



# TRIONARA

*Innovative Caring*



## VITUS 12s

**12" Slim Patient Care Monitor,  
Suitable for Bedside and Portable Use**

- Complete & Reliable Solution for All Care Areas
- High Quality & Full Functionality
- 2 Years Warranty and Reliable Customer Supports

Masimo SET<sup>™</sup> CE 1984

**kiwa**  
ISO 13485

## VITUS 12s Bed Side Monitor

Vitus 12s is a portable bedside monitor with 12" screen which offers a variety of advanced features and parameters such as Masimo Rainbow set®, Cardiac Output and 12-Lead ECG. The monitors could connect to Trionara Central System; Vitus CS, and communicate with HIS through Trionara Gateway or Vitus CS. While Vitus 18 provides 18.5" LED backlight wide screen, Vitus 12 with Light and compact body facilitates bedside or portable use. Touch Screen and Thermal Recorder are available as options for easier user operation and more functionality.



### Features:

- 12" LED-Backlight Color TFT / 800 × 600;  
Slim Portable Patient Monitor
- 6 to 8 signal traces and Up to 10 parameters :  
HR, NIBP, RESP, Gas interface, IBP (2 Channels),  
ECG (3/7 Leads), SPO2 Masimo SET, 2TEMPs
- Wire Networking with central system
- Direct AC power & internal rechargeable battery
- ARR and ST segment analyzer



### Options:

- CO2 & Multi-Gas Analyzer (Main Stream / Side Stream)
- Cerebral State Monitoring (Dual Processor),  
Brain Assessment Function, BFA
- Intra Cranial Pressure Monitoring (ICP)
- 12 Leads ECG
- Trionara Thermal Recorder with 3 Traces
- Touch Screen
- Masimo Rainbow SET®
- Cardiac Output
- Dual display (Dual Processor Motherboard)
- Dual display, Slave monitor (Single Processor Mother board)
- Wireless communication (Dual Processor Motherboard)



