

Anaesthesia Workstation

1. GENERAL OVERVIEW

- **Equipment Type:** Integrated Anesthesia Workstation
 - **Clinical Purpose:**
Preparation and delivery of precise mixtures of medical gases (O₂, N₂O, and Air) combined with anesthetic agents, with advanced mechanical ventilation and respiratory monitoring for safe administration of general anesthesia.
 - **Clinical Application / Location:**
Operation Theaters (OT), Emergency OT, Recovery Areas
-

2. GAS DELIVERY & SAFETY SYSTEMS

- **Gas Supply Inputs:**
 - Three-gas system: Oxygen (O₂), Nitrous Oxide (N₂O), and Medical Air
 - Pipeline supply with reserve pin-indexed cylinder yokes
 - Robust clamping bars for secure cylinder fixation
- **Flow Meters:**
 - Dual cascade or electronic/virtual flow meters for all three gases
 - Multiple scale calibration with high accuracy at low-flow anesthesia
- **Hypoxic Protection:**
 - Mechanical or pneumatic hypoxic guard system
 - Ensures minimum delivered oxygen concentration of $\geq 25\%$ O₂ at all times

- **Gas Outlets:**
 - Single Common Gas Outlet (ACGO)
 - Auxiliary Oxygen outlet with independent flow meter
 - High-flow Oxygen Flush with safety interlock
-

3. VENTILATOR & RESPIRATORY MONITORING

- **Ventilator Type:**
 - Electronically controlled, pneumatically driven integrated ventilator
- **Ventilation Modes:**
 - Volume Control Ventilation (VCV)
 - Pressure Control Ventilation (PCV)
 - SIMV (Volume / Pressure)
 - Pressure Support Ventilation with Apnea Backup
- **Performance Parameters:**
 - **Tidal Volume Range:** 20 mL – 1500 mL (Adult & Pediatric)
 - **Peak Inspiratory Flow:** ≥ 110 L/min (independent of FGF)
- **Monitoring & Display:**
 - Minimum **10-inch high-resolution color touchscreen**
 - Display of set and measured values
 - Real-time spirometry loops and waveforms:

- Airway Pressure
 - Volume
 - Flow
 - FiO₂
 - **Safety Features:**
 - Integrated pressure relief valve
 - Maximum airway pressure limit: **120 cmH₂O**
 - Non-return valve to prevent backflow
-

4. BREATHING SYSTEM & CIRCLE ABSORBER

- **Circle Absorber:**
 - Fully autoclavable
 - Tool-free dismantling for cleaning
 - Heated breathing system to reduce condensation
 - Automatic CO₂ bypass for canister exchange during surgery
- **Volume Compensation:**
 - Automatic compensation for:
 - Fresh Gas Flow (FGF)
 - Circuit compliance
 - Ensures accurate tidal volume delivery

- **Scavenging System:**

- Integrated interface for passive or active Anesthetic Gas Scavenging System (AGSS)
-

5. VAPORIZERS

- **Mounting System:**

- Selectatec-compatible, interlocked vaporizer manifold
- Prevents simultaneous activation of more than one vaporizer

- **Included Vaporizers:**

- Isoflurane Vaporizer – 01
- Sevoflurane Vaporizer – 01
- Latest-generation, temperature- and flow-compensated (Tec 7 equivalent or better)

- **Standardization Requirement:**

- Anesthesia workstation, ventilator, and vaporizers must be from the **same manufacturer**
-

6. HARDWARE & PHYSICAL CHARACTERISTICS

- **Construction:**

- Mobile trolley design
- Minimum **three storage drawers**

- Antistatic castor wheels with central or individual locking brakes
 - **Power Management:**
 - Input: **220–240 VAC, 50 Hz, 13A fuse 3 ping type G power cord**
 - Minimum **three integrated medical-grade power outlets**
 - **Battery Backup:**
 - Internal rechargeable battery
 - Minimum **1-hour operation**
 - Overcharge protection and low-battery alarm
 - **Stabilization:**
 - External automatic servo voltage stabilizer included
-

7. MANDATORY ACCESSORIES & CONSUMABLES

Breathing Circuits:

- Bain's Circuit – 02
- Adult Reusable Circle Circuit – 02
- Pediatric Reusable Circuit – 02
- JR Circuit – 01
- Disposable Limb Circuits – 05

Reservoir Bags:

- 500 mL – 02

- 1.0 L – 02
- 1.5 L – 02
- 2.0 L – 02

Emergency Equipment:

- Adult Autoclavable AMBU Bag – 01
- Pediatric Autoclavable AMBU Bag – 01

Filtration & Absorbent:

- HME Filters – 25
- Medical-grade CO₂ absorbent – 4 kg (Medisorb or equivalent)

Gas Supply Accessories:

- 5-meter color-coded high-pressure hoses with NIST/DISS connectors for O₂ and N₂O

8. STANDARDS & COMPLIANCE

- ISO 13485 certified manufacturer
- CE Marked (Notified Body) and/or US FDA cleared
- IEC 60601-1 (Medical Electrical Safety)
- IEC 60601-1-2 (Electromagnetic Compatibility)
- IEC 62353 (Electrical safety testing)
- IP44 rated power cord

9. USER INTERFACE

- Touchscreen Graphical User Interface (GUI)
- Ergonomic physical controls for critical functions
- Clear alarm hierarchy with visual and audible alerts

10. TRAINING

- On-site clinical training for anesthesiologists and OT staff
- Technical training for Biomedical Engineering personnel
- Documentation of advanced maintenance and troubleshooting procedures

11. WARRANTY & SERVICE

- Minimum **24-month comprehensive warranty**
- Preventive maintenance visits included during warranty period
- Availability of spares and service support for minimum **5–7 years**

12. DOCUMENTATION

- User Manual (Hard & Soft copy)
- Technical & Service Manuals
- Maintenance Schedule

- Calibration and Inspection Certificates
- List of recommended spares with part numbers

BIOMEDICAL ENGINEERING DEPARTMENT