <p style="padding-left: 20px;">Halothane: 0 to 10%</p> <p style="padding-left: 20px;">Enflurane: 0 to 10%</p> <p style="padding-left: 20px;">Isoflurane: 0 to 10%</p> <p style="padding-left: 20px;">Desflurane: 0 to 20%</p> <p style="padding-left: 20px;">Sevoflurane: 0 to 10%</p> <p style="padding-left: 20px;">CO₂: 0 to 12.5%</p> <p style="padding-left: 20px;">N₂O: 0 to 99%</p> <p style="padding-left: 20px;">Oxygen: 0 to 100%</p> <p>Measurement Accuracy:</p> <p style="padding-left: 20px;">Agents: ± (0.1% abs. + 4% reading)</p> <p style="padding-left: 20px;">CO₂: ± 0.2% abs. or 4% of reading</p> <p style="padding-left: 20px;">N₂O: ± (1.5% abs. + 4% of reading)</p> <p style="padding-left: 20px;">Oxygen: ± 3 vol% (for 0-90%), ± 4 vol% (for 91-99%)</p> <p>Time to Detect Agent: < 15 seconds @ 200ml/min</p> <p>Agent Detection Resolution: 0.1 Volume Percent</p> <p>Mixed Gas Threshold: 0.2 vol. % +10% of total concentrations</p> <p>Rise Time:</p> <table style="width: 100%; border: none;"> <tr> <td style="padding-left: 20px;">Agents:</td> <td style="text-align: right;">450 msec</td> </tr> <tr> <td style="padding-left: 20px;">CO₂:</td> <td style="text-align: right;">350 msec</td> </tr> <tr> <td style="padding-left: 20px;">N₂O:</td> <td style="text-align: right;">400 msec</td> </tr> <tr> <td style="padding-left: 20px;">Oxygen:</td> <td style="text-align: right;">600 msec</td> </tr> </table> <p>Respiration Rate</p> <p>Range: 1 to 60 breaths/minute</p> <p>Accuracy: ± 2 breaths/minute or 2% of reading</p> <p>System Features</p> <p>Occlusion Clearing: Automatic</p> <p>Auto Zeroing: Occurs 30 to 60 minutes</p> <p style="padding-left: 20px;">Duration: 3.0 to 7.0 seconds</p> <p style="padding-left: 20px;">Manual user calibration not required.</p> <p style="padding-left: 20px;">Temperature stabilized optical assembly</p> <p style="padding-left: 20px;">Auto-calibration; verification recommended every 6-months.</p> <p>Warm-up Time: 1 minute to first waveforms; < 20 minutes to full accuracy</p>		Agents:	450 msec	CO ₂ :	350 msec	N ₂ O:	400 msec	Oxygen:	600 msec	<p>Display</p> <p>Main Display: Active color TFT</p> <p>Size: 5.5" Display Area</p> <p>Resolution: Internal Display; 320 x 240 pixels</p> <p>External Video: 640 x 480 pixels</p> <p>Number of Traces: 3 maximum</p> <p>Controls</p> <p>Keys: 7; membrane-activated</p> <p>Rotary knob: Push and rotate; 24 steps/turn</p> <p>System Outputs</p> <p>Com Ports:</p> <p style="padding-left: 20px;">Com 1; RS232-compatible, Serial DB-9</p> <p style="padding-left: 20px;">Com 2; Serial/Analog, mini-DIN8</p> <p>Video Port: Color VGA compatible, High Density D-Sub 15</p> <p>Alarms</p> <p>Alarm Characteristics: EN 475, Adjustable; with audible and visual indications.</p> <p>Alarm Levels: High, Medium, Low, Informational</p> <p>Alarm Modes: Adult/Pediatric/Neonate High and low limit settings for each mode.</p> <p>Trends</p> <p>Memory: 24 hours of stored data, History available with external VGA display</p> <p>Display: Tabular, Graphical</p> <p>Power Requirements</p> <p>Voltage: 100, 120, 220, 240 VAC; 50/60 Hz</p> <p>Power Consumption: 40 W, typical</p> <p>Battery: NiMH; Life: 1 hour, typical; Recharge time: 3 hours</p> <p>Mechanical</p> <p>Weight: ≤13 Lbs (5.9 kg)</p> <p>Size: 16.5cm (H) x 27.9cm (W) x 30.5cm (D);</p> <p style="padding-left: 20px;">6.5" (H) x 11.0"(W) x 12.0" (D)</p> <p>Environmental</p> <p>Operating Temperature: 15 to 35 °C; 59 to 95 °F</p> <p>Storage Temperature: -5 to 50 °C; 23 to 122 °F</p> <p>Operating/Storage Humidity: 15% to 95%, noncondensing</p> <p>Altitude: -300m to 3000m (-1,000 to 10,000ft.)</p> <p>Type of Protection: Class I Equipment</p> <p>Degree of Protection: Type CF, Defibrillator-proof</p> <p>Protection against ingress: Ordinary</p>
Agents:	450 msec									
CO ₂ :	350 msec									
N ₂ O:	400 msec									
Oxygen:	600 msec									



