



BIOJENIK ENGINEERING

Towards Bio engineering Technology & Solutions



Customized Bioreactor / Fermenter

Photo Bioreactor

BIOJENIK ENGINEERING

Your Trusted Partner in Bioprocess Engineering

**Biojenik Engineering has been providing innovation
and reliable bioprocess engineering solution for
over 15 years**



www.biojenikengineering.com

PHOTO BIOREACTOR

A PhotoBioreactor (PBR) is an advanced cultivation system that utilizes a controlled light source to support the growth of phototrophic microorganisms, including microalgae, cyanobacteria, and plant cell cultures. Biojenik Engineering offers scalable PhotoBioreactor solutions from laboratory research to industrial production, ensuring optimal performance across all applications. Our systems are designed using high-quality borosilicate glass and stainless steel, providing durability, efficiency, and seamless process control. We specialize in the development of in-situ sterilizable PhotoBioreactors for high-end research, as well as large-scale production units suitable for outdoor deployment. Engineered for precision and automation, our PhotoBioreactors incorporate advanced lighting technologies, aeration systems, and real-time monitoring, delivering exceptional control and scalability for both research and commercial applications.



General Features



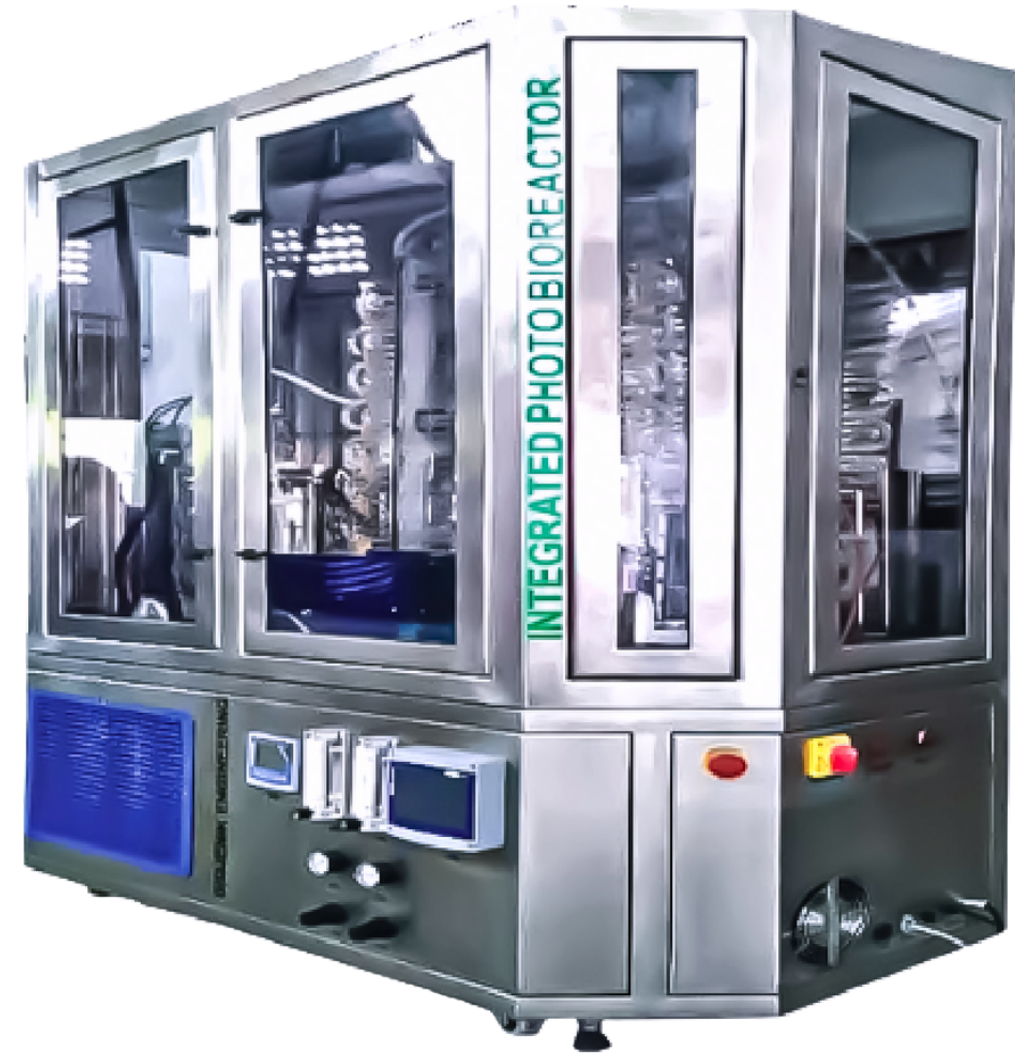
- **Open/Close loop bioreactor suitable to cultivate phototrophic micro organisms.**
- **Models:** Tubular, Panel type, open pond, closed loop integrated design with light/CO₂.
- **Light resources:** Different light source available LED/fluorescent /flash/pulsing. Flashing light duty cycle up to 10KHZ.
- **Wave length** 400-750nm, **Intensity** 5000 to 30000 Lux.
- **Lighting system:** Jacket type, Flat panel, liquid Immersed and open frame.
- **Inbuilt lighting arrangement for the pilot scale closed loop system**
- **UV lights for the ex-situ glass bio reactor**
- **Mixing with air bubbles, Tubular flow and low shear impeller**
- **Measurement and Control:** Speed, Temperature, CO₂, PH, light illumination etc
- **Suitable for the application like mosses, macro algae, microalgae, cyanobacteria and purple bacteria**

