iM70

Patient Monitor

Version 1.0

Data Sheet

iM70 Patient Monitor Specification (FDA only)		
Physical Specifications		
Dimension	328 mm (W) × 285 mm (H) × 158 mm (D)	
Weight	< 4.5 kg (standard configuration, without battery)	
Power Supply		
Power Supply	100 V to 240 V~, 50 Hz/60 Hz	
Current	1.4 A-0.7 A	
Battery		
Battery Type	Rechargeable lithium-ion battery	
Capacitance	2500 mAh, 5000 mAh	
Operating Time	2500 mAh	≥3.5 h
	5000 mAh	≥7 h
Charge Time	2500 mAh	≤3.5 h, 100% charge ≤3.15 h, 90% charge
	5000 mAh	≤6.5 h, 100% charge ≤5.85 h, 90% charge
Display		
Display screen	12.1 inch color TFT, touch screen available	
Resolution	800 × 600	
Wave	A maximum of 13 waveforms (with 12-lead ECG function)	
Recorder		
Record Width	48 mm	
Paper Speed	12.5 mm/s, 25 mm/s, 50 mm/s	
Channels	3	
Recording types	Continual real-time recording 8-second real-time recording 20-second real-time recording Trend graph recording Trend table recording NIBP review recording Arrhythmia review recording Alarm review recording Drug calculation titration recording Hemodynamic Calculation result recording Oxygenation Calculation result recording Ventilation Calculation result recording Renal Function Calculation result recording 12-lead diagnosis recording C.O. measurement recording Frozen waveform recording	

Data Storage		
Internal Temporary Memory (Standard)	Trend data	1 hour, at 1 s resolution 120 hours, at 1 min resolution
	Alarm events	Up to 200 sets
	NIBP Measurement data	1200 sets
	Arrhythmia events	Up to 200 sets
	12-lead Diagnosis results	Up to 50 sets
Non-Volatile Memory (Standard SD card / External USB disk)	A single piece of patient data maximally contains the following information:	
	Trend graph & Trend table	240 hours, resolution: 1 m
	NIBP Measurements review	1200 sets
	Alarm review	200 sets
	Arrhythmia event	200 sets
	Full disclosure waveforms	48 hours
Wi-Fi		
IEEE	802.11a/b/g/n	
Frequency Band	2.4 GHz ISM band & 5 G ISM band	
Interfaces and others		
Nurse call / analog output/ defibrillator synchronization		1
USB Interfaces		2
VGA Interface		1
Network Interface		1
Anti-theft lock interface		1
ECG		
Lead Mode	3-Lead: I, II, III 5-Lead: I, II, III, aVR, aVL, aVF, V 6-Lead: I, II, III, aVR, aVL, aVF, Va, Vb. 12-Lead: I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6	
Lead naming style	AHA, IEC	
Display Sensitivity (Gain Selection)	1.25 mm/mV (×0.125), 2.5 mm/mV (×0.25), 5 mm/mV (×0.5), 10 mm/mV (×1), 20 mm/mV (×2), 40 mm/mV (×4), AUTO gain	
Sweep speed	6.25 mm/s, 12.5 mm/s, 25 mm/s, 50 mm/s	
Bandwidth (-3 dB)	Diagnosis: 0.05 Hz to 150 Hz Diagnosis 1: 0.05 Hz to 40 Hz Monitor: 0.5 Hz to 40 Hz Surgery: 1 Hz to 20 Hz Enhanced: 2 Hz ~18 Hz Customized: High-pass Filter and Low-pass Filter	
CMRR	Diagnosis: > 95 dB Diagnosis 1: > 105 dB (when Notch is turned on) Monitor: > 105 dB Surgery: > 105 dB	

