
**PVMS OF ANAESTHESIA &
VENTILATION**

DRAFT

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Clinical Specialty	Anesthesia
Generic Name	Anesthesia Machine
Clinical Purpose	The anesthesia machine is used by anesthesiologists, nurse anesthetists, and anesthesiologist to support the administration of anesthesia. The most common type of anesthetic machine is the continuous-flow anesthetic machine, which is designed to provide an accurate and continuous supply of medical gases (such as oxygen and nitrous oxide), mixed with an accurate concentration of anesthetic vapor (such as isoflurane), and deliver this to the patient at a safe pressure and flow. Modern machines incorporate a ventilator, suction unit, and patient monitoring devices.

TECHNICAL SPECIFICATIONS

- Comprehensive latest anesthesia machine for children, adults and neonatal applications to administer anesthetic agents in precise control and flow manner.
- The machine will equip to monitor the vital sign parameters and anesthetic agents during operation.
- Mobile 3-gases O₂/N₂O/AIR.

It must comprise of the following components:

- Non-interchangeable pipeline inlets
- Pipeline & cylinder gauges for O₂, N₂O and AIR
- Central gas/ electronically driven unit.
- Pin index cylinder yokes for Oxygen & N₂O (One each), as backup.
- Cylinders will be provided (2xO₂ and 2xN₂O: BS standard)
- Gas outlet and O₂ flush control
- 1 auxiliary O₂ outlet
- Lockable castors (front)
- Impact resistant & easy to clean frame
- Stainless steel/fiber work surface
- Absorber bag support arm
- Three gas flow meters for precise control and monitoring of gases.
- Two pre calibrated Vaporizers of Isoflurane & Sevoflurane vaporizer, temperature and flow compensated.
- Drawer unit not less than 6" high
- Scavenging system Passive / Active type

Anesthesia Ventilator:

- Anesthesia Ventilator with minimum 6" or more color LCD/TFT Screen.
- The ventilator shall be capable of ventilating adult and pediatric patients.

The ventilator shall have following features as a minimum requirement:

- Volume Preset Time Cycled Ventilator (IPPV Mode)
- Pressure Controlled and pressure support Modes
- Breathing Mode Selection (Standby / Volume / Spontaneous and Pressure)
- Built in Oxygen Monitor

- Inverse I:E ratio Capability
- Gas Specific Input Connectors (Air or Oxygen ISO or ANSI Standards)
- Tidal Volume from 20ml to 1400ml
- Rate or Frequency 4 to 60 bpm
- PEEP (0 to 20 cm H₂O)
- Inspiratory Pressure Limit
- Power Supply 220 VAC, 50 Hz
- Battery Backup (60 Minutes or more)
- Low / High FiO₂ Alarm
- Incorrect Rate or Ratio alarm
- Mains Failure alarm
- Low battery alarm at 30%.
- Hypoxic device guard.
- Pressure and Volume Loops / curves.
- High / Low pressure alarm.
- The ventilator shall be supplied with complete drive hose and power cable.

Note: Annual maintenance kits (needs to replace annually) will be included in the warranty period as per manufacturer's guidelines.

Monitoring:

- Vital sign monitor hooked up on side of the machine.
- Size of minimum 14" Touch screen or more for display of vital sign parameters of children and adults.
- Measurement of ECG 5 leads.
- NIBP with re-usable single hose cuff for children and adults
- SpO₂ with re-usable cable and sensors for children and adults size (Massimo Type).
- HR
- Temperature with nasal probe.
- Respiration
- Anesthetic gases
- etCO₂ (main or side stream).
- 220V, 50 Hz operated.

Note: Vial sign Monitor must be supplied by the same manufacture and must be Compatible with the machine and Ventilator.

- The warranty of equipment will be including batteries, oxygen sensor and flow sensor.

Anesthesia Accessories

- Power outlet with 4 socket outlets to connect the auxiliary equipment.
- CO₂ absorber 800 – 1,500 gm complete with valve for bag/ventilator
- Manometer
- Breathing bags
- Re-usable Silicon Autoclaveable breathing circuit (Adult, Peads, Infant 01 each)
- Mounts and Y-piece.
- Additional breathing hose and connector with 03 adult & 03 pediatric bellows.

Monitor Accessories:

- 2 NIBP Cuff each

<ul style="list-style-type: none"> ▪ 2 Spo2 probe ▪ 2 nasal temperature probe ▪ 2 ECG Leads 	
Optional (If any): <ul style="list-style-type: none"> ▪ Anesthesia Optional: Monitor Optional: Dual IBP 	
Clinical Specialty	Anesthesia
Generic Name	Anesthesia Machine with digital flow meter
Clinical Purpose	The anesthesia machine is used by anesthesiologists, nurse anesthetists, and anesthesiologist to support the administration of anesthesia. The most common type of anesthetic machine is the continuous-flow anesthetic machine, which is designed to provide an accurate and continuous supply of medical gases (such as oxygen and nitrous oxide), mixed with an accurate concentration of anesthetic vapor (such as isoflurane), and deliver this to the patient at a safe pressure and flow. Modern machines incorporate a ventilator, suction unit, and patient monitoring devices.
TECHNICAL SPECIFICATIONS	
<ul style="list-style-type: none"> ▪ Comprehensive latest anesthesia machine for children, adults and neonatal applications to administer anesthetic agents in precise control and flow manner. ▪ The machine will equip to monitor the vital sign parameters and anesthetic agents during operation. ▪ Mobile 3-gases O2/N2O/AIR. <p>It must comprise of the following components:</p> <ul style="list-style-type: none"> ▪ Non-interchangeable pipeline inlets ▪ Pipeline & cylinder gauges for O2, N2O and AIR ▪ Central gas/ electronically driven unit. ▪ Pin index cylinder yokes for Oxygen & N2O (One each), as backup. ▪ Cylinders will be provided (2xO2 and 2xN2O: BS standard) ▪ Gas outlet and O2 flush control ▪ 1 auxiliary O2 outlet ▪ Lockable castors (front) ▪ Impact resistant & easy to clean frame ▪ Stainless steel/fiber work surface ▪ Absorber bag support arm ▪ Three gas digital flow meters for precise control and monitoring of gases and virtual tube display on ventilator screen. ▪ Two pre calibrated Vaporizers of Isoflurane & Sevoflurane vaporizer, temperature and flow compensated. ▪ Drawer unit not less than 6" high ▪ Scavenging system Passive / Active type <p>Anesthesia Ventilator:</p> <ul style="list-style-type: none"> ▪ Anesthesia Ventilator with minimum 6" or more color LCD/TFT Screen. 	

- The ventilator shall be capable of ventilating adult and pediatric patients.

The ventilator shall have following features as a minimum requirement:

- Volume Preset Time Cycled Ventilator (IPPV Mode)
- Pressure Controlled and pressure support Modes
- Breathing Mode Selection (Standby / Volume / Spontaneous and Pressure)
- Built in Oxygen Monitor
- Inverse I:E ratio Capability
- Gas Specific Input Connectors (Air or Oxygen ISO or ANSI Standards)
- Tidal Volume from 20ml to 1400ml
- Rate or Frequency 4 to 60 bpm
- PEEP (0 to 20 cm H₂O)
- Inspiratory Pressure Limit
- Power Supply 220 VAC, 50 Hz
- Battery Backup (60 Minutes or more)
- Low / High FiO₂ Alarm
- Incorrect Rate or Ratio alarm
- Mains Failure alarm
- Low battery alarm at 30%.
- Hypoxic device guard.
- Pressure and Volume Loops / curves.
- High / Low pressure alarm.
- The ventilator shall be supplied with complete drive hose and power cable.

