



ELARA  
PHOTOBIOREACTORS



**SOLARIS**  
BIOTECH SOLUTIONS

# STIRRED AUTOCLAVABLE PHOTOBIOREACTORS

## ELARA ST

**ELARAST** photobioreactor is ideal for phototrophic organisms as moss, microalgae, bacteria and plant cells under optimum conditions. The spectrum is selectable and the light intensity is dimmable from 0-100% up to 3000  $\mu\text{mol}(\text{photon})/\text{m}^2$ . Turbidostat mode via turbidity sensor.

**ELARA st** typical applications includes the following:

- Education & Basic research**
- Scale-up and scale-down studies**
- Process development and optimization**

**ELARA St** can be used for:

- Algae**
- Phototrophic bacteria**
- Plant cells**

**INNOVATIVE  
SOLUTION**  
to improve your  
microalgae culture

**WHY TO  
INVEST**  
IN THIS PRODUCT

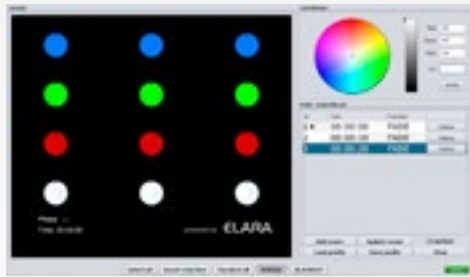
High power  
**LED lighting**,  
spectrum selectable  
and  
dimmable 0-100%

**FLEXIBILITY**

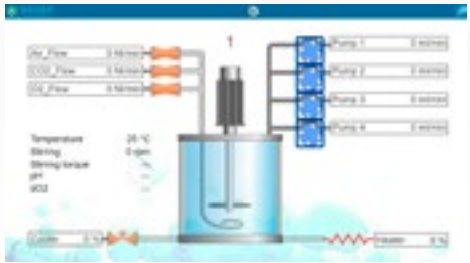
The **fully removable** light  
module allows to use Elara  
as a traditional fermenter



## Benefits



Up to **24 units** managed with one HMI with **innovative PARALLEL process control LEONARDO**: smart controller designed to provide a high level of automated management of the fermentation processes Batch, Fed batch or continuous processes



Different gas mixing strategies with up to 5 TMFC  
Various controller and hardware configurations enable aeration strategies using air, oxygen, nitrogen or a mixture of these to enrich the air. The mass-flow controller allows the exact flow rate control of individual gases. The flexible aeration options integrated in the fermenter/bioreactor permit a wide range of different application giving to this system a substantial versatility.

**Thermal Mass Flow Controller in entry model**  
**Gas mixing through TMFC and solenoid valves or numbers of TMFC**  
**Automatic gas mixing algorithms**  
**Toro and sintered spargers**



23" (single unit) or 27" (multi system) **multi touch HMI**.

Remote control via PC, tablet and smartphone for process management and after sale assistance



Automatic and manual control of RBW light intensity and circadian cycle simulation

Powerful/ Accurate **brushless motor**, from 1 to 2000 RPM. Online absorbed Torques (Nm) and Power (W) measurements obtaining an indirect density indication of the culture broth.

Modbus Digital Hamilton sensors



**LEDA safe sterile sampling system**  
The needle free connector is designed to reduce the risk of contamination during sampling.  
The sterile combination of a syringe (3-5-10-30 ml) and a non return valve guarantees the sterility after sampling until the next use.

Safety: pressure relief valve included in each unit.

Compact and modular PCS (350x350x350 mm)



N.4 assignable Watson Marlow pumps, all speed controlled in entry level

Additional External modular box: OD, dCO2, weight, thermobox, peristaltic pumps

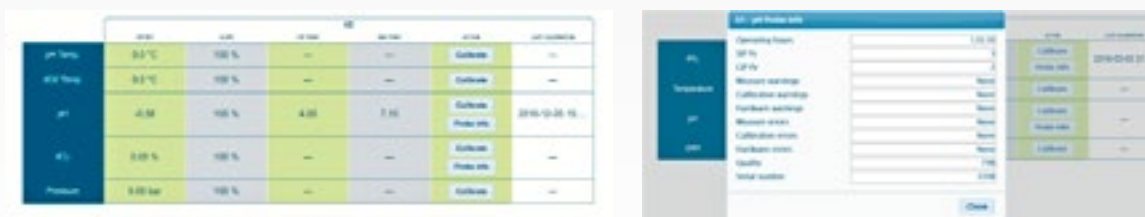
Fully removable and cleanable jacket

## Modbus Hamilton sensors

### Why a digital sensor?

Hamilton sensors (including Cell Density) has been integrated into Solaris PCS and Leonardo software giving the user the benefit of having a unique platform.

