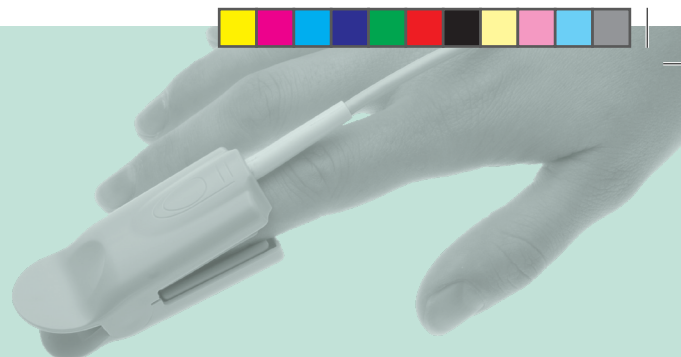


pulse oximetry



VM-2160 SMARTsat

High Performance Pulse Oximeter

Designed with the most difficult conditions in mind

- For spot checking or constant monitoring of SpO₂ and pulse rate
- Now incorporating SMARTsat SpO₂ technology
- Clear and bright, colour TFT display
- Robust, ergonomic design with durable silicone protective cover
- Includes a SMARTsat soft silicone sensor
- Stores and restores up to 480 hours of trend data
- Adjustable high and low alarms
- Antibacterial keypad



The ergonomic VM-2160 hand held pulse oximeter has the durability of a compact and lightweight hand held unit for spot checking of SpO₂, but also has the power and functionality of a stand alone pulse oximeter. The very latest and innovative signal processing technologies and algorithms enable precise measurements, even under very difficult physiological conditions.

The VM-2160 incorporates adjustable high and low alarms for both the SpO₂ and pulse rate with audible pulse tones, and is able to store and restore up to 480 hours of patient trend data, enabling the unit to also be used at the bedside for continual patient monitoring.

Utilising the latest display technology, the clear and bright colour screen offers superb visibility in all lighting conditions, including direct sunlight.

The VM-2160 can be used in a variety of applications; in hospitals, paramedic ambulances, clinics and dental surgeries - making this an extremely flexible and durable piece of equipment.



The VM-2160 SMARTsat offers an efficient and cost effective solution for spot monitoring or constant monitoring of SpO₂ and Pulse rate

- For spot checking or constant monitoring of SpO₂ and Pulse Rate
- Includes a SMARTsat soft silicone sensor - *other sensors can be specified
- Stores and restores up to 480 hours of trend data
- Adjustable high and low alarms

VM-2160 Standard Package

- VM-2160 SMARTsat Pulse Oximeter
- Reusable SMARTsat adult silicone finger sensor*
- Silicone protective cover
- PC review software
- USB data cable
- 3 x AA batteries



* Please select from Soft Sensor (Adult, Small Adult or Paediatric), Finger Sensor, Silicone Wrap Sensor, Ear Sensor and indicate at the time of ordering.



Long term monitoring and trending



VM-2160 Display



VM-2160 in Protective Cover

Key features of the VM-2160 SMARTsat Hand Held Pulse Oximeter

- Self-explanatory and ergonomic functions enable intuitive operation
- The colour information display, as well as the simple information structure, support quick decisions and a rapid user reaction in critical situations
- Intelligent linking of visual and acoustic information and signals
- The pulse tone rate provides information about the level of oxygen saturation
- Automatic suppression of ambient light influences
- Signal quality indications
- Simple handling and clear error messages effectively prevent incorrect operation of the VM-2160
- 20 language options available - for operational control
- The most modern technologies and energy-saving elements enable continued use of the device over several days
- Rapid data transfer using a standard USB interface
- Silicone protective cover included in the package
- Powered by standard AA alkaline batteries

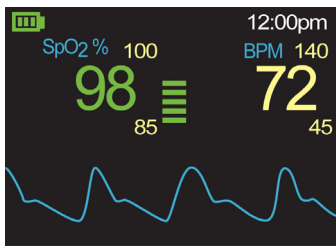
SMARTsat has been calibrated within the range of 60 - 100 % SpO₂.