Note: Annual maintenance kits (needs to replace annually) will be included in the warranty period as per manufacturer's guidelines.

Monitoring:

- Vital sign monitor hooked up on side of the machine.
- Size of minimum 14" Touch screen or more for display of vital sign parameters of children and adults.
- Measurement of ECG 5 leads.
- NIBP with re-usable single hose cuff for children and adults
- SpO₂ with re-usable cable and sensors for children and adults size (Massimo Type).
- HR
- Temperature with nasal probe.
- Respiration
- Anesthetic gases
- etCO₂ (main or side stream).
- 220V, 50 Hz operated.

Note: Vial sign Monitor must be supplied by the same manufacture and must be Compatible with the machine and Ventilator.

- The warranty of equipment will be including batteries, oxygen sensor and flow sensor.

Anesthesia Accessories

- Power outlet with 4 socket outlets to connect the auxiliary equipment.
- CO₂ absorber 800 – 1,500 gm complete with valve for bag/ventilator
- Manometer

- Breathing bags
- Re-usable Silicon Autoclaveable breathing circuit (Adult, Peads, Infant 01 each)
- Mounts and Y-piece.
- Additional breathing hose and connector with 03 adult & 03 pediatric bellows.

Monitor Accessories:

- 2 NIBP Cuff each
- 2 Spo2 probe
- 2 nasal temperature probe
- 2 ECG Leads

Optional (If any):

- Anesthesia Optional: Monitor Optional: Dual IBP

Clinical Specialty	Anesthesia
Generic Name	ANAESTHESIA WORKSTATIONS
Clinical Purpose	The anesthesia machine is used by anesthesiologists, nurse anesthetists, and anesthesiologist to support the administration of anesthesia. The most common type of anesthetic machine is the continuous-flow anesthetic machine, which is designed to provide an accurate and continuous supply of medical gases (such as oxygen and nitrous oxide), mixed with an accurate concentration of anesthetic vapor (such as isoflurane), and deliver this to the patient at a safe pressure and flow. Modern machines incorporate a ventilator, suction unit, and patient monitoring devices.
TECHNICAL SPECIFICATIONS	
<ul style="list-style-type: none"> ▪ Comprehensive latest anesthesia work station machine especially for neonates/ children / adults applications to administer anesthetic agents in precise control and flow manner. ▪ The machine will equip to monitor the vital sign parameters and anesthetic agents during operation. ▪ It should stay on the theatre (I.O to specify the hanging pendant or for mobile use) housing ▪ 3-gases O2/N2O/AIR. ▪ It must communicate directly with the hospital information system for sharing and storing of ventilation patient data. <p>Unit shall comprise of the following components:</p> <ul style="list-style-type: none"> ▪ Electronically/digitally control, mixing and monitoring of anesthetic gases (O2, AIR, and N2O) both by digits as well as virtual tubes. ▪ Built-in illumination system. ▪ Non-interchangeable pipeline inlets ▪ Pipeline & cylinder gauges for O2, N2O and AIR ▪ Central gas/ electronically driven unit. 	

- Pin index cylinder yokes for Oxygen & N2O (One each), as backup.
- These backup cylinders will be provided with the unit (2xO2 and 2xN2O: BS standard)
- Gas outlet and O2 flush control
- 1 auxiliary O2 outlet (preferably electronics).
- Lockable castors (front)
- Impact resistant & easy to clean frame
- Stainless steel/fiber work surface
- Absorber bag support arm
- Three gas electronic digital flow meters for precise control and monitoring of gases.
- Two pre calibrated Vaporizers of Isoflurane & Sevoflurane vaporizer (or by choice), temperature and flow compensated.
- Drawer unit not less than 6" high.
- Power outlet with 4 socket outlets to connect the auxiliary equipment.
- CO2 absorber 800 – 1,500 gm with changeable during the surgery.
- Complete with valve for bag/ventilator, manometer, 0.5, 1.0, 1.5, 2 & 3 L breathing bags,
- Breathing tube (adult and paed).
- Mounts and Y-piece.
- Additional breathing hose and connector (adult and paed).
- Scavenging system passive / active type.
- Suction system.

ANESTHESIA VENTILATOR:

- Anesthesia Ventilator with minimum 12" or more LCD/TFT Screen.
- The ventilator shall be capable of ventilating Neonates /pediatric patients/Adult Patients)

The ventilator shall have following features as a minimum requirement:

- Volume Preset Time Cycled Ventilator (IPPV Mode)
- Manual, spontaneous; Volume Mode (IPPV) / CMV
- Pressure Mode (PCV)
- Pressure Support (PS)
- Pressure Control (PC)
- Pressure Controlled and pressure support Modes
- Synchronized volume controlled ventilation (SIMV) with PS
- PS with apnea back up
- Breathing Mode Selection (Standby / Volume / Spontaneous and Pressure)
- Built in Oxygen Monitor
- Inverse I:E ratio Capability
- Gas Specific Input Connectors (Air or Oxygen ISO or ANSI Standards)
- Tidal Volume from 5ml to 1400ml.
- Rate or Frequency 4 to 60 bpm
- PEEP 0 to 20 cm of H2O.
- Inspiratory Pressure Limit
- Pressure and Volume Loops
- Monitor Interface Capability directly with hospital information system.

- Cardiac bypass mode / HLM.
- Oxygen / Electronically Driven
- Power Supply 220 VAC , 50 Hz
- Battery Backup (60 Minutes or more)
- Low / High FiO2 Alarm
- Incorrect Rate or Ratio alarm
- Mains Failure alarm
- Low battery alarm at 30 %.
- Oxygen Sensor: Paramagnetic / Galvanic /Equivalent
- Hypoxic Device.
- The ventilator shall be supplied with complete drive hose and power cable.

Note: Annual maintenance kits (needs to replace annually) will be included in the warranty period as per manufacturer's guidelines.

MONITORING (MODULAR CONFIGURATION):

- Touch Control vital sign monitor hooked up on side of the machine.
- Size of minimum 17" touch screen or more for display of vital sign parameters of neonates, infants and adults.
- Measurement of ECG
- NIBP with re-usable single hose cuff for neonates, child and small adults
- SpO2 (Massimo Technology) with re-usable cable and sensors for neonates, infant, adult and small adults sizes (Qty I.O specify).
- HR
- Temperature with nasal probe
- Respiration
- Four Channel Dual IBP
- Anesthetic gases
- EtCO2 main / side stream (Complete with all sensors probes, reusable).
- Complete with networking connection for connecting directly with hospital information system for sharing of machine's and patient data.
- 220V, 50 Hz operated.
- Battery backup of at least 60 minutes
- Online UPS with backup of 30 minutes for complete unit.

Note: Monitors must be supplied by the same manufacturer and must be compatible with the machine and ventilator.

- The warranty of equipment will be including batteries, oxygen sensor, all kinds of filters and flow sensor.