Features - MGA-3050

- ◆ Displays anesthetic agent output in percentage values
- ◆ Easy to use
- ◆ Fast response time
- ◆ Very compact
- ◆ Connects directly to common gas outlet



MGA-3050 Multi Gas Analyzer

The MGA-3050 Multi-gas Analyzer connects to any PFC-3000 series Flow Analyzer and is used to measure anesthetic agent concentrations for testing purposes. The MGA-3050 measures Halothane, Enflurane, Isoflurane, Sevoflurane and Desflurane in percentage values. The MGA-3050 also measures percentage values of CO₂ and N₂O. The MGA-3050 is an excellent instrument for performing vaporizer efficacy tests, but a PFC-3000 series unit is required, since it uses its display to display measurement values.

SPECIFICATIONS

	Range		Accuracy
	Measurements	CO ₂	0 - 10%
10 - 20%			± (0.3% ABS + 4% REL)
N ₂ O		0 - 100%	± (2% ABS + 2% REL)
HAL, ISO, ENF		0 - 8%	± (0.15% ABS + 5% REL)
		8 - 12%	± (0.2% ABS + 10% REL)
SEV		0 - 10%	± (0.15% ABS + 5% REL)
		10 - 15%	± (0.2% ABS + 10% REL)
DES		0 - 22%	± (0.15% ABS + 5% REL)
	22 - 25%	± (0.2% ABS + 10% REL)	
Response Time	CO ₂ < 90 ms, N ₂ O, AA < 300 ms, O ₂ < 300 ms		
Monitoring	Numerical data available with the FlowAnalyzer		
	Numerical data and real-time curves available with FlowLab software		
	Interface	through RS-232 port	
Physical Data	Weight	< 25 g (excluding cable)	
	Size	1.49 x 1.14 x 1.22 inches (38 x 29 x 31 mm)	
Environmental Data	Operating	10 - 40 °C (50 - 104 °F)	
	Storage	-20 - 50 °C (-4 - 122 °F)	
	Humidity	10 - 95%, non-condensing	
	Atm. pressure	700 - 1200 mbar (3048 m)	
Compliance and Approvals	CE marked according to the 93/42/EEC MDD		
	ISO 11196:1997, EN 864:1996, EN 12598:1999 ISO/DIN 21647:2003,		
	ISO 7767, ASTM-F 1452-92, ASTM-F 1456-92 and ASTM-F 1462-93		

Benchtop Flow Analyzer

61

Respiratory Parameters

16 respiratory parameters can be calculated including PEEP, VTI and Compliance

Bidirectional Flow Measurement

Two measuring ports evaluate flow, pressure, temperature, humidity and O₂

Pressure Measurements

All pressure information included with up to 6 different pressure sensors

Gas Standards

13 gas standards and 10 gas types adapt the unit to the tested device

RT-200 Emulation Mode

The RT-200 emulation mode simulates the RT-200 operating mode while offering a contemporary replacement

Data Storage

Internally stores all measured and respiratory parameters in order to simplify the testing procedure

Battery Operation

Convenient and independent work when you are on the go

USB, RS-232 and External Trigger

Communicates with your test software and ventilator

Optional Multi-Gas Analyzer

The optional MGA-3050 Sensor offers instant gas concentration measurements of CO₂, N₂O, Halothane, Enflurane, Isoflurane, Sevoflurane and Desflurane



PFC-3000

The PFC-3000 series of instruments measures flow, pressure, temperature, humidity and O₂ concentrations bidirectionally. The one-of-a-kind Adult, Pediatric and High Frequency ventilation measuring modes make the PFC-3000 the ideal calibration tool for all ventilators, anesthesia machines and spirometers.

