

Vitalmax 4100 CL

A. Mechanical Description

Size	9.8" H x 17.3" W x 12.5"D (24.5 cm x 43.25 cm x 31.25 cm)
Weight	35 lb 6 oz
Color	Beige and Aqua

B. Power Requirements

Operation	AC/DC
Internal battery	12V 7.0Ahr sealed lead-acid
Battery operating time	2 - 2.5 hours full charge
Battery charge time	16-20 hours
AC mains input	Universal Switching Power Supply, Hospital grade plug, 100-250 V/50-60 Hz 16VDC / 2.8A Output, UL, CSA, GS
Fuses	Two 5.0 A, 250 V, fast blow

C. Performance Specifications

1. ECG

CMRR	100 dB @60 Hz (common mode rejection ratio)
Heart rate range	30-240 bpm
Heart rate averaging	4 beat average
Heart rate accuracy	±5 bpm or 10%, whichever is greater
Response time of heart rate meter for a step change in heart rate	80-40 bpm less than 7 seconds. 80-120 bpm less than 11 seconds.
Pacemaker pulse rejection	Amp: ± 2 mV to ± 700 mV Duration: 0.1 ms to 2.0 ms
Input	3-Lead ECG / Respiration patient cable with no series resistance
Connector	AAMI 6-pin
Lead selection	I, II, III (Standard Config.)
ECG reference signal	1 mV software triggered
Patient isolation	Breakdown voltage: 5000 VRMS 60 seconds 60 Hz
Leakage current	
a) Internal to ground	< 0.01 mA (< 10 uA)
b) Enclosure	< 0.01 mA (< 10 uA)
c) Leads-off sensing current	< 10 uA
DC current	< 0.01 mA (< 10 uA)
Frequency response/Band width	0.5-40 Hz (±3 dB)
Patient drive current	< 10 uA
Maximum T wave rejection capability	120% of QRS Segment
Defibrillator & ESIS protected	Tested with 5 kV
Recovery time following defibrillation	Within 8 seconds.
Lead fault alarm	Audible, visual
QRS indicator	Audible, visual Asystole: audible and visual
Gain selection	5 mV, 2 mV, 1 mV, 0.5 mV, 0.2 mV
Time to alarm tachycardia	3 seconds
Aspect ratio	0.24, 0.4, 0.6, ±0.08 sec/mV
Alarm frequency	Low alarm 24 Hz 20 High alarm 30 - 34 kHz
ECG input impedance	>2.5 M Ohm @ 10 Hz

2. ECG/ Thoracic Impedance Respiration

Excitation current	<100 uA
Excitation frequency	65 kHz
Maximum allowable electrode impedance	2 K ohm
Size adjustment	User selectable
Respiration rate range	4-99 rpm (respirations per minute)
Respiration rate accuracy	± 2 rpm
Respiration rate averaging	4 breath average
Respiration alarm limits	Upper 4-99 rpm Lower 4-98 rpm
Sensitivity range	Adult: 0.3-10 Ohms Neonate: 0.1-10 Ohms
Apnea	Audible and visual alarm in less than 20 seconds. Not recommended for apnea monitoring.
Sensing electrodes	RA and LA
Lead Selection	I, II, III

3. ANESTHETIC AGENTS (Model G only)

Agent method	Piezoelectric crystal resonance
Selectable agents	Isoflurane, Enflurane, Halothane
Optional agents	Sevoflurane, Desflurane
Display range	0 - 20%
Agent measurement range	Isoflurane, Enflurane, Halothane, and Sevoflurane: 0 - 6% Desflurane: 0 - 17.5%
Accuracy	± 0.2% or 10% of reading
Display resolution	0.01%
Anesthetic calibration gas	1.5% Isoflurane, 10% CO ₂ , 50% N ₂ O, bal. N ₂

4. FiO₂ (Model G only)

Probe	Galvanic fuel cell
Range	0% - 100%
Accuracy	± 2% (when O ₂ cell is calibrated with 100% O ₂)
Resolution / averaging	1% O ₂
Response	< 10 seconds to 90% O ₂
O ₂ calibration gas	Manual with room air (21% O ₂) or 100% O ₂
Pressure	± 4 PSI
Life	750,000, % O ₂ hours (20 months continuous in 50% O ₂)

