



JUPITER

SINGLE &
PARALLEL
FERMENTERS/
BIOREACTORS



SOLARIS
BIOTECH SOLUTIONS

SINGLE & PARALLEL FERMENTERS/BIOREACTORS

JUPITER

JUPITER simply represents the next generation of parallel autoclavable R&D fermenters/bioreactors with a pre-packed high tech innovative solutions, ready out of the box at a terrific price.

JUPITER typical applications includes the following:

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

JUPITER can be used for:

- Biopharmaceutical**
- Biofuels**
- Food industry**
- Bioremediation**
- Bioplastic**
- Cosmeceutical**
- Nutraceutical**



**WHY TO
INVEST**
IN THIS PRODUCT

The best ratio
**Quality/
Capability/Price**
on the market

Parallel control
up to 24 units

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JUPITER

Benefits

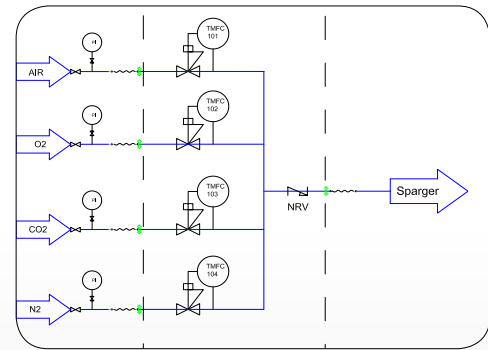
Up to 24 units managed with one HMI with innovative PARALLEL process control LEONARDO: smart controller designed to provide an high level of automated management of the fermentation/ cultivation processes
Batch, Fed batch or continuous processes

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



Different gas mixing strategies with up to 5 TMFC



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 guarantee the sterility after sampling until the next use.

Safety: pressure relief valve included in each unit

Compact and modular PCS (350x350x350 mm)

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



Remote access via PC, tablet/smartphone
Remote control for after sale assistance

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

Wide range of options, 6 different volumes and 3 different ratio H/D

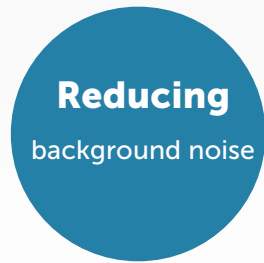
Fully removable and cleanable jacket

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.



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.

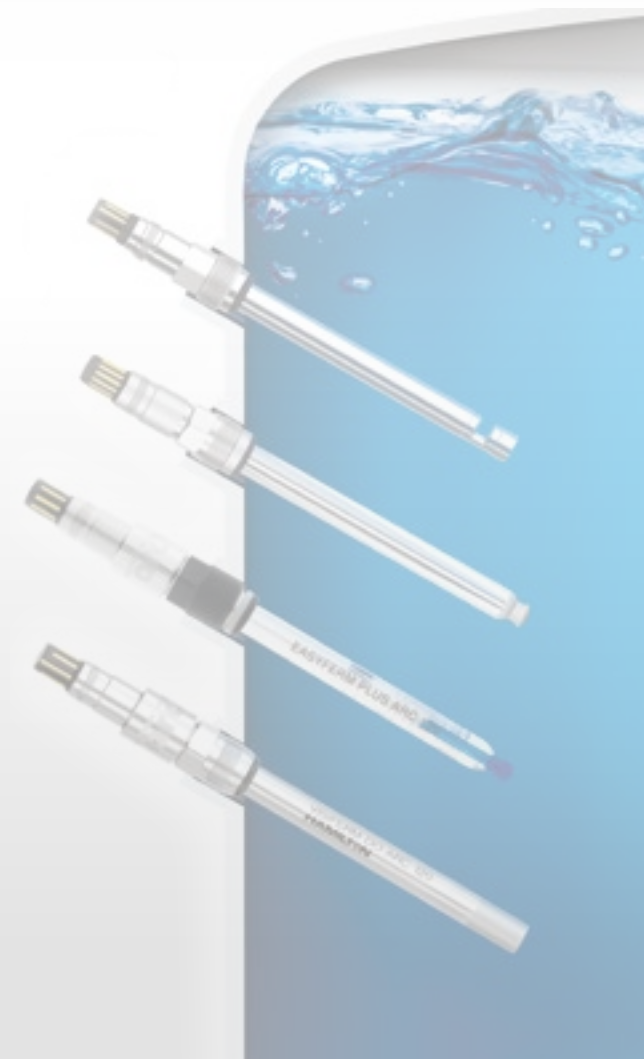
ORP

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 with 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.