The PFC-3000 distinguishes itself from other calibration tools by combining a simple, intuitive multilingual user interface with the highest precision. With the push of a button, all measured values can be stored directly on the PFC-3000 and later retrieved for documentation purposes.

SPECIFICATIONS

Flow & Pressure Measurements		Range	Accuracy	PFC-3000A	PFC-3000V	PFC-3000L
Flow	Measuring direction	bidirectional		•	•	•
	Temperature compensated	yes		•	•	•
	Pressure compensated	yes		•	•	•
	Humidity compensated	yes		•	•	•
	O2 compensated	yes		•	•	•
	High	± 300 L/min	± 1.75%* or ± 0.1 L/min**	•	•	•
Low	± 20 L/min	± 1.75%* or ± 0.04 L/min**	•	•	•	
Pressure	High	0 – 145 PSI	± 1%* or ± 0.15 PSI**	•	•	•
	Average	± 112.5 mmHg	± 0.75%* or ± 0.08 mmHg**	Differential	Relative	Relative
	Low	0 – 3.75 mmHg	± 1%* or ± 0.01 mmHg**	•	•	•
	High Flow Port	0 – 112.5 mmHg	± 0.75%* or ± 0.08 mmHg**	•	•	•
	Barometer	0 – 862.5 mmHg (abs)	± 1%* or ± 3.75 mmHg**	•	•	•
	Vacuum pressure	± 750 mmHg	± 0.5%* or ± 1.5 mmHg**	•	•	•
Measuring unit	Flow	L/min, L/s, cfm, mL/min, mL/s		•	•	•
	Pressure	bar, mbar, cmH ₂ O, inH ₂ O, Torr, inHg, hPa, kPa, mmHg, PSI		•	•	•
Additional Measuring Values		Range	Accuracy			
Oxygen	Concentration	0 - 100%	± 1% O ₂ **	•	•	•
	Pressure compensated	yes		•	•	•
Temperature	High Flow Port	0 - 50°C	± 1.75%* or ± 0.5°C**	•	•	•
Dew point	High Flow Port	-10 - 50°C	± 2%* or ± 1°C**	•	•	•
Air humidity	High Flow Port	0 - 100%RH	± 3%**	•	•	•
CO ₂	Concentration	0 - 10%	± (0.2% ABS + 2% REL)	w/ MGA-3050	w/ MGA-3050	w/ MGA-3050
		10 - 20%	± (0.3% ABS + 4% REL)	w/ MGA-3050	w/ MGA-3050	w/ MGA-3050
N ₂ O	Concentration	0 - 100%	± (2% ABS + 2% REL)	w/ MGA-3050	w/ MGA-3050	w/ MGA-3050
HAL, ISO, ENF	Concentration	0 - 8%	± (0.15% ABS + 5% REL)	w/ MGA-3050	w/ MGA-3050	w/ MGA-3050
		8 - 12%	± (0.2% ABS + 10% REL)	w/ MGA-3050	w/ MGA-3050	w/ MGA-3050
SEV	Concentration	0 - 10%	± (0.15% ABS + 5% REL)	w/ MGA-3050	w/ MGA-3050	w/ MGA-3050
		10 - 15%	± (0.2% ABS + 10% REL)	w/ MGA-3050	w/ MGA-3050	w/ MGA-3050
DES	Concentration	0 - 22%	± (0.15% ABS + 5% REL)	w/ MGA-3050	w/ MGA-3050	w/ MGA-3050
		22 - 25%	± (0.2% ABS + 10% REL)	w/ MGA-3050	w/ MGA-3050	w/ MGA-3050
Gas types		Air, Air/O ₂ , N ₂ O/O ₂ , Heliox (21% O ₂), He/O ₂ , N ₂ , CO ₂ , customized gas types		•	•	•
Gas Conditions		ATP, ATPD, ATPS, AP21, STP, STPH, BTPS, BTPD, 0/1013, 20/981, 15/1013, 25/991, 20/1013		•	•	•
Respiratory Parameters		Range	Accuracy			
Rate		1 - 1000 bpm	± 2.5%** or ± 1 bpm	•	•	•
Time	T _i , T _E	0.05 - 60 s	± 0.02 s	•	•	•
I:E ratio		1:300 - 300:1	± 2.5%*	•	•	•
Ti/Ttotal		0 - 100%	± 5%*	•	•	•
Breath volumes	V _{ti} , V _{te} @Flow Low	± 10 L	± 1.75%* or ± 0.10 mL(>2.4 L/min)	•	•	•
	V _{ti} , V _{te} @Flow High	± 10 L	± 1.75%* or ± 0.20 mL(>6.0 L/min)	•	•	•
Minute volumes	V _i , V _e	0 - 300 L/min	± 2.5%* or ± 20 mL/min(High) ± 10 mL/min(low)	•	•	•
Pressure	P _{peak} , P _{mean} , P _{EOP} , P _{plateau}	0 – 152.96 cmH ₂ O	± 0.75%* or ± 0.1 cmH ₂ O**	•	•	•
Peakflow	Peakflow Insp./Exp.	± 300 L/min	± 1.75%* or ± 0.1 L/min**	•	•	•
Compliance	C _{stat}	0 - 1000 mL/mbar	± 3%* or ± 1 mL/mbar**	•	•	•
Trigger	Adult, Pediatric, HFO	Adjustable on flow or pressure curves with user-defined limits.		•	•	•
General Information						
Electrical & Physical Data	AC input	100 - 240 VAC, 50/60 Hz		•	•	•
	Battery (lead rechargeable battery)	3 hrs (with MGA-3050 2 hrs)		•	•	•
	Power consumption	25 VA(W)		•	•	•
	Weight	<8.5 Lbs (3.8 kg)		•	•	•
	Dimensions (w x d x h)	8.67 x 9.84 x 4.72 inches (220 x 250 x 120 mm)		•	•	•
Data Storage		all parameters (measured as well as respiratory values)		•	•	•
Display	Graphic display	Intuitive user interface with numerical measuring values, statistics, volume trigger configuration, gas type selection and calibration menus.		•	•	•
Communication Interfaces		USB for Windows Software FlowLab, Interfaces RS-232 for individual communication, TTL for external trigger.		•	•	•
Calibration		annually		•	•	•
Conditions	Ambient temperature	15 - 40 °C (59 - 104 °F)		•	•	•
	Humidity	10 - 90% RH, Non-condensing		•	•	•
Approvals		CE, CSA		•	•	•

