

STERNMED[®]



Macs 40/50

modular patient monitors



STERNMED®

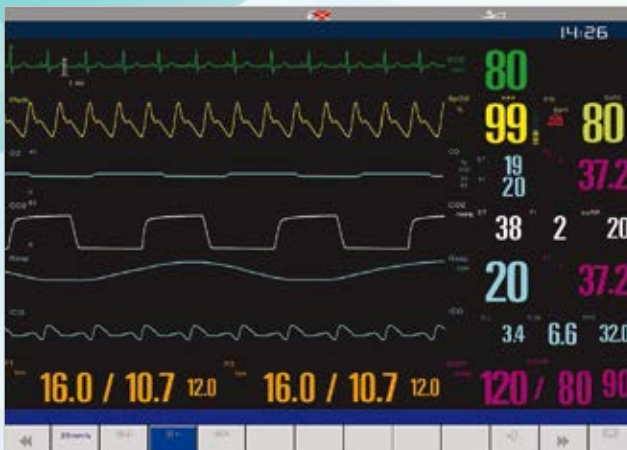


Macs 40/50

modular patient monitors

FEATURES

- All-in-one module with display and built-in battery.
- 17"/12.1" anti-glare color TFT-LCD display.
- Powerful measurement, ergonomic and flexible design.
- Can connect independent large display when multi-display is required.
- Fan-less cooling system, keep the monitor working quietly.
- Multi-screen, multi-interface display.
- Each screen can display user defined parameters, to assure real-time monitoring entire data.



ADVANCE MODULAR MONITORING

ICG

- Non-invasive method to measure patient's Cardio Output and Hemodynamic status and safe easy operate.



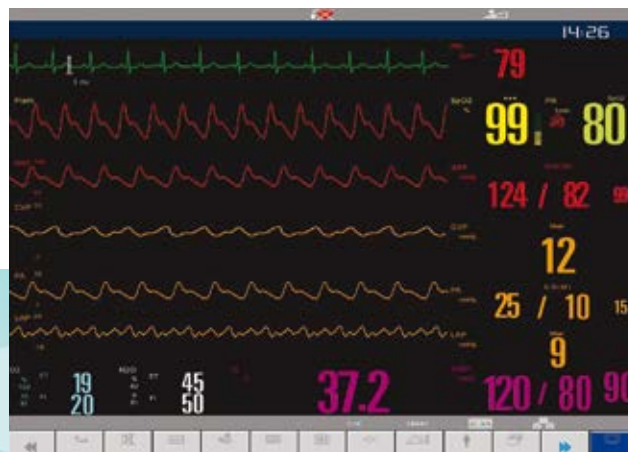
AG

- Anesthesia Gas module, measure concentration of Et and Fi CO₂, O₂, N₂O and ISO, ENF, DES, SEV, HAL



SpO₂

- Masimo SpO₂
- High capacity against interference of ESU, motion & low perfusion



2IBP

- Max, 8 IBP measurement with waveform, Systolic, Diastolic, Mean Pressure on ART, CVP, ICP, PA, LAP, etc to fulfill different positions invasive blood pressure measuring demands



CO₂

- Side stream / Mainstream / Micro stream / EtCO₂ is optional
- Various option can be suitable for intubated patient, ventilation relied patient, non-intubated patient

E-MODULE – EMERGENCY MODULE

Size and Weight

- Size: 160mm x 99mm x 71mm
- Weight: < 0.6kg

Display

- 3.5" Color TFT-LCD, Resolution: 320x240 pixels
- Waveform: Up to 12 tracks

Battery

- Type: 3.7V/1800mAh Rechargeable lithium ion battery
- Operating time: >60 minutes
- Charging time: Standby state: <6h
- Turn off delay: 5 to 10 minutes after the low battery alarm first occurs.
- Standard and Interface: HR, SpO₂, NIBP, RESP, TEMP, and waveform of ECG, SpO₂, RESP.
(ECG waveform available for concatenation)
- Big font Interface: HR, SpO₂, NIBP, 1 channel ECG waveform.
- User defined interface: 3 basic parameter + 1 Blood Pressure parameter, 1-3 channel waveform



