

Multiparameter Monitor Technical Specification



II.1 Type

Standard anti-shock class : class I

EMC type: class A

Standard anti-shock level

CF level for ECG(RESP); type BF for SpO2,NIBP; TEMP

Anti-entering fluid level :

common seal apparatus, does not have the function to prevent liquid entering

Disinfection / sterilization methods:

details as per chapter 5

Working method: Continuous

II.2 Sepsification

II.2.1 Working condition

TEMP range

working 0 ~ 40 °C

transportation and storage -20 ~ 60 °C

Humidity

working ≤85 %

transportation and storage ≤93%

Altitude Range

working -500 — 4,600m(-1,600 — 15,000feet)

transportation and storage -500 — 13,100m(-1,600 — 43,000feet)

Electric specification

100~250 VAC, 50/60 Hz, Maximum 70VA

II.2.2 Displaying Info

- Maximum 6 waveforms
- One alarm light (yellow/red)
- One working indicator (green)
- One battery charging indicator (yellow)
- Three corresponding sound alarming mode

II.2.3 Battery

- 14.8V/4400mAh Li-ion rechargeable battery
- Under normal working condition, battery works for 100 minutes
- It can work for 5 minutes after the first time power alarm
- Maximum 8 hours charging time

II.2.4 Recorder

Paper's width	48mm
Printing speed	25 mm/S
Scanning waveform	2 channels
Recording type	8 seconds real time recording

II.2.5 Recall

Trend recall	
Short trend	1 hour, resolution: 1 second or 5 second
Long trend	72 hours, resolution 1 minute、5 minute 或 10 minute
NIBP measurement recall	400 pcs NIBP measured value's recall

II.3 ECG Specification

II.3.1 Lead configuration

Standard 3 lead or 5 lead cable

3 lead RA、LA、LL, lead method: I, II, III

5-lead RA、LA、LL、RL、V, lead method: I, II, III, aVR, aVL, aVF, V

II.3.2 Gain

×0.25, ×0.5, ×1, ×2, auto

II.3.3 Heart Rate

Range

Adult 15 ~ 300bpm (beat/min)

Neonate/pediatric 15 ~ 350 bpm(beat/min)

Accuracy ±1% or ±1bpm, choose the bigger one

Resolution 1 bpm(beat/min)

II.3.4 Sensitivity

> 200 μ V (peak-peak date)

II.3.5 Impedance

> 5 (Megohm)

II.3.6 Bandwidth

Diagnostic mode 0.05~130Hz

Monitoring mode 0.5~40Hz

Operation mode 1~20Hz

II.3.7 Common-mode rejection ratio

Diagnostic mode > 90 dB

Monitoring mode > 100 dB

Operation mode > 100 dB

II.3.8 Electrode polarization voltage range

±300mV

II.3.9 Pacemaker pulse detection

It can test the following pace-maker pulse :

Extent : ±2 mV ~ ±700mV

width: 0.1ms ~ 2ms

Rise time : 10µs~100µs

II.3.10 Pacing pulse suppression

When the pacing analysis switch is on, it can suppress pacing pulse within the following condition and will not affect the calculation of heart rate:

extent: ±2 mV ~ ±700mV

width: 0.1ms ~ 2ms

Rise time : 10µs ~ 100µs

II.3.11 Recovery time of base line

After Defibrillation < 3 second

II.3.12 Signal's range

±8 mV (peak value)

II.3.13 Calibration signal

1mV (peak value), accuracy ±5%

II.3.14 ST measurement

Range: -2.5mV ~ +2.5mV

Measurement accuracy: within -0.8 mV~+0.8mV, the tolerance is ±0.02mV or ±10%
Without this range, there is no definition