	Enhanced: > 105 dB Customized: > 105 dB (Low-pass Filter < 40 Hz) > 95 dB (Low-pass Filter > 40 Hz)		
Hum Filter	In diagnosis, Diagnosis 1, monitor, surgery, enhanced and customized modes: 50 Hz/60 Hz (Hum Filter can be turned on or off manually)		
Recovery time after defibrillation	<5 s		
ESU Protection	Cut mode: 300 W Coagulation mode: 100 W Restore time: ≤10 s		
Pace pulse detection	one among I, II, III, AVR, AVL, AVF, V1, V2, V3,V4, V5, V6		
Heart Rate			
Range	Adult: 15 bpm to 300 bpm Ped/Neo: 15 bpm to 350 bpm		
Accuracy	±1% or ±1 bpm, whichever is greater		
Resolution	1 bpm		
PVC			
Range	Adult: 0 to 300 PVCs/ min Ped/Neo: 0 to 350 PVCs/ min		
Resolution	1 PVCs/min		
ST value			
Range	-2.0 mV to +2.0 mV		
Accuracy	-0.8 mV to +0.8 mV: ±0.02 mV or 10%, whichever is greater. Beyond this range: not specified.		
Resolution	0.01 mV		
QT measurement			
Range	200 ms ~ 800 ms		
Resolution	4 ms		
Accuracy	± 30 ms		
QTc measurement			
Range	200 ms ~ 800 ms		
Resolution	4 ms		
Accuracy	± 30 ms		
ΔQTc measurement			
Range	-600 ms ~ 600 ms		
Resolution	1 ms		
Arrhythmia analyses			
Asystole	V-Fib/V-Tach	Couplet	VT＞2
Bigeminy	Trigeminy	Vent	R on T
PVC	Tachy	Brady	Missed beats

IRR	Vbrady	PNC	PNP
12-lead ECG synchronization analysis			
Average parameters of heart beat			
Heart rate (bpm)			
Time limit of P wave (ms)			
PR interval (ms)			
QRS interval (ms)			
QT/QTC (ms)			
P-QRS-T AXIS			
RESP			
Method	Impedance between RA-LL, RA-LA		
Measurement lead	Options are lead I and II		
Measuring Range	Adult	0 rpm to 120 rpm	
	Ped/Neo	0 rpm to 150 rpm	
Resolution	1 rpm		
Accuracy	Adult	6 rpm to 120 rpm: ±2 rpm 0 rpm to 5 rpm: not specified	
	Ped/Neo	6 rpm to 150 rpm: ±2 rpm 0 rpm to 5 rpm: not specified	
Gain Selection	×0.25, ×0.5, ×1, ×2, ×3, ×4, ×5		
Sweep	6.25 mm/s, 12.5 mm/s, 25.0 mm/s, 50.0 mm/s		
Apnea Alarm Time	10 s, 15 s, 20 s, 25 s, 30 s, 35 s, 40 s		
NIBP			
EDAN Module			
Method	Oscillometry		
Mode	Manual, Auto, Continuous, Sequence		
Measuring Interval in Auto Mode	1/2/3/4/5/10/15/30/60/90/120/180/240/360/480 min and User Define		
Continuous	5 min, interval is 5 s		
Measuring Type	SYS, DIA, MAP, PR		
Measuring Range	Adult Mode	SYS: 25 mmHg to 290 mmHg DIA: 10 mmHg to 250 mmHg MAP: 15 mmHg to 260 mmHg	
	Pediatric Mode	SYS: 25 mmHg to 240 mmHg DIA: 10 mmHg to 200 mmHg MAP: 15 mmHg to 215 mmHg	
	Neonatal Mode	SYS: 25 mmHg to 140 mmHg DIA: 10 mmHg to 115 mmHg MAP: 15 mmHg to 125 mmHg	
Cuff Pressure	0 mmHg to 300 mmHg		

Measuring Range		
Pressure Resolution	1 mmHg	
Maximum Mean Error	±5 mmHg	
Maximum Standard Deviation	8 mmHg	
Maximum Measuring Period	Adult/ Pediatric	120 s
	Neonatal	90 s
Typical Measuring Period	20 s to 35 s (depend on HR/motion disturbance)	
Overpressure Protection	Adult	297±3 mmHg
	Pediatric	245±3 mmHg
	Neonatal	147±3 mmHg
PR		
Measuring range	40 bpm to 240 bpm	
Accuracy	±3 bpm or 3.5%, whichever is greater	
SunTech Module		
Method	Oscillometric	
Mode	Manual, Auto, Continuous, Sequence	
Measuring Interval in AUTO Mode	1/2/3/4/5/10/15/30/60/90/120/180/240/360/480 and User Define	
Measuring Type	SYS, DIA, MAP, PR	
Measuring Range	Adult Mode	SYS: 40 mmHg to 260 mmHg DIA: 20 mmHg to 200 mmHg MAP: 26 mmHg to 220 mmHg
	Pediatric Mode	SYS: 40 mmHg to 230 mmHg DIA: 20 mmHg to 160 mmHg MAP: 26 mmHg to 183 mmHg
	Neonatal Mode	SYS: 40 mmHg to 130 mmHg DIA: 20 mmHg to 100 mmHg MAP: 26 mmHg to 110 mmHg
Pressure Resolution	1 mmHg	
Maximum mean error	±5 mmHg	
Maximum standard deviation	8 mmHg	
Maximum measuring period	Adult	130 s
	Pediatric	90s
	Neonate	75 s
Overpressure protection	Adult/Pediatric	< 300 mmHg
	Neonate	< 150 mmHg
PR		

