

Spectrum™

Summary of Features and Benefits

- Spectrum's large, bright color display makes viewing critical data simple
- Complete hemodynamics package, 12-Lead monitoring and important calculations at your finger tips makes patient monitoring easy
- The External Module contains the extras you need without sacrificing portability including Cardiac Output, extra Invasive Blood Pressures and Temperature
- View 12™ ECG Analysis Module is a complete cardiology Package with 12-lead ECG interpretation, ST analysis and Arrhythmia Analysis in a compact module
- Use in conjunction with the quick release mount for transport or bedside monitoring in seconds
- Network to a Datascope Central for seamless data collection
- List and graphic trends are expandable to 500 Entries. Oxy-CRG for Neonatal and Pediatric patients
- Standard features include large, bright 12.1 inch Color Display, 8 Waveforms, 3 or 5 lead ECG, NIBP, Masimo SET® Motion Tolerant SpO₂, Temperature, and Drug Calculations
- Select any of our Optional features: Microstream® CO₂, View 12 ECG Analysis Module, Nellcor® OxiSmart® SpO₂, Cardiac Output, Invasive Blood Pressures, ST and Arrhythmia Analysis, Dual Trace Recorder and complete 5 Agent ID, CO₂, O₂, N₂O with our Gas Module



AGENCY COMPLIANCES

This monitor complies with the following industry standards:

- Safety:** IEC 601-1:1988 + A1:1991+A2:1995 +corrigendum June 1995, UL 2601-1:1997, CSA:C22.2 No.601.1M90, IEC 601-1-1:2000/EN 60601-1-1:2001, EN 60601-1-2:1993 and draft IEC 601-1-2, IEC 601-1-4: 1996, EN60601-2-30:2000/ IEC 601-2-30:1999, EN60601-2-34:2001/ IEC 601-2-34:2000, IEC 60601-2-25:1993, A1:1998 section 36.202.101, EN 60601-2-27:1994 / IEC 601-2-27:1994, EN 60601-2-25:1993 / IEC 601-2-25:1993
- Hazard:** EN 1441:1997, ISO 14971:2000
- Performance:** EN 864:1996, EN 865:1997, EN 1060-1:1995, EN 1060-3:1997, AAMI EC13:1992, ISO 3744:1994, EN 60601-2-30:2000, AAMI EC11:1991
- Environmental:** IEC 68-2-6:(1982) and A1(1983) and A2 (1985), IEC 68-2-27:1987, IEC 68-2-37:1973 and A1:1983, IEC 529:1989, EN 55011 (CISPR 11), EN 61000-4-6:1996, EN 61000-4-3:1996, EN 61000-4-2:1995, EN 61000-4-4:1995, EN 61000-4-5:1995, ECRI PB-296892:1979 (for Drop and Impact Requirements only), ISTA: 1994 Procedure 1A

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PERFORMANCE SPECIFICATIONS

DISPLAY

Size:	12.1-inch (30.7cm) Color Active Matrix TFT LCD
Resolution:	800 x 600 pixels
Waveforms:	3 to 8

ECG (3-LEAD AND 5-LEAD)

Leads:	I, II, III, aVR, aVL, aVF, V
Cable Detection:	Autodetecting Datascope 3 or 5 wire
Display Sensitivity:	0.25, 0.5, 1.0, 2.0, 3.0, 4.0, cm/mV +/- 10%
Frequency Response To Screen	
Extended Mode:	0.05-100 Hz, -3db
Monitor Mode:	0.5 – 40 Hz, -3db
ST Mode:	0.05 – 40 Hz, -3db
ECG Sync Pulse for Cardioversion:	
Delay:	≤35 ms max between QRS Peak and rising edge of Sync Pulse
Amplitude:	2Vp minimum into a 5k ohm load
Width:	2-7 ms
Analog Output: (ECG)	
Delay:	25 ms max
Sensitivity:	1 V/mV of input, +/- 10%
Analog Output: (IBP)	
Delay:	45 ms max
Sensitivity:	1 V/100 mmHg, +/- 10%
Defibrillator Overload Protection:	
	Withstand 360 Joule discharge as per IEC 60601-2-27, 51.101.1
Recovery Time:	Time for recovery to within 1mV in < 8 seconds automatically, 3 seconds from 1Vpp at 60 Hz

ECG (12-LEAD)

