



## Genesis

STANDARD  
STERILIZABLE IN  
PLACE SOLUTIONS



SOLARIS  
BIOTECH SOLUTIONS

# STANDARD STERILIZABLE IN PLACE SOLUTIONS



## GENESIS

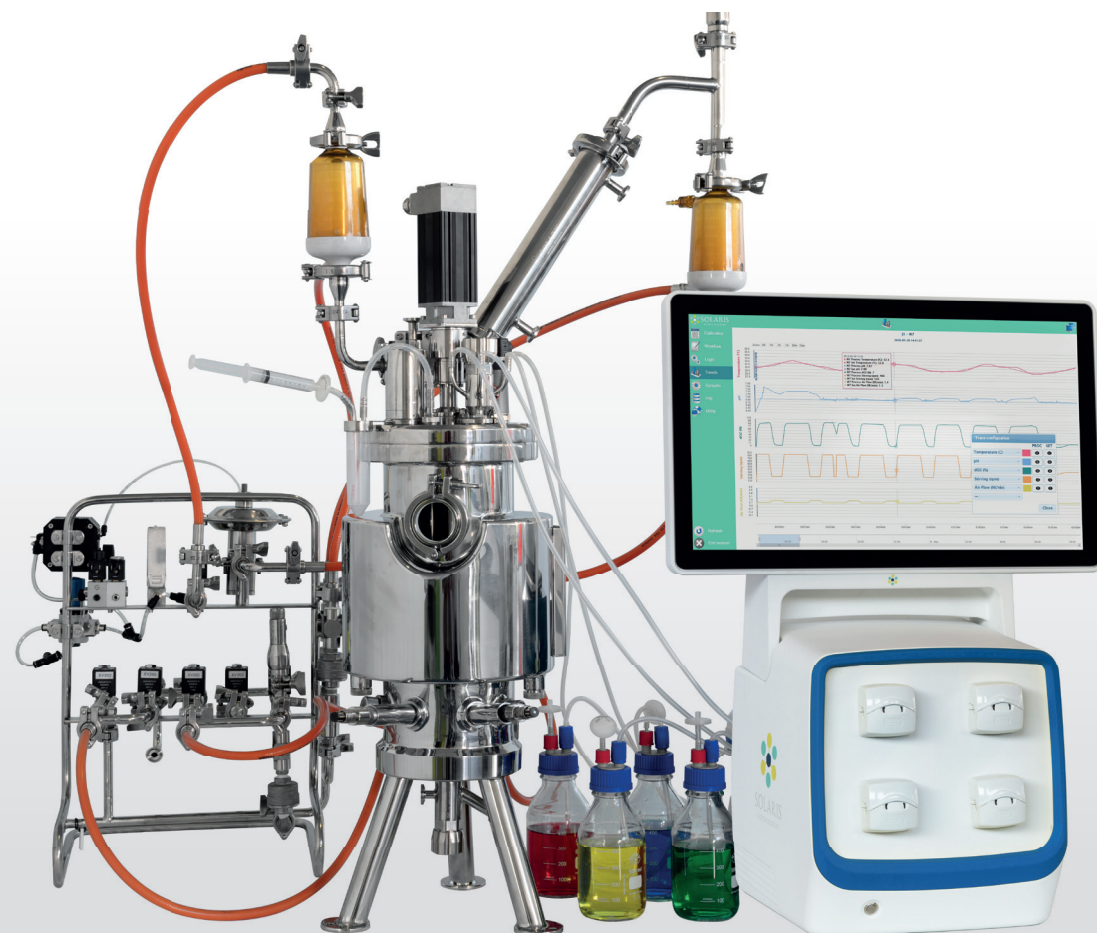
The **GENESIS** series offers a transitional system for scaling from benchtop to SIP systems. Available in sizes from 7.5 to 20 L total volume, Genesis is meant to offer a SIP platform, on the benchtop space. Sterilization can be achieved via steam or alternatively by electric heaters.

**GENESIS** is an ideal partner for microbial fermentation as well as animal, plant and insect cell cultivation. Typical applications includes the following:

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

**GENESIS** can be used for:

- Biopharmaceutical
- Biofuels research and manufacturing
- Vaccines
- Food and beverage biotechnologies
- Bioremediation
- Bioplastics
- Cosmeceutical
- Nutraceutical



**WHY TO  
INVEST  
IN THIS PRODUCT**

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

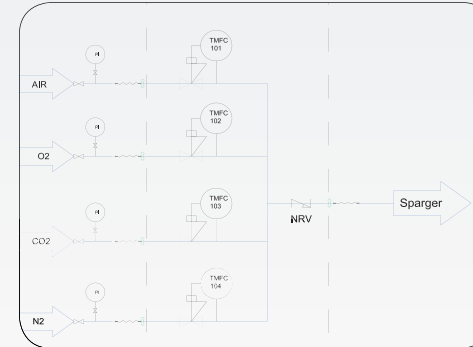
**Automatic  
sterilization**  
through electrical heaters  
(no need for an  
external steam source)  
or by steam

## Benefits

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.

