JUPITER

SINGLE & PARALLEL AUTOCLAVABLE FERMENTER BIOREACTOR

SOLARIS
BIOTECH SOLUTIONS

JUPITER

This technical proposal describes a Solaris JUPITER.
For supervisory control and data acquisition Leonardo 3.2 is included.
The system consists of jacketed fermenter/bioreactor (total volume), bench-top, pre-assembled unit, supplied with all necessary tubes, valves and instruments, automation, control panel (HMI).
The system is designed for aerobic and anaerobic cultivations/ fermentations, closed aseptic operations.
The control is based on a SCADA control system.

Customizable Configuration

differente aspect ratio and thermoregulation strategies

Applications

Process development and optimization

Education

Basic Research

Scale up and scale-down studies

Small production

- Aspect Ratio available:
  - D/H 3:1
  - D/H 2:1

- Jacketed and single-wall borosilicate glass vessel designs available for all volumes
- Different gas mixing strategies with up to 5 TMFC and/or solenoid valves, jacketed design : fully removable and cleanable glass jacket for improved heat transfer during autoclaving and single-wall design: thermoregulation performed with heating blanket and cooling finger.

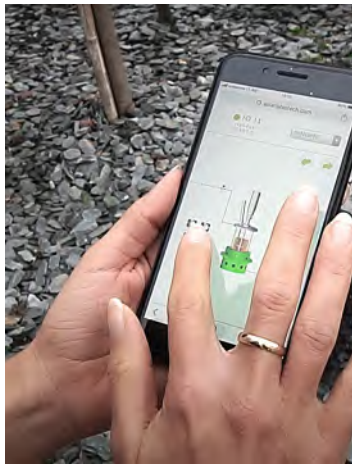
- Modbus digital sensors reduce background noise and guarantee quick response time
- Suitable for batch, fed-batch and continuous processes

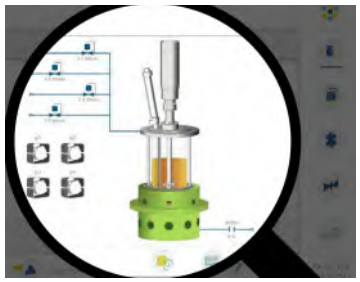
- Powerful and accurate (1 RPM) brushless motor
- Wide range of measurement and control options
- Optional integration of up to 4 analog input/output connections, choosing between 0-10 V and 0-20 mA/4-20 mA (e.g. pumps or valves with power supply independent from Solaris electrical cabinet)

- Sterile septum with single use membrane for manual feeding
- Leda: the innovative sterile sampling system for Solaris' autoclavable fermenters/ bioreactors, which allows up to 180 sterile samplings per batch
- Pressure control up to 1.6 bar (with constant gas-in and gas-out flux) available in the 2 and 4 L volumes with jacketed design.

Leonardo

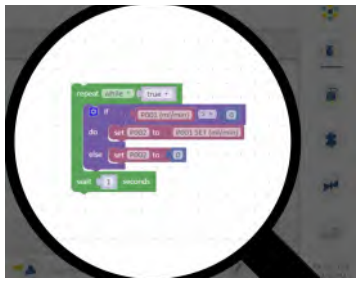
- Innovative SCADA software LEONARDO: a smart and user-friendly controller designed to provide a high level of automated management of the fermentation/cultivation processes
- Full version included in the equipment supply
- Up to 24 units managed in parallel with a unique HMI (24")
- Data extraction in .csv format
- Remote access via PC, tablet or smartphone, with QR code scanning or dedicated portal
- Remote control





Synoptic

- real time 3D view
- parallel control
- manual control



Logic Parser

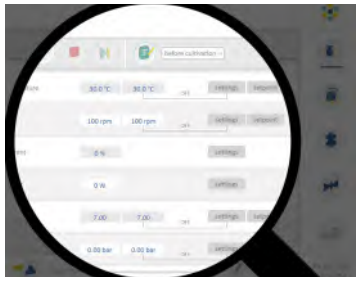
- customized logic functions
- parallel logic blocks and funtions