Legend

- * Tolerance related to the measured value
- ** Absolute tolerance (Whichever is greater)

TSI Certifier® FA Plus Ventilator Test System



Certifier® FA Plus is the full-feature system capable of testing virtually all models of ventilators: adult, pediatric, anesthesia, neonatal and high-frequency

Highlights

- ◆ Color touch screen graphical user interface
- ◆ Real-time graphing mode
- ◆ Bi-directional flow measurement
- ◆ Data storage using SD Flash card and internal memory
- ◆ Access stored data through USB interface
- ◆ Report printing capability
- ◆ Rechargeable battery plus AC operation

Test Parameters

- ◆ Flow
- ◆ Peak & Minimum Flow
- ◆ Volume (Inhaled and Exhaled)
- ◆ Minute Volume
- ◆ Low Pressure (Differential)
- ◆ Peak & PEEP Pressure
- ◆ Mean Airway Pressure
- ◆ High Pressure
- ◆ Barometric Pressure
- ◆ Inspiratory Time
- ◆ Expiratory Time
- ◆ I:E Ratio
- ◆ Respiratory Rate
- ◆ Flow & Volume modes - STP, ATP, BTPS, BTPD, plus user-defined
- ◆ Oxygen Concentration (with optional 4073 Kit)



TSI Certifier® FA Plus

Certifier® FA Plus Ventilator Test System 4080 can also test a variety of other medical equipment such as anesthesia gas delivery machines, insufflators and oxygen concentrators. Its compact size makes this ventilator tester ideal for use in field service, biomedical shops, and manufacturing.