Measuring range	30 bpm to 220 bpm		
Accuracy	±3 bpm or ±2%, whichever is greater		
SpO_2			
EDAN Module			
Measuring Range	0% to 100%		
Resolution	1%		
Data update period	1 s		
Accuracy	Adult/Pediatric	±2% (70% to 100% SpO_2) Undefined (0% to 69% SpO_2)	
	Neonatal	±3% (70% to 100% SpO_2) Undefined (0% to 69% SpO_2)	
SI (Signal Intensity)			
Measuring Range	0-10		
Resolution	1		
Pulse Rate			
Measuring Range	25 bpm to 300 bpm		
Resolution	1 bpm		
Accuracy	±2 bpm		
Nellcor Module			
Measuring Range	1% to 100%		
Resolution	1%		
Data Update Period	1 s		
Accuracy	DS-100A, OXI-A/N(Adult) D-YS (Adult and Pediatric) OXI-P/I (Pediatric)	±3% (70% to 100% SpO_2)	
	MAX-A, MAX-AL, MAX-N, MAX-P, MAX-I, MAX-FAST (Adult and Pediatric)	±2% (70%～100% SpO_2)	
	MAX-A, MAX-AL, MAX-N, MAX-P, MAX-I, MAX-FAST (Adult and Pediatric)	±3% (60%～80% SpO_2)	
	If sensor is used for neonate as recommended, the accuracy will be larger than adult by ±1.		
Pulse Rate			
Measuring Range	20 bpm to 300 bpm		
Resolution	1 bpm		
Accuracy	±3 bpm (20 bpm to 250 bpm)		
TEMP			
Channel	2		
Sensor type	YSI-10K and YSI-2.252K		
Technique	Thermal resistance		
Measure Parameter	T1, T2, TD		

Position	Skin, Oral, Rectum		
Unit	°C, ºF		
Measuring Range	0°C to 50°C (32 ºF to 122 ºF)		
Resolution	0.1°C (0.1 ºF)		
Accuracy	Accuracy (not including sensor): ±0.1°C		
	Sensor accuracy: ≤ ±0.2°C		
Transient Response Time	≤30 s		
IBP			
Channel	2		
Technique	Direct invasive measurement		
Measuring range	Art	0 mmHg to +300 mmHg	
	PA	-6 mmHg to +120mmHg	
	CVP/RAP/LAP/ICP	-10 mmHg to +40 mmHg	
	P1/P2	-50 mmHg to +300 mmHg	
Resolution	1 mmHg		
Accuracy (not including sensor)	±2% or ±1 mmHg, whichever is greate		
Unit	kPa, mmHg, cmH_2O		
PR			
Measuring Range	20 bpm to 300 bpm		
Resolution	1 bpm		
Accuracy	30 bpm to 300 bpm: ±2 bpm or ±2%, whichever is greater; 20 bpm to 29 bpm: undefined		
CO_2			
EDAN G2 Module			
Intended patient	Adult, Pediatric, Neonatal		
Measure Parameters	$EtCO_2$, $FiCO_2$, AwRR		
Unit	mmHg, %, kPa		
Measuring Range	CO_2	0 mmHg to 150 mmHg (0% to 20%)	
	AwRR	2 rpm to 150 rpm	
Resolution	$EtCO_2$	1 mmHg	
	$FiCO_2$	1 mmHg	
	AwRR	1 rpm	
Accuracy	$EtCO_2$	±2 mmHg, 0 to 40 mmHg	Typical conditions: Ambient temperature: 25±3°C Barometric pressure: 760±10 mmHg Balance gas: N_2 Sample gas flowrate: 100ml/min
		±5% of reading, 41 to 70 mmHg	
		±8% of reading, 71 to 100 mmHg	
		±10% of reading, 101 to 150 mmHg	

