Lab Unlimited
CARL STUART GROUP

BlackJar & BlackBox

SINGLE USE FERMENTERS/ BIOREACTORS

SOLARIS
BIOTECH SOLUTIONS

SINGLE USE FERMENTERS/BIOREACTORS

BlackJar & BlackBox

BlackJar vessels: configurable and customizable pre-sterilized single use ridged wall bioreactors and fermenters.

BlackBox - Solaris single use PCS, parallel process control platform.
The BlackBox PCS offers a versatile and powerfull platform for single use systems. There are multiple configurations available for various process sensor outputs, thermoregulation and agitator connectivity, etc. BlackJar offers standard and customizable fermentation and cell culture configurations. BlackBox and BlackJar are compatible with any SU platform, but offer the most versatility in conjunction with each other.

Benefits

- Eliminate cross contamination risk
- Drastically shorten turnaround time between runs
- Integration of Hamilton digital communication as optional
- Flexible PCS I/O design for many vessel sensor configurations

BlackJar vessel series
customizable
SUB & SUF

BlackBox
unique PCS
for single use

Do it single use
&
DO IT FLEXIBLE!

BlackJar & BlackBox
the combined
solution

BlackJar vessel series

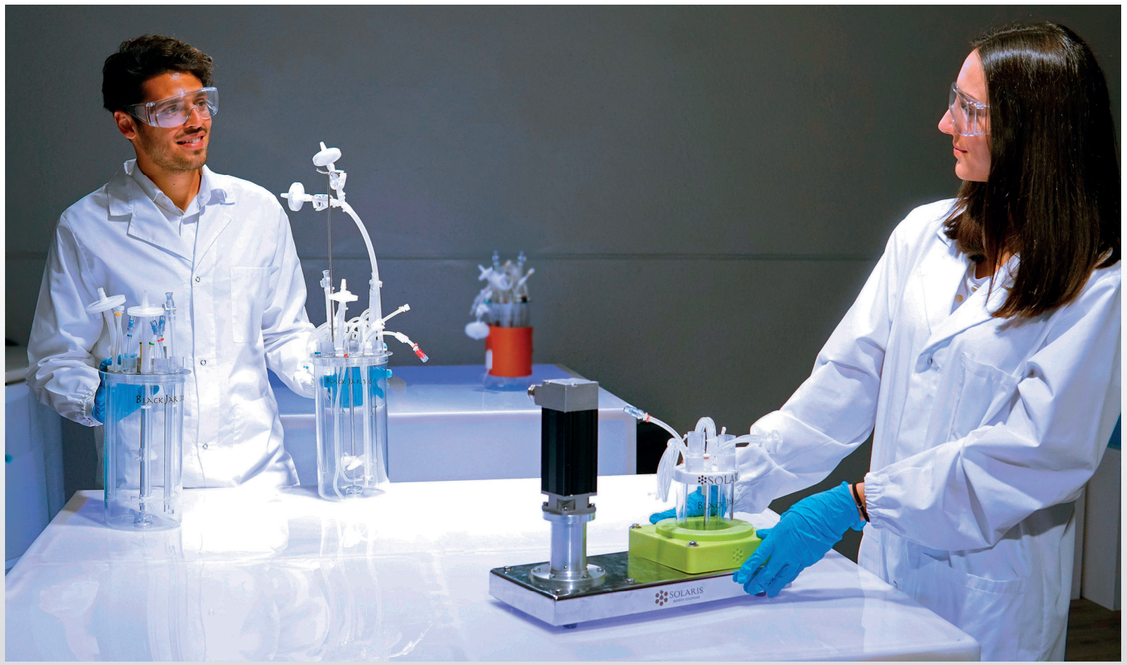
BlackJar vessels are customizable, pre-sterilized, single-use, ridged wall bioreactor/fermenter vessels available in a range of sizes from 50 ml to 30 L.

Materials

Polycarbonate and Nylon materials

Sterilization and Validation

SU components are sterilized via high precision E-beam irradiated in dual polyester foil bags.
Media contact materials are ISO10993, USP class VI.



Benefits

- Single Use bioreactor and fermenter vessels available in 500 ml, 3.2 L, 5.7 L, 30 L, and other total volumes.
- Option to fully customize head plate configuration, impellers, spargers, thermoregulation system, sensors, etc.
- Standard SU bioreactor (SUB) and SU fermenter (SUF) configurations available.
- Many PG 13.5 head plate ports.
- Optional customer preferred dO2 and pH single use sensors integrated and pre-sterilized.
- Single use optical dO2 solution available.
- Long silicon tubing for head plate inlets and outlets.
- Adaptation to any agitator motor.
- Head plate drive or magnetic bottom drive agitator options available.
- Adaptation to any thermoregulation system, electric or liquid jacket.
- Utilization of the best polycarbonate materials pre-sterilized via e-beam radiation.

BlackBox

Unique Process Control System (PCS) for single use

BlackBox is a highly adaptable single use Process Control System (PCS) with a flexible In/out design.

The **BlackBox** PCS offers a versatile and powerful platform for single use systems. There are mutiple configurations available for various process sensor outputs, thermoregulation and agitator connectivity.

