

Masimo Rainbow SpO₂ technology and testing

Application Note



Introduction

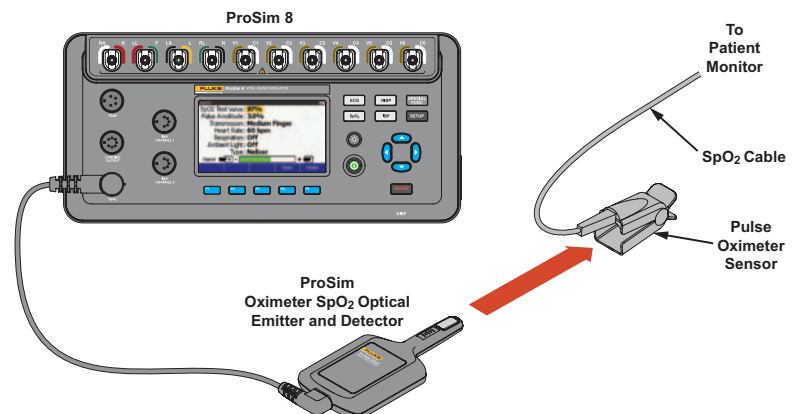
Masimo Rainbow is the first technology to non-invasively measure blood constituents and fluid responsiveness that previously required invasive procedures. Besides measuring arterial oxygen saturation level (SpO₂) and pulse rate, Rainbow technology measures following parameters as well: Hemoglobin (SpHb), Carboxyhemoglobin (SpCO) and Methemoglobin (SpMet).

Traditional pulse oximeters use wavelengths of two lights (infrared light at 940 nm and red light at 660 nm), which are absorbed differently by either oxyhemoglobin or the reduced hemoglobin to measure SpO₂ concentration. Two-wavelength oximeters cannot measure total hemoglobin or dyshemoglobins. Rainbow sensor technology uses more than 7 wavelengths of light to acquire blood constituent data based on light absorption.

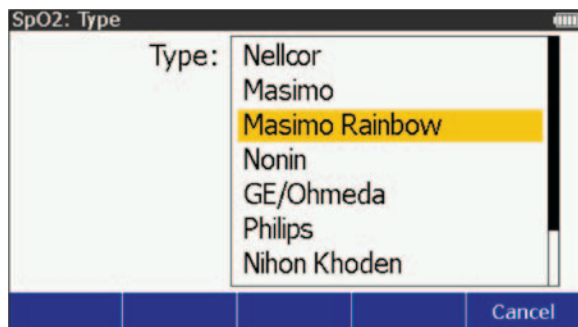
When used with the Masimo Rainbow Test Sensor, ProSim Vital Sign Simulator is the first and only simulator capable of verifying the performance of Masimo Rainbow Oximeters.

How to test Masimo Rainbow

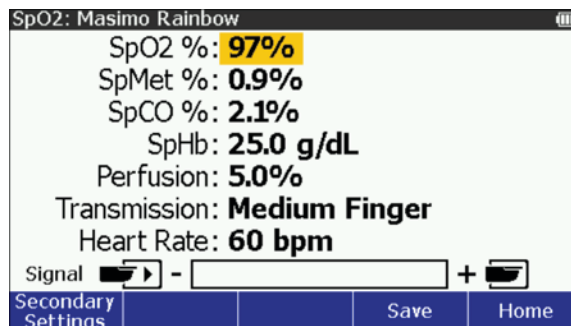
1. Attach the Rainbow Test sensor to the artificial finger of ProSim 8 as shown in the figure below. Place the sensor with the LEDs on the bottom of the artificial finger. While placing the sensor on the artificial finger, monitor the signal indicator along the bottom of the product display. Adjust the sensor on the finger for maximum signal strength.



2. Select Masimo Rainbow from Type selection:



3. The SpO₂ screen shows three more parameters than what is shown for other types of sensors: SpMet, SpCO, and SpHb.



- a. SpMet, SpCO, and SpHb cannot be set through the ProSim. The special Masimo Rainbow cable sets them based on the measured SpO₂ percent. At 100 %, SpMet = 0 %, SpCO = 0 %, and SpHb = 25 g/dl.
 - i. SpCO: -1 % change in SpO₂ = +0.7 % change in SpCo
 - ii. SpMet: -1 % change in SpO₂ = +0.3 %, SpMet
 - iii. SpHb: -1 % change in SpO₂ = -0.5 g/dl change in SpHb
 - iv. SpHb does not change for values of SpO₂ above 90 %.

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Fluke Biomedical
6045 Cochran Road
Cleveland, OH 44139-3303 U.S.A.

Fluke Biomedical Europe
Science Park Eindhoven 5110
5692EC Son, The Netherlands

For more information, contact us:
In the U.S.A. (800) 850-4608 or
Fax (440) 349-2307
In Europe/M-East/Africa +31 40 267 5435 or
Fax +31 40 267 5436
From other countries +1 (440) 248-9300 or
Fax +1 (440) 349-2307
Email: sales@flukebiomedical.com
Web access: www.flukebiomedical.com

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