The fast response and bi-directional sensing sensors makes the Certifier® FA Plus Ventilator Test Systems 4080 capable of testing all types of ventilators including neo-natal and high frequency. This ventilator tester is designed to measure air, oxygen, and nitrous oxide flow and pressure in institutional, home care, field service, laboratory, and production applications



Optional LS-2000A
Lung Simulator

Specifications

Certifier FA PLUS	Gas/Mode	Range	Accuracy**
Flow—High Flow Module	Air, O ₂	-200 to +300 slpm*	±2% or ±0.075 slpm
	Air/O ₂ Mixtures	0 to 300 slpm	±4% or ±0.1 slpm
	N ₂	-200 to +300 slpm	±3% or ±0.1 slpm
	CO ₂	-40 to +40 slpm	±3% or ±0.1 slpm
Flow—Low Flow Module	Air, O ₂	0.01 to 20 slpm	±2% or ±0.01 slpm
	N ₂ , CO ₂	0.01 to 20 slpm	±3% or ±0.01 slpm
	N ₂ O	0.01 to 20 slpm	±4% or ±0.025 slpm
Volume-High Flow-Inhaled	Air, O ₂	0.01 to 10 liters STP	±2% Plus 0.02 liters
	Air/O ₂ Mixtures	0.01 to 10 liters STP	±4% Plus 0.02 liters
Volume-High Flow-Exhaled	Air, O ₂	0.01 to 10 liters STP	±3% Plus 0.03 liters
	Air/O ₂ Mixtures	0.01 to 10 liters STP	±4% Plus 0.04 liters
Volume-Low Flow-Inhaled	Air, O ₂	0.01 to 10 liters STP	±2% or ±0.01 liters
	N ₂ O	0.01 to 10 liters STP	±4% or ±0.01 liters
Minute Volume-High Flow		0.01 to 100 liters STP	±3%
Minute Volume-Low Flow		0 to 10 liters STP	±3%
Respiratory Times	Ti, Tip, Te	0.04 to 30 seconds	±2% or ±0.01 seconds
I:E Ratios	I:E, I:Eip	1:100 to 100:1	±4%
Respiratory Rate	f	1 to 1500 breaths per minute	±2% or 0.1 bpm
Low Pressure	All	-25 to +150 cmH ₂ O	±0.5% or ±0.15 cmH ₂ O
High Pressure		-10 to +150 PSI (-0.7 to 10 bar)	±1% or 0.1 PSI (7 mbar)
Barometric Pressure		7 to 23 PSI (500 to 1600 mbar)	±0.16 PSI (11 mbar)
Oxygen Concentration		21% to 100%	2% of concentration

*slpm = Standard Liters per Minute **Accuracy stated as a percent of reading at TSI standard gas conditions.

To Order Certifier FA Plus

Model	Description
4080	High-Flow Standard Kit

Optional Modules and Accessories

Model	Description
4073	Oxygen Sensor Kit
PSR-11-917-J	Replacement Oxygen Sensor
4082	Low-Flow Module



Part #	Description
1208061	Extra battery pack and charger kit
1303860	Printer cable
1602342	Low Flow Filter
BC20-40702	High Flow Filter

4080 High-flow test system
 4082 Low-flow kit (sold separately)

TSI Certifier® FA Ventilator Test System

65



Certifier® FA is a low-cost test system capable of testing multiple parameters of ventilator performance.

Highlights

- ◆ Simple, easy to read, user interface
- ◆ Backlit LCD display
- ◆ Entire kit weighs less than 3 Lbs (1.4 kg)
- ◆ Volumes and flow in BTPS, ATP, or STP
- ◆ Powered by 4-AA Alkaline Batteries

Test Parameters

- ◆ Flow
- ◆ Peak Flow
- ◆ Volume
- ◆ Stacked Volume
- ◆ Minute Volume
- ◆ Low Pressure
- ◆ Peak & PEEP Pressure
- ◆ Barometric Pressure
- ◆ Inspiratory Time
- ◆ I:E Ratio
- ◆ Respiratory Rate
- ◆ Oxygen Concentration (with optional 4073 Kit)



Respiratory Ventilator Test System

The Certifier® FA Ventilator Test System 4070 is designed to measure air, oxygen, and nitrous oxide flow and pressure in institutional, home care, field service, laboratory, and production applications. The Certifier® FA ventilator test system is a battery-operated flow analyzer that can also test a variety of other medical equipment, such as anesthesia gas delivery machines and oxygen concentrators.

Their compact size makes these ventilator testers ideal for use in field service, biomedical shops, and manufacturing.