II.4 RESP Specification

II.4.1 Measurement

RA-LL Impedance

II.4.2 Detection range of respiratory impedance

0.3~3Ω

II.4.3 Base resistance range

200~4000Ω

II.4.4 Bandwidth

0.1~2.5Hz

II.4.5 RESP Rate

range

adult 0~120 BrPM

Pediatric and neonate 0~150 BrPM

Resolution 1 BrPM

accuracy ±2 BrPM

II.4.6 Suffocation alarm

10~40 seconds

II.5 SpO2

II.5.1 SPO2

range 0~100%
 Resolution 1%
 Accuracy 70~100%: ± 2 DIGIT
 0%~69%: Not defined

II.5.2 pulse rate

measurement range 20~300bpm
 Resolution 1bpm
 accuracy ± 3 bpm

II.6 TEMP's specification

II.6.1 TEMP transducers applied

YSI series, CYF series

II.6.2 Channel's quantity

2 channels

II.6.3 Measurement

range 0~50°C
 Resolution 0.1°C
 Accuracy ± 0.1 °C, not include a sensor error

II.7 NIBP specification

II.7.1 Measurement

Pulse wave oscillation

II.7.2 Working mode

manual/auto

II.7.3 Interval of auto measurement

1,2,3,4,5,10,15,30,60,90,120,180,240,480minutes

II.7.4 Measurement time of Continuous measurement mode

5 minutes

II.7.5 Pulse rate range

40 ~ 240 bpm

II.7.6 Measuring range and accuracy

range

ADULT:

SYS	40~270mmHg
DIA	10~215mmHg
MEAN	20~235mmHg

PEDIATRIC:

SYS	40~200mmHg
DIA	10~150mmHg
MEAN	20~165mmHg

NEONATE:

SYS	40~135mmHg
DIA	10~100mmHg
MEAN	20~110mmHg

Static Pressure Range 0~300mmHg

Static Pressure accuracy $\pm 3\text{mmHg}$
 blood pressure accuracy :
 Maximum average error $\pm 5\text{mmHg}$;
 Maximum standard deviation 8mmHg

II.7.7 over-pressure protection

adult mode $300\text{ mmHg}\pm 10\text{ mmHg}$
 pediatric mode $240\text{ mmHg}\pm 10\text{ mmHg}$
 neonate mode $150\text{ mmHg}\pm 10\text{ mmHg}$

II.8 CO2 specification (optional)

II.8.1 Measurement

Side stream or main stream

II.8.2 Measuring range

CO2: 0-99
 INS: 0-99
 AWRR: 0-99

II.9 IBP IBP's specification (optional)

II.9.1 Channel's quantity

2 channels

II.9.2 Pressure Name

ART, PA, CVP, RAP, LAP, ICP, P1, P2.

II.9.3 Pressure measuring range

ART 0 ~ 300 mmHg
 PA -6 ~ 120 mmHg
 CVP -10 ~ 40 mmHg
 RAP -10 ~ 40 mmHg
 LAP -10 ~ 40 mmHg
 ICP -10 ~ 40 mmHg
 P1, P2 -10 ~ 300 mmHg

II.9.4 Accuracy

$\pm 1\text{mmHg}$ or $\pm 2\%$, the bigger value (not including sensor error)

II.9.5 Pressure transducer

Sensitivity $5\ \mu\text{V/V/mmHg}$
 Resistance range $300\sim 3000\Omega$

II.10 EtCO2 specification:

ETCO2 Specification

Transducer Type	Mainstream CO2 Sensor
Principle of Operation	Non-dispersive infrared (NDIR) single beam optics, dual wavelength, no moving parts.
Energy Emitting	High efficiency IR source

