



SM-PM09 Multi-parameter Patient Monitor (15 inches)

Technical Data Sheet - Release V2.4

The patient monitor is designed to match the pace and unique needs of adult, pediatric, and neonatal intensive care; anesthesia and peri-operative care; OR and cardiac care environments.

An optional **USB Mouse/Keyboard control** eases navigation and data entry.

An optional **HDMI output** eases observation from a long distance.

Features

Core

- Newly advanced A9 main board with Linux OS, calculating speed is 4 times faster than traditional products
- Support **storage** of 2160 hours trend table and graph review, 2 hours waveform review, 2000 groups NIBP review and 2000 alarm events review

Body

- 15 inch high-brightness TFT LED
- Support display 9~13 waveforms
- Support 7 channel ECG waveform display simultaneously
- Optional HDMI output

Printer

- Built-in high-speed 50mm thermal printer (Brand: SEIKO, Japan)

Central System

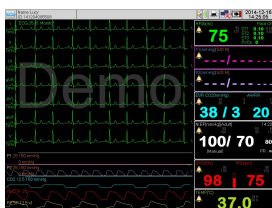
- Optional **Build-in wireless network module**, supporting wired or wireless connection to the central monitoring station.
- Optional Support HL7 (Health Level Seven)

Alarm

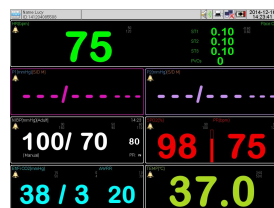
- Double high light alarm light bar.
- Three-level acousto-optic alarm
- Sensor-off alarm
- Paper out alarm
- Support alarm review
- Support alarm pause

Linux OS

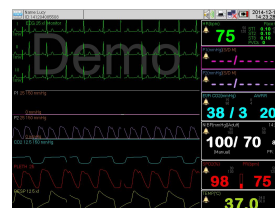
- Support **operation with mouse and computer keyboard** (option)
- **Multi-display mode** to meet different clinical requirement, including standard interface, big font, OxyCRG, trend graph, NIBP review and full leads ECG interface.
- **NIBP self-test mode**: including overpressure test, static pressure test and air leakage test.
- **Generate ID** automatically when register a new patient
- Support **medical history search** by patient ID, name and mobile number
- 18 types of **Arrhythmia analysis** and real-time **S-T** segment analysis and **pacemaker detection**
- **Drug calculation** and **titration table**
- Support **multi-language** display
- Support **online software upgrading** by net/USB



ECG Full Lead



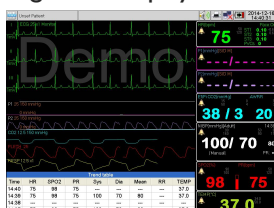
Big Font Display



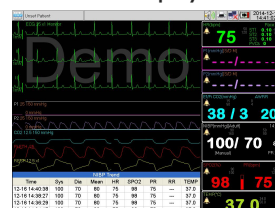
Standard Display



Oxy CRG



Trend Table



NIBP Review

Interface

Transducer socket

- ECG
- SPO2
- NIBP
- IBP 1 / IBP 2
- TEMP 1
- TEMP 2 / Mainstream EtCO2 / AG (multi-gas)
- Sidestream EtCO2

LAN / Central monitor system interface

- The LAN port is for connecting the monitor to a central monitor system network.

Input device interface

- This optional interface provides an USB ports to enable the monitor to be connected to off-the-shelf input devices:
- Mouse: any specified trackball or USB mouse may be used for navigation and data entry.
- Computer keyboard: an USB computer keyboard can be used for data entry instead of the on-screen pop-up keyboard.

[Remark: user has to restart the machine after plug and unplug the mouse / computer keyboard.]

- Knob (Standard)

Service Features

- The Support Tool helps technical personnel to
 - carry out configuration, upgrades and troubleshooting on an individual monitor.
 - back up the monitor settings.
- The Service Mode is password-protected and ensures that only trained staff can access service tests and tasks. It includes Skin Type, Brightness Setting, Clear Data and NIBP Calibration.
- The Support Tool uses the USB interface of the monitor for software upgrading.

