

# CALIFIA<sup>®</sup> Patient Module Technical Specification Sheet

Biomed Simulation, Inc. | Rev. 2025-02

## Product Overview

The CALIFIA<sup>®</sup> Patient Module is a high-fidelity, physiology-driven simulation platform designed to replicate cardiopulmonary bypass (CPB) and extracorporeal membrane oxygenation (ECMO) procedures. It serves as a dynamic training and testing environment for clinicians, engineers, and researchers, enabling realistic scenario-based learning, device validation, and physiological research.



## Key Features

### 1. CPB/ECMO Simulation

- Real-time emulation of venous/arterial pressure, oxygen delivery, and cardiac output.
- Programmable physiological responses to interventions (e.g., fluid administration, vasoactive drugs).
- Integrated hydraulic reservoir (0–6 L capacity) with adjustable venous/arterial valve control (0–100%).

### 2. Physiological Modeling

- Dynamic cardiovascular and respiratory system modeling with customizable parameters.
- Simulated blood gas exchange, acid-base balance, and hemodynamic instability scenarios.

### 3. Advanced Monitoring

- Real-time visualization of:
  - Cardiac output | Systemic vascular resistance | Mixed venous oxygen saturation (SvO<sub>2</sub>)
  - Arterial/venous pressure waveforms | Blood gas analytics (pH, pO<sub>2</sub>, pCO<sub>2</sub>)
- 3D ICU environment interface for multi-modal monitoring.

### 4. Scenario Customization

- Preloaded clinical cases (e.g., oxygenator failure, aortic dissection) or user-defined scenarios.

### 5. Device Interoperability

- Compatible with commercial heart-lung machines, ECMO circuits, and ICU monitors (e.g., cerebral oximeters, infusion pumps).
- Supports integration with third-party ventilators and blood gas analyzers.



## Technical Specifications

### Performance

- Venous valve: 0 – 100 %
- Arterial valve: 0 – 100 %
- Califia's reservoir: 0 – 6 L

### Hydraulics

- Quick-disconnect ports: 2×½" (65GP-PF2-08), 3×¼" (50AC-PB2-04)

### Operating Range

- Temperature: 0–40°C (32–104°F)

### Electrical

- Operating Voltage: 24 V DC
- Power consumption: < 180 W

### Connectivity

- Ethernet connection with included laptop.
- Power connection of 24 V DC with power switch.

### Physical

- Dimensions: 45.7×34.3×20.3 cm (18×13.5×8 in)
- Weight: 14.5 kg (32 lbs)

### Safety

- EN 610010-1:2010 and EN 61326-1:2013. Safety requirements for electrical equipment for measurement, control and laboratory use.
- ICES-003 Issue 6. Standard for information technology equipment.

## Use Cases & Applications

### 1. Clinical Training

- ECMO/CPB circuit management | Crisis resource management (e.g., air embolism, coagulopathy).
- Cannulation techniques | Blood conservation strategies.

### 2. Device Testing & Validation

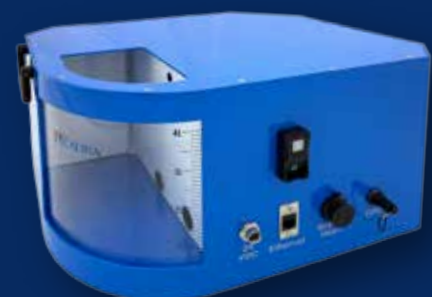
- Performance evaluation of oxygenators, pumps, and monitoring systems under simulated physiological stress.
- Usability testing for human-device interaction.

### 3. Research

- Hemodynamic studies | Pharmacokinetic modeling during bypass.
- Data export for MATLAB<sup>®</sup>/Python<sup>®</sup> analysis via CSV/API.

### 4. Emergency Preparedness

- Low-frequency, high-risk event drills (e.g., circuit rupture, massive transfusion).



## Integration & Compatibility

### Optional Attachments:

- **CALIFIA® Beating Heart Attachment:** Simulates cardiac contractility (0–200 bpm, 0–200 mL stroke volume).
- **CALIFIA® Lung Simulator:** Standalone or integrated pulmonary compliance/resistance modeling (FiO<sub>2</sub> 21–100%, tidal volume 0–1000 mL).

**Software:** Includes scenario editor, data logging, and debriefing tools with VR/AR compatibility (beta).

## Safety & Compliance

- CE Marked | ISO 13485:2016 certified | RoHS compliant.
- Designed for minimal maintenance.

## Warranty & Support

- Hardware: 2-year limited warranty.
- Software: 1-year updates + extended support plans available.
- Training: Remote/onsite options (ABCP-accredited).

## Accessories

- Gaming computer for enhanced graphics needed by the 3D ICU environment.
- Touchscreen monitor, for enhanced monitoring.
- Docking station, for expanded connectivity options.
- Latest version of CALIFIA® Simulation Software.
- Additional monitor stands or mounts for poles and desks.

## Simple Setup and Maintenance

The CALIFIA® Patient Module meets international safety standards and is designed for minimal maintenance, ensuring consistent performance over time.