ACCESSORIES:

- 2 NIBP Cuff each,
- 2 Spo2 probe,
- 2 nasal temperature probe
- 2 ECG Leads

OPTIONAL (IF ANY):

- NIRS (Near Infra-Red Spectroscopy unit for Cerebral Pulse Oximetry for pediatric patients.
- Complete with main unit with monitor and sensors including disposable head

<ul style="list-style-type: none"> sensor/probe (Qty 50 Nos.) ▪ NMT Neuro muscular transmission. ▪ BIS Monitoring. 	
Clinical Specialty	Anesthesia
Generic Name	ICU VENTILATOR
Clinical Purpose	ICU ventilator is a mechanical ventilator, a machine designed to move breathable air into and out of the lungs, to provide breathing for a patient who is physically unable to breathe, or breathing insufficiently. While modern ventilators are computerized machines
TECHNICAL SPECIFICATIONS	
<p>Ventilation:</p> <ul style="list-style-type: none"> ▪ Microprocessor controlled powerful ventilation system mounted on trolley. ▪ LCD/TFT color touch screen 15" Minimum. ▪ Patient Range: Pediatrics and Adult ▪ Breathing classification: Pressure control, Volume control Pressure control with set Volume Breath. ▪ Autoclaveable reusable patient tubing circuit for paed and adult (01 each) <p>Modes of Ventilation:</p> <ul style="list-style-type: none"> ▪ Volume control ▪ Assisted CMV ▪ Pressure control PC ▪ Assist Pressure Control ▪ CPAP ▪ SIMV+ Pressure support ▪ Non invasive ventilation ▪ Bi-level Ventilation <p>Control:</p> <ul style="list-style-type: none"> ▪ Set & measured parameters simultaneously. <p>Measurement range/ specification:</p> <ul style="list-style-type: none"> ▪ Inspiratory tidal volume: 5 to 2000ml ▪ Respiratory frequency: 5 to 120bpm ▪ SIMV breath frequency: 1 to 50 bmp ▪ Inspiratory pressure: 10 to 80 cmH2O ▪ Inspiratory flow: 80 L/Min or cmH2O. ▪ I : E ratio : 1:4 / 4:1 ▪ PEEP: 0 to 30cm H2O ▪ FiO2/ O2 delivery: 21 to 100% <p>Monitoring Parameters for set and measured value simultaneously:</p> <ul style="list-style-type: none"> ▪ Total breath rate. ▪ Oxygen concentration FIO2 ▪ Expired minute volume ▪ Peak expiratory flow ▪ I : E ratio ▪ Peak Pressure 	

- Mean pressure
- Lung Mechanics with pressure and volume loops.
- Others control and functions:
 - Back up ventilation
 - Pause time INSP
 - Microprocessor gas delivery system
 - Breath circuit Compliance Compensation
 - Expiratory hold/ Inspiratory hold
 - Panel lock for safety
 - Pressure / Volume and flow trigger sensitivity
 - Trigger sensitivity indication
 - Trend Data

Alarms:

- Apnea
- AC power failure
- High and low Expired minute volume
- High and low peak air way pressure
- High and low breath rate
- FiO2 variation
- Low and high base line pressure
- Gas supply source failure
- Low battery at 30%

Nebulizer:

- For nebulization of the patient during ventilation
- Supply requirements: Electric 220 V 50 Hz

Battery Backup:

- With internal chargeable battery backup with compressor min for 1.0 hr.

Compressed Air Supply:

- The ventilator should be driven on external / built in compressor for powerful ventilation and should have the capability to connect with central medical pipeline system of the hospital.
- Capnography module to monitor carbon dioxide of the patient.
- The waveform should be displayed on ventilator's screen.

Humidifier:

- Automatic compensation (Servo) controlled heated humidifier with temperature monitoring at air way and
- Humidification chamber with alarm for low/ high limits with water trap in the patient circuit.

Note: The warranty of equipment will be including batteries, oxygen sensor, all kind of sensors and flow sensor.

Accessories:

Optional (If any):

Clinical Specialty	Anesthesia
Generic Name	PAEDIATRIC VENTILATOR
Clinical Purpose	ICU ventilator is a mechanical ventilator, a machine designed to move breathable air into and out of the lungs, to provide breathing for a patient who is physically unable to breathe, or breathing insufficiently. While modern ventilators are computerized machines

TECHNICAL SPECIFICATIONS

Ventilation:

- Microprocessor based controlled ventilation system.
- Touch Screen with Built in LCD/TFT color monitor 15" Minimum.
- Breathing classification: Pressure control, Volume control and pressure control with set Volume Breath.

Modes of Ventilation:

- Volume control
- Assisted CMV
- Pressure control PC
- Assist Pressure Control
- CPAP
- SIMV+ Pressure support
- Non invasive ventilation
- Bi-level Ventilation

Control:

- Set & measured parameters simultaneously.
- Measurement range/ specification
- Inspiratory tidal volume : minimum 5ml or less
- Respiratory frequency : 10 to 120bpm
- SIMV breath frequency : 1 to 50 bpm
- Inspiratory pressure : 10 to 80 cm H2O
- Inspiratory flow : 80 cm H2O
- I : E ratio : 1:4 / 4:1
- PEEP : 0 to 20cm H2O
- FiO2/ O2 delivery : 21 to 100%

Monitoring Parameters for set and measured value simultaneously with Digital Display

- Total breath rate.
- Oxygen concentration FIO2
- Expired minute volume
- Peak expiratory flow
- I : E ratio
- Peak Pressure
- Mean pressure
- Lung Mechanics with pressure and volume loops.

Others control and functions

- Back up apnea ventilation
- Pause time INSP

- Microprocessor gas delivery system
- Breath circuit Compliance Compensation
- Expiratory hold/ Inspiratory hold
- Panel lock for safety
- Pressure / Volume and flow trigger sensitivity.
- Trigger sensitivity indication
- Should able to operate on single air/ and gas source at 21% Oxygen.
- Mounted on trolley with lockable wheel
- Autoclaveable reusable patient tubing circuit for paed
- Trend Data

Alarms:

- Apnea
- AC power failure
- High and low Expired minute volume
- High and low peak air way pressure
- High and low breath rate
- FiO₂ variation
- Low and high base line pressure
- Gas supply source failure
- Low battery

Nebulizer:

- For nebulization of the patient during ventilation.

Power supply

- 220 V 50 Hz with internal chargeable battery backup min for 1 hr along with compressor.
- Compressed Air Supply
- The unit will be driven on the central air and oxygen supply and should have backup driving source in case of failure of central gas system
- Note:
- The warranty of equipment will be including batteries, oxygen sensor and flow sensor.

Accessories:

Optional (If any):

- Humidifier
- Automatic compensation (Servo) controlled heated humidifier
- With temperature monitoring at air way
- Humidification chamber with alarm for low/ high limits
- With water trap in the patient circuit.