CLASSIFICATION								
Protection against electroshock	Class I, Type CF for all modules (except Multi-gas, NIBP and CSM/BFA modules that are BF) (based on IEC 60601-1).							
Protection	Against Electro surgery and Defibrillator (Except BFA/CSM)							
Mode of operation	Continues operation equipment							
Harmful Liquid Proof Degree	IPX1							
Safety of anesthetic mixture	Not suitable for use in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide.							
General								
Display	TFT/LED COLOR	800 × 600	12.1"					
Waveforms	ECG, SPO2, IBP1, IBP2, RESP/GAS, EEG (Freezable), C.O.							
Numeric Parameters	HR, PVCs, ST, SPO2, PR, NIBP (SYS, DIA, MAP), IBP1(SYS, DIA, MAP), IBP2(SYS, DIA, MAP), RR, T1, T2, DT, EtCO2, FICO2, AWR, ETN2O, FIN2O, EtO2, FIO2, EtAA, FIAA, CSI/BFI, B5%, EMG%, SQI%, C.O, Alarm Limits.							
Operation Method	Membrane/Keys and rotary knob							
	Touch Screen							
AC Power	100 - 240 VAC, 50/60 Hz, Ip: 0.9 - 0.4 A							
MotherBoard	Single Processor MB for normal application (ZZ Board) Dual Processors MB for advanced application (STM Board)							
ECG								
Lead & Wire Options								
Selectable: 3, 5 or 12 Leads	Selectable: 3, 5 or 10 Wires							
3 ECG Leads I, II, III	3 Lead wires ECG Cable							
5 Leads ECG: I, II, III, V, aVR, aVF, aVL	5 Lead wires ECG Cable							
12 Leads ECG: I, II, III, V, aVR, aVF, aVL, C2, C3, C4, C5, C6	10 Lead wires ECG Cable							
Dynamic Range	± 5 mV	Lead Off Current	< 90 nA					
Gain	4, 2, 1, 1/2, 1/4, Auto	Calibration	1mV, 0.5 sec					
Filters	"MONITOR"	0.5 - 24 Hz						
	"NORMAL"	0.5 - 40 Hz						
	"EXTENDED"	0.05-100 Hz						
CMRR	> 98 dB							
Internal Noise	< 30 µV RTI							
Input Impedance	> 5 MΩ							
QRS Detection	Duration	40 to 120 msec						
	Amplitude	0.25 to 5 mV	for Adult/Pediatric					
		0.2 to 5 mV	for Neonate					
Heart Rate Range	15 - 300 BPM	for adult/Pediatric						
	15 - 350 BPM	for neonate						
Accuracy	±1% or 2 BPM							
Tall T-Wave	Reject up to 1.2 mV Amp.							
Pacer	Duration	0.1 - 2 msec						
Detection/Rejection	Amp	±2 to ± 700 mV (Without over/undershoot)						
	Reject from heart rate counter							
	Re-insert into ECG to display on screen							
	Ineffective pace rejection	HR:0, Pace:60 HR:60, Pace:60 HR:30, Pace:80						
	Beside rejection of atrial paces precede ventricular paces by 150 or 250 ms							
Protection	Defibrillator and Electrosurgery							
ANALOG OUTPUT								
Signals	ECG							
Maximum delay	≤30 ms							
Output range	± 5 V							
Signal gain	1000 (1V/mV)							
Gain accuracy	± 20 mV							
Maximum offset	± 50 mV							
ECG bandwidth	"MONITOR"	0.5 - 24 Hz						
	"NORMAL"	0.5 - 40 Hz						
	"EXTENDED"	0.05-100 Hz						
	Amplitude:	5 V (nominal)						
	Duration:	5 ms						
Pacemaker pulses								
ECG range	-5 to 5 mV							
Output impedance	249 Ω ± 5%							
Data rate	400 samples/sec							
ARRHYTHMIA ANALYSIS								
Type	ASYNS, VFIB, VTAC, RUN, AIVR, COUPLET, BIGEMINY, TRIGEMINY, TACHY, BRADY, AFIB, PAUS, FREQUENT PVCs							
Learning	Rapid Learning: only 20 seconds required for recognition of dominant rhythm.							
Method	Real time arrhythmia detection with innovative feature.							
Memory	Capability of storing the latest 150 ARR event (waveform and Parameters)							
ST ANALYSIS								
Display resolution	0.01 mV							
Measurement Range	-2mv to +2mv							
Alarm Range	-2mv to +2mv							
Features	User Adjustable Isoelectric and ST point trending of ST values							
Update period	5 Sec.							
NIBP								
SAADAT Module & CAS ND+ Module								
Measurement method	Oscillometric							
Measurement mode	Manual/Automatic/Stat							
Measurement time	20-25 sec (excluding cuff pressurization time)							
Measurement Range								
Adult	SYS	30 ~ 255 mmHg	Neonate	SYS	30 ~ 135 mmHg	Pediatric	SYS	30 ~ 240mmHg
	DIA	15 ~ 220 mmHg		DIA	15 ~ 110 mmHg		DIA	15 ~ 220 mmHg
	MAP	20 ~ 235 mmHg		MAP	20 ~ 125 mmHg		MAP	20 ~ 230mmHg
Pressure Transducer accuracy	±3 mmHg full range							
Initial Inflation Target	Adult : 150 mmHg,		Pediatric: 150mmHg,		Neonate: 85 mmHg			
Memory	500 Records							
SpO2 (Masimo Rainbow Set)								
Spo2 Parameters	SPO2,PI,PR							
Method SpO2	2 Wavelengths of light used							
Rainbow parameters	SpOC, SpCO, SpMe, SpHb, PVI							
Method Rainbow	7+Wavelengths of light used							
Range & Resolution	Parameters	Range	Resolution					
	SPO2	0 - 100 %	1 %					
	SpMet	0 - 99.9 %	0.1 %					
	SpCO	0 - 99 %	1 %					
	SpHb	0 - 25.0 g/dL	0.1 g/dL					
	SpOC	0 - 35.0 ml/dL	0.1 ml/dL					
	PR	25 - 240 bpm	1 BPM					
	PI	0 - 20.0 %	0.1%					
	PVI	0 - 100 %	1%					