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

Vessel

Solaris Code	Jupiter 2.0	Jupiter 4.0	Jupiter 6.5	Jupiter 8.0	Jupiter 10.0
Production Code	jpt110300	jpt130395	jpt160395	jpt160480	jpt180480
Total Volume (L)	2.00	4.00	6,50	8,00	10,00
Ratio D/H	1:3,0	1:3,0	1:2,5	1:3,0	1:3,0
Min. Working Volume (L)	0,5	1	1,6	2	2,5
Max. Working Volume (L)	1,5	3	4,8	6	7,5
Max. temperature	70 °C				
Operating pressure	< 0.5 bar (g) Jupiter 2.0 and 4.0: optionally < 2 bar (g)				
Headplate ports (n.10 in Jupiter 2.0; n.12 in the others)	10: n.1 Agitation Group, n.1 Gas Sparger, n.1 Gas Overlay, n.1 Gas Out/Condenser, n.1 Sampling/Harvesting, n.1 Temperature, n.1 Multifeed, n.2 Sensors DN12 (pH, dO2, dCO2) , n.1 adjustable level sensor 12: n.1 Agitation Group, n.1 Gas Sparger, n.1 Gas Overlay, n.1 Gas Out/Condenser, n.1 Sampling/Harvesting, n.1 Temperature, n.1 Multifeed, n.2 Sensors DN12 (pH, dO2, dCO2), n.1 adjustable level sensor, n.2 Spare				
Design	Borosilicate Glass Jacketed Vessel				
Materials	Borosilicate Glass and AISI 316 L				

Sensors length (mm)

pH	325	425	425	425	425
dO_2	325	425	425	425	425

Dimensions for autoclave (with Condenser)

Height (mm)	610	705	705	790	790
Diameter (mm)	275	285	315	315	335

Stirring

Drive	Brushless Motor				
Speed (rpm)	1-1900	1-1800	1-1700	1-1700	1-1700
Nominal Torque (Nm)	0,9	0,9	0,9	1,1	1,1
Impellers	Select from: Rushtons impellers, Marine impellers, Pitched blade				

Thermoregulation

Control	PID Control - Accurancy 0,1 °C - Jacketed with Electric Heaters and cooling valve

Gas Control & Gas Mixing

Sparger and overlay Gas Control	TMFC
Gas Mixing (Air, CO_2, O_2,N_2)	n.1 TMFC (included in entry level) + n.4 solenoid valves or + n. of additional TMFC (up to n.4)
Sparger type	Select from: Toro type (ring), sintered microbubbling - both provided with 0,22 µm sintered filter
Gas Out	n. 1 Condenser + 0,22 µm sinterized filter

Peristaltic Pumps

n.4 WM 114 FD/DV 60 rpm

Controller

Master Control Module	From 1 to 24 units - 35x35xh35 cm
HMI with Leonardo software	Operate interface touch screen PC, 24"color monitor; power consumption 200W

Temperature

Sensor	PT100
Accuracy	± 0,1 °C
Control system	Measuring resident in Leonardo 3.2 software
Control range	0 - 150 °C

pH

Sensor	Digital sensor
Sensitivity	57 to 59 mV/pH
Control system	Measuring resident in Leonardo 3.2 software
Control range	0 - 14 °C
Operation temperature	up to 130 °C
Pressure range	0 - 6 bar

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 3.2software
Control range	0 - 300% air saturation
Operation temperature	up to 130 °C
Pressure range	0 - 12 bar

Antifoam/Level

Sensor	Solaris sensor
Control	Measuring resident in Leonardo 3.2 software

Redox (ORP)

Sensor	Digital sensor
Control system	Measuring resident in Leonardo 3.2 software
Control range	± 1500 mV
Operation temperature	up to 130 °C
Pressure range	0 - 6 bar

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 3.2 software
Control range	1 - 300.000 µS/cm
Operation temperature	up to 130 °C
Pressure range	0 - 20 bar

dCO_2

Sensor	Analog sensor
Accuracy	± (10 % of the reading + 10 mbar)
Control system	Measuring resident in Leonardo 3.2 software
Control range	0-200% saturation
Operation temperature	up to 130 °C

Cell density

Sensor	Digital sensor
Control system	Measuring resident in Leonardo 3.2 software
Operation temperature	0 - 90° up to 141°
Pressure range	up to 10 bar (150 psi)
Interfaces	RS485 Modbus
VCD Measuring Range	Capacitance: 0.0 to 400pF/cm

Weight

Sensor	Digital balance
Accuracy	±0.1 g
Control	Measuring resident in Leonardo 3.2 software

Peristaltic Pumps

WM 120 U Brushless	1-100 rpm