		±12% of reading or ±4 mmHg, whichever is greater	All conditions
	AwRR	±1 rpm	
Sample Gas Flowrate	70 ml/min or 100 ml/min, accuracy: ±15 ml/min		
Warm-up time	Display waveform within 20 s Reach the design accuracy within 2 minutes.		
Response time	<4 s		
Barometric pressure compensation	Automatic		
Zero Calibration	Support		
Calibration	Support		
Apnea alarm delay	10 s, 15 s, 20 s, 25 s, 30 s, 35 s, 40 s		
Respironics Module			
Applicable Patient Type	Adult, Pediatric and Neonatal		
Method	Infra-red Absorption Technique		
Measure Parameters	$EtCO_2$, $FiCO_2$, AwRR		
Unit	mmHg/ %/ kPa		
Measuring Range	$EtCO_2$	0 mmHg to 150 mmHg	
	$FiCO_2$	3 mmHg to 50 mmHg	
Measuring Range	AwRR	2 rpm to 150 rpm (Sidestream) 0 rpm to 150 rpm (Mainstream)	
Resolution	$EtCO_2$	1 mmHg	
	$FiCO_2$	1 mmHg	
	AwRR	1 rpm	
Accuracy	$EtCO_2$	±2 mmHg, 0 mmHg to 40 mmHg	
		±5% of reading, 41 mmHg to 70 mmHg	
		±8% of reading, 71 mmHg to 100 mmHg	
		±10% of reading, 101 mmHg to 150 mmHg	
		±12% of reading, RR is over 80 rpm (Sidestream) There will be no degradation in performance due to respiration rate. (mainstream)	
	AwRR	±1 rpm	
Sample Gas Flow Rate (Sidestream)		50 ml /min ±10 ml /min	
Barometric Pressure Compensation		User setup	
CO_2 Rise Time/Response Time (Mainstream)		< 60 ms	
Sensor Response time (Sidestream)		<3 seconds - includes transport time and rise time	
Zero Calibration		Support	

Apnea Alarm Delay	10 s, 15 s, 20 s, 25 s, 30 s, 35 s, 40 s	
Masimo Module		
Applicable Patient Type	Adult, Pediatric and Neonatal	
Method	Infra-red Absorption Technique	
Measure Parameters	$EtCO_2$, $FiCO_2$, AwRR	
Unit	mmHg, %, kPa	
Measuring Range	CO_2	0 to 25 vol%
	AwRR	0 to 150 rpm
Resolution	CO_2	0.1%
	AwRR	1 rpm
Accuracy	CO_2	0 to15 vol%: ± 0.2 vol% + 2% of reading 15 to25 vol%: Unspecified
	AwRR	± 1 rpm
Sample Gas Flow Rate (Sidestream)	50 (± 10) ml/min	
Warm-up Time	< 10s	
CO_2 Response Time (Mainstream)	< 1s	
Sensor Response time (Sidestream)	< 3s	
Zero Calibration	Support	
C.O.		
Technique	Thermodilution Technique	
Measure Parameters	C.O., TB, TI	
Measuring Range	C.O.	0.1 L/min to 20 L/min
Measuring Range	TB	23°C to 43°C (73.4ºF to 109.4ºF)
	TI	-1°C to 27°C (30.2ºF to 80.6ºF)
Resolution	C.O.	0.1 L/min
	TB, TI	0.1° C (+0.1 ºF)
Accuracy	C.O.	±5% or ±0.2 l/min, whichever is greater
	TB	±0.1° C (not including sensor)
	TI	±0.1° C (not including sensor)
AG		
Edan G7 Module		
Intended Patient	Adult, pediatric, neonatal	
Measure Parameters	Halothane (HAL), Isoflurane (ISO), Enflurane (ENF), Sevoflurane (SEV), Desflurane (DES), CO_2, O_2, N_2O, AwRR, and MAC	
Unit	HAL, ISO, ENF, SEV, DES, N_2O: %; CO_2, O_2: mmHg, %, kPa, default is %; AwRR: bpm;	
Measuring Range	CO_2	0~15 vol%
	N_2O	0~100 vol%
	Halothane/ Enflurane/ Isoflurane	0~8 vol%

