

# JUPITER

SINGLE & PARALLEL  
MINI  
FERMENTER  
BIOREACTOR



SOLARIS  
BIOTECH SOLUTIONS



## JUPITER

This technical proposal describes a Solaris JUPITER. For supervisory control and data acquisition Leonardo 3.0 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

different aspect ratio and thermoregulation strategies

## Applications



Process development and optimization



Education



Basic Research



Scale up and scale-down studies



Small production studies

- 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.

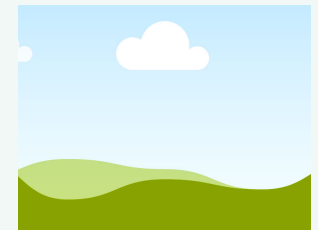


- Modbus digital sensors reduce background noise and guarantee quick response time
- Suitable for batch, fed-batch and continuous processes



- Powerful and accurate (1 RPM) brushless motor

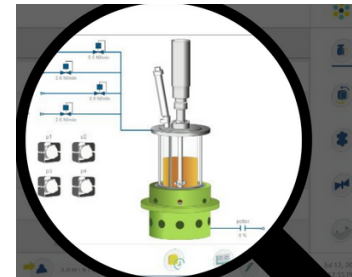
- Wide range of measurement and control options
- Optional integration of up to 4 analog input/output connections, choosing between 0-10 V and 0-20 mA/4-20 mA (e.g. pumps or valves with power supply independent from Solaris electrical cabinet)



- 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.

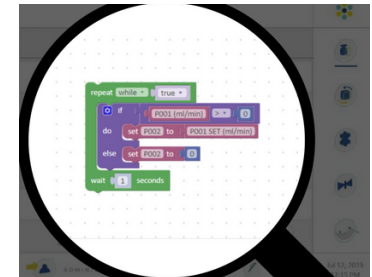
# Leonardo

- 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



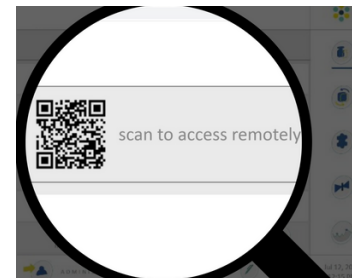
## Synoptic

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



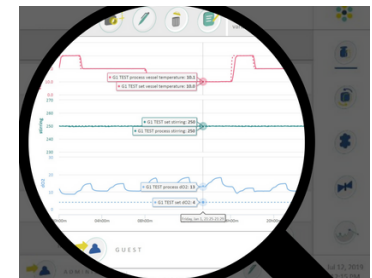
## Logic Parser

- customized logic functions
- parallel logic blocks and functions



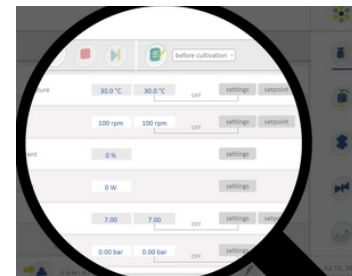
## Remote Control

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



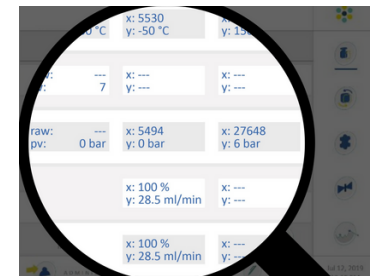
## Trends

- 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
- simultaneous calibration values for parallel work

<b>Vessel</b>					
<b>Solaris Code</b>	<b>Jupiter 2.0</b>	<b>Jupiter 4.0</b>	<b>Jupiter 6.5</b>	<b>Jupiter 8.0</b>	<b>Jupiter 10.0</b>
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)	0,35	0,60	1,10	1,10	1,60
Max. Working Volume (L)	1,40	2,80	4,50	5,50	7,0
Max. temperature	70 °C				
Operating pressure	< 0.5 bar				
	Jupiter 2.0 and 4.0: optionally < 1.6 bar				
Headplate ports (n.10 in Jupiter 2.0; n.13 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, n.1 Spare 13: n.1 Agitation Group, n.1 Gas Sparger, n.1 Gas Overlay, n.1 Gas Out/Condenser, n.1 Sampling/Harvesting, n.1 Sterile Sampling System, n.1 Temperature, n.1 Multifeed, n.2 Sensors DN12, n.3 Spare				
Design	Borosilicate Glass Jacketed Vessel				
Materials	Borosilicate Glass and AISI 316 L				

