





KRONOS

This technical proposal describes the Kronos system. For supervisory control and data acquisition software is included.

The system consists of highly modular benchtop Ultrafiltration (UF) and microfiltration (MF) system for concentration and/or buffer exchange. Kronos has been designed to be used in laboratory environment for process development as well as for small scale production in cGMP environment. Kronos is supplied with all necessary tubes, valves and instruments, automation, control panel (HMI) to be ready for process.



Filtration equipment

Fixed or wheeled skid options





Process development and optimization

Education







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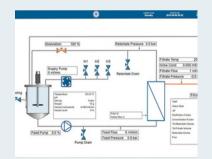
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Basic Research

Scale up and scale-down studies

Small production

- The system can support a wide range of membrane area facilitating process development from very low volumes to small scale production.
- Automated filtration process
- Documentation and validation service available.
- Easy-to-use control software interface.





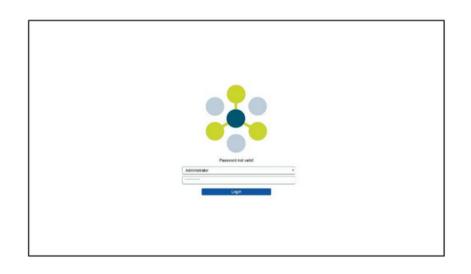
- Modular system accommodates cassette or Hollow fiber covering large application field, such:
 - Vaccine
 - proteins concentration and buffer exchange
 - Cell broth clarification
 - Virus concentration and purification

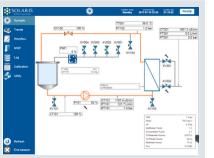


• Safe: pressure alarm setting; level sensor option preventing overflow during manual operations.

Leonardo

- Innovative SCADA software LEONARDO: a smart and userfriendly controller designed to provide a high level of complete automated monitoring of the process
- Full version included in the equipment supply
- Data extraction in .csv format
- Remote access via PC, tablet or smartphone, with QR code scanning or dedicated portal
- Remote control





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Synoptic

Filtration management and controls





Remote Control

Trends

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Synoptic								
Trends	· · · · · · · · · · · · · · · · · · ·	47.80	UT NO	Page 17 rouge	iter 1	LONG DAMETER	NUMBER OF FREE	.
Workflow	UFP500E65		4.4 m ²	11		1 mm	2600	
NWP			1000		-		PROCESS MUSE	
	X\001	.01	N (BUFFER)		o %		0%	
Log	X\/002		QEE		*		0%	
Celibration	X\003	ON	(PRODUCT)		9%		0%	
	X\004		QEE		3%		0%	
Usility	Empty Time			0.1	5 min		0.0 min	
	colonomo		~	a.e		~	r mocesa	
	C Water Flush	0	Concentrati	ion1	0	Buffer Flu	sh	0
	ID NWP	0	Diafitration		0	CIP		•
	CIP	•	Concentrati	ion2	0	Water Flu	sh	0
	Water Flush	0	DPause			D Pause		
	Buffer Conditioning	•	Product Re	covery	0	DNWP		0
	C Pause					Storage C	onditioning	•
	s	art				Stop		
Refresh								



Workflow

Calibration

Vessel	Kronos 2.0	Kronos 5.0	Kronos 10.0		
Solaris Code Total Volume (L)	kr2 2 L	kr5 5 L	kr10 10 L		
Pump output Cassettes area range	180 l/h 200 cm2 to 0.5 sqm	180 l/h 200 cm2 to 0.5 sqm	180 l/h 200 cm2 to 0.5 sqm		
Hollow fiber area range	140 cm2 to 0.4 sqm	140 cm2 to 0.4 sqm	140 cm2 to 0.4 sqm		
Max. operating pressure	e	4 bar(g)			
Design	Borosilicate (Blass Jacketed Vessel wi	ith conical		
		bottom			
Design	Design Borosilicate glass vessel (single wall)				
Materials	Materials Vessel: Borosilicate Glass Lid: AISI 316 L				
Drive RPM	Brushless Motor Direct Assembly 1-2000 RPM, Accuracy 1RPM				
Impeller	Marine Impeller				
Weight		Load cells			
Options					
Transfer module		I Charles II	I I Chart		
Transfer pump Triple inlet valve		r diafiltration and large ve as for highly automated f			
Permeate module					
Perm. press. flow contro pump incl. flow meter	ol Prevent n	nembrane fouling in micro	ofiltration		
pH measurement		Inline pH sensor			
Conductivity measurem	nductivity measurementInline conductivity sensor280 nm measurementInline UV prevent low yield or yield loss				
Vessel upgrade option Weigh measurement th load cells Conductivity measurem	rough				
Temperature measurem Level control via sensor		safety during manual ope	eration		

Options Holder option

Hallow fiber holder	For single hallow fiber cartridges		
Manifold for 3 hallow fiber cartridges Cassette holder	From various manufactures		
PCS and SOFTWARE			
PCS			
HMI	Touch Screen Industrial PC Color Monitor		
Software	SCADA Solaris Software Control		
Data Extraction	Through USB port or Ethernet		
Graphs trends, On line displaying and Printing			
On line Parameters Calibration			
Alarms Management			
Events Recording			
Multipasswords Levels			

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Dimen	ISIONS

KRONOS 2.0 Depth Lenght Height	73 cm 76 cm 120 cm
KRONOS 5.0 Depth Lenght Height	73 cm 76 cm 135 cm
KRONOS 10.0 Depth Lenght Height	73 cm 76 cm 140 cm