Related Product



- IBP accessories



- Respironics EtCO2 module



- Nellcor SpO2 module



- Masimo Spo2 module



- Masimo Phasein AG module



- CSM Anaesthesia Depth Monitoring

Performance Specifications

Dimension and Weight

- Dimension: 393mm*382mm*173mm
- Weight: 4.5kg (excluding accessories)

Power Supply

- Voltage: AC100 ~ 240V, 50/60HZ, Power≤60W

Display

- 15" color TFT LED
- Resolution: 1024*768 pixels

Battery (Pluggable)

- Type: Rechargeable lithium battery 14.8V/2200mAh
- Charge Cycle: ≥500 times
- Working time: 2 hours (optional larger battery for 4-5 hours)

Recorder (Option)

- Method: Thermal printer
- Paper width: 50 mm (1.97 in)
- Printing speed: 12.5/ 25/ 50 mm/s
- Trace: Max. 3 tracks
- Recording way: Real-time Recording, Review Printing, Periodic Recording, Alarm Recording

Alarm

- Level: Low, medium and high
- Indication: Auditory and visual
- Alarm volume adjustable
- Alarm pause time: 1min, 2min
- Parameter alarm type: Latch/ Unlatch

Input Device

- Knob (Standard)
- Keypad input (Standard)
- Mouse/ Keyboard input (option)

System Output & Extensible Interface

- Ethernet Network: 1 standard RJ45 socket
- USB Port: 1
- Video Output: 1 HDMI port (option)

Operating Environment

- Temperature: 5 ~ 40 °C
- Humidity: 15% ~ 80% (non-condensing)
- Atmosphere pressure: 86 KPa ~ 110 KPa

Transportation and Storage Environment

- Temperature: -20 ~ 50 °C
- Humidity: 10% ~ 90% (non-condensing)
- Atmosphere pressure: 86 KPa ~ 110 KPa

Safety

- IEC60601-1 Approved, CE marking according to MDD93/42/EEC
- With reference to RoHS Directive 2011/65/EU recasting

Trend & Reviewing

- Trend: 2160 hours
- ARR events: 128 groups of ARR events and associated waveform
- NIBP measurement reviewing: 2000 groups
- Waveform review: 2 hours
- Alarm event: 2000 groups of parameter alarms events and associated parameter

ECG

- Lead mode: 3/5 Leads, I, II, III or I, II, III, AVR, AVL, AVF, V
- Protection: Breakdown Voltage 4000VAC 50/60Hz; Defibrillator proof
- Gain: 2.5mm/mV (×0.25), 5.0mm/mV (×0.5), 10mm/mV (×1), 20mm/mV (×2), 40 mm/ mV (×4), Auto
- Sweep speed: 6.25mm/s, 12.5mm/s, 25mm/s, 50mm/s
- ECG signal range: ±12 mV (Gain × 0.25)
- Accuracy: ±1bpm/ ±1%, whichever is greater
- Resolution: 1 bpm
- Leakage Current < 10 μA
- Baseline Recovery:
 - ≤ 3s after defibrillation (Monitor mode)
 - ≤ 1s after defibrillation (Surgery mode)
- Bandwidth: Surgery 1 ~ 25 Hz
 - Monitor 0.5 ~ 40 Hz
 - Diagnostic 0.05 ~ 120 Hz
- Indication of Electrode Separation: Every electrode (exclusive of RL)

Heart Rate

- Measure range:
 - Adult: 0bpm; 10 ~ 300 bpm
 - Neo/Ped: 0bpm; 10 ~ 350 bpm
- Resolution: 1 bpm
- Accuracy: ± 1% or ± 1bpm, whichever is greater

ST Measurement

- Range: -2.0 ~ +2.0 mV
- Accuracy: -0.8mV ~ +0.8mV: ±0.02mV or ±10%, whichever is greater
- Other range: unspecified
- Resolution: 0.01mV

Respiration

- Method: Impedance between RA-LL, RA-LA
- Gain: ×0.25, ×0.50, ×1, ×2, ×4
- Respiration Rate: 0bpm, 6 ~ 150 BrPM
- Sweep speed: 6.25 mm/s, 12.5 mm/s, 25mm/s
- Resolution: 1 BrPM
- Accuracy: ±2 bpm or ±2%, whichever is greater
- Apnea Alarm: 10 ~ 60 s