Closed loop Sterile Photo Bioreactor

- **Closed loop SterInsitu: Glass:** TV: 2.5Lts and 3.5Lts
- **Autoclavable: Glass.** TV 2.5.Lts, 3.5Lts, 6.5Lts, 15Lts
- **Insitu: SS TV:** 5Lts to 1000Lts.ile Photo Bioreactor

Process Measurement and Controller

- All measurement and controller as applicable for the standard Reactor / Fermenter

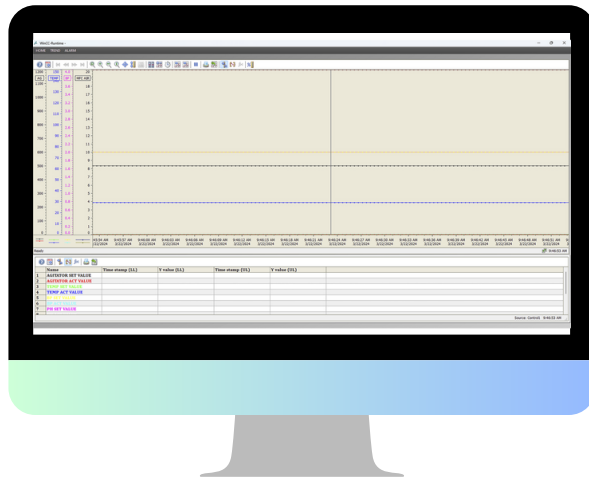
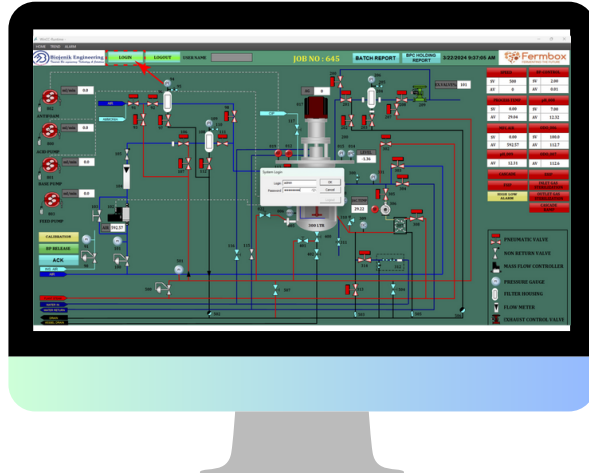


Application Areas

Algae and Cyanobacteria Cultivation | Biopharmaceutical Research | Sustainable Biofuel Production | Wastewater Treatment | Food and Nutraceutical Industry

Biojenik Engineering SCADA Software

Biojenik Engineering's **SCADA software** is designed for real-time monitoring and control, offering a range of features to improve efficiency and ensure compliance.



