



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 560 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 560 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
- Hard shell carry case

* Alternatively please select from Soft Sensor (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

VM-2160 SMARTsat® SpO_2 accuracy validation results

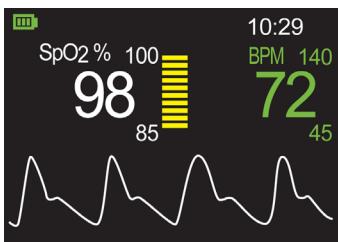
A_{RMS} in the SaO_2 ranges ²⁾

Sensor Type	60 - 100%	70 - 100%	90 - 100%	80 - 90%	70 - 80%	60 - 70%
SF7500VM Finger Clip Sensor	1.6	1.5	1.4	1.4	1.7	2.0
SC7500VM ¹⁾ Silicone Soft Sensor	1.7	1.6	1.5	1.8	1.7	2.4
W7500VM Wrap Sensor	1.7	1.6	1.3	1.5	1.9	2.4
EP7500VM Ear Clip Sensor	2.4	2.3	1.4	1.6	3.2	3.3
10-AP-VM Disposable Sensor - Adult	2.5	2.4	2.1	2.3	2.6	3.4

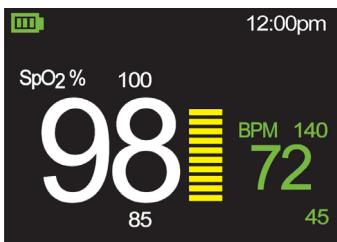
1) Accuracy statement applies to SC7500VM, SCM7500VM and SCP7500VM

2) As inherent to their functional principle, pulse oximetry measurements underlie statistical spread; therefore only two thirds of the measurement data are within the specific range of +/- ARMS

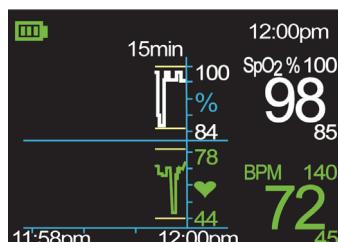
Display Formats



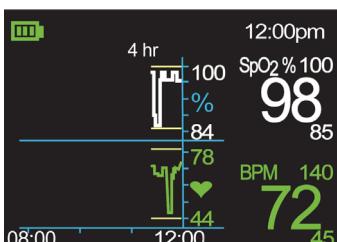
Default Display



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



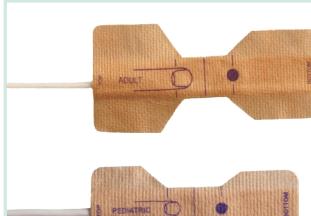
0014752

SMARTsat
Reusable Adult Silicone Soft Sensor
1.2m cable length



0014851

SMARTsat
Reusable Silicone
Wrap Sensor
1.2m cable length



0015010

0015011

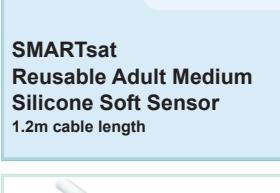
0015012

0015013



0014895

Pulse Oximetry
Extension Cable
1.2m cable length



0014754

SMARTsat
Reusable Adult Medium
Silicone Soft Sensor
1.2m cable length



0014850

SMARTsat
Reusable Ear Sensor
1.2m cable length



0014753

SMARTsat
Reusable Paediatric
Silicone Soft 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) ^{1,4}	
	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 A _{RMS} (no motion)	
Pulse Rate		
Optical Specifications		
Red emitter	660nm, typ 3.5mW	
Infra-red emitter	905nm, typ 3.5mW	
Display		
Features	1.77" TFT Colour, 65,000 colours, 128 x 160 pixels	
Data displayed	Oxygen saturation, pulse rate, plethysmogram, bar graph, short and long term trends	
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 data storage	> 560 hours, maximum 50 data sets	
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 :2007 (3rd Edition), EN ISO 80601-2-61:2011, EN ISO 9919:2009, ISO 14971:2007, IEC 60601-1-6:2010; 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 1.5V 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	
Central European language pack includes: English, Afrikaans, Dutch, French, German, Hungarian, Italian, Polish, Portuguese & Spanish		
VM-2160 - Scandinavian languages (English, Danish, Finnish, Swedish, Dutch)	0012166	
VM-2160 - Special EU characters languages (English, Greek, Russian, Turkish)	0012167	
Sensors and Cables		
Reusable Adult Finger Clip Sensor - 1.2m PVC cable, (SF7500VM)	0014651	
Reusable Adult Silicone Soft Sensor - 1.2m silicone cable, (SC7500VM)	0014752	
Reusable Medium (Small Adult) Silicone Soft Sensor - 1.2m silicone cable, (SCM7500VM)	0014754	
Reusable Paediatric Silicone Soft Sensor - 1.2m silicone cable, (SCP7500VM)	0014753	
Reusable Silicone Wrap Sensor - 1.2m silicone cable, (W7500VM)	0014851	
Reusable Ear Sensor - 1.2m PVC cable, (E7500VM)	0014850	
Disposable Plaster Tape - Adult - 0.45m PVC cable - Box of 24, (10-AP-VM)	0015010	
Disposable Plaster Tape - Paediatric - 0.45m PVC cable - Box of 24, (10-PP-VM)	0015011	
Disposable Plaster Tape - Infant - 0.90m PVC cable - Box of 24, (10-IP-VM)	0015012	
Disposable Plaster Tape - Neonatal - 0.90m PVC cable - Box of 24, (10-NP-VM)	0015013	
Pulse Oximetry Extension Cable, 1.2m PVC cable, (XT6500)	0014895	
Pulse Oximetry Extension Cable, 2.4m PVC cable, (XT6501)	0014896	
Additional Accessories Available		
Sensor Wraps - for use with 0014851 Silicone Wrap Sensors - Box of 12	0014890	
Posey Sensor Wraps - 6554 - Box of 12	0021013	
Posey Sensor Wraps - 6554P - Box of 12	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	

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

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

⁴ Refers to SC7500VM, SCM7500VM and SCP7500VM

€ 0482

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