Clinical Specialty	Anesthesia
Generic Name	HFO VENTILATOR
Clinical Purpose	High frequency ventilation is a type of mechanical ventilation which utilizes a respiratory rate greater than 4 times the normal value. ^[1] (>150 (V _f) breaths per minute) and very small tidal volumes. ^{[2][3]} High frequency ventilation is thought to reduce ventilator-associated lung injury (VALI), especially in the context of ARDS and acute lung injury

TECHNICAL SPECIFICATIONS

- Pre Mature Infant & Peads Ventilator System with High Frequency Ventilation
- Microprocessor controlled ventilation system with HF ventilation
- LCD/TFT color Monitors 12-15"
- Patient Range: Pre Mature Infant and Peads
- Body weight range 0.3kg. – 20kg
- Modes of Ventilation:
 - CMV
 - Pressure Control / PS
 - CPAP
 - SIMV
 - Volume Targeting
 - APRV
 - High Frequency Ventilation : NIV

CONTROL

- Set & measured parameters simultaneously
- Measurement Range / Specification
- High Frequency Ventilation: 5-20Hz
- Inspiratory Tidal Volume: 3-200ml or more
- Respiratory Frequency: 5-150bpm
- Inspiratory Pressure: 5-60cm H₂O
- Peep: 20cm H₂O
- I:E Ratio: 4.1
- FiO₂/O₂ Delivery: 21-100%
- Monitoring Parameters for set and measured value simultaneously with Digital Display
- Total breath rate
- Oxygen concentration FiO₂
- Expired Minute Volume
- Expired Tidal Volume
- Peak expiratory flow
- I : E Ratio
- Peak Pressure
- Mean Pressure
- Lung Mechanics with pressure and volume loops

OTHERS CONTROL AND FUNCTIONS

- Back up Ventilation.
- Microprocessor Gas Delivery System
- Breath Circuit Compliance Compensation
- Expiratory hold/ Inspiratory Hold
- Panel lock for safety
- Pressure / Volume and Flow Trigger Sensitivity.
- Trigger Sensitivity Indication
- Should able to operate on single air/and gas source at 21% Oxygen.
- Mounted on trolley with lockable wheel
- Autoclaveable Reusable Patient Tubing Circuit for Infant & Peads (O2 each)
- CO2 Analyzer.
- With built in Nabalizer.
- Trend Data

ALARMS

- Apnea
- AC Power Failure
- High and Low Expired Minute Volume
- High and Low Peak Air Way Pressure
- High and Low breathe rate
- FiO2 Variation
- Low and High base line pressure
- Gas Supply Source Failure
- Low battery

POWER SUPPLY

- 220V 50Hz with internal chargeable battery backup with compressor time for minimum 1 hr.

PNEUMATICS

- The unit will be driven on the central compressed air and oxygen
- Should have provision of connecting external compressor

SPECIAL TERMS AND CONDITIONS

- Five years comprehensive warranty including parts and spares
- The contracting firm will supply one Fluke Ventilator Analyzer with the consignment for testing & calibration of conventional and HF Ventilators
- The firm will supply one set of Repair & Maintenance Manual including repair codes; if any for maintenance of the ventilators
- 2 x Tool kit for maintenance.

ACCESSORIES:

Optional (If any):
HUMIDIFIER

- Automatic compensation (Servo) controlled heated humidifier
- With temperature monitoring at air way
- Humidification chamber with alarm for low / high limits
- With water trap in the patient circuit.

Clinical Specialty	Anesthesia
Generic Name	SYRINGE PUMP
Clinical Purpose	A syringe pump is a small infusion pump used to gradually administer small amounts of fluid (with or without medication) to a patient or for use in chemical and biomedical research. Syringe drivers are also useful for delivering IV medications over several minutes. In the case of a medication which should be slowly pushed in over the course of several minutes, this device saves staff time and reduces errors.
TECHNICAL SPECIFICATIONS	
<ul style="list-style-type: none"> ▪ Syringe pump for fluid administration. ▪ Flow Rates: 0.1 - 999 ml/hr. ▪ Digital display of set parameters. ▪ Universal Syringe acceptance capability for disposable, Plastic, Size, 10, 20, 50 ml. ▪ Drive Accuracy: $\pm 3\%$ ▪ Display of drug name, Infusion rate, infused volume and volume to be infused. ▪ Automatic adaptation of controls according to syringe /infusion set. ▪ Quick freed/rapid infusion facility. ▪ Rechargeable battery and mains operated 220V, 50Hz. ▪ Safety alarm audible and acoustic for occlusion end of infusion, low battery. ▪ Battery back up 1-2 Hours. 	
Accessories:	
Optional (If any):	

Clinical Specialty	Anesthesia
Generic Name	INFUSION PUMP
Clinical Purpose	A syringe pump is a small infusion pump used to gradually administer small amounts of fluid (with or without medication) to a patient or for use in chemical and biomedical research. Syringe drivers are also useful for delivering IV medications over several minutes. In the case of a medication which should be slowly pushed in over the course of several minutes, this device saves staff time and reduces errors.

TECHNICAL SPECIFICATIONS

- Operates on any brand of infusion set.
- Automatic control of infusion rate independent of venous or arterial pressure
- Solution container height and solution viscosity.
- Bolus function automatic.
- Air bubble detector.
- Automatic pressure release after occlusion.
- Automatic switchover to keep-vein-open (KVO) rate of 1.0 ml/hr (or previous rate, whichever is less).
- Compatible with commonly available Infusion sets.
- Portable operation from self-contained rechargeable battery with 03 hours or more operation time.
- ON/OFF:
- Light indicates main or battery operation
- FLOW SENSOR:
- Detects a "no flow" situation i.e. empty container

DISPLAY:

- LED/LCD digital display which indicates flow rate
- Infused volume
- Volume to be infused
- Volume balance
- Infusion time
- Remaining time
- Battery capacity
- Occlusion level
- Pressure barograph
- Medication name

INFUSION RATE:

- 0.1-999.9 ml/hr in 1 ml increments

INFUSION TIME:

- 99 to 95 hours

AUTOMATIC RATE CALCULATION:

- On total volume + time

VOLUME LIMIT SELECTION:

- From 1 -999 ml
- Accuracy of above parameters +/- 5%

KVO RATE:

- 1– 3.0ml/hr

AUDIBLE AND VISUAL ALARMS:

- Activated by: Empty Container
- Occlusion
- Low Battery
- Open Door
- Air-in-Line
- Internal Malfunction

<ul style="list-style-type: none"> ▪ End of infusion. <p>BATTERY:</p> <ul style="list-style-type: none"> ▪ Rechargeable maintenance free dry batteries with 3 hours or more operation when fully charged. <p>SAFETY FEATURES:</p> <ul style="list-style-type: none"> ▪ Door locks while functioning
Accessories:
Optional (If any):

Clinical Specialty	Anesthesia
Generic Name	ULTRASONIC NEBULIZER HEAVY DUTY
Clinical Purpose	A nebulizer is a drug delivery device used to administer medication in the form of a mist inhaled into the lungs. The technology inside an ultrasonic wave nebulizer is to have an electronic oscillator generate a high frequency ultrasonic wave, which causes the mechanical vibration of a piezoelectric element. This vibrating element is in contact with a liquid reservoir and its high frequency vibration is sufficient to produce a vapor mist. ^[18] As they create aerosols from ultrasonic vibration instead of using a heavy air compressor, they only have a weight around 170 grams (6.0 oz). Another advantage is that the ultrasonic vibration is almost silent
TECHNICAL SPECIFICATIONS	
<ul style="list-style-type: none"> ▪ For nebulization of respiratory tracts. ▪ Hospital grade for continuous operation. ▪ Ultrasonically generated uniform and highly dense particles of 0.5-5 microns size. ▪ Approximately 65-70% of particles of less than 4 micron size. ▪ Autoclave able delivery pipes. ▪ Air flow of 10 L/min. ▪ Aerosol heating facility ▪ Quiet operation with noise level of less than 40dB. ▪ Nebulizing time setting from 0-30 min. ▪ Medication cup capacity: 150 ml. ▪ Power of 220 Volts / 50 Hz. ▪ One extra Flexible arm/ delivery pipe/masks (all sizes). ▪ Complete with bacteria filter 	
Accessories:	
Optional (If any):	