ON LINE MEASUREMENT OF TOTAL CELL DENSITY

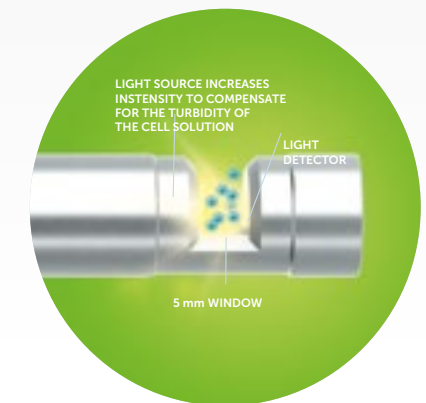


- Simple online measurement of cell growth
- Reliable values during the growth phase
- Early detection of process deviations

The Dencytee sensor performs online measurement of total cell density in solution. The sensor is based on optical density, which measures the turbidity of the cell suspension. The measurement is made at NIR (near-infra red) wavelengths so it is insensitive to changes in media color. All particles and molecules that scatter light at 880 nm will be detected, including living and dead cells as well as cell debris. This measurement is effective after inoculation when cells are expanding quickly but concentrations are low, making capacitance-based readings less reliable.

HOW IT WORKS

The Dencytee sensor emits light through a 5 mm window onto a light detector. Cells in suspension absorb and scatter light so less light is read by the detector. To compensate, the sensor increases the amount of light emitted by the light source to maintain a constant reading at the detector. By reading the amount of light that is increased at the light source, the Dencytee sensor can measure solutions with high cell densities.



ON LINE MEASUREMENT OF VIABLE CELL DENSITY

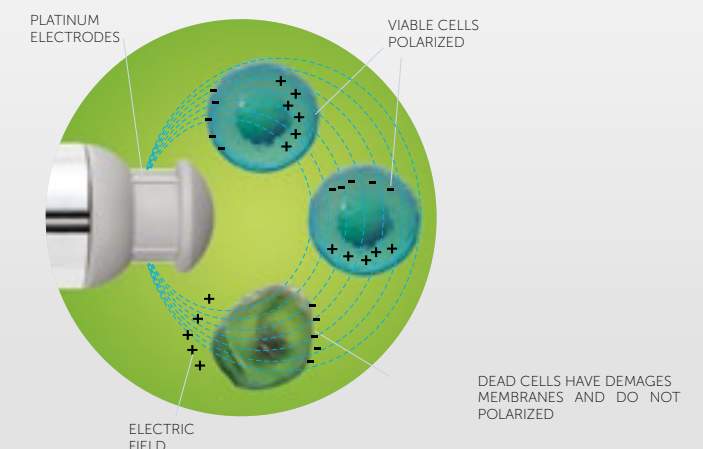


- Increase yield and lower production costs
- Detect changes in cell physiology with frequency scanning
- Precisely control harvesting for continuous culturing
- Early detection of process deviations

The Incyte sensor enables real-time, online measurement of viable cells in solution. The measurement is not influenced by changes in the media, microcarriers, dead cells or debris, and is designed for mammalian cell culture, yeast and high-density bacterial fermentation. Online measurement of viable cells makes it possible to detect events and respond in real time without sampling.

HOW IT WORKS

The Incyte measurement principle is based on capacitance. In an alternating electrical field, viable cells behave like small capacitors. The charge from these small capacitors is measured by the sensor and reported as permittivity (capacitance per area).



GAS MIXING

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



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 a platform where to easily and quickly manage cultivation data. This software is included in the fermenter/bioreactor supply and can be installed on unlimited number of client's PC or laptop.



Parallel synoptic.

Parallel trends comparison between units, current and old batches.

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.

S Cube



Solaris new modular product design strategy decreases time to market and the number of unique parts in the product architecture increasing the number of product variants. The result is a lean, flexible and smart PCS.

Additional parameters in modular external boxes for future PCS upgrade including dCO₂, Cell Density, Weight, Peristaltic pumps, ect.



