



VM-2160 SMARTsat

High Performance Pulse Oximeter

Designed with the most difficult conditions in mind

- For spot checking or constant monitoring of SpO_2 and pulse rate
- Now incorporating SMARTsat SpO_2 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 SpO_2 , 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 SpO_2 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 SpO_2 and Pulse rate

- For spot checking or constant monitoring of SpO_2 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.



VM-2160 SMARTsat Display



VM-2160 SMARTsat 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

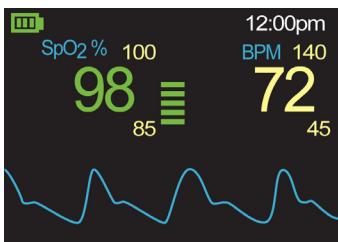
SMARTsat has been calibrated within the range of 60 - 100 % SpO_2 .

SMARTsat A_{RMS} in the SaO_2 ranges*

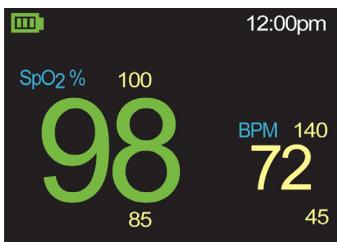
	100 - 60%	100 - 90%	90 - 80%	80 - 70%	70 - 60%
Silicone Sensors	1.7	1.5	1.8	1.7	2.4
Finger Clip Sensors	1.6	1.4	1.4	1.7	2.0
Silicone Wrap Sensors	1.7	1.3	1.5	1.9	2.4
Disposable Adult	2.5	2.1	2.3	2.6	3.4
Ear Sensors	2.4	1.4	1.6	3.2	3.3

* OEM III

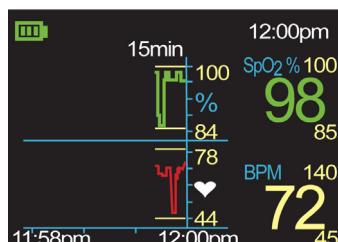
Display Formats



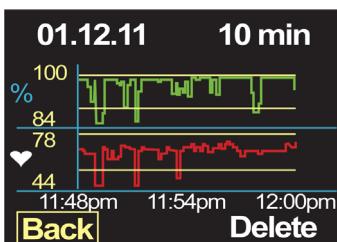
Default Display



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



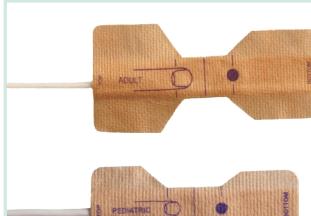
0014752

SMARTsat
Reusable Adult Silicone Soft Sensor
1.2m cable length



0014851

SMARTsat
Reusable Silicone Wrap Sensor
1.2m cable length



SMARTsat
Disposable
Plaster Tape Sensors
Box of 24 sensors

Adult	0015010
Paediatric	0015011
Infant	0015012
Neonatal	0015013



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

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



Universal Mounting Plate



'V' Wall Mount



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



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



'V' Mount Rail Clamp



Universal Mounting Clamp



Sensor Wraps
Pack of 12



Posey Wrap
Pack of 12 - 6554



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		20 - 300 bpm
Perfusion Index		0.1 - 20% (no motion)
Accuracy		
SpO ₂	60 - 100% \pm 2 A _{RMS} (no motion) ¹	
	70 - 100% \pm 3 A _{RMS} (motion condition) ²	
	60 - 100% \pm 2 A _{RMS} (low perfusion, no motion) ³	
	20 - 300 bpm \pm 2 bpm (no motion)	
Pulse Rate		
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 (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	
Safety		Class II, Type BF
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

CE0086

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