Clinical Specialty	Anesthesia
Generic Name	C-PAP UNIT
Clinical Purpose	Continuous positive airway pressure (CPAP) is a form of positive airway pressure ventilator, which applies mild air pressure on a continuous basis to keep the airways continuously open in people who are able to breathe spontaneously on their own. It is an alternative to positive end-expiratory pressure (PEEP). Both modalities stent the lungs' alveoli open and thus recruit more of the lung's surface area for ventilation. But while PEEP refers to devices that impose positive pressure only at the end of the exhalation, CPAP devices apply <i>continuous</i> positive airway pressure throughout the breathing cycle. CPAP typically is used for people who have breathing problems, such as sleep apnea. CPAP also may be used to treat preterm infants whose lungs have not yet fully developed. For example, physicians may use CPAP in infants with respiratory distress syndrome. It is associated with a decrease in the incidence of broncho pulmonary dysplasia. In some preterm infants whose lungs haven't fully developed, CPAP improves survival and decreases the need for steroid treatment for their lungs.
TECHNICAL SPECIFICATIONS	
<p>A device for delivery of continuous positive airway pressure (CPAP) through servo control mechanism for constant flow of oxygen/air to the patient at a preselected pressure</p> <ul style="list-style-type: none"> ▪ Monitor Display to display the digital data. ▪ Airway pressure range to be user settable ▪ Controls to be easy to operate, numbers and displays to be clearly visible. ▪ Display of CPAP Pressure, ▪ Alarms Level, ▪ O₂ concentration and Spontaneous breathing frequency. ▪ Alarms to alert user to "not in connection, ▪ Overpressure, ▪ Supply pressure of O₂ and Air, ▪ O₂ concentration, ▪ Upper and lower CPAP Pressure. ▪ CPAP range: 2–10 mbar ▪ FiO₂ : 21-100% ▪ Provision of overpressure safety valve ▪ Humidifier with patient circuit (reuse able). ▪ Air compressor internal / external to produce air for making air/ oxygen mixture. Noise level less than 50dB ▪ Trolley with lockable wheels ▪ Rechargeable battery with at least 4hrs backup time ▪ 220V, 50Hz 	
Accessories:	

<ul style="list-style-type: none"> ▪ Continuous flow with breathing circuits ▪ Continues flow breathing kits ▪ Flow masks 	
Optional (If any):	
Clinical Specialty	Anesthesia
Generic Name	BI-PAP UNIT
Clinical Purpose	Bi-level positive airway pressure is a form of non-invasive mechanical pressure support ventilation that uses a time-cycled or flow-cycled change between two different applied levels of positive airway pressure. It generates inspiratory (IPAP) and expiratory (EPAP) pressure gradients that complement the patient's own respiratory cycle, optimizing the lungs' efficiency and reducing the work of breathing. BiPAP has been shown to be an effective management tool for chronic obstructive pulmonary disease and acute and chronic respiratory failure Bi-level positive airway pressure is used when positive airway pressure is needed with the addition of pressure support. Common situations where positive airway pressure is indicated are those where taking a breath is difficult. These include pneumonia, chronic obstructive pulmonary disease, asthma and status asthmaticus
TECHNICAL SPECIFICATIONS	
<ul style="list-style-type: none"> ▪ Automatic BIPAP unit for pre & post operative treatment to assist breathing mechanism & gas exchange for pediatrics & adult patients and also sleep apnea. ▪ Mode of ventilation will be Bi-level Ventilation. ▪ Digital display for pressure and time parameters. ▪ Adjustable pressure range up to 30 cm H₂O. ▪ Pressure bar Graph for patient breaths and pressure. ▪ Display of patient parameters. ▪ Alarms on adjustable values. ▪ Backup Battery for one hour ▪ Temperature control ventilation system. ▪ Complete with filters, carrying case and temperature controlled Humidifier. ▪ Power of 220 V, 50 Hz 	
Accessories:	
Optional (If any):	

Clinical Specialty	Anesthesia
Generic Name	(SCD) Sequential Compression Device
Clinical Purpose	Intermittent pneumatic compression is a therapeutic technique used in medical devices that include an air pump and inflatable auxiliary sleeves, gloves or boots in a system designed to improve venous circulation in the limbs of patients who suffer edema or the risk of deep vein thrombosis (DVT) or pulmonary embolism(PE)

TECHNICAL SPECIFICATIONS

- DVT prophylaxis, the Compression device with Vascular Refill Detection increased the volume expelled per hour in the post-thrombotic leg, Customized Compression Cycles – Moves blood from the lower extremities as quickly as the veins refill.
- Venous Thrombo embolism (VTE)
- Prophylaxis for the obese & morbidly obese patient
- Small, Medium and Large Sleeves.
- Foot cuff sleeve.
- Lithium Ion Battery
- Up to 8 Hours of Uninterrupted Compression on battery
- One Touch Operation
- Port A& B indicator.
- Audio and visual alarms, e.g. Low battery, single port use etc.
- 220 VAC
- Compression Parameters
- 45 mmHg (ankle), 40 mmHg (calf), 30 mmHg (thigh)
- Sequential, Gradient, Circumferential
- 5 sec. 130mmHg foot compression
- Vascular Refill Detection
- Automatic pressure adjustment
- Compact & Portable, patient bed hanging system.

Accessories:

Optional (If any):

Clinical Specialty	Anesthesia
Generic Name	Transport Ventilator
Clinical Purpose	Transport ventilator is a mechanical ventilator, a machine designed to move breathable air into and out of the lungs, to provide breathing for a patient who is physically unable to breathe, or breathing insufficiently in ambulance, air ambulance

TECHNICAL SPECIFICATIONS

TRANSPORT VENTILATOR

- Microprocessor controlled ventilator with following minimum modes.
- Continuous Mandatory Ventilator (CMV).
- Synchronized intermittent Mandatory ventilation (SIMV)
- Continuous positive airway pressure (CPAP)
- Pressure Support Ventilation
- Non Invasive Ventilation
- Tidal volume 100-2000ml

MONITORING DISPLAY:

- Graphic Screen 04” screen or more.
- Display parameters:- Airway pressure, Breath rate
- Inspiratory time
- Exhaled minute volume I:E ratio
- Exhaled tidal volume
- Trend Data.

ADJUSTABLE ALARM FORHIGH/LOW respiratory rate.

- Built in battery backup, upto 4 hours and battery level indication.
- Complete with breathing circuits, hose, test lung & universal masks or other accessories required for proper functioning of the equipment.

Accessories:

Optional (If any):

Clinical Specialty	Anesthesia
Generic Name	Human Patient Simulator
Clinical Purpose	Simulation can be used to show the eventual real effects of alternative conditions and courses of action. Simulation is also used when the real system cannot be engaged, because it may not be accessible, or it may be dangerous or unacceptable to engage, or it is being designed but not yet built, or it may simply not exist

TECHNICAL SPECIFICATIONS

- Human Patient Simulator for Training & Education of undergraduates,

- Post graduate students & Health professionals in routine and special clinical situations
- It Should offer sophisticated mathematical models of human physiology and pharmacology and capable of determining automatically the patients response to user actions and interventions:

Human Patient Simulation system should comprise the followings:

MANIKIN:

- It Should be supplied with two manikin
- Adult Mannequin should represent the physical characteristic of an adult male / female patient with interchangeable genitalia
- Pediatric mannequin to represent physical characteristic of pediatric patient
- It should be fully operational in spine, sitting, lateral & prone position and can be placed on O. T. Table, ICU Beds on ground & in an ambulance
- It should react to intravenous drugs, CPR, defibrillation, intubations ventilation, catheterizations & other procedures
- Should physically demonstrate of various clinical signs (i.e. heart / breath sounds, palpable pulses, chest excursion, airway patency etc.) which should be dynamically coupled with the mathematical models of human physiology and pharmacology.