Accuracy (Masimo SpO2/RainBow)		
Oxygen Saturation		
no motion conditions	Adult/Pediatric	±2% (SPO2 70 ~ 100%)
	Neonate	±3% (SPO2 70 ~ 100%)
motion conditions	Adult/Pediatric/Neonate	±3% (SPO2 70 ~ 100%)
	low perfusion conditions	Adult/Pediatric/Neonate ±2% (SPO2 70 ~ 100%)
Pulse Rate		
no motion conditions	Adult/Pediatric/Neonate	±3bpm (PR 25 ~ 240)
motion conditions	Adult/Pediatric/Neonate	±5bpm (PR 25 ~ 240)
low perfusion conditions	Adult/Pediatric/Neonate	±5bpm (PR 25 ~ 240)
Carboxyhemoglobin Saturation		
Carboxyhemoglobin Saturation	Adult/Pediatric	±3% (1 - 40)
Methemoglobin Saturation		
Methemoglobin Saturation	Adult/Pediatric/Neonate	±1% (1 - 15)
Total Hemoglobin		
Total Hemoglobin	Adult/Pediatric	±1g/dL (8 - 17) g/dL
TEMPERATURE(2 Channel)		
Probe Type	YSI 400 Compatible	
Range	0 - 50 °C	
Accuracy	± 0.2 °C	
RESPIRATION		
Method	Impedance	
Base Resistance	250 -1250 Ohm	
Dynamic Range	0.2 - 2 Ohm	
Breath Rate Range	0 - 253 BrPM	
Accuracy	±2% or 2 BrPM	
IBP		
Number of Channels : 2 Channels		
Measurement Range :	SYS/DIA/MAP: -50 ~ 300 mmHg	
Pressure Filter	8Hz, 16Hz, 22Hz selectable	
Press Sensor Sensitivity	5 µV / V / mmHg	
Press Sensor Impedance	300 ~ 2500 Ohm	
Resolution	1 mmHg	
Accuracy	2 % or 2mmHg (each one is greater) without transducer	
Multi-gas, Mainstream (MASIMO SWEDEN AB)		
IRMA CO2	CO2	
IRMA AX+	CO2, N2O, primary and secondary agents (HAL, ISO, ENF, SEV, DES)	
IP44 Standard for protection against harmful ingress of water or particulate matter		
Mode of operation	CONTINUOUS OPERATION	
Accuracy - standard conditions		
The following accuracy specifications are valid for dry single gases at 22 ± 5 °C and 1013 ± 40 hPa		
Gas	Range	Accuracy
CO2	0 to 15 vol%	±(0.2 vol% +2% of reading)
N2O	0 to 100 vol%	±(2 vol% +2% of reading)
HAL, ISO, ENF	0 to 8 vol%	±(0.15 vol% +5% of reading)
SEV	0 to 10 vol%	±(0.15 vol% +5% of reading)
DES	0 to 22 vol%	±(0.15 vol% +5% of reading)
Multi-gas, Sidestream (MASIMO SWEDEN AB)		
ISA CO2	CO2, CO2 waveform	
ISA AX+	CO2, O2, N2O, primary and secondary Agents (HAL, ISO, ENF, SEV, DES)	
ISA OR+	CO2, O2, N2O, primary and secondary Agents (HAL, ISO, ENF, SEV, DES)	
Mode of operation	CONTINUOUS OPERATION	
Accuracy standard conditions		
The following accuracy specifications are valid with no drift for dry single gases at 22 ± 5 °C and 1013 ± 40 hPa:		
Gas	Range	Accuracy
CO2	0 to 15 vol%	±(0.2 vol% +2% of reading)
	15 to 25 vol%	Unspecified
N2O	0 to 100 vol%	±(2 vol% +2% of reading)
HAL, ENF, ISO	0 to 8 vol%	±(0.15 vol% +5% of reading)
	8 to 25 vol%	Unspecified
SEV	0 to 10 vol%	±(0.15 vol% +5% of reading)
	10 to 25 vol%	Unspecified
DES	0 to 22 vol%	±(0.15 vol% +5% of reading)
	10 to 25 vol%	Unspecified
O2	0 to 100 vol%	±(1 vol% +2% of reading)
Cardiac Output		
Method :	Right Heart Thermodilution	Range: 0.5-18 l/min
Resolution :	0.01l/min	Reproducibility : ±3%
Thermal Recorder		
Channel :	Up to 3 waveforms	Printing Speed : 6,12,5,25 mm/sec
Paper Size :	57mm by 59 foot roll	
DRUG CALCULATE		
To calculate the dose and time of medication		
ALARM		
Sources	Error messages, All other parameter limits	
Alarm On/Off	Selectable for all parameters	
Alert	Blinking on Display, Volume Selectable Audio Alarms, Light indicator	
TREND		
Sources :	HR, PVCs, ST, AFIB, SPO2, RR, T1, T2, IBP1(SYS, DIA, MAP), IBP2(SYS, DIA, MAP), IBP3(SYS, DIA, MAP), IBP4(SYS, DIA, MAP), EtCO2, FICO2, AWR, (sidestream, mainstream), ETN2O, FIN2O, EtO2, FIO2, EtAA, FIAA (ISO, DES, ENF, HAL, SEV)	
Trend Time Save	96 Hours	
Trend Time Interval	15, 30, 45 Min, 1, 2 and 4 Hours	
Resolution	1 sec	
INPUT/OUTPUT		
Network	TCP/IP Protocol Ethernet LAN with RJ45 Interface	
VGA Connection	VGA output with same page (Available in Single Processor M.B)	
	VGA output with different page (Available in Dual Processor M.B)	
Internal Battery		
Battery Type	Charge time	Usage
Lead Acid 12 V, 2.8 AH	~ 4 hours	~ 2 hours
Lithium Polymer: 11.1V, 4.3AH	~ 6 hours	~ 7 hours
Physical Specification		
Dimension (Cm)	34.7 (W) ×30.9 (H) ×14.2 (D)	
Weight (approximately)	With Lithium Polymer Battery	4.9Kg
	With Sealed Lead Acid Battery	5.3 Kg
ENVIRONMENTAL		
Temperature	Operating: 5 to 40 °C	Storage & Transport: -25 to 60 °C
Humidity	Operating: 20-90 % (Noncondensing)	Storage & Transport: 10-100 % (Noncondensing)
Altitude	-200 to 3000 m	



## **Trionara Technologies AB**

Trionara Technologies AB, Address: Laxfiskevägen 6, 433 38 Partille - Sweden

Website: [www.Trionara.com](http://www.Trionara.com)

Tel: +46-31-135514

E-Mail: [info@trionara.com](mailto:info@trionara.com)

Fax: +46-31-7777770