### Sensors length (mm)

pH	325	425	425	425	425
dO <sub>2</sub>	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 - Accuracy 0,1 °C - Jacketed with n. 2 Electric Cartridge Heaters and cooling valve				
Total heater power (W)	400	600	700	700	700

### 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 (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

(optional) Watson Marlow type 313 FDM/D, max. speed 350 rpm, volumetric flow, 1,5-1750 ml/min, function assignable from software n. 4 Watson Marlow type 114, fixed speed, max. 60 rpm, volumetric flow 0,5-51 ml/min, function assignable from software
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### Controller

Master Control Module	From 1 to 24 units - 35x37xh36 cm
HMI with Leonardo software	Operate interface 58x15xh48 cm with 24" monitor

### Temperature

Sensor	PT100
Accuracy	0,1 °C
Control system	Measuring resident in Leonardo 3.0 software
Control range	0 - 70 °C

### pH

Sensor	Digital sensor
Sensitivity	57 to 59 mV/pH
Control system	Measuring resident in Leonardo 3.0 software
Control range	0 - 14 °C
Operation temperature	0 - 130 °C
Pressure range	0 - 6 bar

### dO<sub>2</sub>

Sensor	Digital Optical sensor
Accuracy	±0.05%-vol, 21±0.2%-vol, 50±0.5%-vol
Control system	Measuring resident in Leonardo 3.0 software
Control range	0,05 - 300% air saturation
Operation temperature	-10 - 130 °C
Pressure range	0 - 12 bar

### Antifoam/Level

Sensor	Solaris sensor
Control	Measuring resident in Leonardo 3.0 software

### Redox (ORP)

Sensor	Digital sensor
Sensitivity	57 to 59 mV/pH
Control system	Measuring resident in Leonardo 3.0 software
Control range	± 2000 mV
Operation temperature	-10 - 130 °C
Pressure range	≤ 6 bar

### Conductivity

Sensor	Digital sensor
Accuracy	±3%
Control system	Measuring resident in Leonardo 3.0 software
Control range	1 - 3000 µS/cm
Operation temperature	0 - 130 °C
Pressure range	0 - 20 bar

### dCO<sub>2</sub>

Sensor	Analog sensor
Accuracy	±10% (pCO <sub>2</sub> 10-900 mbar) ≥ ±10% (pCO <sub>2</sub> > 900 mbar)
Control system	Measuring resident in Leonardo 3.0 software
Control range	0,00-200% saturation
Operation temperature	-20.0-150 °C

### Cell density

Sensor	Digital sensor
Accuracy	Mammalian cells in suspension ±5.104 cells/ml Fermentation ±0.05 g/l dry weight
Control system	Measuring resident in Leonardo 3.0 software
Pressure range	0-3 bar (option 1) 0-10 bar (option 2)
Operation temperature	0-60°C (option 1 ) 0-80°C (option 2 ) (max. sterilization temperature 135°C)
Option 1	Dencytee:Total cell density based on turbidity (Two ranges: 10 <sup>^</sup> 5 to 10 <sup>^</sup> 8 mammalian cells/ml - 0.5 to 100 g/L dry weight
Option 2	Incyte: Viable cell density based on capacitance (Two ranges: 5x10 <sup>^</sup> 5 to 8x10 <sup>^</sup> 8 mammalian cells/ml - 5 to 200 g/L dry weight))

### Weight

Sensor	Digital balance
Accuracy	±0.2 g
Control	Measuring resident in Leonardo 3.0 software

### Peristaltic Pumps

WM 114	10-60 rpm
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