COMPUTERISED SYSTEM CONTROLLER:

- Simulation system should be supplied complete with PC console and
- A hand held Laptop for instructor to control all aspects of simulator from bedside of the patient

UTILITY SOFTWARE:

- Simulation system should be supplied complete with software for
- Modification of preconfigured scenarios & patient profiles or creating new scenarios & profiles
- Recording of patients physiology and intervention by student ,instructor or central software
- modification of pharmacokinetics & pharmaco dynamics parameters of selected drugs

PATIENT MONITOR:

- Should have facility to be connected to a real patient monitor for monitoring following parameters :
 - 5 Lead ECG
 - NIBP
 - IBP (at least 2 Ch.)
 - SPO2
 - Cardiac Output
 - ST. Segment & Arrhythmia Analysis
 - ETCO2
 - Anesthetic agents (enflurane, Sevoflurane, Halothane, Isoflurane)

ANAESTHESIA MACHINE:

- (Must Have facility to connect directly to Adult/ Paediatric Manikins and have the real time responses of Gas exchanges)
- Should be supplied complete with flow meters for Air, Oxygen, Nitrous Oxide with low flow range and hypoxia guard.
- Electronic anesthesia ventilator for Paed. & Adult usage.
- Breathing circuit (O₂ nos. each) for adult & paed. patient.
- Vaporizer
- Circle Absorber.

DEFIBRILLATOR:

- With ECG Monitoring,
- Integrated adult & pediatric paddles.

ICU VENTILATOR:

- For adult & pediatric applications.
- Must have facility to connect ventilator directly to Adult/ Pediatric Manikins for real time response

HUMAN PATIENT SIMULATOR SHOULD HAVE FOLLOWING FEATURES :

1. AIRWAY SYSTEM:

- Mannequins should provide automatically realistic oropharynx , naso -pharynx and larynx representing adult and pediatric patient
- Should allow direct laryngoscope, oral and nasal tracheal intubation.
- Should support mainstream endo bronchial intubation, oesophageal intubation.
- Should allow for activation of laryngospasm activator & airway occluder to create "cannot ventilate, cannot intubate" crisis scenario.
- Should allow instructor to activate tongue swelling of varying degrees.
- Should support the use of Combitubes, lighted stylets and fibre optic intubation tubes.

2. PULMONARY SYSTEM:

- The patient should breathe spontaneously with a self-regulated rate and tidal volume sufficient to maintain a target arterial carbon dioxide which can be adjusted by the instructor.
- Should be capable of simulating events such as atelectasis , pneumothorax , asthma , COPD etc.
- The mannequin's lungs should physically consume O₂ ,produce Co₂ and uptake or excrete N₂O,sevfluorane, isofluorane, enflurane, and halothane
- Independent control of left & right lung to model airway resistance, lung compliance, as well as control of chest wall compliance.
- The lungs should be realistically modelled with respect to the range of tidal volumes & functional residual capacity.
- Should have facility to superimpose modes of ventilation (spontaneous, assisted & mechanical) one on another and respiratory system should be capable of

triggering a ventilator.

- Ventilation should result in appropriate production of expired CO₂ which registers correctly on external capnograph.
- Should give appropriate & dose dependent pulmonary response to intravenously injected drugs.
- Should have facility to continuously Calculate patients arterial blood gas & PH

3. CARDIO VASCULAR SYSTEM:

- Should simulate heart sound synchronized to QRS complex of ECG, generate 5 lead ECG from appropriate positions on the patients chest and Should be able to simulate associated abnormalities such as myocardial ischemia, sinus tachycardia & bradycardia, ventricular fibrillation & asystole.
- Should have palpable carotid, radial, brachial, femoral pedal pulses synchronous to ECG.
- Should have independent control of left & right radial, brachial, femoral & pedal pulses.
- Should simulate hypovolemia & hypervolemia and right and / or left heart failure.
- Should be able to simulate patients blood pressure that can be measured with cuff of NIBP Monitor, and provide monitoring of haemodynamic parameters.

4. METABOLIC SYSTEM:

- Should physiologically model Actual blood gases including pH, Pco₂, Po₂ accurately corresponding to alveolar concentration of CO₂ & O₂.
- Should allow instructor to adjust ABG pH level to simulate Metabolic Acidosis and alkalosis

5. GENITO URINARY SYSTEM:

- Manikin should allow insertion of urinary catheters, & offer instructor controlled or automatic scenario controlled excretion of urine and its flow rate.

6. NEUROLOGIC SYSTEM:

- Should model cardio vascular & respiratory responses to sympathetic & para sympathetic activities.
- Should have electrode attachment for peripheral nerve stimulator.
- Should automatically detect PNS stimulus pattern and generate appropriate thumb twitch response.

7. ADVANCED CARDIAC LIFE SUPPORT SYSTEM:

- Should display alveolar & arterial gas concentrations appropriately reflecting efficacy of ventilatory technique employed.
- Should display artificial circulation, cardiac O/P, Central & peripheral blood pressure palpable pulses & CO₂ return as a result of effective chest compression.
- Should have facility to select & maintain desired cardiac Arrhythmia and central patients response to clinical intervention.
- Should have facility to apply conventional & automatic external defibrillators to the patient and should trigger appropriate patient response.

- Should have provision to apply transcutaneous pacemakers.
- Should support all drug required by ACLS algorithm

8. TRAUMA FEATURES:

- Should simulate constriction & dilation of pupils of each eye in response to changing light stimuli.
- Should have provision to perform needle decompression of Tension Pneumothorax, & chest tube placement and management.
- Should have facility to perform subxyphoid needle peri-cardiocentesis to resolve acute cardiac tamponade.

9. PHARMACOLOGY & DRUG RECOGNITION SYSTEM:

- Should have pre-programmed pharmacokinetic and pharmacodynamics parameter for over 50 (fifty) intravenous medication.
- Should incorporate various intravenous access points such as antecubital, right internal jugular and femoral veins in the mannequin.
- Should have facility to administer injection & intravenous infusions from main PC console or instructors hand held remote control.
- Mannequin should appropriately & automatically respond to incorrect medications.
- Should have drug recognition system to identify drug, its concentration & quantity of dosage given.
- Should have facility to modify pharmacodynamics & pharmacokinetic models of existing drugs & to add new drugs.

10. ANESTHESIA AND SCAVENGING:

- Ability to administer anesthetic agents and medical gases
- Lungs consume oxygen and produce carbon dioxide
- Uptake and distribution of nitrous oxide and volatile anesthetics
- Direct gas exchange within the lungs
- Mechanical ventilation fully supported with automatic responses to CPAP, PSV, PEEP, SIMV, assist control modes and weaning protocols
- Simulator should flow trigger or pressure trigger a ventilator to cycle
- Simulator should be configured to fight the ventilator
- Expired carbon dioxide should be automatically based on patient condition and interventions
- Thumb twitch with standard Peripheral Nerve Stimulator should be based on neuromuscular agent response

11. PATIENT PROFILES & SCENARIOS:

- Should have at least 25 pre-configured profiles of patients of various ages, medical history, gender & physiological parameter
- Should have facility to change existing patient profiles and to create new patient profiles.
- It should be possible to capture the current state of patient at any part of simulation session & to use it as new patient.
- Simulator should have at least 50 pre-configured scenarios of events & crises.

