vPad-PS™ - Performance Specifications

ECG General:
- Full 12-Lead ECG; independent outputs for each signal lead - color coded to AHA and IEC Standards.
- Output Impedances: 500, 1000, 1500, & 2000 ohms
- ECG Amplitude: 0.05 - 5.5 mV
  - Amplitude Accuracy: ± (2% setting + 0.05 mV)
- High Level ECG: 500x lead II signal
- High Level Accuracy: ± 5%
- Rate Accuracy: Better than 0.1%

Normal Sinus Rhythm:
- Rates: 10-360 BPM, 1 BPM steps, Accuracy better than 0.1%
- user defined presets (15), user input specific rates
- Amplitudes (Lead II): 0.05mV to 0.5mV (0.05mV steps; 0.5mV to 5.5 mV (0.25mV steps)
- Neonatal Mode: ECG QRS width is reduced from 80ms to 40ms.
- Artifact: 50Hz, 60Hz, muscle, baseline, respiration
- Axis Deviation: Normal , horizontal, and vertical.

ECG Performance Testing:
- Square Wave: 0.125, 2, 2.5Hz
- Triangle Wave: 0.125, 2, 2.5Hz
- Pulse: 30, 60 BPM with 60ms pulse
- Sine Waves: 0.05 - 200 Hz.
- QRS and R Wave Detection Test:
  - Rate: 30 - 250 BPM triangle wave
  - Width: 8 - 200ms
- ST Segment Adjustment (Lead II):
  - Rate: 60 BPM; ST Segment: ± 80% of ECG amplitude
- Tall T wave:
  - Rate: 80 BPM; ST Segment: 0 - 150% of ECG amplitude

Fetal / IUP(ch1 only) Simulations:
- Fetal heart rates: 60 to 240 BPM 1 BPM steps
  - 12 Preset rates, user defineable
- Uniform, Early and Late Deceleration,
  - Uniform Acceleration
- Dynamic intrauterine pressure (IUP) waveform:
  - Positive bell shaped pressure curve
  - Peak pressure: 50 or 90 mmHg,
  - Contraction duration: 90 sec
- IUP Period: 2, 3, 5 min and Manual
- Pressure transducer sensitivity: 5 or 40 m v/v/mmhg
- Input/output impedance: 300 ohms ±10%

2 Blood Pressure Channels:
- Electrically Isolated Channels
- Transducer Sensitivity: 5 or 40 µV/V/mmHg
- Input/output impedance: 300 ohms ±10%
- Excitation : 2 to 16 Vp; DC to 5000Hz
- Calibrated Rate: 80 BPM normal sinus rhythm
- Static Levels BP1/2:
  - -10 to 400 mmHg in 1 mmHg steps
  - 15 User defined presets; user input specific pressures
- Accuracy: ± (1% of setting + 1mmHg)

Dynamic Simulations:
- Arterial (120/80)
- Arterial (90/40)
- Arterial (160/110)
- Radial Artery (120/80)
- Left Ventricle (120/0)
- Right Ventricle (25/0)
- Pulmonary Artery (25/10)
- Pulmonary Artery Wedge(25/2)
- Right Atrium [CVP] (120/0)
- Left Atrium (14/4)
- Swan-Ganz (channel 1 only)
  - Automatic (every 15, 25sec) with Pause
  - Manual, advance is manually triggered
- Artifact/Respiration (larger of):
  - 5mmHg or 5%
  - 10mmHg or 10%

Pacemaker:
- Pulse Amplitude: -700mV to +700mV
- Pulse Polarity: Positive or negative.
- Pulse Width: 0.1, 0.2, 0.5, 1.0, 2.0 ms
- Accuracy : ±(5% setting + 0.2mV) Lead II
- Pacer Rhythm:
  - Venticular
    - Asynchronous 75 BPM
    - Demand with frequent sinus beat
    - Demand with occasional sinus beat
    - A-V sequential
    - Non-capture
    - Non-function
  - Atrial
    - Atrial 80 BPM
    - A-V sequential