- Arrhythmia analysis and ST analysis.
- Simultaneous display of 12 lead ECG in one screen
- Independent physiological alarm light and technical alarm light.
- Seamless transport solution fully meet the clinic demand.
- Providing fast and convenient monitoring during the patient transfer with display, battery, alarm and storage capability.
- Patient's data transferring automatically when connect to main Unit.
- Extremely compact design, convenient to carry, allowing patient to roam freely.
- 3.5 Color TFT-LCD display.
- 480 groups NIBP review.
- Power off storage of 8 hours trend.

E-MODULE OPTIONS

	M-1	M-2	M-3	M-4	M-5	M-6	M-7	M-8
RESP	✓	✓	✓	✓	✓	✓	✓	✓
2-TEMP	✓	✓	✓	✓	✓	✓	✓	✓
NIBP	✓	✓	✓	✓	✓	✓	✓	✓
2-IBP	✓	✓			✓	✓		
3/5 Lead ECG	✓		✓		✓		✓	
12-Lead ECG		✓	✓	✓		✓		✓
Digital SpO ₂	✓	✓	✓	✓				

- Touch Screen (Option), supporting for Mouse Key board operation.
- Available for multi-language interface.
- Independent Physiological & Technical Alarm.
- Built-in detachable rechargeable lithium battery
- Particularly backlight button for night operation
- SD card socket, effective storage for historical patient data.



Drug dose calculation
Hemodynamic calculation
OXYCRG

- Display 16 minutes trend of HR, SPO₂, RESP

Short trend

- Maximum 168 hour graphic and tabular trends

Other bed

- Display other bedside monitor's all parameter and one waveform, support user defined parameter display

Big font

- User can select 5 parameters (related waveform will display of available)
- Clear observation in a long distance, especially suitable for ICU, CCU room checking and monitoring during night

TECHNICAL SPECIFICATIONS

Macs 50/40 | SternMed modular Patient Monitors

SIZE AND WEIGHT		Macs 50	Macs 40
Size		434x389x206mm	350x340x206mm
Weight		<11kg	<8kg
Standard module slot		4	
Additional module rack Slot		1	
POWER SUPPLY			
Power voltage		AC 100-240V 50/60Hz	
Power Input		<150VA	
Input Current		1.7-0.8A	
Safety class		Category 1	
DISPLAY		Macs 50	Macs 40
Resolution		17" color Anti-glare TFT-LCD 1280x1024 pixels	12.1" color Anti-glare TFT-LCD 800x600 pixels
BATTERY		Macs 50	Macs 40
Type		Rechargeable Lithium battery, 11.1V/4.0AH Operating time under the normal use and full charge :>60minutes (2 batteries for 120 minutes)	Rechargeable Lithium battery, 11.1V/4.0AH Operating time under the normal use and full charge :>150 minutes (2 batteries for 300 minutes)
RECORDER (OPTION)			
Method		Thermal dot array	
Paper width		50 mm (1.97 in)	
Paper length		15m	
Paper Speed		12.5 / 25 / 50 (mm/sec)	
Traces		Maximum 3 tracks	
Recording way		Real-time recording, Periodic recording, Alarm recording	
ALARM			
Level		Low, medium and high	
Indication		Auditory and visual	
Patient Physiological Alarm Light color		Yellow & Red	
Equipment: Technical Alarm Light color		Blue, Supports Pitch tone and multi-level volume, Supports custom arrhythmia	
INPUT DEVICE			
Touch button		standard configuration, support operation of shortcut menu	
Knob		Standard configuration	
Mouse Input		Support	
Keyboard Input		Support	
SYSTEM OUTPUT & EXTENSIBLE INTERFACES		Macs 50	Macs 40
Ethernet Network		2 Standard RJ45 socket	1 Standard RJ45 socket
Defibrillation Output		1RJ11 socket	
Nurse Call		1 BNC socket	
Video Output		1 DVI port, 1 VGA port	1 VGA port
USB 1.1 port		6	4
Auxiliary Module Rack connector		1	1
SD memory card		2G (Standard configuration)	2G (Option)
Analog Output (ECG or IBP)		Option	
TREND & REVIEWING			
Trend		168 hours	
NIBP measurement reviewing		1000 groups	
ARR event		128 groups of ARR event and the associated parameter	
waveform		at the alarm moment	
Holographic waveform		The storage time depends on the stored waveforms and the quantity of them.	
ENVIRONMENT			
Operating temperature		0-+40°C	
Storage temperature		-20°C to +50°C	
Operating humidity		15% to 85% (non condensing)	
Storage humidity		10% to 93% (non condensing)	
Operating atmospheric pressure		860hPa to 1060hPa	
Storage atmospheric pressure		500hPa to 1060hPa	
SAFETY			
IEC60601-1 Approved, CE marking according to MDD93/42/EEC			