Different gas mixing strategies with  
up to 5 TMFC

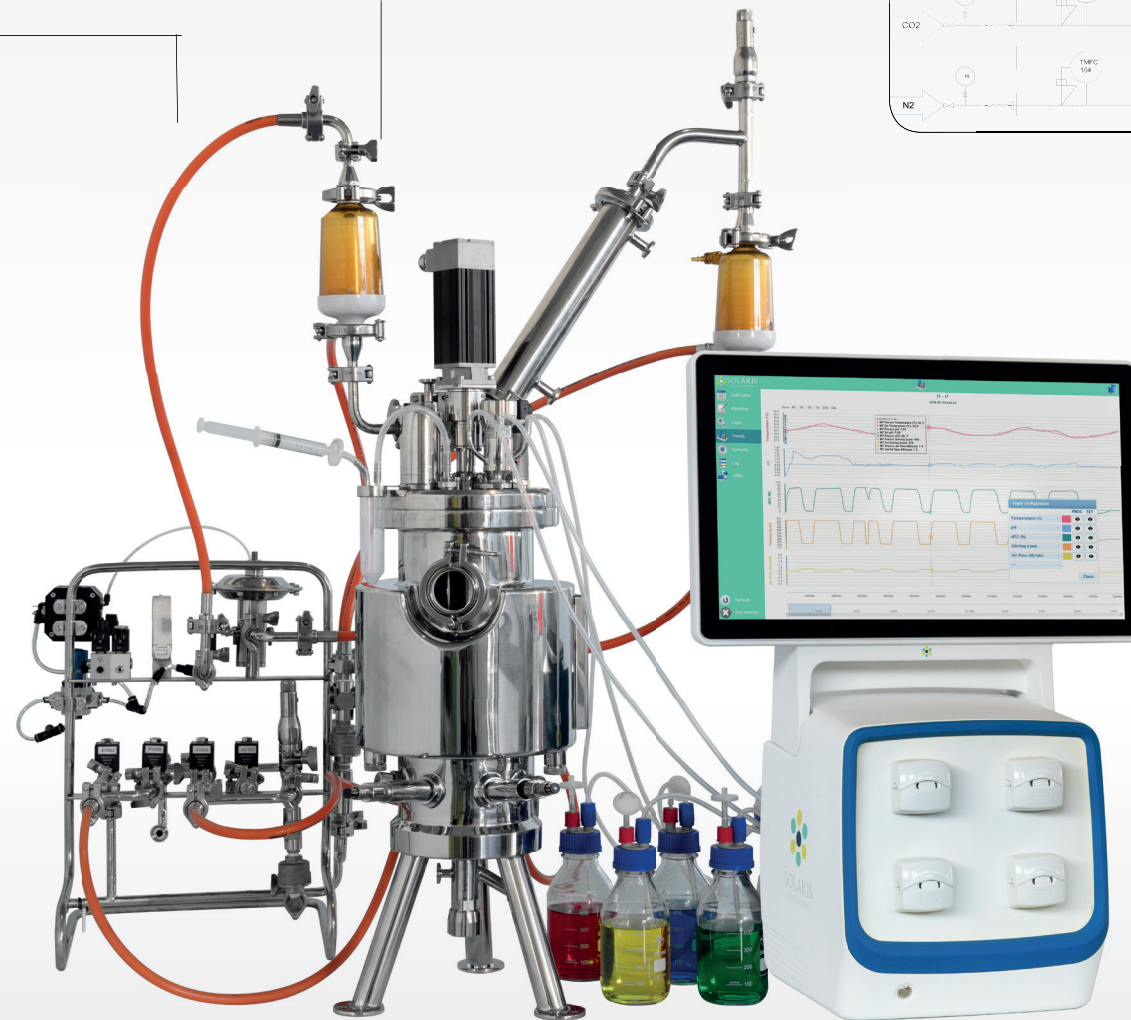
Sampling system



External additional boxes parameters for  
future PCS upgrade including dCO<sub>2</sub>, Cell  
Density, Weight, Peristaltic pumps, ect

