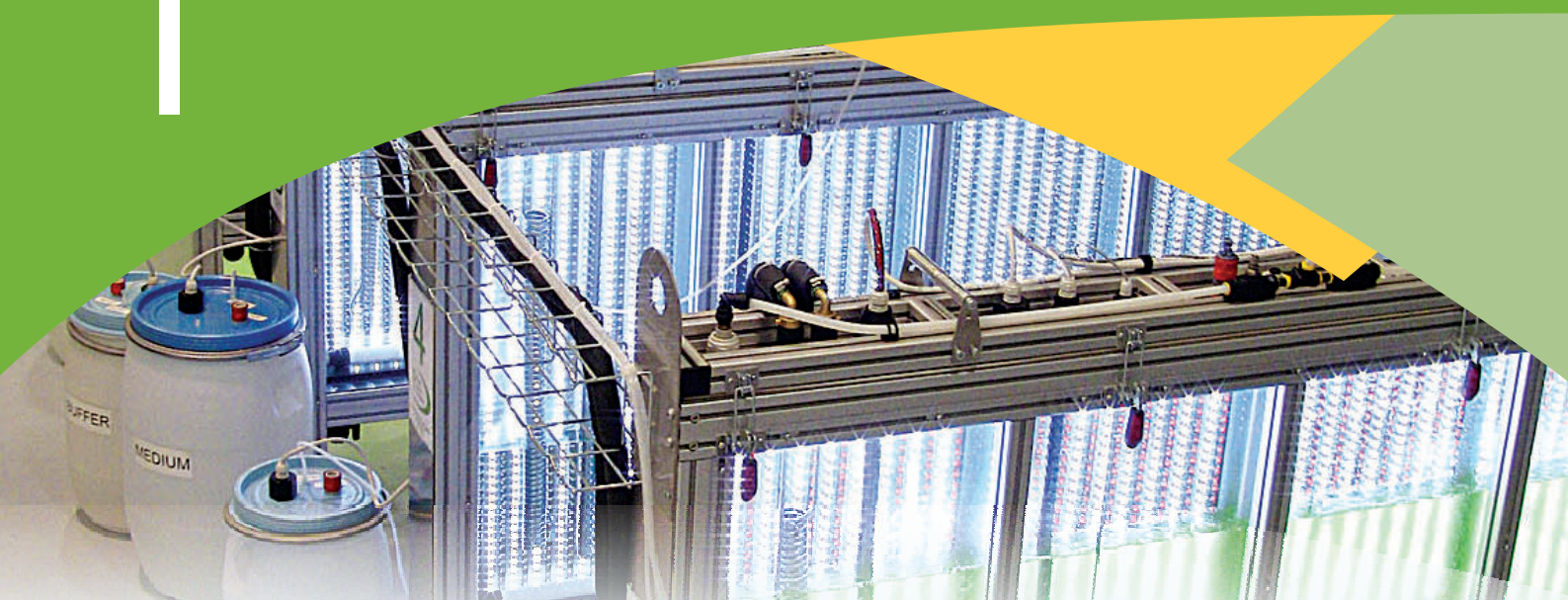




# Large-Volume Photobioreactors

**PSI Large-Scale Photobioreactors** are systems that create artificial environment for large-scale growing and harvesting of photosynthetic organisms, mostly algae. They are manufactured as modular systems that enable the customers to build their own cultivating apparatus according to their individual experimental needs.

PSI Photobioreactors feature a unique combination of the cultivator and monitoring device with user-friendly software control which offers remote control via internet. The core of the Photobioreactor system is a flat cultivation tank (120 L or 25 L in volume) with integrated temperature regulation in the range of 15-60 °C and bubble stirring (aeration) of the culture. Cultivation tanks may be built as modular systems containing number of optional modules and may be cascaded to increase the total volume up to 1000 L.

The modular Photobioreactors are designed to allow for precise control and optimization of the cultivation conditions by continuous monitoring of fluorescence parameters, photosynthetic efficiency, optical density of the culture and pH of the suspension for determining CO<sub>2</sub> injection. The Photobioreactors assure control and monitoring of numerous parameters essential for successful culture cultivation and maximum production of biomass such as stable suspension temperature, homogenous light illumination and light spectral distribution.

Photobioreactor function may be enhanced by the two gas modules: Gas Mixing System GMS 150 providing optimal control of input gas concentration and composition; and Gas Analyzing Systems GAS 150 measuring CO<sub>2</sub> concentration at the Photobioreactor output.

## CULTIVATION VESSEL

- Flat construction
- 25 L or 100 L volume
- Stainless steel frame
- Front and back parts made of glass
- Gas-tight vessel lid with gas and electronics fittings
- Gas sparging and/or active stirring at the bottom part





Photon Systems Instruments

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## ELECTRODE MODULES

- pH/Temperature sensor
- O<sub>2</sub> sensor
- dCO<sub>2</sub> sensor

## OPTICAL MODULES

- PAM fluorometer with blue and red excitation
- Turbidimeter 680 nm (OD680)
- Turbidimeter 735 nm (OD735)

## OTHER MODULES

- Peristaltic pumps for turbidostat or chemostat regimes
- Built-in, computer controllable stirrer
- Cooling module
- pHstat module
- Precision gas mixing system
- Gas analysis system



## LED-BASED ILLUMINATION

- Solar simulation
- White or red/blue LEDs, separately controllable by computer
- Both static and fluctuating light regime - day/night cycles
- Intensity up to 400  $\mu\text{mol}(\text{photon})/\text{m}^2 \cdot \text{s}$  (standard)

## CONTROL SOFTWARE

- User-defined protocol writing
- Data collection in real time
- Data upload even when the experiment is running
- Data visualization in graphs
- Further processing of data sheets in Excel accessible format
- Remote control of the experiment via internet