X10

Patient Monitor

Version 1.2

Main Unit Specification

Physical Specifications

Dimension	261±2 mm (W) × 246±2 mm (H) × 146±2 mm (D)
Max Weight	< 2.8 kg Standard configurations, no battery or accessories

Power Supply

Line Voltage	100 V to 240 V~
Current	1.4 A to 0.7 A
Frequency	50 Hz/60 Hz

Battery

Capacity	2550 mAh , 5100 mAh	
Operating Time	2550 mAh	≥ 4 h
	5100 mAh	≥ 8 h
Charge Time	2550 mAh	≤ 3.5 h, 90% charge
	5100 mAh	≤ 6.5 h, 90% charge

Display

Display screen	10.1 inch color TFT screen, touch screen available
Resolution	800 × 480
Waves	A maximum of 13 waveforms can be displayed on the same screen

Recorder

Record Width	48 mm
Paper Speed	12.5 mm/s, 25 mm/s, 50 mm/s
Channels	3
Recording Types	Continuous real-time recording 8-second real-time recording 20-second real-time recording Time recording Alarm recording Trend graph recording Trend table recording NIBP review recording Arrhythmia review recording Alarm review recording Drug calculation titration recording Hemodynamic Calculation result recording 12-lead analysis recording C.O. measurement recording ST view recording QT view recording

Data Storage

Internal Temporary Memory

Trend graph/trend table review	3 hrs, at 1 s resolution 120 hrs, at 1 min resolution
Alarm/Monitoring Event data	Up to 200 sets
NIBP Measurement Review	1200 sets
Arrhythmia events	Up to 200 sets
12-lead Diagnosis Review	Up to 50 sets

Non-volatile Memory (internal or external storage device)

A single piece of patient data maximally contains the following information:

Trend graph and trend table	240 hours, at 1 min resolution
NIBP measurement review	1200 sets
Alarm review	200 sets
Arrhythmia event	200 sets
12-lead diagnosis review	50 sets
Full disclosure Waveforms	3 electrodes/5 electrodes/6 electrodes: 48 hours 10 electrodes: 35 hours

Wi-Fi

IEEE	802.11b/g/n
Frequency Band	2.4 GHz ISM band & 5 G ISM band

Interfaces and others

VGA output (optional)	1
USB interface	2
Nurse Call / Analog Output/ Defibrillator Synchronization (optional)	1
Network Interface	1

Data Transmission

Data Export	Ethernet / USB / Wi-Fi (Optional)
Data Management	CMS-Lite
Central Monitoring System	MFM-CMS
HIS/EMR connection	HL7 MFM-CMS / GW1 Gateway Software

ECG

Lead Mode	3-Electrodes: I, II, III 5-Electrodes: I, II, III, aVR, aVL, aVF, V 6-Electrodes: I, II, III, aVR, aVL, aVF, Va, Vb 10-Elctrodes: I, II, III, aVR, aVL, aVF, V1-V6
Electrode Standard	AHA, IEC
Display Sensitivity	×0.125, ×0.25, ×0.5, ×1, ×2, ×4, AUTO gain

EDAN

Sweep	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 Surgery 1: > 105 dB (when Notch is turned on) 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 (measured without electrodes as IEC60601-2-27:2011, Sect. 201.8.5.5.1 requires.)
ESU Protection	Cut mode: 300 W Coagulation mode: 100 W Restore time: ≤10 s
Pace Pulse Detecting Lead	one among I, II, III, aVR, aVL, aVF, V1-V6

Heart Rate

Range	ADU: 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	ADU: (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	±0.02 mV or 10% (-0.8 mV to +0.8 mV), whichever is greater. Beyond this range: not specified.
Resolution	0.01 mV

Arrhythmia analysis

Asystole, Sustain VT, V-Fib/V-Tach, ExtremeTachy, ExtremeBrady, V-Tach, Vent Brady, Tachy, Brady, Wide QRS Tachy, Non-Sustain VT, Afib, Vent Rhythm, Acc. Vent Rhythm, Pause, Pauses/min High, PVCs High, R on T, PVC Bigeminy, PVC Trigeminy, Pacer not Pacing, Pacer not Capture, Missed Beat, VEB, PVC, Couplet, Run PVCs, IPVC, Irr Rhythm, PAC Bigeminy, Multiform PVCs, PAC Trigeminy, Low Voltage (Limb)

12-Lead ECG Synchronization Analysis

Average parameters of heart beat	PR interval (ms)
Heart rate (bpm)	QRS interval (ms)
Time limit of P wave (ms)	QT/QTC (ms)
P-QRS-T AXIS	