Fully compensated digital sensors, store and transmit all relevant sensor data, including calibration and diagnostic information directly to Solaris Leonardo software.



**Sensor life traceability**

**Reducing background noise**

### pH

The electrolyte of the EasyFerm Bio sensors is prepressurized to prevent the diffusion of sample into the sensor. The Everef-F reference cartridge ensures that the reference electrolyte remains free of silver and precipitation of proteins.

### dO2

The VisiFerm DO is the first optical oxygen sensor with integrated opto-electronics. The visiFerm requires less maintenance than a classical oxygen sensor as it does not have a mechanically sensitive membrane or a corrosive electrolyte.

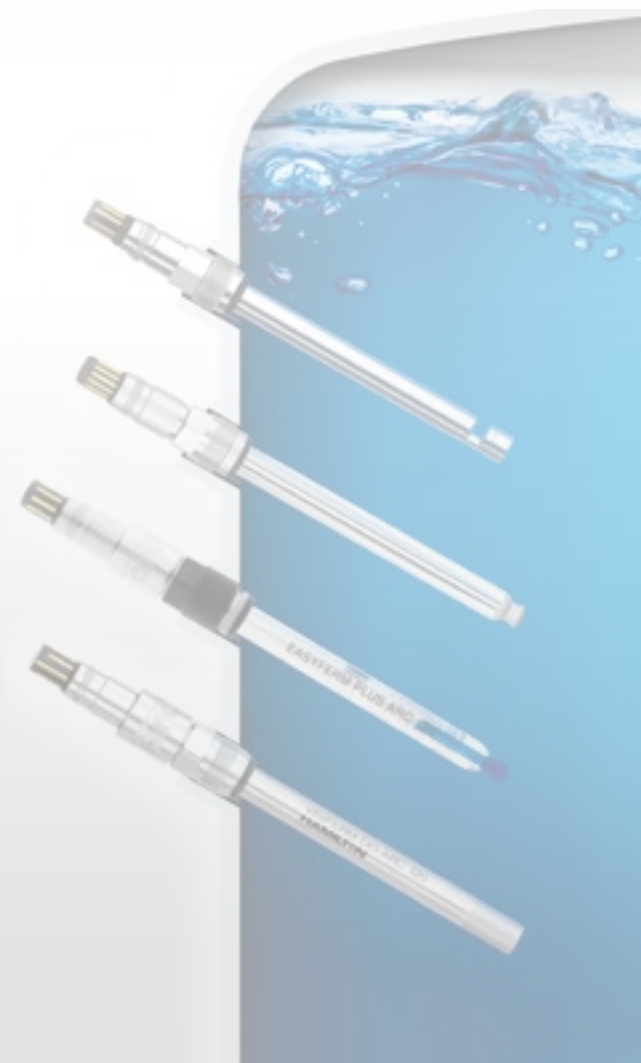
### ORP

The ORP sensor through a pre-pressurized reference electrolyte has a clog-free diaphragm.

The sensor ensures a stable measurement signals after steam sterilization, autoclavation and CIP cleanings qith almost drift-free measurement.

### Conductivity

All wetted conductivity sensor parts are FDA approved, can be cleaned easily and withstand CIP cleanings and autoclavations. The sensor shows a very good linearity over a broad measuring range.



## Leonardo 2.0

### USER-FRIENDLY SOFTWARE

The software is the user's best friend in experimental design planning and performing trial runs, as well as analyzing and optimizing media and parameters for cultivation.

The graphical user interface enables you to select the software functions intuitively. Data extracted are compatible with Windows Excel. However, Solaris has developed Leonardo data viewer, a platform where to easily and quickly manage fermentation data. The software is included in the fermenter supply and can be installed on unlimited number of client's PC or laptop.

### Do it parallel: smarter..faster

Leonardo can be used for process development (i.e. time-saving · parallel fermentation approaches)

Up to 24 independent fermentations/cultivations can be carried out simultaneously.