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						
Solaris Code	Jupiter 2.0	Jupiter 3.1	Jupiter 4.0	Jupiter 6.0	Jupiter 8.0	Jupiter 10.0
Production Code	A1	A2	A3	C2	C3	C4
Total Volume (liters)	2,00	3,10	4,00	6,00	8,00	10,00
Ratio D/H	1:2,0	1:2,5	1:3,0	1:2,0	1:2,5	1:3,0
Min. Working Volume (liters)	0,50	0,66	0,60	1,10	1,30	1,50
Max. Working Volume (liters)	1,50	2,25	3,00	4,50	6,00	7,50
Max. temperature	65°C					
Operating pressure	< 0,5 bar					
Headplate Ports (14)	n.1 port, Gas Sparger Input n.1 port, Gas overlay n.1 port, Gas out/Condenser n.1 port, Sampling system n.1 port, Harvesting system		n.1 port, Temperature sensor n.1 port, multiaddition (4) needle free connectors		n.5 ports, spares, n.1 port, single addition needle free connectors, n.1 port, agitation group	
Sensors lenght (mm)						
pH	225	225	325	225	325	425
dO ₂	225	225	325	225	325	425
Dimensions for autoclave (with Condenser)						
Height (mm)	505	580	655	580	655	760
Diameter (mm)	225	225	225	280	280	280
Design	Borosilicate Glass Jacketed Vessel					
Materials	Borosilicate Glass and AISI 316 L					
Stirring						
Drive	Brushless Motor, Direct Assembly , 1-2000 rpm (bacterial), 1-500 (cell cultures)					
Power (P _N)	208 W					
Impellers	Select from: Rushtons impellers, Marine Impellers, Pitched blade					
Thermoregulation						
Control	PID Control - Accuracy 0,1 °C - Jacketed with electrical heaters and cooling valve					
Gas Control & Gas Mixing						
Sparger and overlay Gas Control	TMFC					
Gas Mixing (Air,CO ₂ ,O ₂ ,N ₂)	1TMFC (included in entry level) +4 solenoid valves or + n. of additional TMFC					
Sparger type	Select from: Toro type (ring), synered microbubbling both provided with 0,2 µm filter					
Exhaust	Condenser and 0,2 µm filter					
Peristaltic Pumps						
	up to 4 Watson Marlow 114, speed 10 - 60 rpm, volumetric flow 0,5-51 ml/min, application assignable from software					
	n. 1 Watson Marlow 313 FDM/D, speed 45-350 rpm, volumetric flow 1,5-1750 ml/min, application assignable from software					
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

INTEGRATED IN 5 CUBE	Temperature	
	Sensor	PT100
	Accuracy	0,1 °C
	Control system	Measuring resident in Leonardo 2.0 software
	Control range	0 - 70°C
	pH	
	Sensor	Digital Hamilton sensor
	Sensitivity	57 to 59 mV/pH
	Control system	Measuring resident in Leonardo 2.0 software
	Control range	0 - 14
Operation temperature	0 - 130°C	
Pressure range	0 - 6 bar	
INTEGRATED IN 5 CUBE	dO ₂	
	Sensor	Digital Optical Hamilton sensor
	Accuracy	±0.05%-vol, 21±0.2%-vol, 50±0.5%-vol
	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	
INTEGRATED IN 5 CUBE	Redox (ORP)	
	Sensor	Digital Hamilton sensor
	Sensitivity	57 to 59 mV/pH
	Control system	Measuring resident in Leonardo 2.0 software
	Control range	±2000 mV
	Operation temperature	- 10 -130°C
Pressure range	≤ 6 bar	
INTEGRATED IN 5 CUBE	Conductivity	
	Sensor	Digital Hamilton sensor
	Accuracy	±3%
	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	
INTEGRATED IN 5 CUBE	dCO ₂	
	Sensor	Mettler Toledo sensor
	Accuracy	±10% (pCO ₂ 10-900 mbar) ≥ ±10%(pCO ₂ > 900 mbar)
	Control system	Measuring resident in Leonardo 2.0 software
	Control range	0,00-200% saturation
	Operation temperature	-20,0-150°C
EXTERNAL MODULAR BOX	Cell density	
	Sensor	Hamilton-Fogale sensor
	Accuracy	Mammalian cells in suspension ±5·10 ⁴ cells/ml - Fermentation ±0.05 g/l dry weight
	Control system	Measuring resident in Leonardo 2.0 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	Total cell density based on turbidity (Two ranges: 10 ⁴ to 10 ⁸ mammalian cells/ml - 0.5 to 100 g/L dry weight)
	Option 2	Viable cell density based on capacitance (Two ranges: 5x10 ⁴ to 8x10 ⁸ mammalian cells/ml - 5 to 200 g/L dry weight)
	Weight	
	Sensor	load cells
Accuracy	±0.2 g	
Control	Measuring resident in Leonardo 2.0 software	
Peristaltic pumps		
WM 114	10-60 rpm	

Chiller

- Optionally JUPITER 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
Cooling output at -10°C measured with ethanol	0.09-0.15 kW
Pump pressure max.	0.35-1.30 bar
Pump flow max.	16-35 L/min.
Dimension (WxDxH)	
up to Jupiter 5.0	200x350x465 mm
from Jupiter 5.5 to 8.0	240x400x500 mm
Jupiter 10.0	350x480x595 mm



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