NIBP

- Method: Oscillometric
- Measure mode: Manual, Auto, STAT
- Measure Interval in AUTO Mode 1~480 min
- STAT mode cycle time: Keep 5 minutes, at 5 seconds interval
- Measure and Alarm Range:

Adult:	SYS: 30 ~ 270 mmHg
	DIA: 10 ~ 220 mmHg
	MEAN: 20 ~ 235 mmHg
Pediatric:	SYS: 40 ~ 235 mmHg
	DIA: 10 ~ 220 mmHg
	MEAN: 20 ~ 225 mmHg
Neonate:	SYS: 30 ~ 135 mmHg
	DIA: 10 ~ 110 mmHg
	MEAN: 20 ~ 125 mmHg
- Static pressure accuracy: ±3mmHg
- Resolution: 1mmHg
- Accuracy: Maximum Mean error ±5mmHg
 - Maximum Standard deviation ≤8mmHg
- Over pressure Protection: Dual protection via software & hardware

Temperature

- Technique: Thermistor probe (2.25K)
- Channel: Dual-Channel, provide T1; T2; ΔT
- Measuring and Alarm Range:
 - 0.0 °C~ 50 °C (32°F~ 122°F)
- Unit: Celsius (°C), Fahrenheit (°F)
- Resolution: 0.1 °C or 1 °F
- Accuracy: ±0.1 °C (exclusive probe)

Performance Specifications

SpO2 (Digital Technic)

- Measurement Range: 0 ~ 100 %
- Resolution: 1 %
- Response Modes: Low, Medium, High
- Accuracy: $\pm 2\%$ (70% ~ 100%)
 $\pm 3\%$ (35% ~ 69%)
Unspecified (0 ~ 34%)
- Support Pitch tone and multi-level volume

Pulse Rate

- Measuring and Alarm Range: 25~250bpm
- Accuracy: $\pm 1\%$ or ± 1 bpm, whichever is greater
- Resolution: 1bpm

Nellcor-SpO2 (Option)

- Measurement Range: 0 ~ 100 %
- Resolution: 1 %
- Accuracy: 70% ~ 100%, $\pm 2\%$ (adult)
70% ~ 100%, $\pm 3\%$ (Neonate)
70% ~ 100%, $\pm 2\%$ (Low Perfusion)
0% ~ 69%, unspecified

Pulse Rate

- Measurement range: 20 ~ 300 bpm
- Resolution: 1bpm
- Accuracy:
 ± 3 bpm (20 ~ 250 bpm)
unspecified (251~300 bpm)

Masimo SpO2 (Option)

- Measurement Range: 0 ~ 100 %
- Resolution: 1 %
- Accuracy:
70% ~ 100%, $\pm 2\%$ (adult/ pediatric, non-motion conditions)
70% ~ 100%, $\pm 3\%$ (neonate, non-motion conditions)
70% ~ 100%, $\pm 3\%$ (motion conditions)
0% ~ 69% unspecified

Pulse Rate

- Measurement range: 25 ~ 240 bpm
- Resolution: 1bpm
- Accuracy: ± 3 bpm (non-motion condition)

EtCO2 (Mainstream/ Sidestream) (Option)

- Measure method: Non-dispersive infrared (NDIR)
- Measure Range: 0 ~ 19.7% (0 ~ 150 mmHg)
0 ~ 20 kPa
- Resolution: 0.1 mmHg
- CO2 Accuracy:
0 ~ 40 mmHg, ± 2 mmHg
41 ~ 70 mmHg, $\pm 5\%$ of reading
71 ~ 100 mmHg, $\pm 8\%$ of reading
101 ~ 150 mmHg, $\pm 10\%$ of reading
at 760 mmHg, ambient temperature of 25°C)
- Respiratory Rate: Range: 3 ~ 150 BrPM
Accuracy: ± 1 bpm

EtCO2 (Micro-stream) (Option)

