SOLARIS™
BIOTECH
By Donaldson

# IO

## CATALOGUE


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# IO

## single & parallel fermenter bioreactor

IO is a fully electrical mini fermenter/bioreactor with a fast and accurate thermoregulation system (without water circulation).

**“Having the opportunity to extract real time process data with the lowest step time of 1 second remotely offers to our customer a powerful monitoring tool.”**

### APPLICATIONS

Our products are utilized across various sectors including **pharmaceuticals**, **food production**, **agriculture**, **biomanufacturing**, **bioplastics**, **biofuels**, **cosmeceuticals**, catering to both research and development and lab production needs

# Our Product
# IO

This catalogue describes Solaris IO.
For supervisory control and data acquisition
Leonardo software is included.


## THE SYSTEM

The system consists of a benchtop, pre-assembled fermenter/bioreactor, supplied with all necessary tubes, valves and instruments, automation, control panel (HMI).

## THE DESIGN

The system is designed for aerobic and anaerobic cultivations/fermentations, closed aseptic operations. The control is based on a SCADA control system.

# Customizable Configuration

IO is completely electrical.
The thermoregulation (both heating and cooling) is performed through a Peltier Cell, placed on the bottom of the fermenter/bioreactor.
This avoids water circulation (no water source is needed in the lab).
**Multiple operations:** up to 24 parallel units.

BASIC RESEARCH

EDUCATION

PROCESS DEVELOPMENT & OPTIMIZATION

SCALE UP & SCALE-DOWN STUDIES

SMALL PRODUCTION

**Fully electric:**
no water circulation.

Up to 24 units managed with one HMI with innovative PARALLEL process control.

Single-wall borosilicate glass vessel, with thermoregulation performed through a Peltier Cell.

Different configurations available for microbial and cell culture applications, with the choice of Rushton/Marine/Pitched-Blade impellers and fluted/L-shaped sparger.

Modbus digital sensors reduce background noise and guarantee quick response time.

Suitable for batch, fed-batch and continuous processes.

# Product Description


Different gas mixing strategies with up to 5 TMFC.

Powerful and accurate (1 RPM) brushless motor.

Wide range of measurement and control options.

Optional integration of up to 4 analog input/output connections, choosing between 0-10 V and 0-20 mA/4-20 mA (e.g. pumps or valves with power supply independent from Solaris electrical cabinet).

Extremely compact system maximizes lab space.

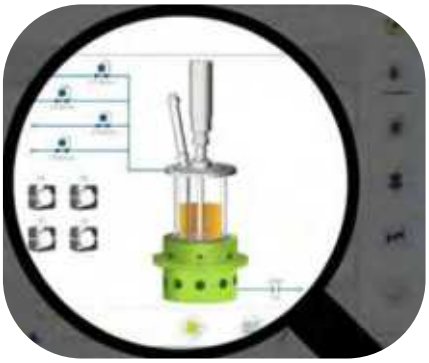
Additional parameter in modular external boxes for future PCS upgrade Including $dCO_2$, cell density, weight, peristaltic pumps.

# Leonardo Software

**The innovative SCADA software Leonardo has a smart and user-friendly controller designed to provide a high level of automated management of the fermentation/cultivation processes.**

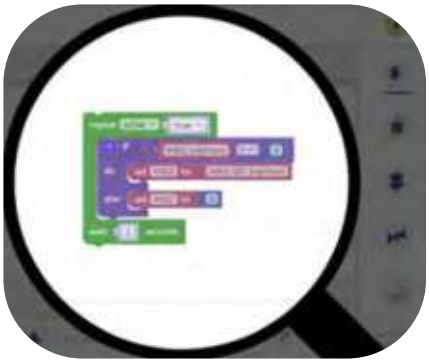
Full version included with the equipment. Up to 24 units managed in parallel with a unique HMI (24”). Data extraction in .csv format.

Remote control and access via PC, tablet or smartphone, with QR code scanning or via dedicated portal.



## SYNOPTIC

- Real time 3D view
- Parallel control
- Manual control

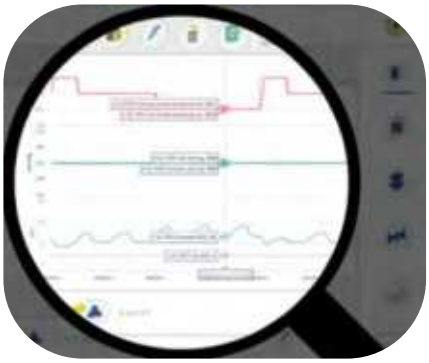


## LOGIC PARSER

- Customized logic functions
- Parallel logic blocks and funtions


## REMOTE CONTROL

- Unlimited number of profiles editor
- Unlimited number of devices to be associated



## TRENDS

- Custom acquisition time
- Up to 6 values simultaneously display
- Automatic graph comparison

## WORKFLOW

- Custom phase manager
- Parallel visualization
- Cascade settings
- Peristaltic pumps function assignable from software

## CALIBRATION

- Up to three-point calibration
- Simoultaneus calibration values for parallel work