Temperature:
- 20 - 42°C in 0.5°C increments
- Accuracy: ±0.01 °C high precision simulations (30, 32, 35, 37, 40, 42 °C)
- ±0.03 °C general
- Probe Compatibility: 400 or 700 series YSI

Respiration:
- Baseline Impedance:
  - 500, 1000, 1500, 2000 ohms on LEADS I, II, III
  - Accuracy +/- 5%
- Impedance Variations (Delta):
  - 0.05 to 1.0Ω in 0.05Ω increments;
  - 1.0 to 5.0Ω in 0.25Ω increments;
  - Accuracy +/- 5% + 0.01 ohms
- Rates: 10 to 150 BrPM; 1 BrPM steps; 0 BrPM for APNEA
- Apnea Selections: 12, 22, 32 seconds, and continuous
- Respiratory Effort (Inspiration/Expiration Ratio:) 1/1, 1/2, 1/3, 1/4, 1/5
- Ventilated 1/1
- Respiration Lead LA or LL

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Cardiac Output:
Baseline Temperature: 36, 37 and 38°C, ±0.03 °C
8 Inject Temperatures 0, 2, 20 & 24°C; Spacelabs and Phillips
1 user adjustable
Simulations:
C.O. of 3, 4, 5, 6, 7l/min
Slow Injectate Curve
Faulty Injectate Curve
Left to Right Shunt Curve
Cal Pulse: 1°C for 1 second

Arrhythmia Selections:
General 1
Asystole 1
Asystole 2
Asystole 3
PVC1 Bigeminy
PVC1 Trigeminy
PVC2 Bigeminy
PVC2 Trigeminy
Premature Atrial Contraction (PAC)
Nodal Premature Nodal Contraction (PNC)
Multifocal PVC (once)
Frequent Multifocal PVCs

Ventricular Arrhythmia (PVC1\left or 2\right)
PVC Ventricular (once)
PVC Ventricular (every 10th beat)
PVC Early, Ventricular
PVC R-on-T, Ventricular
PVC 6/Minute
PVC 12/Minute
PVC 24/Minute
Pair PVCs (1 time event)
Run 5 PVCs (1 time event)
Run 11 PVCs (1 time event)

Conduction Defects:
First Degree Heart Block
Mobitz I, Second Degree Heart Block
Mobitz II, Second Degree Heart Block
Third Degree Heart Block
Right Bundle Branch Block
Left Bundle Branch Block

Fibrillations
Coarse Atrial Fibrillation
Fine Atrial Fibrillation
Coarse Ventricular Fibrillation
Fine Ventricular Fibrillation

Supraventricular Arrhythmia
Atrial Tachycardia
Paroxysmal Atrial Tachycardia
Supraventricular Rhythm @ 90 & 120 BPM
Supraventricular Tachycardia @ 140, 150, 160, 180, 190, 200, 210 & 220 BPM
NSR @ 160 BPM

General 2
Atrial Flutter
Sinus Arrhythmia
Missed Beat @ 80 BPM (1 time event)
Miss every 10th @ 80 BPM
Miss every 10th @ 120 BPM
Nodal Rhythm
Sinus Bradycardia <60 BPM

AutoSettings
Unlimited number of user programmable, simulation parameter setups available.

Communication / User Interface:
via vPad-A1 Base Unit
Android 5" tablet:
Touchscreen User Interface
Wired (USB) or Bluetooth mode
WiFi
16 GB memory
Dual XBUS for Datrend test automation

Power Supply:
via vPad-A1 Base Unit
External AC adapter
Internal rechargeable Li-Ion batteries (for 10 hrs of simulation with full charge)

Dimensions:
98mm x 208mm x 56mm (3.85" x 8.2" x 2.21")
PS Unit (incl. A1 Base)

Weight:
660g (1.44lb) PS Unit (incl. A1 Base)
200g (0.44lb) wireless tablet interface

Environment:
15°C to 40°C, 10% to 90% RH, Indoor Use Only, Category II

All specifications subject to change without notice.

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