Device	
Energy Detecting Device	Frequency stable thermopile
CO2 Measurement Range	0% to 20% (0 to 150mmHg)
CO2 Resolution	0.1 mm Hg 0 to 49 mm Hg 0.2 mm Hg 50 to 150 mm Hg
CO2 Accuracy	± 2 mm Hg @ $< 5.0\%$ CO2 (at BTPS) $< 10\%$ of reading @ $> 5.0\%$ CO2(at BTPS)
Dimensions	50mm*22mm*36mm
Weight	< 40 g
Respiration Rate Range	3 to 150 Breaths Per Minute (BPM)
Respiratory Rate Accuracy	1% of reading ± 1 breath
Calibration	No routine user calibration required. An airway adapter zero is required when changing to a different style of airway adapter.
Data Interface	Highly configurable serial digital interface (TTL/RS232 Level)
Data Output	CO2 gas concentration (mmHg), End-tidal CO2, Inspired CO2, Respiratory Rate.
Input Voltage	5.0 VDC $\pm 5\%$
Power Consumption	1000mW
Warmup Time	10 seconds
Response Time	10mS
Operating Temperature	5 to 55
Shipping/Storage Temperature Range	-40 to 70
Interconnection	Standard Lemo Redel 8-pin plastic Material PSU Sensor Plug: PAB.M0.8GL.AC39GZ Band Relief: GMA.1B.030.DJ Host Receptacle: PKB.M0.8GL.LJ Pinout: 1 VA 5.0V 2 SHIELD SHIELD return 3 DGND Digital return 4 VSRC 5.0V 5 TxD Serial data from CAPNOSTAT 6 RxD Serial data from Host 7 AGND Analog return 8 SYNC Waveform synchronization*
Shock Impact	IEC TR 6 0721-4-7 Class 7M3 (designed to withstand environments subject to significant vibrations or high shock levels)

	EN6 0068-2-27 Shock EN60068-2-64 Random vibration
Regulatory	Designed to meet IEC 6 0601-1-2 , EN55011 CISPIR 11 Class B (Radiated and Conductive Emissions), IEC 6 1000-4-2 Electrostatic Discharge Immunity, IEC 6 1000-4-3 Radiated Immunity, Designed to comply with 93/42/EEC (MDD CE Marking), FDA Standards, Minimum Performance and Safety Requirements for Capnometers and ISO21647. Medical Electrical Equipment performance requirements for the basic safety and essential performance of respiratory gas monitors.

ETCO₂ Specification(Side stream)

Transducer Type	Sidestream CO ₂ Sensor
Sampling Rate	50 mL/minute ± 10 mL/minute
Principle of Operation	Non-dispersive infrared (NDIR) single beam optics, dual wavelength, no moving parts in optics
Initialization Time	Capnogram displayed in less than 5 seconds at ambient temperature (e.g., 25°C); full specifications within 1 minute
CO₂ Measurement Range	Selectable at 0 ~ 150 mm Hg 0 ~ 19.7% 0 ~ 20 kPa (at 760 mm Hg) Barometric Pressure supplied automatically by onboard chip
CO₂ Resolution	0.1mmHg, at 0 to 49 mm Hg 0.2 mmHg, at 50 to 150 mm Hg
CO₂ Accuracy	±2 mm Hg at 0 ~ 40 mm Hg ±5% of reading at 41 ~ 150 mm Hg ± 8% of reading at above 80 BPM
CO₂ Stability	Drift over 4 hours shall not exceed 1 mm Hg max.
CO₂ Noise	RMS noise of the sensor shall be less than or equal to 0.25 mm Hg at 5% CO ₂
Respiratory Rate Range	2 to 150 Breaths Per Minute (BPM)
Respiratory Rate Accuracy	1% of reading ± 1 breath
Compensations	Barometric Pressure 400 mmHg to 800 mmHg can be compensated by module automatically* Operator selectable O ₂ / N ₂ O compensation