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PERFORMANCE			3-leads ECG input
ECG	Lead Mode		5-leads ECG input
			12-leads ECG input
	Lead selection		I, II, III
			I, II, III, aVR, aVL, aVF, V-
			I, II, III aVR, aVL, aVF, V1-V6 (option)
	Gain		2.5 mm/mV(x0.25), 5 mm/mV (+0.5), 10 mm/mV(x1), 2.0 mm/mV(x2), 40 mm.mV(x4), Auto
	CMRR		Monitor mode >105dB Surgery mode >105dB Diagnostic mode 0.05-150Hz
	Input impedance		>5.0 Mohm
	ECG signal range		+10.0 mV
	Patient Leakage Current		<10 uA
	Standardizing signal		1mV+5%
	Baseline recovery		5s after Defibrillation. (Mon or Surg mode)
	Indication of electrode separation		Every electrode (exclusive of RL)
	Protection		Breakdown Voltage 4000VAC 50/60HZ; defibrillator proof
Sweep speed		12.5mm/s, 25mm/s, 50mm/s	
HR	Range		Adult 10-300 bpm Pediatric & Neonate: 10-350 bpm
	Refreshing time		<50 bpm Per2 pulses 50-120bpm Per 4 pulses > 120bpm Per 6 pulses
	Resolution		1 bpm
	Accuracy		+1% or + bpm, whichever is greater
ST SEGMENT			
Measurement range			-2.0mV-2.0mV
Accuracy			-0.8V-0.8mV: +1 bpm, whichever is greater Over + 0.8mV: unspecified
Resolution			0.01mV
RESP			
Method			Thoracic impedance
Lead Selected from			I (RA-LA) or II (RA-LL): Default: I
Gain			x0.25,x1, x2, x4
Bandwidth			0.25 Hz to 2.0Hz (-3db)
Sweep speed			6.25mm/s, 12.5mm/s, 25mm/s
Measurement Range			0-150 rpm
Resolution			1rpm
Accuracy			+2 rpm or 2% whichever is greater
Delay of Apnea Alarm			10s, 15s, 25s,30s, 35s, 40s, 45s, 50s, 55s, 60s
NIBP			
Way of measurement			Automatic oscillometry
Range of measurement	Adult		SYS 30-270 mmHg
			DIA 10-220 mmHg
			MAP 20-235 mmHg
	Child		SYS 30-235 mmHg
			DIA 10-220 mmHg
			MAP 20-225 mmHg
	Neonate		SYS 30-135 mmHg
			DIA 10-100 mmHg
			MAP 20-125 mmHg
Cuff pressure range			0-300 mmHg
Resolution			1 mmHg
Pressure Accuracy	Static		±2% or ±3 mmHg, whichever is greater
	Clinical		+5 mmHg average error
	Standard deviation		< 8 mmHg
Unit			mmHg, kPa
Measurement mode			Manual, Auto, STAT
Intervals for AUTO measurement time			1,2,3,4,5,10,15,30,60,90 minutes; 2,4,8,12hours
STAT mode cycle time			Keep 5 minutes, at 5 seconds Interval
Overpressure Protection			Hardware and software double protections
Pulse rate range			40-240 bpm

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BLT-SPO₂ (DIGITAL TECHNIC)