RESP

Method	Impedance between RA-LL, RA-LA
Measurement lead	Options are lead I and II. The default is Lead II.
Measuring Range	Adult: 0 rpm to 120 rpm Neo/Ped: 0 rpm to 150 rpm
Resolution	1 rpm
Accuracy	Adult: 6 rpm to 120 rpm: ±2 rpm 0 rpm to 5 rpm: not specified Neo/Ped: 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 Delay	10 s, 15 s, 20 s (Default), 25 s, 30 s, 35 s, 40 s

NIBP

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 Measuring Range	0 mmHg to 300 mmHg
Pressure Resolution	1 mmHg
Maximum Mean Error	±5 mmHg
Maximum Standard Deviation	8 mmHg
Maximum Measuring Period	Adult: 120 s Neo/Ped: 90 s
Typical Measuring Period	20 s to 35 s (depend on HR/motion disturbance)
Dual Independent Channel Overpressure Protection	
Adult	(297±3) mmHg
Pediatric	(245±3) mmHg
Neonatal	(147±3) mmHg

SpO_2

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) Neonate: ±3% (70% to 100% SpO_2) Undefined (0% to 69% SpO_2)

PI (Perfusion Index)

Measuring Range	0-10, invalid SI value is -?-.
Resolution	1

TEMP

Channel	2
Sensor type	YSI-10K and YSI-2.252K
Technique	Thermal resistance
Measure Parameter	T1, T2, TD
Position	Skin, oral cavity, rectum
Unit	°C , °F

Measuring Range	0°C to 50°C (32 ºF to 122 ºF)
Resolution	0.1°C (0.1 ºF)
Accuracy	±0.3 °C (±0.54 ºF) [±0.1 °C (±0.18 ºF), exclude sensor error]
Transient Response Time	≤ 30 s

PR

PR (SpO_2)	
Measuring range	EDAN: 25 bpm to 300 bpm
Accuracy	EDAN: ±2 bpm
Resolution	EDAN: 1 bpm
PR (NIBP)	
Measuring range	EDAN: 40 bpm to 240 bpm
Accuracy	EDAN: ±3 bpm or 3.5%, whichever is greater
Resolution	EDAN: 1 bpm
PR (IBP)	
Measuring range	EDAN: 20 bpm to 300 bpm
Accuracy	EDAN: 30 bpm to 300 bpm: ±2 bpm or ±2%, whichever is greater; 20 bpm to 29 bpm: undefined
Resolution	EDAN: 1 bpm

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	±2% or ±1 mmHg, whichever is greater (not including sensor)
Unit	kPa, mmHg, cmH_2O

CO_2

Intended patient	Adult, Pediatric, Neonatal
Measure Parameters	$EtCO_2$, $FiCO_2$, AwRR
Unit	mmHg, %, kPa
Measuring Range	$EtCO_2$: 0 mmHg to 150 mmHg (0% to 20%) $FiCO_2$: 0 mmHg to 50 mmHg AwRR: 2 rpm to 150 rpm
Resolution	$EtCO_2$: 1 mmHg $FiCO_2$: 1 mmHg AwRR: 1 rpm
$EtCO_2$ Accuracy	
Typical conditions: Ambient temperature: (25 ± 3) °C Barometric pressure: (760 ± 10)mmHg Balance gas: N_2 Sample gas flowrate: 100 ml/min	±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
All conditions	±12% of reading or ±4 mmHg, whichever is greater
AwRR Accuracy	±1 rpm
Sample Gas Flowrate	50 ml/min, 70 ml/min or 100 ml/min(default), accuracy: ±15 ml/min
Warm-up time	Display waveform within 20 s, reach the design accuracy within 2 minutes.
Response time	< 4 s (with m;2 m gas sampling tube, sample gas flowrate: 100 ml/min/70 ml/min) < 5.5 s (with 2 m gas sampling tube, sample gas flowrate: 50 ml/min)
Barometric pressure compensation	Automatic (The change of barometric pressure will not add additional errors to the measurement values.)
Zero Calibration	Support
Calibration	Support (It is recommend to be operated by trained personal.)
Apnea delay	10 s, 15 s, 20 s (Default), 25 s, 30 s, 35 s, 40s

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: 2018
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 (32 ºF ~104 ºF) When the battery is charged: +0 °C to +35 °C (32 ºF~95 ºF) Transport and Storage: -20°C to +55°C (-4 ºF ~131 ºF)
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

EDAN