Calibration	No routine user calibration required, but module can be calibrated by user
Sample line	Single patient use sample line and inline drier line which eliminates water vapor of gas
Nasal Sampling Kits for Non-intubated Patients	Adult and pediatric nasal CO ₂ sampling lines
On-Airway Adapter KITS for Intubated Patients	Adult and pediatric sampling lines with T-fitting
Sample Kit Hours of Use	Nasal Cannula and connecting sampling line up to 12 hours, for single patient use T-fitting (on-Airway Adapter) can be disinfected repeatedly Gas dryer line up to 1 year, do not need to be disinfected
Flow Control	Via Delta P measurement across a capillary tube
Scavenging Port	Yes
Voltage Requirements	5.0 VDC ± 5%
Power Rating	Rated input: In steady state: less than 0.5 Watts typical Maximum power: less than 1.1 Watts on Offset Calibration or sampling line occluded
Interconnection	Standard Lemo Redel 8-pin plastic
Temperature and Humidity	Operating: 5° to 55°C, 10 to 90% RH, non-condensing Storage: -40° to 60°C, <90% RH, non-condensing
Data Interface	RS232, bi-directional, 19200 baud. Standard N-8-1
Data Output	CO ₂ gas concentration (mm Hg), End-tidal CO ₂ , Inspired CO ₂ , Respiratory Rate, Gas and barometric pressure

II.11 AG Specification (Optional)

Waveform: Max can get 5 waveforms, designed to monitor respiratory concentrations of CO₂, N₂O, O₂, and gas mixtures containing any two of the five anesthetic agents halothane, Enflurane, Isoflurane, Sevoflurane and Desflurane.

sample flow :50±10 ml/min

Calibration	No span calibration is required for the IR bench. An automatic zero reference calibration is performed at startup and then every 24 hours ¹
Warm-up time	ISA CO ₂ : < 10sec(Concentrations reported and full accuracy) ISA OR +/AX+ : < 20sec(Concentrations reported, automatic agent identification enabled and full accuracy)

Typical rise time at 50ml/min sample flow	CO2 ≤200ms (≤250ms for ISA OR+/AX+) N2O ≤350ms Agents ≤350ms O2 ≤450ms ²	
Primary agent threshold (ISA OR +/AX+)	0.15vol% When an agent is identified, concentrations will be reported even below 15vol%.	
Secondary agent threshold (ISA OR +/AX+)	0.2vol%+10% of total agent concentration	
Agent identification time (ISA OR +/AX+)	<20seconds (typically<10 seconds)	
Total system response time	<3seconds (with 2m sampling line)	
Gas	Range ³	Accuracy
CO2	0 to 15vol%	± (0.2 vol%+2% of reading)
	15 to 25vol%	Unspecified
N2O	0 to 100vol%	± (2 vol%+2% of reading)
HAL、ENF、ISO	0 to 8vol%	± (0.15 vol%+5% of reading)
	8 to 25vol%	Unspecified
SEV	0 to 10vol%	± (0.15 vol%+5% of reading)
	10 to 25vol%	Unspecified
DES	0 to 22vol%	± (0.15vol%+5% of reading)
	22 to 25vol%	Unspecified
O2	0 to 100vol%	± (1 vol%+2% of reading)

Configurations and Options for each model:

8 Inch (MT800)

Basic: 5 leads ECG, SPO2, NIBP , 1-Temp, HR/PR

Options: Touch, EtCO2 (mainstream / sidestream), Printer, CMS

Package:

Carton Size: 237.0 x 265.00 x 285.00mm, 0.02CBM

G.W. : 3.0 KGs

N.W. : 2.5 KGs

12.1 inch (MT1200, MT1200 Pro)

Basic : 5 Leads ECG, SPO2, NIBP , 2-Temp ,HR/PR

Options: Touch, EtCo2, 2IPB / 1IBP, C.O., Suntech NIBP, Massimo SPO2, CMS

Package:

Package Info:

Carton Size: 370.0 x 340.00 x 290.0mm (1 pcs/CTN), 0.04CBM

G.W. : 5.20Kgs,

N.W. : 4.00Kgs

15 inch (MT1500, MT1500 Pro)

Basic : 5 Leads ECG, SPO2, NIBP , 2-Temp ,HR/PR

Options: Touch, EtCo2, 2IPB / 1IBP, C.O., AG, Suntech NIBP, Massimo SPO2, CMS

Package:

Package Info:

Carton Size: 430.0 x 420.00 x 320.00mm (1 pcs/CTN), 0.06CBM

G.W. : 6.00Kgs,

N.W. : 5.00Kgs