- Measure method: Non-dispersive infrared (NDIR)
- Measure Range: 0 ~ 19.7% (0 ~ 150 mmHg)
0 ~ 20 kPa
- Sample Rate: 50 mL/min ± 10 mL/min
- Resolution: 0.1 mmHg (0 ~ 50 mmHg)
0.25 mmHg (50 ~ 114 mmHg)
- CO2 Accuracy: 0 ~ 40 mmHg, ± 2 mmHg
41 ~ 70 mmHg, $\pm 5\%$ of reading
71 ~ 100 mmHg, $\pm 8\%$ of reading
101 ~ 150 mmHg, $\pm 10\%$ of reading
at 760 mmHg, ambient temperature of 35°C)
- Respiratory Rate: Range: 3 ~ 120 BrPM
Accuracy: ± 1 bpm

Depth of Anesthesia (CSI) (Option)

- EEG sensitivity: $\pm 400\mu V$
- Noise: $< 2\mu V$ p-p, $< 0.4\mu V$ RMS, 1-250 Hz
- CMRR: > 140 dB
- Input impedance: > 50 Mohm
- Sample rate: 2000 samples/sec, (14 bits equivalent)
- BS%: 0-100, filter 1-42 Hz, 1 sec. display update
- EMG: 0-100 Logarithmic. Filter 75-85 Hz, 1 sec. update
- Alarms: High / Low with user selectable limit
- Artifact rejection: Automatic
- Sensor impedance range: 0 ~ 10 kOhm / measurement current 0.01 μA

Multi-gas/O2 (Anesthetic Gas) (Option)

- Method: Infrared absorption
- Gas sorts: CO2, N2O, Des, Iso, Enf, Sevo, Hal, O2 (Optional paramagnetic sensor)
- Calibration: Room air calibration performed automatically when changing airway
Airway adapt (< 5 sec)
- Measurement range:
CO2: 0~25%, N2O : 0~100%
O2: 0~100%, Enf, Iso, Hal: 0~25%,
Sevo, Des: 0~25%
- Data output: Fi and ET values
- Respiration rate: 0~ 150 BrPM
- Other: Up to 5 waveforms displayed
Agent mixture detection
MAC value displayed

IBP (Option)

- Max Channel: 2
- Measurement way: Thermal resistance way
- Press Sensor: Sensitivity 5 uV/V/mmHg, $\pm 2\%$
Impedance 300 to 3000 Ω
- Resolution: 1 mmHg
- Unit: mmKg, kPa, cmH2O
- Transducer sites:
Arterial Pressure (ART)
Pulmonary Arterial (PA)
Left Arterial (LAP)
Right Arterial (RAP)
Central Venous Pressure (CVP)
Intracranial Pressure (ICP)
PI / P2
- Measuring and alarm range:
ART 0 ~ +350mmHg
PA -10 ~ +120 mmHg
CVP/ RAP/ LAP/ ICP -10 ~ +40 mmHg
PI / P2 -50 ~ +350mmHg
- Accuracy:
Static: ± 1 mmHg or $\pm 2\%$, whichever is greater (exclusive of transducer)
 ± 4 mmHg or $\pm 4\%$, whichever is greater (inclusive of transducer)
Dynamic: ± 4 mmHg or $\pm 4\%$, whichever is greater

** Specifications subject to change without prior notice*

Model Configuration

Standard Config.	15 inch LED, 3/5 Lead ECG, NIBP, SpO2, Pulse Rate, Temperature, Respiration
Optional Config.	1/2 IBP, 2-Temperature, Nellcor SpO2, Masimo SpO2, 12-Lead ECG EtCO2 (Mainstream/Sidestream/Microstream), Anesthesia Depth Monitoring (CSM module), Multi-gas (AG) Monitoring
Optional Accessories:	Printer, USB Mouse/Computer Keyboard Input Function, Central Monitoring Station, Neo/Ped Accessories, HDMI Output, Wall-mounting, Trolley,
Remark:	1) User can NOT choose USB mouse function and WIFI at the same time.

