**PVMS OF MEDICAL EQUIPMENT**

<table>
<thead>
<tr>
<th>Clinical Specialty</th>
<th>Cardiac Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic Name</td>
<td><strong>Heart and Lung Machine</strong></td>
</tr>
<tr>
<td>Clinical Purpose</td>
<td>Cardiopulmonary bypass (CPB) is a technique that temporarily takes over the function of the heart and lungs during surgery, maintaining the circulation of blood and the oxygen content of the body. The CPB pump itself is often referred to as a heart–lung machine &quot;the pump&quot;.</td>
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**TECHNICAL SPECIFICATIONS**

- 05 Pump Complete Modular Pumps console with all Modular Parameter
- 04 Single roller pump+1 Twin Pump or Two Small roller Pump
- Dual Pressure module
- Temperature module
- Monitor interface module
- Power supply module
- Battery backup minimum 90min.
- Level sensor
- Ultrasonic Bubble detector
- Flexible Led Lamp
- Mechanical/Electronic Gas blender
- Cardioplegia Monitoring Unit
- System Control Panel
- Venous occluding clamp

**05- Pump Console:**

- Heart Lung machine should have modular system.
- The Console should have 05 pump attachment.
- Smooth stainless steel, painted metal and aluminum.
- Entire system should operate on battery system for a minimum of 90 Minutes For arterial pump battery backup should be 180 minute or more.
- Switch over from main power to battery backup should be automatic and immediate.
- Battery Unit should be built in to the pump base.
- It should recharge automatically when the system is operating with main power supply.
- Pump-console should have single cable connection from external power supply.
- Provision for a connection to PC.
- 24Volt operated socket for all pumps to avoid risk.
- Should have hand crank facility as a safety feature with each pump
• All the pump should have facility of pulsatile mode

**System Control Monitor: Should display follow below components.**
• Pulsatile operation display.
• Pressure monitoring display.
• Temperature monitoring display.
• Timer system display.
• Battery voltage display.
• Safety buttons
• Alarm for shut down for any pump

**Cardioplegia monitoring unit:**
• It should display Volume ratio, timer, temperature, and pressure of full control of independent cardioplegia line.
• Master follower function and pump to stop

**Single Roller Pump:**
• The unit should have 5-pump compactly arranged with Universal connection.
• Monitoring flow rates in LPM & RPM should be digitally display on the pump or equivalent.
• Modules pump should have easy access connection for interchanging the pump with console.
• Pump should be peristaltic for durability and convince of handling.
• Roller pump should have a self-diagnostic circuit with provision to detect and display critical alarm conditions.
• Each individual roller pump should be capable of running independently.
• Each Pump should operate onto 24 Volt.
• Roller Pump Range: 0-250 RPM.
• Display of all pump condition on pump.
• Calibrations preset for ¼, 3/8 & ½ tubing.
• It should have Reverse flow capability.

**PRESSURE MONITOR: (Four pressure module)**
• Facility to monitor pressures.
• Along with necessary pressure transducers Kit, cables and domes reusable, with accurate digital display and alarm facilities audio and visual.
• It should have trend indicator and trend readout.
• Pole mounts for transducer Kit.
**TEMPERATURE MONITOR:**
- 04 temperature displays on Control panel for patient monitoring and for cardioplegia monitoring with digital display in Celsius.
- It should have trend indicator and trend readout.

**Air – Emboli module.**
*Level sensor:*
- With alarm settings. Should be able to provide both alert alarm for audible and visual alarms or low blood level alarm
- Level sensor pads 100 pcs

**Air Bubble detector:**
It should be ultrasonic in nature.
Micro – bubble detection: Yes
Bar Leds, sensor fault, override facility.
Sensor should be compatible with all tubing sizes.

**TIME MONITOR:**
Minimum 3 time displays.
- With stop, reset and start function

**Accessories:**
System Should be with all complete accessories.

Optional (if any):
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<tr>
<td>Generic Name</td>
<td><strong>Centrifugal Pump</strong></td>
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<td>Clinical Purpose</td>
<td>Centrifugal pump can be used for extracorporeal membrane oxygenation (ECMO) or extracorporeal life support (ECLS) is an extracorporeal technique for providing both cardiac and respiratory support to persons whose heart and lungs are unable to provide an adequate amount of gas exchange to sustain life.</td>
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## TECHNICAL SPECIFICATIONS

- Centrifugal Pump system should be used as a fully independent stand-alone unit and can be use as part of heart lung machine.
- Flow and bubble measuring function must be integral part of the Console
- Console should have With triple power supplies: mains, Heart Lung, or own batteries
- An adjustable holder allows optimal positioning of the drive unit.
- Emergency drive, a manual drive (hand crank) with speed indicator

**Specialized for ECMO, ECLS:**
- Separate flow and speed displays
- Constant flow mode of operation
- Suitability for pulsatile operation
- Technologically advanced disposable pump head
- Priming :60 ml or less
- Flow : 0-08 l/min
- Power supply / battery: 90 min
- Mains power inlet cable
- Push and turn control knob

**Accessories:**
- Trolley imported from Manufacturer

**Optional (if any):**
- Specialized ECMO unit certified by FDA/CE/MHLW for 7/14 days or more