SMARTsat A_{RMS} in the SaO₂ ranges*

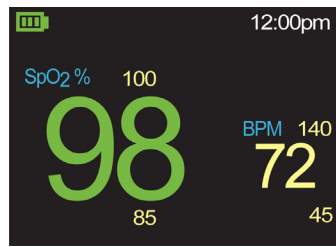
	100 - 60%	100 - 90%	90 - 80%	80 - 70%	70 - 60%
Silicone Sensors	1.77	1.64	1.78	1.71	2.42
Finger Clip Sensors	1.44	1.01	1.35	1.66	2.05
Silicone Wrap Sensors	1.74	1.24	1.53	1.92	3.04
Disposable Adult	2.32	1.55	2.2	2.55	3.67
Ear Sensors	2.46	1.44	1.68	3.52	3.27

* OEM III

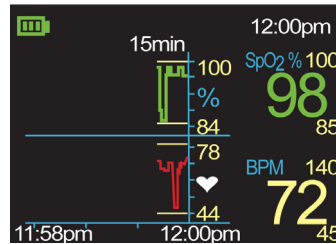
Display Formats



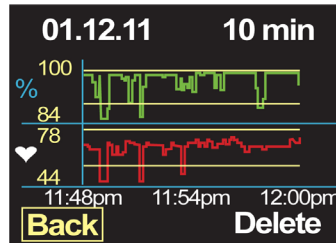
Default Display



Large Digit Display



Short Term
Trending Display



Long Term
Trending Display



Actual Size

Sensors and Cables



0014651

**SMARTsat
Reusable Adult Finger Sensor**
1.2m cable length



0014752

**SMARTsat
Reusable Adult
Silicone Soft Sensor**
1.2m cable length



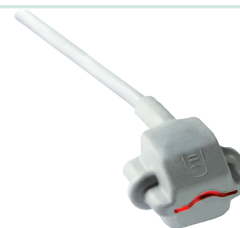
0014851

**SMARTsat
Reusable Silicone
Wrap Sensor**
1.2m cable length



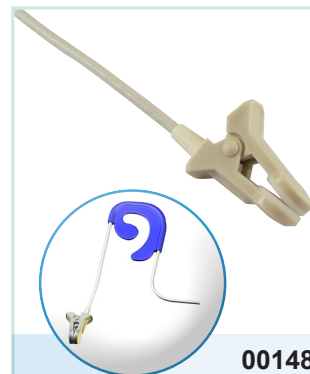
0014895

**Pulse Oximetry
Extension Cable**
1.2m cable length



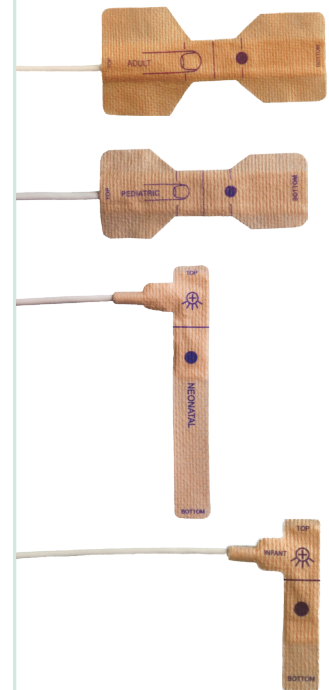
0014753

**SMARTsat
Reusable Paediatric
Silicone Soft Sensor**
1.2m cable length



0014850

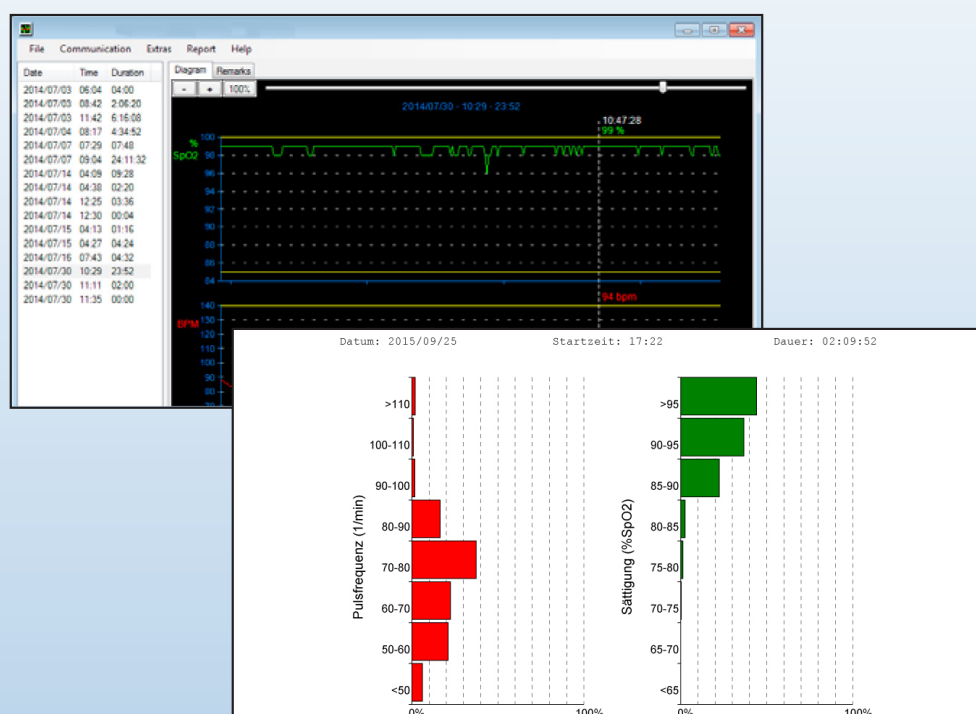
**SMARTsat
Reusable Ear Sensor**
1.2m cable length



**SMARTsat
Disposable
Plaster Tape Sensors**
Box of 24 sensors

Adult	0015010
Paediatric	0015011
Infant	0015012
Neonatal	0015013

Powerful Pulse Oximetry PC Software



With the convenient Pulse Oximetry PC Software all measured values, selected alarm limits and alarm messages can be transferred to a computer via the USB interface.

The data can be viewed on a computer and patient information added. The PC software enables basic statistical evaluation of the stored data, to be printed or exported as CSV file for processing with additional software.