# Technical Data

| VESSEL | | |
|---|---|---|
| **Solaris Code** | **IO 200** | **IO 1000** |
| **Total volume (mL)** | 200 | 1000 |
| **Ratio H/D** | 1.5/1 | 2.5/1 |
| **Min working volume (mL)** | 70 | 360 |
| **Max working volume (mL)** | 150 | 700 |
| **Max temperature** | 56 °C | |
| **Operating pressure** | < 0.5 bar(g) | |
| **Headplate ports** | 3 ports PG13.5<br>(sensors, condenser, multi feed, or plugs)<br><br>2 ports M11<br>(sparger, harvest, LEDA, or plugs)<br><br>3 ports M12<br>(anti-foam probe, single feed/overlay, gas out, or plugs) | 5 ports PG13.5<br>(sensors, condenser, adjustable level, multi feed or plugs)<br><br>5 M12<br>(sparger, harvest, gas out, LEDA, antifoam probe, fixed level probe, single feed/overlay or plugs) |
| **Materials** | Borosilicate Glass and AISI 316L | |
| **SENSORS LENGTH (mm)** | | |
| **Length** | 120 | 225 |
| **DIMENSIONS FOR AUTOCLAVE (with Condenser)** | | |
| **Height (mm)** | 320 | 420 |
| **Diameter (mm)** | 170 | 170 |
| **STIRRINGS** | | |
| **Drive and speed (rpm)** | Brushless Motor, 1 - 2000 rpm | |
| **Impellers** | Select from: Rushton, Marine, Pitched blade | |
| **THERMOREGULATION** | | |
| **Control** | PID Control - Accurancy 0.1 °C - Peltier cell | |

## GAS CONTROL & GAS MIXING

| | |
|---|---|
| **Sparger and overlay gas control** | TMFC |
| **Gas mixing (Air, $CO_2$, $O_2$,$N_2$)** | 1 TMFC (included in entry level) + up to 4 additional TMFC |
| **Sparger type** | Select from: Flute type or L-shaped |
| **Gas out** | 0.2 µm filter |

## PERISTALTIC PUMPS

| | |
|---|---|
| **Quantity & type** | 2 Watson Marlow type 400 F/A<br>2 Watson Marlow type 114 FD/DV |

## CONTROLLER

| | |
|---|---|
| **Master control module (w x d x h)** | From 1 to 24 units - 35 cm x 35 xm x 35 cm |
| **HMI with Leonardo software** | Touch screen PC, 24” color monitor |

## pH

| | |
|---|---|
| **Sensor** | Digital sensor |
| **Sensitivity** | 57 to 59 mV/pH |
| **Control system** | Measuring resident in Leonardo software |
| **Control range** | 0 - 14 |
| **Operating temperature** | Up to 130 °C |
| **Pressure range** | 0 - 6 bar(g) |
| **Actuator** | Cascade to peristaltic pumps for the addition of acid/base solutions or gas ($CO_2$) |

## $dO_2$

| | |
|---|---|
| **Sensor** | Digital Optical sensor |
| **Accuracy** | 1 ± 0.05 %-vol, 21 ± 0.2 %-vol, 50 ± 0.5% -vol |
| **Control system** | Measuring resident in Leonardo software |
| **Control range** | 0 - 300 % air saturation |
| **Operating temperature** | Up to 130 °C |
| **Pressure range** | 0 - 12 bar(g) |
| **Actuator** | Cascade to RPM, gas control, feedings |

## REDOX (ORP)

| | |
|---|---|
| **Sensor** | Digital sensor |
| **Control system** | Measuring resident in Leonardo software |
| **Control range** | ± 1500 mV |
| **Operating temperature** | Up to 130 °C |
| **Pressure range** | 0 - 6 bar(g) |

| ANTIFOAM/LEVEL | |
|---|---|
| **Sensor** | Conductivity based |
| **Control** | Measuring resident in Leonardo software |
| **CONDUCTIVITY** | |
| **Sensor** | Digital sensor |
| **Accuracy** | ± 3 % at 1 µS/cm to 100 mS/cm, ± 5 % at 100 to 300 mS/cm |
| **Control system** | Measuring resident in Leonardo software |
| **Control range** | 1 - 300 000 µS/cm |
| **Operating temperature** | Up to 130 °C |
| **Pressure range** | 0 - 20 bar(g) |
| **$dCO_2$** | |
| **Sensor** | Digital sensor |
| **Accuracy** | ± (10 % of the reading + 10 mbar) |
| **Control system** | Measuring resident in Leonardo software |
| **Control range** | 0 - 200 % saturation |
| **Operating temperature** | Up to 130 °C |
| **Pressure range** | 0 - 4 bar(g) |
| **CELL DENSITY** | |
| **Sensor** | Digital sensor |
| **Control system** | Measuring resident in Leonardo software |
| **Operating temperature** | Up to 140 °C |
| **Pressure range** | Up to 10 bar(g) (150 psi) |
| **TCD measuring range** | 0 - 4 AU |
| **VCD measuring range** | 0.0 to 400 pF/cm |
| **WEIGHT** | |
| **Sensor** | Digital balance |
| **Accuracy** | ± 0.01 g (3.6 kg) , ± 0.1 g (36.0 kg) |
| **Control system** | Measuring resident in Leonardo software |
| **PERISTALTIC PUMPS** | |
| **WM 120 U Brushless** | 1 - 100 rpm |

# Get in touch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