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Parallel synoptic



Parallel trends comparison between

### Do it wireless!

Increased mobility: users can roam around lab or reaching office or home without losing their connection with the running batch



## Data sheet

Vessel	
Photobioreactor type	Stirred
Total Volume (liters)	4,00
Ratio D/H	1:3,0
Min. Working Volume (liters)	0,60
Max. Working Volume (liters)	3,00
Max. temperature	135 °C
Operating pressure	< 0,5 bar
Ports	n.1 port, Gas Sparger Input n.1 port, Gas overlay n.1 port, Gas Out n.1 port, Harvesting system n. 1 port, Sampling system n.1 port, Temperature Sensor n.1 port, multi addition (4) needle free connectors n.5 ports, spares probes n.1 port, single addition needle free connector n.1 port, Agitation Group
Design	Borosilicate Glass Jacketed Vessel
Materials	Borosilicate Glass and AISI 316 L
Sensors lenght (mm)	
pH	325
dO <sub>2</sub>	325
Dimensions for autoclave (with Condenser)	
Height (mm)	655
Diameter (mm)	225
Stirring	
Drive	Brushless Motor, Direct Assembly , 1-2000 rpm (bacterial), 1-500 (cell cultures)
Power (Pn)	266 W
Impellers	Select from: Rushtons impellers, Marine Impellers, Pitched blade
Thermoregulation	
Control	PID Control - Accuracy 0,1 °C Thermobox (flat) / water jacketed with electric heaters (stirred vessel)
Gas Control & Gas Mixing	
Sparger and overlay Gas Control	TMFC
Gas Mixing (Air,CO <sub>2</sub> ,O <sub>2</sub> ,N <sub>2</sub> )	n.1 TMFC + n. solenoid valves or n° of TMFC
Aeration system	Toro ring or sintered (microbubbling) sparger with 0,2 µm filter
Exhaust	Condenser and 0,2 µm filter
Peristaltic Pumps	
Peristaltic pumps	4 Watson Marlow 114, fixed speed or speed controlled, application assignable from software
Variable speed	10 - 60 rpm
Controller	
Master Control Module	from 1 to 24 units - Dimensions Height: 350 mm Largeness: 350 mm Depth: 350 mm
HMI with Leonardo software	23" for single unit , 27" for multi system parallel

## Controls

Temperature	
Sensor	PT100
Control system	Measuring resident in Leonardo 2.0 software
pH	
Sensor	Digital Hamilton sensor
Control system	Measuring resident in Leonardo 2.0 software
Control range	0 - 14
Operation temperature	0 - 130°C
dO <sub>2</sub>	
Sensor	Digital Optical Hamilton sensor
Control system	Measuring resident in Leonardo 2.0 software
Control range	0,05 - 300% air saturation
Operation temperature	-10 - 130°C
Pressure range	0 - 12 bar
Actuator	Cascade to RPM, Gas Control, feedings,ect
Antifoam/Level	
Sensor	Solaris sensor
Control	Measuring resident in Leonardo 2.0 software
Redox (ORP)	
Sensor	Digital Hamilton sensor
Control system	Measuring resident in Leonardo 2.0 software
Control range	±2000 mV
Operation temperature	- 10 -130°C
Pressure range	≤ 6 bar
Conductivity	
Sensor	Digital Hamilton sensor
Control system	Measuring resident in Leonardo 2.0 software
Control range	1 - 3000 µS/cm
Operation temperature	0 -130°C
Pressure range	0 - 20 bar
dCO <sub>2</sub>	
Sensor	Mettler Toledo sensor
Control system	Measuring resident in Leonardo 2.0 software
Control range	0,00-200% saturation
Operation temperature	-20,0-150°C
Pressure range	0 - 4 bar
Weight	
Sensor	load cells
Control	Measuring resident in Leonardo 2.0 software
Peristaltic pumps	
WM 114	10-60 rpm
WM 313 FDM/D	45-350 rpm

## Chiller

- Optionally ELARA can be equipped with a chiller for heat removal from your culture minimizing lab water usage
- Using this system you don't need a water supply line in your lab
- Cost-effective cooling of fermenters
- Easy operation
- Refregerant level monitoring



### Chiller data sheet

Working temperature range	-10°C / +40°C
Temperature stability	±0.5
Power consumption	0.7 kW
Filling volume range	2-8 L
Cooling output at 20°C measured with ethanol	0.25-0.60 kW
Cooling output at 10°C measured with ethanol	0.20-0.50 kW
Cooling output at 0°C measured with ethanol	0.15-0.36 kW



**SOLARIS BIOTECHNOLOGY srl**

Via Bachelet, 58 - 46047 Porto Mantovano  
Mantova - Italy

Phone: +39 0376 408760

Fax: +39 0376 385108

Email: [info@solarisbiotech.com](mailto:info@solarisbiotech.com)

[www.solarisbiotech.com](http://www.solarisbiotech.com)