Mounting Options and Accessories

For use with VM-2160

- Fluid repellent
- Non rot
- U.V. stable
- Washable at 60°C
- Self healing and waterproof zips
- micAgard silver-lining inners
- Abrasion and tear resistance
- High visibility and reflective properties

0022178



0022160



0022171



Universal Mounting Plate

0121180



'V' Wall Mount

0121181



'V' Mount Pole Clamp
Small: 14 - 25mm clamping width

0121182



'V' Mount Pole Clamp
Large: 16 - 40mm clamping width

0121184



'V' Mount Rail Clamp

N.B.: The universal mounting plate is required when using any of the mounting options shown.

0121200



Universal Mounting Clamp

0014890



Sensor Wraps
Pack of 12

0021013



Posey Wrap
Pack of 12 - 6554

0021018



Posey Wrap Paediatric
Pack of 12 - 6554P

Applications

The VM-2160 SMARTsat with Silicone Finger Sensor is suitable for the following applications:

- Clinical Environments
- Rescue and emergency services
- Sleep studies
- Home care
- Long-term monitoring
- Stress testing



Measuring Range

SpO ₂	0 - 100%
Pulse Rate	0 - 300 bpm
Perfusion Index	0.1 - 20% (no motion)

Accuracy

SpO ₂	60 - 100% ± 2 A _{RMS} (no motion) ¹
	70 - 100% ± 3 A _{RMS} (motion condition) ²
	60 - 100% ± 2 A _{RMS} (low perfusion, no motion) ³
Pulse Rate	20 - 300 bpm ± 2 bpm (no motion)

Optical Specifications

Red emitter	660nm, typ 3.5mW
Infra-red emitter	905nm, typ 3.5mW

Display

Features	TFT Colour, 65,000 colours, 128 x 160 pixels
Data displayed	Oxygen saturation, pulse rate, plethysmogram, bar graph, short and long term trend
Indicators	Signal strength & quality, pulse amplitude, battery status, alarm silenced, sensor detection, sensor disconnection