5. EtCO₂, inCO₂(min), N₂O, and RESPIRATION

Type	Side stream, non-dispersive infrared
Method	CO ₂ sample line with nasal cannula or endotracheal tube connector
CO ₂ averaging	4 breaths or breath-to-breath
CO ₂ range	0-99 mmHg adult/pediatric (0-13.2 kPa)
CO ₂ accuracy	± 2 mmHg (0-40 mmHg)[± 0.27 kPa (0-5.33 kPa)] ± 5% of reading [(40-99 mmHg)(5.33-13.2 kPa)]
Rise time	< 300 ms 10% to 90%
CO ₂ calibration	Two point: Room air, and 10% CO ₂ , 50% N ₂ O, bal. N ₂
N ₂ O range	0 - 100%
N ₂ O accuracy	± 5% of full scale
Sample aspiration rate	140 ml/min ±10 ml
Sample line purging	Automatic
Water trap	Disposable, Volume 17 cc
Analog output	Optional

Alarm limits	Respiration	Upper	4-99 rpm
		Lower	4-98 rpm
	ETCO2	Upper	0-99 mmHg (13.2 kPa)
		Lower	0-98 mmHg
	InCO2	Upper	0-99 mmHg (0-13.2 kPa)
		Lower	0-98 mmHg
Alarm volume	Fixed		

6. INVASIVE PRESSURE

Channels	Two
Measurement range	-30 mmHg to +300 mmHg (-4.0 kPa to 40.0 kPa)
Waveform Span	Adjustable to 30, 60, 90, 120, 180 or 300mmHg
Pressure offset	Adjustable in steps of 10 mmHg
Gain accuracy	± 1% or ± 2 mmHg whichever is greater (± 0.27 kPa)
Analysis value	Maximum, minimum, and mean pressure
	Pulse rate from arterial waveforms
Heart rate range	10-250 bpm
Heart rate accuracy	± 1% or ± 5 bpm, whichever is greater
Heart rate alarm limits	Upper 0-250 bpm
	Lower 0-249 bpm
Transducer sensitivity	5 uV/V/mmHg
Transducer excitation	5V DC
Transducer zero adjust	± 150 mmHg (± 19.99 kPa)
Transducer auto-zeroed on pressing the zero-adjust button	
Band width	Upper band limit: User selectable: 8, 9, 10, 12, 14, 16, 19, 22, 25, 30, 35, 40 Hz Default: 14 Hz Lower band limit: DC
Display	Digital waveform display with semiautomatic and manual pressure range scaling Trend display of pressure waveforms
Alarms	Audio and Visual User adjustable upper and lower alarm limits
User selectable pressure channel labels	IP1(2), ART1(2), AO1(2), RA1(2), FA1(2), CVP1(2), PA1(2)
Alarm limits	Max IP (Systolic): Upper -30 to 300 mmHg (-4.0 to 40 kPa) Lower -30 to 299 mmHg (-4.0 to 39.9kPa)
	Min IP (Diastolic): Upper -30 to 300 mmHg (-4.0 to 40 kPa) Lower -30 to 299 mmHg (-4.0 to 39.9kPa)
	Mean IP Upper -30 to 300 mmHg (-4.0 to 40 kPa) Lower -30 to 299 mmHg (-4.0 to 39.9kPa)

7. PULSE OXIMETRY (SpO2)

Saturation range	0-100%, adult/pediatric/neonate
Saturation averaging	8 beat average
Saturation accuracy	± 2% (70-100%), ± 3% (50-69%), (0-49% unspecified)
Saturation alarm limits	Upper: 0-100%
	Lower: 0-99%
Pulse rate range	30 - 254
Pulse rate averaging	8 second average
Pulse rate accuracy	±2 % @ 30 - 100 bpm
Pulse alarm limits	Upper: 0-250 bpm
	Lower: 0-249 bpm
Pulse tone	Pitch adjusts to SpO2 value Volume adjustable
Pulse rate display	Waveform, digital, pulse amplitude
Sensor types	Finger, Universal "Y", ear lobe clip Disposable and reusable wrap probes