	Sevoflurane		0~10 vol%
	Desflurane		0~22 vol%
	O_2		0~100%
Resolution	N_2O, O_2		1%
	CO_2, AG		0.1%
AwRR	Measurement range		2 ~ 150 rpm
	Measuring accuracy		±1 bpm (120 bpm and below), Not specified (120 bpm above)
	Resolution		1 rpm
Sampling Flow Rate	150 ml/min, accuracy ±15 ml/min		
Warm-up Time	Display reading within 20 s; reach to the designed accuracy within 2 minutes		
Response Time	< 4 s (with 2 m gas sampling tube, sample gas flowrate: 150 ml/min)		
Masimo Module			
Module Type	ISA AX+	Sidestream, Displaying the concentration of CO_2, N_2O, and two anesthesia agent and identifying the anesthesia agent automatically	
	ISA OR+	Sidestream, Displaying the concentration of CO_2, O_2, N_2O, and two anesthesia agent and identifying the anesthesia agent automatically	
	IRMA AX+	Mainstream, Displaying the concentration of CO_2, N_2O and two anesthesia agent and identifying two anesthesia agents	
Measurement Parameters	CO_2, N_2O, O_2, Halothane (HAL), Isoflurane (ISO), Enflurane (ENF), Sevoflurane (SEV), Desflurane (DES), AwRR, MAC		
Measurement Principle	CO_2, N_2O, AA	Infra-red absorption characteristic	
	O_2	Paramagnetic method	
Sampling Flow Rate (sidestream)	50 ± 10 ml/min		
Compensations	Automatic compensation for pressure, temperature, and broadening effects on CO_2.		
Warm-up Time	< 20 s		
Measurement Range	CO_2	0 to 25 vol%	
	O_2	0 to 100 vol%	
	N_2O	0 to 100 vol%	
	HAL, ENF, ISO, SEV, DES	0-25 vol%	
	AwRR	0 rpm to 150 rpm	
Resolution	CO_2 :	0.1%	
	HAL, ENF, ISO, SEV, DES	0.1%	
	N_2O	1%	
	O_2	1%	
	AwRR	1 rpm	
Accuracy	CO_2	0 to 15 vol%	± (0.2 vol% + 2% of reading)

(Standard Conditions)		15 to 25 vol%	Unspecified
	N_2O	0 to 100 vol%	± (2 vol% + 2% of reading)
	HAL, ENF, ISO	0 to 8 vol % 8 to 25 vol %	± (0.15 vol% + 5% of reading) Unspecified
	SEV	0 to 10 vol % 10 to 25 vol %	± (0.15 vol% + 5% of reading) Unspecified
	DES	0 to 22 vol % 22 to 25 vol %	± (0.15 vol% + 5% of reading) Unspecified
	O_2	0 to 100 vol %	± (1 vol% + 2% of reading)
AwRR Accuracy	±1 rpm		
Apnea Alarm Delay	20 s, 25 s, 30 s, 35 s, 40 s		
Safety Specifications			
Compliant with Standards	IEC 60601-1: 2005+A1 :2012; IEC 60601-1-2: 2014; EN 60601-1: 2006+A1 :2013; EN 60601-1-2: 2015; IEC 60601-2-49: 2011		
Anti-electroshock Type	Class I equipment and internal powered equipment		
Anti-electroshock Degree	CF		
Ingress Protection	IPX1		
Environmental Specifications			
Temperature	Working	+0°C to +40°C (32ºF ~ 104ºF)	
	Transport and Storage	-20°C to +55°C (-4ºF ~ 131ºF)	
Humidity	Working	15%RH to 95%RH (non-condensing)	
	Transport and Storage	15%RH to 95%RH (non-condensing)	
Altitude	Working	86 kPa to 106 kPa	
	Transport and Storage	70 kPa to 106 kPa	

** Specifications are subject to change without prior notice*

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