Leads:	I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6
Connection Type:	Type II PCMCIA card to be installed in PCM slot
Cable Detection:	Automatically enabled when 12-lead Card is inserted
Frequency Response	
Extended Mode:	0.05-100 Hz, -3db @ 1mVpp input
Monitor Mode:	0.5 – 40 Hz, -3db @ 1mVpp input (ESU filter disabled)
ST Mode:	0.05 – 40 Hz, -3db @ 1mVpp input
Analog Output (ECG):	Disabled when 12-lead ECG analysis is enabled
Defibrillator Overload Protection:	
	Withstand 360 joule discharge as per IEC 60601-2-27, 51.101.1

HEART RATE METER

Range:	30 – 300 BPM Adult/Pediatric, 30 – 350 BPM Neonate 3-lead and 5-lead/ 30 – 300 BPM 12-lead
Accuracy:	+/- 3 BPM or +/- 3% at 30 – 250 BPM whichever is greater, +/- 5% at 251 – 350 BPM
Pacer Rejection:	Rejects all pulses of amplitude +/- 2.0 mV to ± 700 mV and duration 0.1 to 2 ms with no tail. AAMI EC-13-1992 4.1.4 (3-Lead and 5-Lead) Rejects all pulses of amplitude +/- 2.0 mV to 700 mV and duration 0.1 to 2 ms with 100 ms time constant tail of less than 2.0 mV, or 4 ms time constant tail of < 2.0 mV per AAMI EC-13-1992 3.1.4.2
Tall T-Wave Rejection:	Rejects all T-Waves of amplitude less than 120% of 1 mV, 100 ms QRS, T wave duration of 180 ms and Q-T interval of 350 ms per AAMI EC-13-1992 4.1.2.1 (c)

ST ANALYSIS

3-lead or 5-lead Range:	-9.9 mm to +9.9 mm
12-lead Absolute Range:	-10 mm to +10 mm
12-lead Delta Range:	-20 mm to +20 mm
Resolution:	0.1 mm
Default ST Measuring Point:	80 ms after j point for HR ≤ 120 BPM, 60 ms after j point for HR >120 BPM

ARRHYTHMIA ANALYSIS

3-lead or 5-lead cables:	
Adult / Pediatric Only:	Asystole, Missed Beat, Irregular Heart Rate, Couplets, Triplets, Bigeminy, Trigeminy, Ventricular Tachycardia, Ventricular Fibrillation, PVC's per minute, Runs
12-lead:	
Adult / Pediatric Only:	Asystole, Missed Beat, Couplets, Runs, Bigeminy, Trigeminy, Ventricular Tachycardia, Ventricular Fibrillation, PVC's per minute, Ventricular Rhythm

RESPIRATION (ECG)

Range:	4 to 199 BPM
Accuracy:	+/- 2% or 2 breaths per minute whichever is greater from 4 to 150 BPM, +/- 4% from 151 to 199 BPM
Lead:	I or II

NON-INVASIVE BP

Technique:	Oscillometric
Systolic Range:	Adult – 55-235 mmHg Pediatric – 55-160 mmHg Neonate – 45-120 mmHg
Diastolic Range:	Adult – 30-200 mmHg Pediatric – 30-150 mmHg Neonate – 20-100 mmHg
Systolic Accuracy:	Mean Error less than +/- 5 mmHg, Standard Deviation less than +/- 8 mmHg
Diastolic Accuracy:	Mean Error less than +/- 5 mmHg, Standard Deviation less than +/- 8 mmHg
Pulse Rate Range:	Adult/Pediatric: 35 to 245 BPM Neonate: 70 to 245 BPM
Pulse Rate Accuracy:	+/-3 BPM or 3% whichever is greater
Connector Type:	Rectus
Cuff Inflation:	Volume of 500 cc to 300 mmHg in ≤35 sec

TEMPERATURE

Scale:	Selectable C° or F°
Range:	15° to 45°C / 59° to 113°F (T1 and T2) 0°C to 5.5°C / 0°F to 9.9°F (Delta T)
Accuracy:	+/- 0.1°C (15°C to 45°C) exclusive of probe errors. +/- 0.2°F (59°F to 113°F) exclusive of probe errors.