Illuminated side glass

Modbus Digital  
sensors



Compact and modular PCS

### Double jacket (side-bottom)

Increased heat transfer efficiency  
It ensures optimal temperature  
control and sterilization even at  
minimum volumes

N.4 assignable Watson Marlow pumps in  
entry level

Harvest valve in entry level  
optionally SIP

Automatic sterilization by steam  
or alternatively through electrical  
heaters

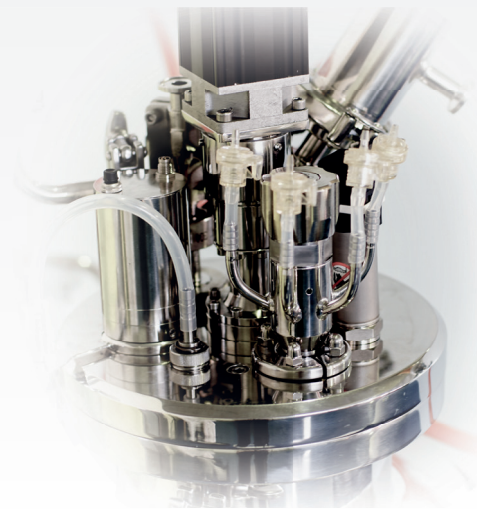
## SALAS - Solaris Sterile Needle Free Additions System

NEEDLE  
FREE

Genesis is supplied with SALAS, a 4 channel, needle free additions system for inoculums, feedings, pH corrective solutions, antifoam, etc.

EASY & QUICK  
OPERATION

SALAS allows an easy and quick connection between the feeding solution and the vessel top lid.



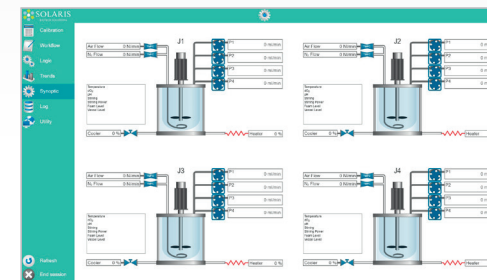
## Leonardo 3.0

### USER-FRIENDLY SOFTWARE

Solaris controlling software offers a simply laid out, yet powerful platform for experimental design planning and process control.

The graphical user interface enables the intuitive selection and adjustment of control functions.

Extracted data is compatible with Window Excel but, in addition, Solaris offers a platform where fermentation data can be easily exported in real time and thus managed. This software is included in the supply and can be installed on an unlimited number of the client's PC or laptops.



### Do it parallel: smarter..faster

Leonardo allows intuitive and time-saving parallel operations. Up to 24 independent fermentations/cultivations can be carried out simultaneously.

### Why a digital sensor?

Digital sensors (including Cell Density products) have been integrated to the Solaris PCS and Leonardo controlling software, giving the user many benefits over traditional analog sensor outputs. Such benefits include a robust communication protocol not susceptible to signal loss, in-software sensor diagnostic information, parallel calibration/batch calibrations and more.

Sensor life  
traceability

Reducing  
background noise

### Gas mixing

Hardware and software adaptability are key to enable the best aeration strategy for each process. Thermal mass flow controllers (TMFC) allow precise flow rate control of individual gasses. Up to 5 TMFC's can be configured within each PCS cube and integrated to the controlling software. The powerful software and control platform allows precise cascade adjustment of multiple parameters to manage gas transfer, OTR, kLa, etc.

- n.1 TMFC included in "entry" level system; additional available as optional
- Automatic gas mixing algorithms
- Various agitator and baffle designs available or numbers of TMFC
- Toro, sintered and other spargers available