<ul style="list-style-type: none"> Should have facility to change existing scenarios and to create new scenarios of events & crises
Accessories:
Optional (If any):

Clinical Specialty	Anesthesia
Generic Name	HUMAN PATIENT SIMULATOR (INFANT)
Clinical Purpose	Simulation can be used to show the eventual real effects of alternative conditions and courses of action. Simulation is also used when the real system cannot be engaged, because it may not be accessible, or it may be dangerous or unacceptable to engage, or it is being designed but not yet built, or it may simply not exist

TECHNICAL SPECIFICATIONS

<ul style="list-style-type: none"> Infant Simulators should have Portable Touch screen patient monitor computer (21") Two pre-configured patients, Four Simulated Clinical Experiences (SCEs), four SCE development licenses Software, Simulated Patient Monitoring software Palpable physical landmarks: clavicle, sternum, ribs, intercostals spaces Bulging fontanel capability Interchangeable male and female genitalia with urine output Blinking eyes, variable pupil dilation Tearing and secretions of fluids from eyes, ears, and mouth Voice sounds include crying, cooing, giggling Realistic airway; trachea with realistic anatomical landmarks Fully operational in the supine, lateral and sitting positions
Accessories:
Optional (If any):

Clinical Specialty	Anesthesia
Generic Name	HUMAN PATIENT SIMULATOR (BABY)
Clinical Purpose	Simulation can be used to show the eventual real effects of alternative conditions and courses of action. Simulation is also used when the real system cannot be engaged, because it may not be accessible, or it may be dangerous or unacceptable to engage, or it is being designed but not yet built, or it may simply not exist

TECHNICAL SPECIFICATIONS

- Baby Simulators should have
- Touch screen patient monitor computer
- Two pre-configured patients
- 13 Simulated Clinical Experiences (SCEs)
- Wireless patient Monitor
- Drug Recognition
- Portable Air Compressor
- Realistic airway
- CPR Correct hand placement, depth, and rate of compressions are reflected in physiological feedback
- Ability to support anesthesia and Respiratory Care
- It should also have complete facility of Cardiac
- Breathing
- Circulation
- Pharmacological System
- Articulation
- Trauma
- Vascular access and urinary catheterization,
- Neurological disorder, and Sound

Accessories:

Optional (If any):

Clinical Specialty	Anesthesia
Generic Name	TRAINING PHANTOMS
Clinical Purpose	Computational human phantoms are models of the human body used in computerized analysis. the radiological science community has developed and applied these models for ionizing radiation dosimetry studies. These models have become increasingly accurate with respect to the internal structure of the human body

TECHNICAL SPECIFICATIONS

ANESTHESIOLOGY

- By Specialty Cardiac
 - Vimedix Cardiac Echo Simulator
 - Transesophageal Echo and Transthoracic Echo Training Model (Blue Phantom)
 - FAST Exam Real Time Ultrasound Training Model (Blue Phantom)
 - Transthoracic Echocardiography and Pericardiocentesis Ultrasound Training Model (Blue Phantom)
- By Specialty - Anesthesiology – Doppler
 - Vimedix Cardiac Echo Simulator
 - Peripheral Doppler Ultrasound Training Model (Blue Phantom)

- By Specialty - Anesthesiology – Thrombosis
 - Femoral Vascular Access Lower Torso Ultrasound Model with DVT Option
 - PICC Vascular Access Ultrasound Training Model with Thrombosis
 - Femoral Regional Anesthesia & Vascular Access with DVT Option
 - Upper Arm Tissue Insert with Brachial and Basilic Thrombosis
- By Specialty - Anesthesiology - Vascular Access
- Internal Jugular Central Line Ultrasound Manikin -
- Femoral Vascular Access Lower Torso Ultrasound Model with DVT Option
- Femoral Regional Anesthesia & Vascular Access with DVT Option
- Regional Anesthesia Ultrasound Training Block Model
- Pediatric 4 Vessel Ultrasound Training Block Model
- Regional Anesthesia and Ultrasound Central Line Training Model - NEW
- Understanding Ultrasound for Guiding Central Catheter Insertions
- PICC Vascular Access Ultrasound Training Model
- Ultrasound Central Line Training Model Replacement Tissue Insert
- Brachial Plexus Block and Ultrasound Central Line Replacement Tissue Insert
- Central Venous Access Ultrasound Training Model Transparent Insert
- PICC with IV and Arterial Line Vascular Access Ultrasound Trainer
- Upper Arm Tissue Insert with Brachial and Basilic Vessels
- IV and Arterial Line Vascular Access Ultrasound Model
- PICC Vascular Access Ultrasound Training Model with Thrombosis
- By Specialty - Anesthesiology - Regional Anesthesia
- Lumbar Puncture and Spinal Epidural
- TAP Block Ultrasound Training Model
- Sciatic Nerve Regional Anesthesia Ultrasound Training Model
- Femoral Regional Anesthesia & Vascular Access with DVT Option
- Gen II Brachial Plexus Block and Ultrasound Central Line Replacement Tissue Insert
- Regional Anesthesia and Central Venous Access Ultrasound Replacement Tissue
- Regional Anesthesia Ultrasound Training Block Model

Accessories:

Optional (If any):

Clinical Specialty	Anesthesia
Generic Name	Oxygen Concentrator
Clinical Purpose	An oxygen concentrator is a device which concentrates the oxygen from a gas supply (typically ambient air) to supply an oxygen enriched gas stream

TECHNICAL SPECIFICATIONS

- Oxygen concentrator with Built-in oxygen purity indicator
- High and low oxygen alarms.
- Light weight and easy to transport.
- Quietest,

<ul style="list-style-type: none"> ▪ Uses less power and produces less heat. ▪ Metal cannula connection. ▪ Option to connect all types of Humidifier Bottles. ▪ Average Power Consumption not more than 350 watts. ▪ Oxygen concentration should be above 90% at all flow settings. ▪ Flow meter scale should be from 0.5 to 5.0 liter per minute. ▪ Outlet pressure should be more than 5.0 PSI. ▪ Sound level should not be more than 45 dBA
<ul style="list-style-type: none"> ▪ Accessories:
<ul style="list-style-type: none"> ▪ Optional (If any):

Clinical Specialty	Anesthesia
Generic Name	Patient Monitor Modular Type
Clinical Purpose	A medical monitor or physiological monitor is a medical device used for monitoring. It can consist of one or more sensors, processing components, display devices (which are sometimes in themselves called "monitors"), as well as communication links for displaying or recording the results elsewhere through a monitoring network.

TECHNICAL SPECIFICATIONS

- Modular bedside monitor for Adult, Paeds. The monitor should take different modules for display of vital sign monitor of Adults, Paeds.

OPERATING FEATURES AND CHARACTERISTICS:

- Non fade TFT color display
- Electro-surgical interference suppression/protection
- Defibrillator protection
- Freeze and cascade facility
- Waveform traces speed; 25/50mm/sec.
- Screen size: min. 12" TFT/LCD color display.
- Capacity to interface with LAN/WLAN for data transfer

ECG:

- Numeric: heart rate.
- Waveform: Six Wave forms minimum, real time and freeze ECG trace

NON-INVASIVE BLOOD PRESSURE(NIBP):

- Method: Oscillometric principle
- Numeric: systolic, diastolic and mean pressure
- Selectable auto inflate interval settings
- Rising cuff continuous pressure display

TEMPERATURE:

- Numeric: temperature selectable in °C/°F.