PULSE OXIMETRY

Masimo SET® SpO ₂ Accuracy Saturation with no motion conditions	
Adult/Pediatric:	70% to 100% +/- 2 digits SpO ₂ , 0-69% unspecified
Neonate:	70% to 100% +/- 3 digits SpO ₂ , 0-69% unspecified
Ear Sensor (Adult/Pediatric):	70% to 100% +/- 4 digits SpO ₂ , 0-69% unspecified
Masimo SET® SpO ₂ Accuracy Saturation during motion conditions	
Adult/Pediatric/Neonate:	70% to 100% +/- 3 digits SpO ₂
Response Time:	18 seconds to 95% of final step of % SpO ₂ value from 60-95% at 75 BPM. Averaging set at 8 seconds.
Pulse Rate Range Masimo with no motion conditions	
Adult/Pediatric/Neonate:	30-235 ±3 BPM, Ear Sensor (Adult/Pediatric) 30-235 ± 3 BPM
Pulse Rate Range Masimo during motion conditions	
Adult/Pediatric/Neonate:	30-235 ±5 BPM
Low Perfusion Performance	
Masimo:	> 0.02% Pulse Amplitude and % Transmission > 5% / Saturation (%SpO ₂) ± 2 digits; Pulse ± 3 digits
Nellcor® Oxismart® SpO ₂ Saturation Accuracy	
Adult/Pediatric/Neonate:	70% to 100% +/- 2 digits
Note:	Adult sensor D-25, Neonate sensor N-25
Pulse Rate Range Nellcor:	20-249 ±3 BPM

IBP

Range:	Sys/Dia/Mean -30 - +300 mmHg
Accuracy:	+/- 2 mmHg or 2% whichever is greater
Scale:	-10 to 10, 0-20, 0-40, 0-160, 0-225, 0-320, 60-140 mmHg
Zero Range:	+/- 120 mmHg
Excitation:	5V DC +/- 2%
Frequency Response:	DC to 16 Hz +/- 1Hz, -3db

RECORDER

Speed:	3.125, 6.25, 12.5, 25 mm, and 50 mm/sec Note: 3.125 speed is for CO ₂ /Resp only.
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CO₂ (MICROSTREAM®)

Range:	0 – 99 mmHg
Accuracy:	0 – 38 mmHg +/- 4 mmHg 39 – 99 mmHg +/- 12% (0 – 20 min) 0 – 38 mmHg +/- 2 mmHg 39 – 99 mmHg +/- 5% + .08% for every 1mmHg above 40 mmHg (> 20 min)
Respiration Rate:	0-150 breaths per minute
Respiration Accuracy:	+/- 1 breath per minute from 0 – 40 BPM +/- 2 BPM from 41 – 70 BPM +/- 3% from 71 – 100 BPM +/- 5% from 101 – 150 BPM

CO ₂ Waveform	
Recognition:	5 mmHg +/- 2 mmHg bandwidth
Start-up Time:	30 seconds typical
Sampling Rate:	50 ml/min +/- 7.5 ml/min
Auto Zero:	<15 seconds at 5, 10, 15 and 60 minutes then every 60 minutes thereafter.

ELECTRICAL RATINGS

AC Voltage:	100 – 240 VAC +/- 10%, 50/60 Hz +/- 3 Hz
Battery Type:	Sealed Lead Acid
Number of Batteries:	2
Battery Voltage:	12 V
Battery Capacity:	2.3 Ah
Battery Run Time:	1 hour, 20 min from two fully charged, new batteries at 25°C with ECG, SpO ₂ and NIBP running at 15 minute intervals
Recharge Time:	16 hrs max

ENVIRONMENTAL CONDITIONS

Storage Temperature:	-20°C - +60°C/-4°F - +140°F
Storage Humidity:	10 – 95% non-condensing
Operating Altitude:	-381 to 3,014 meters ASL, 1060hPa to 700hPa, 795 mmHg to 525 mmHg
Operating Temperature:	5°C to 40°C/41°F - 104°F
Operating Humidity:	15% to 95%, non-condensing

PHYSICAL DIMENSIONS

Monitor Size:	26.7cm H x 30.2cm W x 18.8cm D 10.5" H x 11.9" W x 7.4" D without module 27.2cm H x 30.2cm W x 18.8cm D 10.7" H x 11.9" W x 7.5" D with module
Weight:	5.43 kg (11.95 lbs) without optional accessories 7.04 kg (15.52 lbs) with 2 batteries, without optional accessories 0.8 kg (1.75 lbs) module, without optional accessories

CARDIAC OUTPUT

Range:	0.2 to 20.0 liters/min
C.O. Repeatability:	± 2% or 0.02 l/min from the mean value
Blood Temp Range:	17.5°C to 43°C (63.5°F to 109.4°F)
Blood Temp Accuracy:	± 0.2°C (± 0.4°F) exclusive of probe errors
Injectate Temp Range:	-1.0°C to 30.0°C (30.2°F to 86°F)
Injectate Temp Accuracy:	± 0.2°C (± 0.4°F) exclusive of probe errors

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