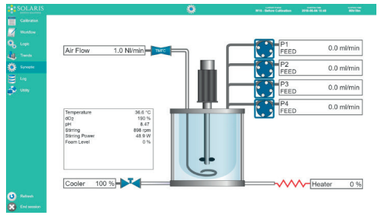
BlackBox is compatible with any SU vessels on the market like BioBLU®, UniVessel®, CellReady®, etc., but most flexible in conjunction with BlackJar.

Leonardo 3.0

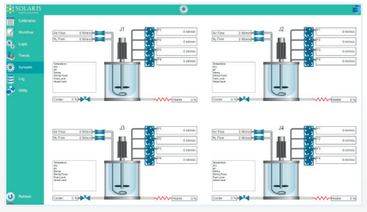
USER-FRIENDLY SOFTWARE

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 numer of the client's PC or laptops.

Workflow page



Synoptic page top agitation



Parallel synoptic

Do it parallel: smarter..faster

Leonardo allows intuitive and time-saving parallel operation. Up to 24 indipendent fermentation/cultivations can be carried out simultaneously.

Do it wireless!

Increase mobility: users have the option to access the platform remotely, via PC, tablet, phone. Remote access is multi-level password protected.

BlackBox Data sheet

DEFAUTL SET UP

PCS	
Cabinet	S Cube -Black Satin Stainless Steel h 350mm; l 350mm, d 350mm

Stirring	
Drive	Brushless Motor, 0-500 rpm for cultivation or 0-2.000rpm for fermentation (top direct or MST coupling)
	Magnetic stirred table (MST)

Aeration	
Gas control	n.1 TMFC
Gas mixing (AIR, N2, CO2, O2)	numbers of TMFC (up to 5, sparger/overlay)
Off-gas filter heater	
Numbers of TMFC (up to 5)	
Off-gas filter heater	

Thermoregulation
Temperature sensor Pt100 (length depending from SUB/SUF size)
PID Control for Heating and Cooling, Accuracy: 0.1°
Heating blanket
Re-Usable-Jacket with electrical heaters

Sensors Inputs
Input for Hamilton VisiFerm dO ARC 220 mm digital sensor (no sensor included)
Input for Polarographic/Ampheometric analogue dO probe (BNC and K8 connectors; no sensor included)
Input for analogue electrolyte-based pH (BNC and K8 connectors; no sensor included)
Input for digital electrolyte-based pH (no sensor included)
Input for level sensor (no sensor included)
Input for foam control (no sensor included)

Pumps
N.4 Watson Marlow peristaltic pumps, fixed speed
External additional peristaltic pumps

Weight
Input for Weight measurement
Digital balance 0,1 gr. accuracy

Communication
n.4 Analog Input 0-10V and 0-20 mA/4-20 mA and n.4 Analog Output 0-10V and 0-20 mA/4-20 mA

PC & Software	
HMI	From 1 to 24 units - 35x37xh36 cm- HMI with 24" monitor
Software	SCADA Solaris Software Control Leonardo 3.0
Solaris Logic Parser Software	
Solaris Fermentation Manager	
Data Extraction	Through USB port or Ethernet/Wi-Fi
Graphs Trends, On line displaying and Printing	
On line Parameters Calibration	
Alarms Management	
Events Recording	
Multipasswords Levels	

Controls

OPTIONAL (BUILT IN)

Gas Mixing
up to 5 TMFC's (sparger and overlay)

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

OPTIONAL (EXTERNAL)

Stirring
Stirring through Magnetic Stirrer Table

dCO_2	
Sensor	Analog sensor
Accuracy	±10% (pCO_2 10-900 mbar) ≥ ±10%(pCO_2 > 900 mbar))
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
Accuracy	Mammalian cells in suspension $\pm 5 \cdot 10^4$ 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	Dencytee: Total cell density based on turbidity (Two ranges: 10^5 to 10^8 mammalian cells/ml - 0.5 to 100 g/L dry weight)
Option 2	Incyte: Viable cell density based on capacitance (Two ranges: 5x10^5 to 8x10^8 mammalian cells/ml - 5 to 200 g/L dry weight)

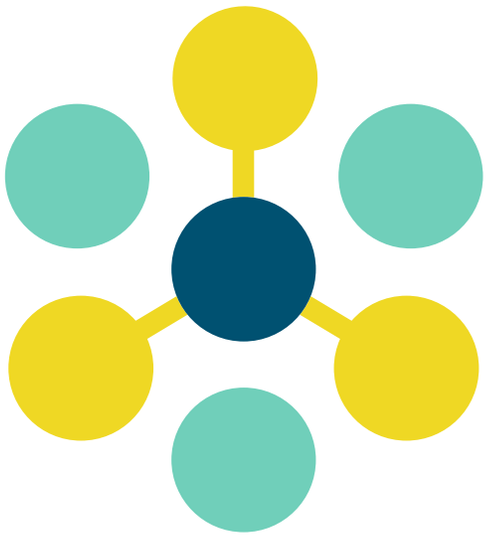
Weight	
Sensor	Digital Balance
Accuracy	±0.2 g
Control	Measuring resident in Leonardo 2.0 software

Peristaltic pumps	
WM 114	fixed speed, max. 60 rpm

Chiller

- Optionally the BlackJar 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.



SOLARIS

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