PULSE OXIMETRY:

- Numeric: 0-100% oxygen saturation measuring range.

- Waveform-Plethysmograph pulse with pulse strength indication.
- Reusable sensor electrode.
- Reusable cuff.

ARRHYTHMIA ANALYSIS:

- Arrhythmia analysis and St. analysis

RESPIRATION:

- Breath rate display and settable apnea alarms.
- Sweep speed; 6.25, 12.5 mm/sec.

Modules:

- IBP Four Channel Module.
- Capnography Module (EtCO2) module
- Cardiac output module.

OTHER FEATURES:

- Trend data; graphical and tabular

ALARMS:

- High & low (settable) on all parameters
- Visual and audible indication of alarms
- Built in Printer/Separate Two/Three Channel
- OPERATING REQUIREMENTS:
- AC 220V/50HZ
- Built-in rechargeable battery for at least 1 - 2 hour AC power failure at full parameter.

NOTE: The system must be complete with all sensors, probes, cables or any other accessories required for measuring all the above selected parameters for Adults and Peads

Accessories:

Optional (If any):

Clinical Specialty	Anesthesia
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Generic Name	High End Invasive Patient Monitor
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Clinical Purpose	A medical monitor or physiological monitor is a medical device used for monitoring. It can consist of one or more sensors, processing components, display devices (which are sometimes in themselves called "monitors"), as well as communication links for displaying or recording the results elsewhere through a monitoring network.
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TECHNICAL SPECIFICATIONS

- Patient monitor for display of vital sign monitoring of Adult, Neonate and Paeds.
- The Monitor have plug in modules / pods for measurement, recording and display of different Vital Signs.
- Mounted on Wall.

- The monitoring solution shall make available all the directly connected monitoring parameters accessible at the bedside during transport.
- The monitoring solution shall be capable of displaying a minimum of ten waveform channels, and can expand up to 16 channels when required.
- Monitors can be connected with Central station wirelessly / wired

OPERATING FEATURES AND CHARACTERISTICS:

- Non-fade TFT Touch color display.
- Electro-surgical interference suppression/protection.
- Defibrillator protection.
- Freeze and cascade facility.
- Waveform traces speed; 25 / 50mm/sec.
- The monitoring solution should be a minimum display size of 17 inches wide Touch screen.
- Monitors should be connected with Hospital information system, laboratory information system and Radiology information System (DICOM images) for bidirectional flow of data and images.

PARAMETERS:

ECG:

- Real time and freeze ECG trace.
- Measuring Range : 15 to 300 bpm

NON-INVASIVE BLOOD PRESSURE (NIBP):

- Method: Oscillometric principle.
- Numeric: systolic, diastolic and mean pressure
- Modes of operation: Manual, Interval, Continuous, Venous stasis.
- Rising cuff/continuous pressure display.

TEMPERATURE

- Numeric: temperature selectable in °C and °F.
- Measuring Range: 0 to 50 °C (equal to °F).

PULSE OXIMETERY

- Numeric: 1-100% oxygen saturation measuring range.
- Measuring Method: Absorption.
- Display Parameters: Saturation, Pulse Rate and Perfusion rate.
- Massimo Technology / other patient technology with motion tolerance.

ARRHYTHMIA ANALYSIS:

- Arrhythmia analysis and ST analysis.
- More than 13 types of arrhythmia should be detected.

RESPIRATION:

- 2 sensing leads.
- Measuring Range: 0 to 150 bpm.
- Breathe rate display and settable apnea alarms.

CAPNOGRAPHY:

- Measuring Parameters: End-tidal CO₂, Inspired CO₂ and RRC.
- CO₂ measuring Range: 0 to 100 mmHg.
- Unit selection: %, mmHg, KPa.
- Measuring Range: -40 to 400 mmHg
- 4 channel IBP

OTHER FEATURES:

- Up to 72 hours of Trend data.
- 1 to 2 hours battery backup.
- Nurse call Connection option should be available in monitor.
- Audible and Visible alarm.

OPTIONAL PARAMETERS

- PiCCO
- NMT
- BIS
- Total Hemoglobin
- Perfusion index
- Total oxygen content
- Carboxyhemoglobin saturation.
- Hemoglobin saturation.
- Pleth variability index.

Accessories:

Clinical Specialty	Anesthesia
Generic Name	Patient Transfer Trolley With Transport Ventilator, Vital Sign Monitor & Infusion Pump
Clinical Purpose	Patient Transfer trolley is a set of trays/drawers/shelves on wheels used in hospitals for transportation and dispensing of emergency medication/equipment at site of medical/surgical emergency for life support protocols (ACLS/ALS) to potentially save someone's life.

TECHNICAL SPECIFICATIONS

PATIENT TROLLEY

- Critical Patient Transport Trolley Mattress base: 3-sectional
- Base plate of epoxy coated steel
- Mattress base frame made of chromed or epoxy coated steel, Mattress size: 650 x 1900 mm or better
- Castors: Ø 150/200 mm, anti-static, Central braking system
- Bumpers on all corners;
- Collapsible Side Rails.
- Hydraulic height adjustment, operating pedals on both sides of the trolley
- Adjustment range from floor to base plate: 650 – 900 mm
- X-ray platform 480 – 950 mm, Back section adjustment gas spring-assisted (0°...+70°)
Leg section adjustment gas spring-assisted (0°...-45°)
- Accessories
- Mattress
- I/V Stand

TRANSPORT VENTILATOR

- Microprocessor controlled ventilator with following minimum modes.
- Continuous Mandatory Ventilator (CMV).
- Synchronized intermittent Mandatory ventilation (SIMV)
- Continuous positive airway pressure (CPAP)
- Pressure Support Ventilation
- Non Invasive Ventilation
- Tidal volume 100-2000ml

MONITORING DISPLAY:

- Graphic Screen 04" screen or more.
- Display parameters:- Airway pressure, Breath rate
- Inspiratory time
- Exhaled minute volume I:E ratio
- Exhaled tidal volume

ADJUSTABLE ALARM FOR HIGH/LOW respiratory rate.

- Built in battery backup, upto 4 hours and battery level indication.
- Complete with breathing circuits, hose, test lung & universal masks or other accessories required for proper functioning of the equipment
- Vital Sign Monitor
- Suitable / Recommended for Transport Monitoring from manufacturer.
- Parameters: ECG, NIBP, Respiration, Temperature and Masimo Pulse Oximeter with Motion Tolerance technology.
- Screen color minimum 10" TFT
- Complete with Standard accessories for above mentioned Parameters.

INFUSION PUMP:

- Infusion pumps for fluid administration.
- Programmable, Automatic control of infusion rate independent of venous or arterial pressure, solution container height, and solution viscosity.
- Automatic function to keep vein open rate of 0.1ml/hr
- PCA.
- TCI
- Drug Library for 650 drugs.
- Dose Rate Calculation.
- Digital display to indicate flow rate and volume infused, volume remaining and the name of the drug.
- Rate of infusion 0.1 – 99ml/hr in 0.1 ml/hr increments. 1.0 – 999 ml/hr in 1.0 ml /hr increments.
- Accuracy: +/-5%
- Universal/ standard infusion set acceptance capability.
- Visual and Audible alarms for empty Container, occlusion, low battery, Air-in-line and internal malfunction.
- Power of AC 220V/50Hz with a battery back-up of 2 hours operation.

Note: Monitor, Ventilator and Infusion Pump should be properly mounted with Trolley for smooth Transportation of Patient

Accessories:

Optional (If any):

DRAFT