Trend Information

Short term trend	15 / 30 / 240 minutes
Long term trend	> 48 hours

Environmental Conditions

Operating temperature	-20 - 50°C , 15 - 95% RH, 600 - 1300 hPa
Storage temperature	-30 - 70°C, 10 - 95% RH, 600 - 1500 hPa

Regulatory Approvals

Standards	CE Class IIb in accordance with MDD 93/42/EEC IEC 60601-1:2005 (3rd Edition), IEC 60601-1 (2nd Edition), IEC 60601-1-2:2014 (4th Edition), IEC 60601-1-2 (3rd Edition), EN ISO 80601-2-61:2011, EN ISO 9919:2009, ISO 14971:2007, IEC 60601-1-6:2010; IEC 60601-1-11:2010, IEC 60601-1-8:2006, ISO 10993-1:2009, ISO 10993-5:2009, ISO 10993-10:2010 Class II, Type BF
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Safety**Assembly**

Construction	IP32
Dimensions	118 mm (L) x 60 mm (W) x 25 mm (H)
Weight	Approximately 160g (including batteries, without sensor)
Power Supply	3 x AA alkaline batteries.
Battery Life	> 2 days continuous operation or approximately 5 days in economy power mode
PC interface	USB 2.0

VM-2160 SMARTsat*	0012165
* Language package: Central European, includes: English, Afrikaans, Dutch, French, German, Hungarian, Italian, Polish, Portuguese and Spanish.	
VM-2160 - Scandinavian languages (English, Danish, Finnish, Swedish)	0012166
VM-2160 - Special EU characters languages (English, Greek, Russian, Turkish)	0012167
VM-2160 - Asia I languages (English, Chinese and Traditional Chinese)	0012168
VM-2160 - Asia II languages (English, Japanese and Korean)	0012169

Additional Accessories Available

Sensor Wraps - for use with 0014851 Silicone Wrap Sensors	0014890
Posey Sensor Wraps - 6554	0021013
Posey Sensor Wraps - Paediatric - 6554P	0021018
Silicone Protective Cover	0022160
Carrying Case	0022178
Universal Mounting Plate, V-adapter with female pole-mount thread (1/4 - 20)	0022171
'V' mount wall plate	0121180
'V' mount pole clamp (Small: 14 - 25mm clamping width)	0121181
'V' mount pole clamp (Large: 16 - 40mm clamping width)	0121182
'V' mount rail clamp	0121184
'V' mount pole clamp, horizontal	0121197
Universal Mounting Clamp, with vertical and horizontal adjustments	0121200

Sensors and Cables

Reusable Adult Finger Sensor - 1.2m cable length	0014651
Reusable Silicone Wrap Sensor - 1.2 cable length	0014851
Reusable Adult Silicone Soft Sensor - 1.2m cable length	0014752
Reusable Medium (Small Adult) Silicone Soft Sensor - 1.2m cable length	0014754
Reusable Paediatric Silicone Soft Sensor - 1.2m cable length	0014753
Reusable Ear Sensor - 1.2m cable length	0014850
Pulse Oximetry Extension Cable, 1.2m cable length (XT6500)	0014895
Pulse Oximetry Extension Cable, 2.4m cable length (XT6501)	0014896
Disposable Plaster Tape - Box of 24 - Adult	0015010
Disposable Plaster Tape - Box of 24 - Paediatric	0015011
Disposable Plaster Tape - Box of 24 - Infant	0015012
Disposable Plaster Tape - Box of 24 - Neonatal	0015013

¹ A_{RMS}: +/- 1 A_{RMS} represents approx 68 % of measurements

² Tested with all motion patterns index II

³ Tested with Prosim 8 simulator

* in accordance with ISO 9919:2005 Standards.

N.B. The universal mounting plate is required when using any of the above mounting options
Specifications subject to change



CE 0086

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VIAMED

Viamed Limited · 15 Station Road · Cross Hills
Keighley · West Yorkshire · BD20 7DT · United Kingdom
Tel: +44 (0)1535 634 542 Fax: +44 (0)1535 635 582
Email: info@viamed.co.uk Website: www.viamed.co.uk



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