Displays 2 test parameters

1-888-223-6763 - bcgroupintl.com

TSI Certifier® FA

Specifications

Certifier FA	Gas	Range	Accuracy**
Flow—High Flow Module	Air, O ₂	0 to 300 slpm*	±2% or ±0.075 slpm
	Air/O ₂ Mixtures	0 to 300 slpm	±4% or ±0.1 slpm
Flow—Low Flow Module	Air, O ₂	0.01 to 15 slpm	±2% or ±0.01 slpm
	N ₂ O	0.01 to 15 slpm	±4% or ±0.025 slpm
Volume-High Flow-Inhaled	Air, O ₂	0.01 to 10 liters STP	±2% Plus 0.02 liters
	Air/O ₂ Mixtures	0.01 to 10 liters STP	±4% Plus 0.02 liters
Volume-Low Flow-Inhaled	Air, O ₂	0.01 to 9.999 liters STP	±2% or ±0.01 liters
	N ₂ O	0.01 to 10 liters STP	±4% or ±0.01 liters
Minute Volume-High Flow		0.01 to 99 liters STP	±7%
Minute Volume-Low Flow		0 to 9.999 liters STP	±7%
Inspiratory Time		0.25 to 60 seconds	±0.01 seconds
I:E Ratio— High Flow		1:100 to 100:1	±5%
I:E Ratio— Low Flow		1:15 to 15:1	±5%
Respiratory Rate		0.5 to 120 breaths per minute	±5%
Low Pressure		-25 to +150 cmH ₂ O	±0.75% or ±0.2 cmH ₂ O
Barometric Pressure		7 to 29 PSI (500 to 2000 mbar)	±0.16 PSI (11 mbar)
Oxygen Concentration		21% to 100%	2% of concentration

*slpm = Standard Liters per Minute **Accuracy stated as a percent of reading at TSI standard gas conditions.

To Order Certifier FA

Model	Description
4070	High-Flow Standard Kit

Optional Modules and Accessories

Model	Description
4073	Oxygen Sensor Kit
PSR-11-917-J	Replacement Oxygen Sensor
BC20-40701	Replacement Low Flow Filter
BC20-40702	Replacement High Flow Filter
4072	Low-Flow Module

Part #	Description
1319288	Hard shell carrying case

DPM-235175NNFC Digital Pressure Meter



Lung Simulators

67

Lung Simulators

General Features

- ◆ Easy to Use
- ◆ Ultra-Portable (< 1 Lbs)
- ◆ Quick Disassembly
- ◆ Simple Design
- ◆ Replacement Parts Available
- ◆ All Components can be Sterilized
- ◆ Connects Directly to your Ventilator's Existing Tubing

LS-2000 Series Features

- ◆ Adjustable Compliance Settings
- ◆ Adjustable Resistance Settings
- ◆ Variable Leakage Valve
- ◆ Simple Design
- ◆ Fraction of the Price and Size of any Comparable Lung Sim

LS-1000E Features

- ◆ Unique Double-conus Connector (OD 22 conical, OD 15 conical)
- ◆ Unbeatable Simplicity & Price

LS-1000N Features

- ◆ Two Compliances
- ◆ Two Separately Adjustable Resistances
- ◆ Leak Simulator on Each Lung



CE



LS-2000A, LS-2000I, LS-1000E



LS-1000N

LS-2000A, LS-2000I, LS-1000E, LS-1000N

BC Biomedical's Lung Simulator series is an affordable, ultra-portable and easy to maintain alternative to older models. The LS-2000(A/I) SmartLungs come in Adult and Infant models, offering all the performance and features of large and expensive test lungs in an easy to use, compact package. The LS-1000E EasyLung is a simple, low-cost, general purpose test lung with no variable controls. LS-1000N is the ideal tool to test neonatal and infant ventilators.

