



Multi-Cultivator MC 1000-OD is a cost-effective, small-scale cultivation device designed for the cultivation of multiple samples of algae and cyanobacteria. The Multi-Cultivator consists of 8 cultivation vessels that can hold up to 85 ml of suspension under controlled light, temperature and aeration conditions. The cultivation vessels are immersed in the temperature-controlled water bath that regulates the cultivation temperature up to 60 °C. An optional Cooling Unit is available so as to extend the temperature range down to 15 °C. All vessels can be bubbled with air or selected gas mixture via the valve manifold which allows for manually adjusted flow rates.

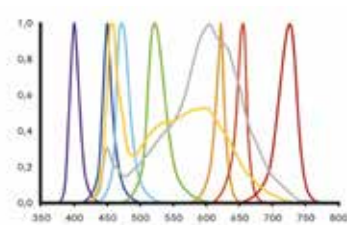
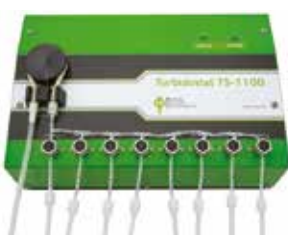
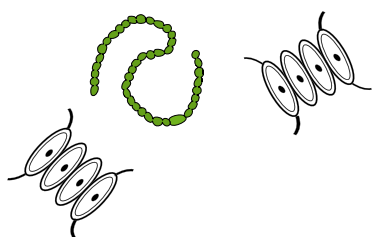
The Multi-Cultivator 1000-OD is available in three versions, which differ in spectral characteristics of used illumination: Cool White, Multi and Mix. Each vessel is illuminated by an array of LEDs producing an incident PPFD of up to

1 000 $\mu\text{mol.m}^{-2}.\text{s}^{-1}$ (optionally up to 2 500 $\mu\text{mol.m}^{-2}.\text{s}^{-1}$). Illumination is independently adjustable in intensity, timing and modulation for each cultivation vessel, allowing an unlimited number of user defined protocols to be set up.

The growth of cultivated organisms is automatically monitored by measuring optical density at two wavelengths of 680 and 720 nm. The Turbidostat Module allows the biomass concentration to be maintained at a predefined OD level in each vessel independently.

All cultivation conditions can be dynamically modified according to a user-created protocols using the Photobioreactor Control Software. Cultivation parameters are continuously monitored and visualized in real time. The control software allows remote access to the Multi-Cultivator.

Version	Intensity/Tube ($\mu\text{mol.m}^{-2}.\text{s}^{-1}$)	Light panel	Illumination spectra
Cool White	1 000 (2 500)	Unicolor: identical color for all tubes	Cool White Different color optional
Multi	1 000	Different color for each tube (1 color / 1 tube)	405, 450, 475, WW, 530, 615, 660, 730 nm
Mix	2 500	Combination of eight colors per tube	405, 450, 475, 2x WW, 530, 615, 660, 730 nm



Cultivation tubes	
Number	8
Shape and material	Rounded, glass, autoclavable
Stopper	Silicon stopper (one input for air sparging, one output for effluent)
Volume per tube	100 ml (maximum working volume ca. 85 ml)
Aeration tubes	Glass Stainless steel (optional)
Humidifier	Moistening of the sparging air to avoid evaporation from testing tubes
Sampling	Through aeration tube. Three-way sampling valve (optional) may be used

Illumination – LED lighting		
Maximum intensity per slot	1 000 $\mu\text{mol.m}^{-2}.\text{s}^{-1}$ for Cool White and Multi versions 2 500 $\mu\text{mol.m}^{-2}.\text{s}^{-1}$ for Mix version	2 500 $\mu\text{mol.m}^{-2}.\text{s}^{-1}$ for Cool White (optional)
Cool White version	Cool White	Warm White, 450, 475, 530, 615, 660, or 730 nm (optional)
Multi, Mix versions	405, 450, 475, WW, 530, 615, 660, and 730 nm	
Light path	27 mm	
Light regime	Light / dark cycles Constant, linear, sinusoid light mode Cycles from minutes up to days	Java scripting (Advanced PBR Control SW)

OD Monitoring	
Optical density	Real time measurement of OD at 680 and 720 nm / test tube
Optical path	Ca. 27 mm

Thermoregulation		
Volume of the temperatureregulated water bath	5 liters	
Heating system	150 W cartridge heater	
Range	From ca. 5 - 10 °C above the ambient temperature up to 60 °C	15 – 60 °C with the Cooling Unit AC-710 (optional)

Aeration system	
Air sparging	Aeration pump providing total air flow rate around 1 100 ml/min
Central valve manifold	Manually adjustable valves
Bubbling interruption	Automatically during OD measurement
Module for compressed air connection	Parker Prestolok (6 mm) connector that fits to the Parker Polyflex Presto TPU 6 x 1 tubing

Accessories (optional)	
Cooling Unit AC-710	For extended thermoregulation range 15 – 60 °C
Turbidostat Module TS 1100	For fully controlled automatic turbidostatic cultivation
Light Upgrade	For high-illumination cultivation up to 2 500 $\mu\text{mol.m}^{-2}.\text{s}^{-1}$
Gas Mixing System GMS 150	For precise concentration and flow rate of aeration gases, gas cylinders not included
PWM Pump	For automatic refilling of the water bath during high temp or long term cultivation
Stainless Steel Aeration Tubes	Replacement of the glass aeration tubes
Three-Way Sampling Valve	To facilitate sampling
PBR Control Software	For fully automatic control of the MC Optional for Cool White and Multi, compulsory for Mix Basic / Advanced version

Others	
BIOS	Upgradeable firmware
Communication port	USB A-B
Material	Glass, stainless steel, silicon gasket, polyamide, ertacetal, polycarbonate
Dimension	80.5 x 35 x 23 cm
Weight	20 kg
Electrical	110 – 240 VAC
Max. power consumption	320 W (MC 1000-OD) 185 W (AC-710) 50 W (GMS 150) 30 W (TS 1100)