Measurement Range		0-100%
Resolution		1%
Accuracy		At 70-100%, +2% At 0-69%, unspecified
PR	Measurement Range	25-255 bpm
	Resolution	1 bpm
	Accuracy	+1% or +1 bpm, whichever is greater

MASIMO SPO₂

Measurement range	0% to 100%
Resolution	1 %
Accuracy	70% to 100%: +2 % (adult/pediatric, non-motion conditions) 70% to 100%: +3 % (neonate, non-motion conditions) 70% to 100%: +3 % (motion conditions)
Average time	2-4s, 4-6s, 8s, 10s, 12s, 14s, 16s
Measurement Range	25 bpm to 240 bpm
Accuracy	+3 bpm (non-motion conditions) +5 bpm (motion conditions)
Resolution	1bpm

TEMP

Max Channel	8
Measurement way	Thermal resistance way
Measurement Range	0.0°C-50.0°C (32°F-122°F)
Accuracy	+0.1°C or 1°F
Unit	Celsius (°C), Fahrenheit (°F)

IBP

Max Channel		8
Measurement way		Directly invasive pressure measurement
Sensitivity of transducer		5uV/V/ mmHg, +2%
Impedance of transducer		300 to 3000Ω
Measurement Range		+50-+350mmHg
Resolution		1mmHg
Unit		mmHg, kPa,cmH ₂ O
Accuracy	Static	+ 1mmHg or +2%, whichever is greater (excluding the transducer)
		+ 4mmHg or +4%, whichever is greater (including the transducer)
	Dynamic	+ 4mmHg or 4 %, whichever is greater
	Transducer sites	Arterial Pressure (ART)
		Pulmonary Artery Pressure (PA)
		Left Atrium Pressure (LAP)
		Right Atrium Pressure (RAP)
		Central Venous Pressure (CVP)
Intracranial Pressure (ICP)		
P1/P2		
Selection of measurement range		ART: 0- +350 mmHg PA: +10- +120 mmHg CVP/RAP/LAP/ICP: -10- +40mmHg P1/P2: +50 ~ +350mmHg

ETCO₂ (SIDE-STREAM)

Measure method	Infrared spectrum
Measurement Range	0.0-13.1% (0-99.6 mmHg)
Resolution	1 mmHg
Unit	% mmHg, kPa
Accuracy	0% to 4.9%, +0.3% (+2.0 mmHg) 5.0% to 13.1%, , < +10% of the reading
Measurement range of awRR	3-150 rpm
Calibration	Offset calibration: auto, manual, Gain calibration

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ETCO₂ (MAIN-STREAM)

Measure method	Infrared spectrum
Warm up time	Capnogram displayed in less than 15 seconds, At an ambient Temperature of 25°C, full specifications within 2 minutes.
Measurement Range	0.0-19.7% (0-150 mmHg)
Resolution	1 mmHg
Rise time (10 l/min)	< 60 ms
Unit	%, mmHg, kPa
CO ₂ Accuracy	0-40 mmHg, + 2 mmHg 41-70 mmHg, +5% of reading 71-100 mmHg, +8% of reading 101-150 mmHg, +10% of reading (at 760 mmHg, ambient temperature of 35°C)
awRR measurement range	0-150 rpm
awRR measurement Accuracy	+1rpm

ETCO₂ (MICROSTREAM)

Measure method	Infrared spectrum
Warm up time	Capnogram displayed in less than 20 seconds, At an ambient temperature of 25°C, full specifications within 2 minutes.
Measurement range	0-19.7% (0-150 mmHg)
Resolution	1 mmHg
Unit	%, mmHg, kPa
CO ₂ Accuracy	0-40 mmHg, +2 mmHg 41-70 mmHg, +5% of reading 71-100 mmHg, +8% of reading 101-150 mmHg, +10% of reading (at 760 mmHg, ambient temperature of 25°C) (when RR>80rpm, all the range is +12% of reading)
CO ₂ response time	<3s
awRR measurement range	2-150 bpm
awRR measurement Accuracy	+1rpm
Sample Flow Rate	50ml/min + 10ml/min

