SIGNAL EXTRACTION PULSE CO-OXIMETER®

Radical-7®

Breakthrough Measurements. Radical Monitor.

Once again raising the technology bar, the 2012 Radical-7 leverages Masimo's breakthrough noninvasive measurements with a radical departure from traditional monitoring for breakthrough functionality designed to automate the process of care and enable clinicians to instantly adapt to changing monitoring needs in individual patients and care areas.

BREAKTHROUGH MEASUREMENTS

Noninvasive and Continuous:

- **Masimo SET®** Measure-through Motion and Low Perfusion™ pulse oximetry
- **Perfusion Index (PI)** helps assess peripheral blood flow
- **Hemoglobin (SpHb®)** to help clinicians identify bleeding earlier[1] and reduce blood transfusions during surgery[2]*
- **Pleth variability index (PVI®)** to help clinicians assess fluid responsiveness[3] and improve fluid management to decrease patient risk[4]*
- **Carboxyhemoglobin (SpCO®)** to help clinicians assess carbon monoxide (CO) in the blood – facilitating earlier detection and treatment of CO poisoning[5]*
- **Methemoglobin (SpMet®)** to help clinicians assess methemoglobin in the blood – facilitating earlier detection and treatment of a dangerous, often unrecognized reaction to many commonly used drugs*
- **Acoustic respiration rate (RRa™)** to help clinicians assess breathing – facilitating earlier detection of respiratory compromise and patient distress[6]*

* Each measurement is optional and requires a software upgrade

RADICAL FEATURES

- Keep your patients connected with standard integrated wireless connectivity with 802.11 radio & Bluetooth®
- Easy operation with intuitive color touchscreen
- Instant adaptability to what each clinician wants to see – parameters, waveforms, trends
- Powerful trending functionality – select one or two parameters at once and with a simple gesture, move, expand, or collapse parameter trends for real-time analysis
- Device profile light for easy customization and quick changes to settings with pre-configured profiles as well as easy identification of which department the device belongs
- Unprecedented versatility with rotational screen in the handheld – automatically changes to horizontal or vertical view – in or out of the docking station
- Help assess measurement confidence with Signal IQ®
- Extended monitoring with 4 hour handheld battery life
- Maximum safety with redundant speaker system

MASIMO®

[1] Causey MW et al. *American Journal of Surgery*. 2011;201:590-596. [2] Ehrenfeld JM et al. *ASA*. 2010;LB05. (abstract). [3] Cannesson M et al. *Br J Anaesth*. 2008;101(2):200-6. [4] Forget P et al. *Anesth Analg*. 2010;111(4):910-4. [5] Hampson NB. *AM J Emerg Med*. 2012. Article in press. [6] Ramsay M et al. *PGA*. 2011. P9137. (abstract).

Performance

OXYGEN SATURATION (%SpO2)[1]

Measurement Range ..... 0 – 100%
Saturation ..... 70 – 100%
No Motion
Accuracy (Adults/Infants/Pediatrics) ..... ± 2%
Accuracy (Neonates) ..... ± 3%
Motion
Accuracy (Adults/Infants/Pediatrics/Neonates) ..... ± 3%
Low Perfusion
Accuracy (Adults/Infants/Pediatrics/Neonates) ..... ± 3%
Saturation ..... 60 – 80%
No Motion
Accuracy (Adults/Infants/Pediatrics) ..... ± 3%

PULSE RATE[1]

Measurement Range ..... 25 – 240 bpm
No Motion
Accuracy (Adults/Infants/Pediatrics/Neonates) ..... ± 3 bpm
Motion
Accuracy (Adults/Infants/Pediatrics/Neonates) ..... ± 5 bpm
Low Perfusion
Accuracy (Adults/Infants/Pediatrics/Neonates) ..... ± 3 bpm

RESPIRATORY RATE (RRa, breaths per minute)[1]

Measurement Range ..... 4 – 70 breaths per minute
Accuracy (Adults/Pediatrics) ..... 4 – 70 ± 1 breath per minute

TOTAL HEMOGLOBIN (SpHb g/dL)[1]

Measurement Range ..... 0 – 25 g/dL
Accuracy (Adults/Infants/Pediatrics) ..... 8 – 17 g/dL ± 1 g/dL

METHEMOGLOBIN (%SpMet)[1]

Measurement Range ..... 0 – 99.9%
Accuracy (Adults/Infants/Pediatrics/Neonates) ..... 1 – 15% ± 1%

CARBOXYHEMOGLOBIN (%SpCO)[1]

Measurement Range ..... 0 – 99%
Accuracy (Adults/Infants/Pediatrics) ..... 1 – 40% ± 3%

PLETH VARIBILITY INDEX (PVI), PERFUSION INDEX (PI), OXYGEN CONTENT (SpOC)