- **Software:** Siemens WinCC.
- **Simulation and Auto-Tuning:** Generates random process values for simulation and auto-tuning.
- **Third-Party Integration:** Free OPC server for third-party device integration.
- **Remote Operation:** Webex-based remote operation/control of setpoints.
- **Customized Interface:** Personalize display to show Process, Profiles, Set Points, and Cascade.
- **Batch Management:** Manage batches and track them using tags.
- **Access Control:** Different access levels for enhanced security.
- **Dosage Tracking:** Monitor and record material consumption during production.
- **Real-Time Data Recording:** Automatic recording and trending of setpoints and measurement values.
- **Data Export:** Export data to Excel for analysis and reporting.
- **Data Comparison:** Compare and analyze data for improved decision-making.
- **Event Alarms & History:** Alerts for issues, historical data access, and ANSI-18.2 compliant alarm management.
- **Audit Trail:** Record-keeping compliant with 21 CFR Part 11 standards.
- **Lifetime Support:** One-time license with lifelong updates and support.

Benefits:

- Simplifies process monitoring and control.
- Increases efficiency by automating tasks and tracking.
- Ensures compliance with regulatory standards.
- Provides actionable insights with data comparison and analysis.

Technical Specification

SPECIFICATIONS	DETAILS
<u>BIOREACTOR VESSEL</u>	
Capacity	2L – 1000L (Lab to Industrial Scale)
Vessel Type	Open/Closed loop photobioreactor for cultivating phototrophic microorganisms
Design	Closed-system photobioreactor with tubular, flat-panel, or vertical-column configurations
Material	Double-walled borosilicate glass with stainless steel (SS 316L) supports, ports, and nozzles.
Sterilization	In-situ sterilization of media and vessel
Autoclavable	Yes, with provision for lifting and transfer
Temperature Regulation	5°C to 55°C using hot and cold fingers
Mixing Mechanism	Airlift design, Mechanical stirring, or Pump-driven flow
Head Plate Ports	Acid, alkali, antifoam, feed addition, air inlet sparger, injection septum, sample collection, exhaust gas with cooling, temperature, pH, DO probes, turbidity sensor, and other tube fittings & baffles
<u>AGITATION & AERATION SYSTEM</u>	
Agitation Type	Top agitation with servo drive motor
Speed Range	30-1200 rpm (or better)
Impellers	3 (Ruston turbine impeller and marine impeller) with adjustable height
Baffles	≥2 SS 316L baffles to improve mixing and prevent vortex formation
Aeration	Microbubble or Fine-hole spargers for efficient CO₂ & O₂ exchange
Gas Flow Control	Mass Flow Controllers (MFC) for at least 2 gases (Air & CO₂)
Gas Exchange Efficiency	Enhanced through optimized sparger design and mixing