ANESTHETIC GAS

Measure method	Infrared spectrum		
Fi and Et values	CO ₂ , N ₂ O, O ₂ , AG (HAL, ISO, ENF, SEV, DES)		
Resolution	1%		
Unit	1%		
Calibration	Room air calibration performed automatically when changing airway adapter (<5 sec)		
Warm-up time	<10s, full accuracy within 1 min		
Measurement and alarm range of AG	Gas	Range	Accuracy
	CO ₂	0-10%	+ (0.3% ABS +4% REL)
	N ₂ O	0-100%	+ (2% ABS+8% REL)
	O ₂	10-100%	+ (2% ABS+2% REL)
	HAL, ISO, ENF	0-5%	+ (0.15% ABS+2% REL)
	SEV	0-8%	+ (0.15% ABS+10% REL)
	DES	0-18%	+ (0.15% ABS+10% REL)
awRR measurement range	0-150rpm		
awRR measurement Accuracy	+1rpm		
Rise time (flowing speed 10 l/min)	CO ₂ < 90 ms O ₂ < 300 ms N ₂ O < 300 ms Hal, Iso, Enf, Sev, Des < 300 ms		
Total system response time	<1 seconds		

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NONINVASIVE CARDIO OUTPUT (ICG):

Method	Measurement of thoracic electrical bio-impedance
Measurement Range	HR: 40-250 bpm SV: 5-250ml SI: 5-125mL/m2 C.O.: 1.4-15 L/min TFC: 15-143 K Ω
Accuracy	HR +2bpm SV: unspecified C.O unspecified
Alarm range	C.I.: 0.0 L/min/m2 to 15.0 L/min/m2 continuous I adjustable. TFC: 10 /k Ω continuously adjustable

STANDARD CONFIGURATION OF Macs 50:

Main unit:	17" anti-glare TFT-LCD display, 4 Standard module slot, 1 Additional module rack Slot (for EMS all-in-one module), 13 Touch buttons , 2RJ45 Ethernet socket, 1 Defibrillation Output, 1 Nurse Call Socket, 1 DVI port, 1 VGA port, 6 USB 1.1 port, 1 Auxiliary Module Rack connector, 2G SD memory card , 1 Lithium rechargeable battery.
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OPTIONS

EMS module:	8 different options
Option Module:	Side-stream CO ₂ module, Micro-stream CO ₂ module, Main-stream CO ₂ module, Main-stream CO ₂ , AG module, ICG module, IBP module, Temp module, SpO ₂ module
Module Rack:	Auxiliary Module Rack
Navigating:	USB compatible mouse and keyboard.
Printing:	3 channel thermal recorder
Mounting:	Rolling stand, wall mount
Battery:	11.1V/4.0AH Rechargeable Lithium Battery (max 2 pcs.)
Other options:	External Display, Wireless LAN, Extensive Memory card, Analog Output (ECG or IBP), Touch Screen.

STANDARD CONFIGURATION OF Macs 40:

Main unit:	12.1" anti-glare TFT-LCD display, 4 Standard module slot, 1 Additional module rack Slot (for EMS all-in-one module), 1RJ45 Ethernet socket, 1 Defibrillation Output, 1 Nurse Call Socket, 1 VGA port, 4 USB 1.1 port, 1 Auxiliary Module Rack connector, 1 Lithium rechargeable battery.
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OPTIONS

EMS module:	8 different options
Option Module:	Side-stream CO ₂ module, Micro-stream CO ₂ module, Main-stream CO ₂ module, Main-stream CO ₂ , AG module, ICG module, IBP module, Temp module, SpO ₂ module
Module Rack:	Auxiliary Module Rack
Navigating:	USB compatible mouse and keyboard and touch buttons
Printing:	3 channel thermal recorder
Mounting:	Rolling stand, wall mount
Battery:	11.1V/4.0AH Rechargeable Lithium Battery (max 2 pcs.)
Other options:	External Display, Wireless LAN, Extensive Memory card, Analog Output (ECG or IBP), Touch Screen.



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