## Data sheet

Vessel				
Solaris Code	Genesis 7.5	Genesis 10.0	Genesis 15.0	Genesis 20.0
Total Volume (liters)	7.5	10.0	15.0	20.0
Ratio D/H	1:2,5	1:2,5	1:2,5	1:2,5
Min. Working Volume (liters)	1.3	1.8	2.7	3.6
Max. Working Volume (liters)	5.6	7.5	11.25	15
Working temperature range	0-135°C			
Working pressure range	2 bar			
Design	Stainless Steel Jacketed Vessel			
Materials	Parts in contact with the culture AISI 316 L - other parts AISI 304			
Finishing	All parts in contact with the culture: Ra < 0,5 µm ; External: Ra < 0,6 µm Mirror polished			
Ports and Connections				
	Connection	Description		
Vessel lid	PG13	Antifoam		
	TC 3/4"	Safety valve		
	TC 3/4"	Gas-out		
	TK 3/4"	SALAS-Solaris Sterile liquid addition		
Upper side wall	TC 1"	Pressure probe		
	DN 52	Stirrer		
	TC 1/2"	Overlay gas inlet		
	TC 1/2"	Sparger		
Lower side wall	In gold	Sight glass		
	In gold	Sight glass		
	Hygenic socket	pH probe		
	Hygenic socket	dO probe		
	Hygenic socket	spare probe		
	Hygenic socket	spare probe		
Vessel bottom	Temperature housing	PT100		
	TC 3/4"	Harvest/sampling valve		
	TC 1/2"	Steam in		
Jacket in-out	TC 1/2"	Water in		
	TC 1/2"	Jacket out		
	1/2" G	Electric heaters		
	1/2" G	Electric heaters		
	1/2" G	Electric heaters		
Stirring				
Drive	Brushless Motor, Direct Assembly, 1-1500 rpm (bacterial), 1-500 (cell cultures)			
Power	208W ( 7.5-10L ) ; 622W ( 15-20L )			
Impellers	Select from: Rushtons impellers , Marine Impellers, Pitched blade			
Thermoregulation				
Control	PID Control - Accuracy 0,1 °C Jacket steam and electric heaters / cooling source			
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.4 solenoid valves, n° of TMFC			
Sparger type	Select from: Toro type (ring), synered microbubbling both provided with 0,2 µm filter			
Exhaust	Condenser and 0,2 µm filter			
Controller				
Master Control Module	From 1 to 24 units - 35x37xh36 cm			
HMI with Leonardo software	Operate interface 58x15xh48 cm with 24" monitor			

## Controls

INTEGRATED IN THE PCS	Temperature	Sensor	PT100
	Control system	Measuring resident in Leonardo 3.0 software	
	Control range	0 - 150°C	
	pH	Sensor	Digital sensor
	Control system	Measuring resident in Leonardo 3.0 software	
	Control range	0 - 14	
	Operation temperature	0 - 130°C	
	Pressure range	0 - 6 bar	
	Actuator	Cascade to peristaltic pumps for the addition of acid/base solutions or gas (CO <sub>2</sub> )	
	dO <sub>2</sub>	Sensor	Digital Optical sensor
	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		
Actuator	Cascade to RPM, Gas Control, feedings,ect		
ANTIFOAM/LEVEL	Sensor	Solaris sensor	
	Control	Measuring resident in Leonardo 3.0 software	
Redox (ORP)	Sensor	Digital sensor	
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	
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	
Control system	Measuring resident in Leonardo 3.0 software		
Control range	0,00-200% saturation		
Operation temperature	-20.0-150°C		
Pressure range	0 - 4 bar		
Cell density	Sensor	Digital sensor	
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>^5</sup> to 10 <sup>^8</sup> mammalian cells/ml - 0.5 to 100 g/L dry weight)		
Option 2	Incyte: Viable cell density based on capacitance (Two ranges: 5x10 <sup>^5</sup> to 8x10 <sup>^8</sup> mammalian cells/ml - 5 to 200 g/L dry weight)		
Weight	Sensor	Digital Balance	
Control	Measuring resident in Leonardo 3.0 software		
Peristaltic pumps	WM 114	10-60 rpm	
WM 313 FDM/D	45-350 rpm		

EXTERNAL MODULAR BOX

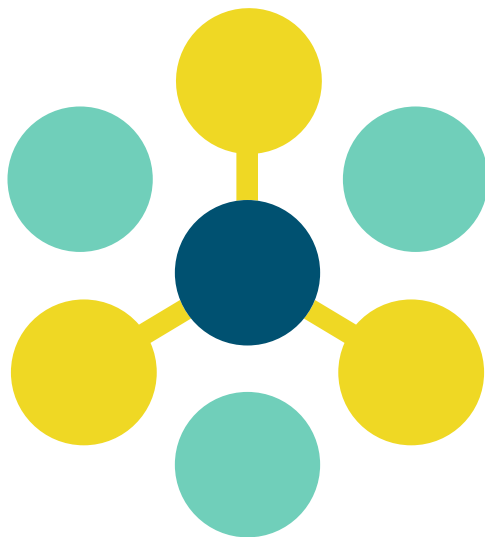
## Chiller

- Optionally GENESIS 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
- Refrigerant 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.



# SOLARIS

BIOTECH SOLUTIONS

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