Gallery for Optional Accessories:



Nellcor Extension Cable



Reusable Nellcor Neo SpO2 Probe



Reusable Ped. SpO2 Probe



Disposable Ped SpO2 Probe



Disposable Neo SpO2 Probe



IBP Disposable Kits



HDMI to VGA transverter



Central Monitoring Station



Trolley with Basket



Wall-mount with basket



Printer



AG Mainstream Probe



AG IRMA Airway Adapter (Adult/Infant)



AG Sidestream Analyser



Disposable Electrodes of Anaesthesia Depth Monitoring

Standard Packing List:

Standard Packing List			
No.	Parts No.	Description	QTY
1	8189007070	5-lead snap connector ECG cable (AHA standard)	1
2	8189007002	Adult disposable adhesive electrodes (snap connector, 25pcs/pack)	1
3	8310400014	reusable adult SpO2 finger sensor	1
4	8189007010	NIBP PVC hose (3M), with connector	1
5	8189007074	Reusable adult NIBP cuff with connector (25cm-35cm), Sac-type	1
6	8189007072	Skin temperature probe with plug 2.25K	1
7	8112900002	Power cord	1
8	8310100008	Ground cable	1
9	8510100001	User's manual	1
10	8510120002	Checking list	1

Options:

No.	Parts No.	Description
ECG		
1	8189007070	5-lead snap connector ECG cable (AHA standard)
2	8189007064	5-lead ECG cable (crocodile type) (AHA standard)
3	N/A	5-lead snap connector ECG cable (IEC standard)
4	N/A	5-lead ECG cable (crocodile type) (IEC standard)
5	8189007002	Adult Disposable Adhesive Electrodes (Snap Connector, 25pcs/pack)
6	8189007003	Pediatric/Neonatal Disposable Adhesive Electrodes (Snap Connector, 25pcs/pack)
Nellcor SPO2		
7	8310300058	Nellcor SpO2 Module, extension cable 1pc and adult sensor 1pc
8	8189007075	Nellcor reusable adult SpO2 finger sensor
9	8189007059	Nellcor reusable neonatal SpO2 wrapping sensor
10	8189007060	Nellcor disposable neonatal SpO2 sensor
11	8310400031	SpO2 extension cable with Nellcor connector
Masimo SPO2		
12	N/A	Masimo SpO2 Module, extension cable 1pc and adult sensor 1pc
13	N/A	Masimo reusable adult SpO2 finger sensor
14	N/A	Masimo reusable neonatal SpO2 wrapping sensor
15	N/A	Masimo disposable neonatal SpO2 sensor
16	N/A	Masimo extension cable with Masimo connector
SPO2		
17	8310400014	reusable adult SpO2 finger sensor
18	8189007024	reusable pediatric SpO2 finger sensor
19	8189007029	reusable neonatal SpO2 wrapping sensor
20	8189007060	disposable neonatal SpO2 sensor
21	8189008003	reusable SpO2 adult soft sensor
22	8189008051	reusable SpO2 pediatric soft sensor
23	N/A	reusable SpO2 ear clip sensor
24	N/A	reusable Y-Type SpO2 sensor