Measurement Range (PVI) ..... 0 – 100%
Measurement Range (PI) ..... 0.02 – 20%
Measurement Range (SpOC) ..... 0 – 35ml of O2/dL of blood

RESOLUTION

Oxygen Saturation (%SpO2) 1%
Pulse Rate (bpm) ..... 1 bpm
Respiration Rate (RRa) ..... 1 breath per minute
Total Hemoglobin (SpHb g/dL) ..... 0.1 g/dL
Methemoglobin Saturation (%SpMet) 0.1%
Carboxyhemoglobin Saturation (%SpCO) 1%

BATTERIES
HANDHELD

Type ..... Lithium Polymer
Capacity (battery life) ..... 4 hours[2]
Charging Time ..... 3 hours

STANDALONE (with RDS-1B)

Type ..... NiMH
Capacity (battery life) ..... 10 hours[2]
Charging Time ..... 6 hours

ENVIRONMENTAL

Operating Temperature ..... 41°F to 104°F (5°C to 40°C)
Storage Temperature ..... -40°F to 158°F (-40°C to + 70°C)
Operating Humidity ..... 5% to 95%, noncondensing
Operating Altitude ..... 500 mbar to 1060 mbar pressure
-1000 ft to 18,000 ft (-304 m to 5,486 m)

PHYSICAL CHARACTERISTICS

Dimensions ..... 8.9" x 3.5" x 2.1" (22.6 cm x 8.9 cm x 5.3 cm)
Standalone ..... 3.5" x 10.5" x 7.7" (8.9 cm x 26.7 cm x 19.6cm)

WEIGHT

Handheld ..... 1.2 lbs (0.54 kg)
Docking Station (models RDS-1, 2, and 3) ..... 2.5 lbs (1.14 kg)
Standalone (models RDS-1, 2, and 3) ..... 3.8 lbs (1.73 kg)

TRENDING

Provides 96 hours of trending at 2-second resolution of SpO2, Pulse Rate, RRa, SpHb, SpMet, SpCO, Perfusion Index, and SpOC with output to serial printer or other serial devices.

SpO2 MODES

Averaging Mode ..... 2, 4, 8, 10, 12, 14, or 16 seconds
Sensitivity ..... Normal, APOD®, and Maximum

RRa MODES

RRa Averaging ..... 0, 10, 20, 30, 60 seconds

ALARMS

Audible and visual alarms for high low saturation and pulse rate (SpO2 range 1-99%, pulse rate range 30-235 BPM, RRa range 4-69 breaths per minute, SpHb range 1-24.5 g/dL, SpMet range 1-99.5%, PVI range 1-99%, SpCO range 1-98%, PI range 0.03-19%).

DISPLAY/INDICATORS

Data display: SpO2, pulse rate, Respiratory Rate (RRa), SpHb, SpMet, PVI, SpCO, perfusion index, SpOC, pleth waveform, RRa waveform, alarm status, trends, status messages, Signal IQ, MAX, Norm and APOD sensitivities, and FastSat®.
Type ..... Backlit Active Matrix TFT LCD, Color Touchscreen
Pixels ..... 480 x 272 dots
Dot Pitch ..... 0.25 mm

OUTPUT INTERFACE

SatShare (RDS-1); Serial RS-232 (RDS-1, RDS-3); Nurse Call/Analogue Output (RDS-1, RDS-3); Philips Vuelink, Spacelabs Universal Flexport, (RDS-1, RDS-3)

Docking Station

With a choice of docking stations for your Radical-7, you can select the connectivity configurations that work best for your clinical needs.

RDS-1
Serial, analogue, nurse call, and SatShare connectivity. Optional extended battery provides battery life up to 10 hours.

RDS-2
Power Only.

RDS-3
Serial, analogue, and nurse call connectivity.

[1] SpO2, SpCO, and SpMet accuracy has been validated on healthy adult male and female volunteers with light to dark skin pigmentations in the range of 60% - 100% SpO2, 0% - 40% SpCO, and 0% - 15% SpMet against a laboratory CO-Oximeter. SpHb accuracy has been validated on healthy adult male and female volunteers and on surgical patients with light to dark skin pigmentations in the range of 8 g/dL to 17 g/dL SpHb against a laboratory CO-Oximeter. The SpCO, SpMet and SpHb have not been validated with motion or low perfusion. Pulse Rate accuracy has been validated in the range of 25-240 bpm in bench top testing against a Biotek Index2 simulator. Respiration rate accuracy has been validated for the range of 4 to 70 breaths per minute in bench top testing. Clinical validation for up to 30 breaths per minute was also performed with the Masimo Acoustic Respiration sensor and instrument. The variation in accuracy specifications equals plus or minus 1 standard deviation which encompasses 68% of the population. Contact Masimo for testing specifications.

[2] This represents approximate runtime at the lowest indicator brightness and pulse tone turned off using a fully charged battery.

Caution: Federal law restricts this device to sale by or on the order of a physician.

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