<u>CONTROLLER & SENSORS</u>	
Control Panel	• PLC-based control panel with touchscreen HMI (Siemens WinCC)
pH Monitoring	• Online sterilizable system with probe & transmitter (Hamilton/Mettler Toledo), auto-control via peristaltic pump (Watson Marlow) • Range 1-14 pH • Accuracy : ± 0.02 pH.
Nutrient Supply	• Programmable dosing pumps for nutrients and additives
Nutrient Control	• Programmable dosing pumps for precise nutrient delivery
DO Monitoring	• Range: 0 to 100% saturation, with probe & transmitter (Hamilton/Mettler Toledo) • Accuracy : $\pm 0.1\%$
Turbidity Sensor	• Hamilton make
Peristaltic Pumps	• 4 pumps (Watson Marlow) for feed, alkali, acid, and harvesting
Exhaust Gas Monitoring	• Online O₂/CO₂ monitoring system
Process Control	• Controls stirring speed, feed rate, anti-foam, pump control, acid/alkali addition
Cascading Control	• Provision for cascading RPM, air, oxygen, gas, and feed to maintain DO
<u>LIGHT SYSTEM</u>	
Light Sources	• LED, Fluorescent, Flashing/Pulsing (Flashing duty cycle up to 10 kHz)
LED Wavelength Range	• 400–750 nm
Light Type	• RGBW LED with mix-and-match combination and individual intensity control
Light Intensity	• 5,000–30,000 Lux
Light Distribution	• Evenly around vessel or via light-permeable jacket
Illumination System	• LED-based adjustable light intensity (0–100%) with different wavelengths (400 nm, 750 nm)
Photoperiod Control	• Programmable light/dark cycles to simulate natural conditions

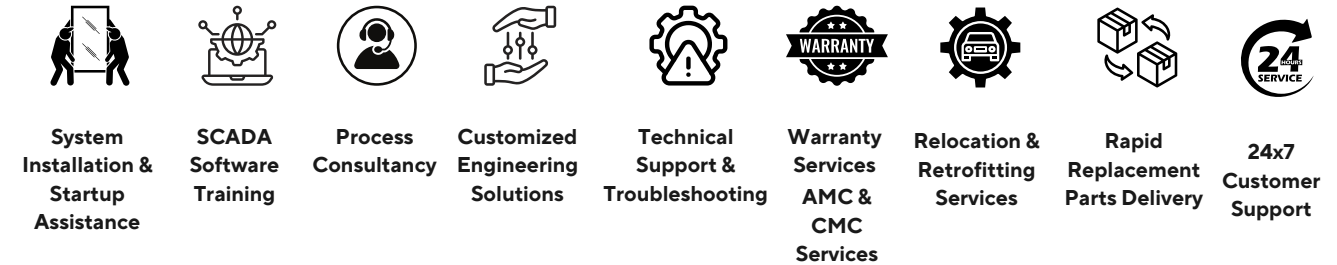
<u>CIRCULATION SYSTEM</u>	
Circulation System	Draft tube or Pump-driven circulation for uniform mixing
<u>SAMPLING & HARVESTING</u>	
Sampling Ports	Sterile sampling points for real-time culture analysis
Harvesting System	Automated harvesting with filtration or centrifugation modules
<u>CLEANING & STERILIZATION</u>	
Cleaning System	CIP (Clean-in-Place) & SIP (Sterilization-in-Place) integration
UV Sterilization	UV lights for ex-situ glass bioreactors
<u>COMPUTER & SOFTWARE</u>	
Data Logging	Necessary software, suitable PC, and printer included
SCADA Integration	Enables remote monitoring, control, and data logging
Display	Online overview of all process parameters on controller screen
Measurement & Control	Speed, Temperature, CO₂, pH, Light Intensity
Process Monitoring	Real-time tracking of pH, DO, Temperature, Light Intensity, and Gas Levels
User Interface	PLC control with 7" & 12" HMI (Touch screen panel), SCADA with PC (Optional)
Customization	Tailored configurations for specific research/production needs
Compliance	cGMP, FDA, ASME, BPE standards
<u>Energy Efficiency & Safety Features</u>	
Energy Efficiency	LED lighting & optimized aeration for reduced power consumption
Modularity	Expandable for increased production capacity
Safety Features	Pressure relief valves, Emergency shut-off, Alarm systems

Our Valuable Clients



Biojenik Engineering Services

We offer a comprehensive range of services to ensure the smooth operation and longevity of your systems:



Our Certifications



Connect with us...



Call Us Now!



+91 - 98407 02137
+91 - 9003003951

Email Us Now!



sales@biojenikengineering.com
info@biojenikengineering.com



FACTORY ADDRESS

No. 3A, Sathish Nagar, Thirumudivakkam, Chennai – 600044, Tamil Nadu, India.