NIBP		
25	8189007063	Reusable neonatal cuff with connector (10cm-15cm), Sac-type
26	8189007047	Reusable pediatric cuff with connector (18cm-26cm), Sac-type
27	8189007074	Reusable adult NIBP cuff (4) with connector (25cm-35cm), Sac-type
28	8189007069	Reusable adult NIBP cuff (5) with connector (33cm-47cm), Sac-type
29	8189007073	Reusable adult NIBP leg cuff (6) with connector (46cm-66cm), Sac-type
30	8189007028	Disposable neonatal NIBP cuff
31	8189007010	NIBP PVC hose (3M), with connector
Temperature		
32	8189007005	Rectal probe
33	8189007071	Esophageal probe
34	8189007004	Reusable skin probe, 10k
35	8189007072	Reusable skin probe, 2.25k
IBP		
36	81800100078	2-IBP module with accessories kit (Pressure transducer interface cable with connector 2pcs; Disposable pressure transducer kit 2sets)
37	8189007033	UTAH IBP transducer interface cable with connector (2 sets)
38	8189007032	UTAH IBP disposable transducer (PT-01) (Made in china)
Main-stream ETCO2		
39	8180100059	USA Respironics Main Stream EtCO2 probe with Disposable airway adapter - Adult / Pediatric 1pc
40	8189008007	USA Respironics Main Stream EtCO2 sensor
41	8189008008	Disposable airway adapter - Neonatal/Infant
42	8189008009	Disposable airway adapter - Adult / Pediatric
Side-stream ETCO2		
43	8180100064	USA Respironics Side Stream EtCO2 Module with accessories kit (bracket 1pc, water trap 1pc, Disposable CO2 tube 1pc, three way tap 1pc)
44	8189008010	Bracket
45	8189008011	Water trap
46	8189008012	Disposable CO2 sample tube
47	8189008013	Three way tap
Side-stream ETCO2 (China module)		
48	8180100067	China Module Side Stream EtCO2 Module with accessories kit (bracket 1pc, water trap 1pc, Disposable CO2 tube 1pc, three way tap 1pc)
49	8189008027	Bracket
50	8189008028	Water trap
51	8189008029	Disposable CO2 sample tube
52	8189008030	Three way tap
Micro stream ETCO2		
53	8180100065	Micro Stream EtCO2 Module with accessories kit (Disposable CO2 Nasal Cannula -adult 1 pc, Disposable CO2 Airway Adapter Cannula -adult 1 pc)
54	8189008014	Micro Stream EtCO2 sensor
55	8189008015	Disposable CO2 Airway Adapter - Adult
56	8189008016	Disposable CO2 Nasal Cannula - Infant
57	8189008017	Disposable CO2 Nasal Cannula - Pediatric
58	8189008018	Disposable CO2 Nasal Cannula - Adult
Multi-gas (main Stream)		
59	8189008019	Multi-gas Probe with accessories kit (Disposable airway adapter Adult/pediatric 1pc,)
60	8189008020	IRMA AX+ Multi-Gas sensor (Main Stream)
61	8189008021	Disposable airway adapter - Neonatal/Infant (10pcs/pack)
62	8189008022	Disposable airway adapter - Adult / Pediatric (25pcs/pack)
63	8189008023	Extension cable

Multi-gas (side stream)-ISA OR+		
64	8189008019	Multi-gas Probe with accessories kit (Disposable Nomoline Sampling line 1pc)
65	8180100066	ISA OR+ Multi-Gas Module (Side Stream, Paramagnetic O2)
66		Servomex Paramagnetic Oxygen Sensor (note: needs calibration when paried with ISA)
67	8189008024	Nomoline Sampling line with Luer Lock connector, 2 m.
68	8189008025	ISA module Modura holder
69	8189008026	ISA module Clamp Adapter
Multi-gas (side stream)-ISA AX+		
70		Multi-gas Probe with accessories kit (Disposable Nomoline Sampling line 1pc)
71		ISA AX+ Multi-Gas Module (Side Stream, CO2,N2O, 5 x AA, Auto Agent ID)
72	8189008024	Nomoline Sampling line with Luer Lock connector, 2 m.
73	8189008025	ISA module Modura holder
74	8189008026	ISA module Clamp Adapter
CSM (Depth of Anesthesia Awareness Index)		
75	N/A	Cerebral state monitor module with accessories kit (disposable electrode 1 set)
76	N/A	Disposable electrode 1 set
Others		
77	8600000007/2	Central Monitoring System (software + dongle)
78	8510110001	Service Manual
79	8112900002	Power cord
80	8212010010	Rechargeable Lithium-ion Battery
81	8700010103	Net cable for Wire Central Monitoring (5M)
82	9100010003	Switch Board
83	8490000031	Wireless AP (transmitter & receiver) (Four patient monitors need one set of transmitter & receiver)
84	8490000030	Wireless AP (transmitter) (Each monitor needs one transmitter)
85	8310500003	Built-in thermal printer
86	8111810002	Thermal printing Paper 50mm
87	8212900053	Wall mounting rack
88	8490000001	Trolley with basket and wheels

Remark: Multi-gas has included CO2 monitoring, if you choose Multi-gas module, EtCO2 module is needless.