1-888-223-6763 - bcgroupintl.com

SPECIFICATIONS



Models	LS-1000E	LS-2000I	LS-2000A
Use	General Purpose	Infant	Adult
Resistance	20 mbar/L/s	5, 20, 50, 200 mbar/L/s	5, 20, 50, 200 mbar/L/s
Compliance	25 mL/mbar (Vt = 500mL, PEEP = 0 mbar)	1, 2, 3, 5 mL/mbar	10, 15, 20, 30 mL/mbar
Volume	0-1000 mL (with 1L bag)	0-200 mL (with 0.5L bag)	0-600 mL (with 1L bag)
Leak	N/A	0-10 L/min	0-10 L/min
Weight	< 0.5 Lbs (0.23 kg)	< 0.7 Lbs (0.32 kg)	< 0.8 Lbs (0.36 kg)
Dimensions (LxWxH)	11.9" x 4.6" x 1.7" (302.3 x 116.8 x 43.7 mm)	10.7" x 4.6" x 1.6" (271.8 x 116.8 x 40.6 mm)	11.9" x 4.6" x 1.6" (302.3 x 116.8 x 40.6 mm)
Replaceable Components	Yes	Yes	Yes
Sterilizable	Yes	Yes	Yes

The BC Biomedical LS-1000E EasyLung is an affordable, versatile, general purpose test lung that provides a broad spectrum of benefits to the respiratory care field. It is ideal for ventilator manufacturers validating the safety of their products, for ventilator training and for biomedical engineers performing general service procedures. The EasyLung combines singular design with high-quality, replaceable parts. Its unique double-conus multi-connector also ensures a direct connection to all tubing systems.

The SmartLung is unbeatable in terms of price/performance ratio. Resistance (airway resistance), lung compliance and leakage are all adjustable. Its size eliminates the cumbersome side-tables needed by large test lungs. Different bag sizes ensure that virtually all patient lungs can be simulated; from babies to adults. The SmartLung does not require any additional adapters and the leak simulation is infinitely adjustable. The SmartLung enables verification of premature baby ventilators as well as mask ventilation. Even the sensitive function of patient flow triggering can be tested with the SmartLung.



These test lungs are manufactured in accordance with CE requirements.

← Flip for product pricing - Page X →

Tachometer Series

69

CE

Applications

- ◆ Ideal for use in production, engineering, inspection, quality control and maintenance.

Highlights

- ◆ Contact or non-contact measurement
- ◆ Eight character display with floating decimal point
- ◆ Sixteen units of measure
- ◆ Unit measure always displayed
- ◆ Four memories (last, maximum, minimum and average)
- ◆ Most significant display digit flashes to indicate need for battery

Two models available:

- ◆ TC-1726 without calibration
- ◆ TC-1726C with NIST calibration certificate



TC-1726

The BC Biomedical Model 1726 hand-held Digital Tachometer is a dual function instrument providing contact and non-contact measurement of rotational and linear motions, with an accuracy of $\pm 0.025\%$ of indicated reading ± 1 LSD.

The Model TC-1726 comes complete with a convex tip, concave tip, 10 cm linear measuring wheel, 9V Alkaline battery, and carrying case.

The compact size and light weight of the TC-1726 makes for easy, one-hand operation while the rugged, high impact housing provides for years of dependable service.

SPECIFICATIONS

Angular Velocity	< 100 Hz: $\pm(0.025\%$ reading + 1 digit) 100 to 1000 Hz: $\pm(0.05\%$ reading + 1 digit) >1000 Hz: $\pm(0.1\%$ reading + 1 digit)
Linear Measurement	$\pm 0.2\% \pm 1$ LSD
Transducer	Built-in photoelectric transducer, 12" operating distance
Display	8 character dot matrix LCD, contrast is adjustable for different viewing angles, 3/8" character height
Contact Adapter	Utilizes interchangeable accessories. Convex tip, concave tip and 10 cm linear measuring wheel included
Battery	9V Alkaline battery (ANSI/NEDA 1604A or equivalent)
Low Battery Indicator	Most significant display character flashes to indicate need for battery replacement
Memory	Last reading, maximum, minimum and average
Dimensions Unit	7.65 x 3.83 x 1.84 Inches (194.3 x 97.3 x 46.7 mm)
Case	10.53 x 7.18 x 2.39 Inches (267.5 x 182.4 x 60.7 mm)
Weight	< 2 Lbs. (0.91 kg)
Operating Temperature	0 to 50 °C (32 to 122 °F)
Storage Temperature	-20 to 70 °C (-4 to 158 °F)
Humidity	< 95% R.H. , Non-condensing