8. NON-INVASIVE BLOOD PRESSURE (NIBP)

Method	Automatic oscillometric
Parameters measured	Systolic, diastolic, mean arterial pressure, pulse
Scale	mmHg or kPa
Operating modes	Manual, Automatic, Stat
Repeat cycles	10-50 seconds; 1-99 minutes
Rapid cycle update	1-4 minutes (STAT mode)
Measurement range	Systolic: Adult/pediatric 30-250 mmHg (4.0-33.3 kPa) Neonate 20-160 mmHg (2.7-21.3 kPa) Diastolic: Adult/pediatric 10-180 mmHg (1.3-24.0 kPa) Neonate 10-140 mmHg (1.3-18.7 kPa)
Measurement time	Typical 50 seconds Maximum 120 seconds Typical Stat 30 seconds
Cuff inflation rate	Not greater than 40-50 mmHg/sec (5.33-6.66 kPa/sec)
Cuff inflation pressure	30 mmHg above last systolic (4.0 kPa)
Cuff pressure range	Adult/pediatric 0-250 mmHg (0-33.3 kPa) Neonate 0-140 mmHg (0-18.7 kPa)
Initial cuff inflation	Adult/pediatric 170 ± 10 mmHg (22.7 ± 1.3 kPa) Neonate 120 ± 10 mmHg (16.0 ± 1.3 kPa)
Auto deflate pressure	Adult/pediatric 280 mmHg; ± 5 mmHg (36.7-38.0 kPa) Neonate 235 mmHg; ± 5 mmHg (30.7-32.0 kPa)
NIBP display accuracy	± 3 mmHg (0.4 kPa)
NIBP alarm limit	Systolic: Upper 0-255 mmHg (0-34.0 kPa) Lower 0-254 mmHg (0-33.9 kPa) Diastolic: Upper 0-255 mmHg (0-34.0 kPa) Lower 0-254 mmHg (0-33.9 kPa) Mean: Upper 0-255 mmHg (0-34.0 kPa) Lower 0-254 mmHg (0-33.9 kPa)
Pulse rate determinations	30-254 bpm
Pulse rate averaging	4 beat average
Pulse rate accuracy	±3 bpm @ 40-120 bpm ±10 bpm @ 121-200 bpm
Pulse rate alarm limits	Upper 0-250 bpm Lower 0-254 bpm
Cuffs	Reusable and disposable cuffs Neonate, infant, pediatric, standard adult, large adult, thigh, with 6 foot air hose

9. TEMPERATURE

Temp scale	°F or °C
Temp range	82.4-109.8°F (28.0-43.2°C)
Temp accuracy	± 0.2°F (± 0.1°C)
Temp alarm limits	Upper 83.0-110.0°F (28.3-43.3°C) Lower 83.0-109.9°F (28.3-43.2°C)
D Temp range	0°-27°F (0-15°C)
D Temp alarm limits	Upper 0-27°F (0-15°C) Lower 0-26.9°F (0-14.9°C)
Temp probes	Skin or rectal/esophageal YSI™ 400 Series compatible: for use with invasive pressure models only Medtronics™/ Electromedics 2100 Series™ compatible: for use with non-invasive pressure models only

D. Color LCD Display

Matrix	SVGA: 800 pixels (Horizontal) x 600 pixels (Vertical)
Effective display area	12.1 inch diagonal
Signal Indicators	Green signal LED

E. Printer

Type	Built-in 2-channel thermal array recorder/printer
Print mode	Text or waveform
Waveforms	Real time or alarm-triggered (10, 15, 20, or 30 seconds)
Resolution	200 dpi vertical; 400-800 dpi horizontal
Waveform annotations	Time, date, speed, channel identification, waveform lead selection

F. Environmental Specifications

Temperature	Operating: 66°F - 86°F (19°C - 30°C)
	Storage 40°F - 110°F (4.4 C - 43.3°C)
Relative humidity	Operating: 20-80% (non-condensing)
	Storage 10-90% (non-condensing)

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.