**Contact measurement
using standard
accessories**



**Standard
Accessories**

Flip for product pricing BB



BC Group consists of three interlinking operations: **BC Biomedical**, **BC Marketplace** and **BC Service**. In January 2005, Lloyd Industries added Engineering, Design and Manufacturing capability when they purchased BC Group. With these new tools at our disposal, the list of BC Biomedical products has grown substantially, as is evident in the BC Biomedical portion of this catalog. In January 2009, BC Group moved all departments into one new facility, allowing us to better serve our customers. Additionally, we also have a sales office in Atlanta, GA. BC Group's growth has come from listening to customers and then providing what they want. BC Group is now the second largest manufacturer of Biomedical Test Equipment in the world and growing. We are truly your ONE-STOP BIOMED SHOP.



BC Group designs and manufactures a complete line of test equipment under the BC Biomedical label. The familiar Green and Gold overlays tell you that you are getting the latest technology available in the biomedical field today.

BC Biomedical products have been designed with the customer in mind. Most of our instruments are offered as families of products. We do not subscribe to the theory that one size fits all. You choose the features you want and only pay for what you need. The BC Biomedical product offering is extensive but we have many more in the works that will be introduced after this catalog is published. Please check our website for the latest products being introduced or contact us about being added to our BC Group email newsletter list.



BC Group distributes over 75 product lines under BC Marketplace. This large group of high quality products, coupled with our own BC Biomedical Line, truly makes us your ONE STOP BIOMED SHOP.

Why should you buy items from BC Group that can be purchased directly from the OEM? (1) Price - We buy in volume. (2) We have stock. (3) It is expensive for an organization to cut a purchase order. If you need to order 5 items from 5 different vendors, you will be paying much more than if you cut one PO to BC Group for all items. (4) You may only buy one or two items from a vendor in a year where we purchase hundreds of items from that same vendor. If you have any problems with a manufacturer's product, you'll have BC Group as your advocate.



BC Group offers support for the Biomedical Industry's test equipment. We calibrate, repair, manage and store test equipment for our customers. There are three components to BC Service: **BC OnSite**, **BC Depot** and **BC eTEAMS**. We have a dedicated technical staff that has been specializing in biomedical test equipment repair and calibration for many years.



BC Group offers test equipment calibration and repair service for all BC Biomedical and most other manufacturers of test equipment at our St. Louis Depot facility. We are ISO 9001:2008 Certified, ISO/IEC 17025:2005 Accredited, NIST Traceable and ANSI Z540 compliant. Quick turnaround time, years of experience calibrating and attractive prices are just some of the reasons our customers keep sending their equipment to BC Group.



BC Group offers a nation wide, onsite calibration service program that provides some unique benefits. Allow us to come to your facility to minimize downtime and shipping costs, plus there are no travel charges. We offer multi-year discounts on your calibration cost, plus you will enjoy special discounting when purchasing test equipment if you use BC Group as your onsite provider.



BC eTEAMS (Test Equipment Asset Management System) is a web-based program, custom tailored to customer needs. Secure access to the on-line database of equipment, complete with location, calibration certificates and customized management reports make this program an instant favorite of anyone attempting to manage a fleet of test equipment in more than one location. This program can also add the tracking of tools, consumables & other specialized needs as they arise.

BC
S
T
R
U
C
T
U
R
E

1-888-223-6763 - bcgroupintl.com

Quality

Is at the heart of everything we do at BC Group



BC Group is committed to exceeding customer expectations and enhancing customer satisfaction through the continual improvement of our products, services and quality management system.

BC Group has been ISO certified for over a Decade

Our Quality Programs



ISO 9001:2008 Certified
ISO 13485:2003 Certified
ISO/IEC 17025:2005 Accredited
ANSI Z540-1 Accredited
FDA Registered & Inspected
FDA - QSR 21 CFR 820 Compliant
FDA - CGMP Compliant
NIST Traceable

BC Group Manufactures and Sells the familiar Green Labeled BC Biomedical product line with all products falling under our overall Quality Program



Our Production Department Meets the Highest Standards and Operates Under Our Quality Program



BC Group offers Depot Calibration and Repair Services

For BC Biomedical products and most other Brands of Biomedical Equipment



BC Group offers Onsite Calibration Services

We bring our Technicians and Expertise to your facility to Minimize Downtime



1-888-223-6763 - bcgroupintl.com

BC Quality Program