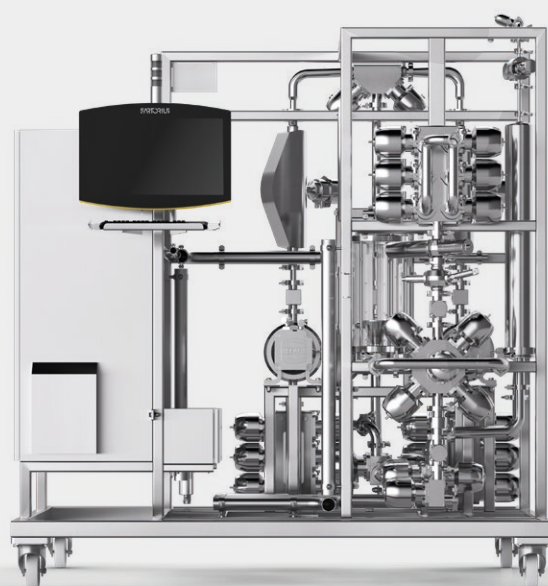


Resolute® Flowdrive MU Chromatography System

Stainless-steel low-pressure liquid chromatography systems for clinical and commercial drug production



Product Information

Resolute® Flowdrive MU chromatography systems cover the most common functionalities required for multi-use (MU) batch chromatography and were developed to meet the highest standards in design and operation. The comprehensive portfolio includes standard, configurable, and engineered-to-order systems across a range of flowrates and platform sizes.

Each system supports inline dilution and gradient formation in a two-pump configuration, or isocratic operation in a single-pump format. A full customization service is available to address diverse chromatography requirements, including inline conditioning (ILC) with buffer preparation skids, medium-pressure liquid chromatography (MPLC), explosion-proof designs, and steam-in-place (SIP) capabilities.

Features and Benefits

- Designed for both membranes and columns, supporting flexible operation
- Available with CE or UL compliance, with additional certifications available on request
- Configurable options including inlet and outlet valve numbers, instrumentation, bubble traps, and filters
- Full customization available to accommodate diverse process needs

Overview

Relevant applications

Clinical- and commercial-scale purification of original and biosimilar therapies including:

- mAbs | Recombinant proteins
- Blood plasma
- Vaccines

Relevant process steps

Capture and polishing chromatography on consumables (packed bed and membrane) using the following chemistries:

- Affinity
- Ion exchange
- Hydrophobic interaction
- Size exclusion
- Mixed mode

Technical Specifications

General specifications

Temperature rating	5 – 60 °C process, 80 °C CIP
Pipework connection	Tri-clamp
Vent and drain connections	Tri-clamp (terminations only, no drain pipework as standard) Bubble trap and filter vent Pre-column low point Pump outlet drain
Column connections	Tri-clamp
Column flow	Downflow, upflow, and bypass
Inline filter	Separate valve block automatic filling
Bubble trap	Separate valve block automatic filling
Air sensors	Sample inlet and pre-column
Flow meters	Coriolis, one per pump
Conductivity temperature	Pre- and post-column
pH	Pre- and post-column
Pressure sensor	Pre-bubble trap, pre- and post-column
Pressure switches	1 per pump
UV	Post-column dual wavelength (three wavelengths available as an option)

Specifications by system size

System size	M	L	XL	XXL
System flow range* [L/h]	20–400	30–1,200	60–2,500	150–5,000
Pipe (ASME BPE) [in]	0.50	0.75	1.00	1.50
Dimensions (H × W × D; confirmed at point of order) [mm]	1,900 × 1,335 × 1,550	1,900 × 1,400 × 1,550	1,900 × 1,530 × 1,650	2,100 × 1,580 × 1,900
Weight (confirmed at point of order) [kg]	Approx. 425	Approx. 475	Approx. 650	Approx. 850
Pump type	QF1200-OEM	QF1200-OEM	QF2500-OEM	QF5K-OEM
Max pressure [bar]	6	6	5	4

*Systems with higher flow rates than those listed are available on request. Lower flow rate applications are addressed by the Resolute® BioSC Pilot Batch system, with flow rates up to 150 L/h.

Process equipment and fittings

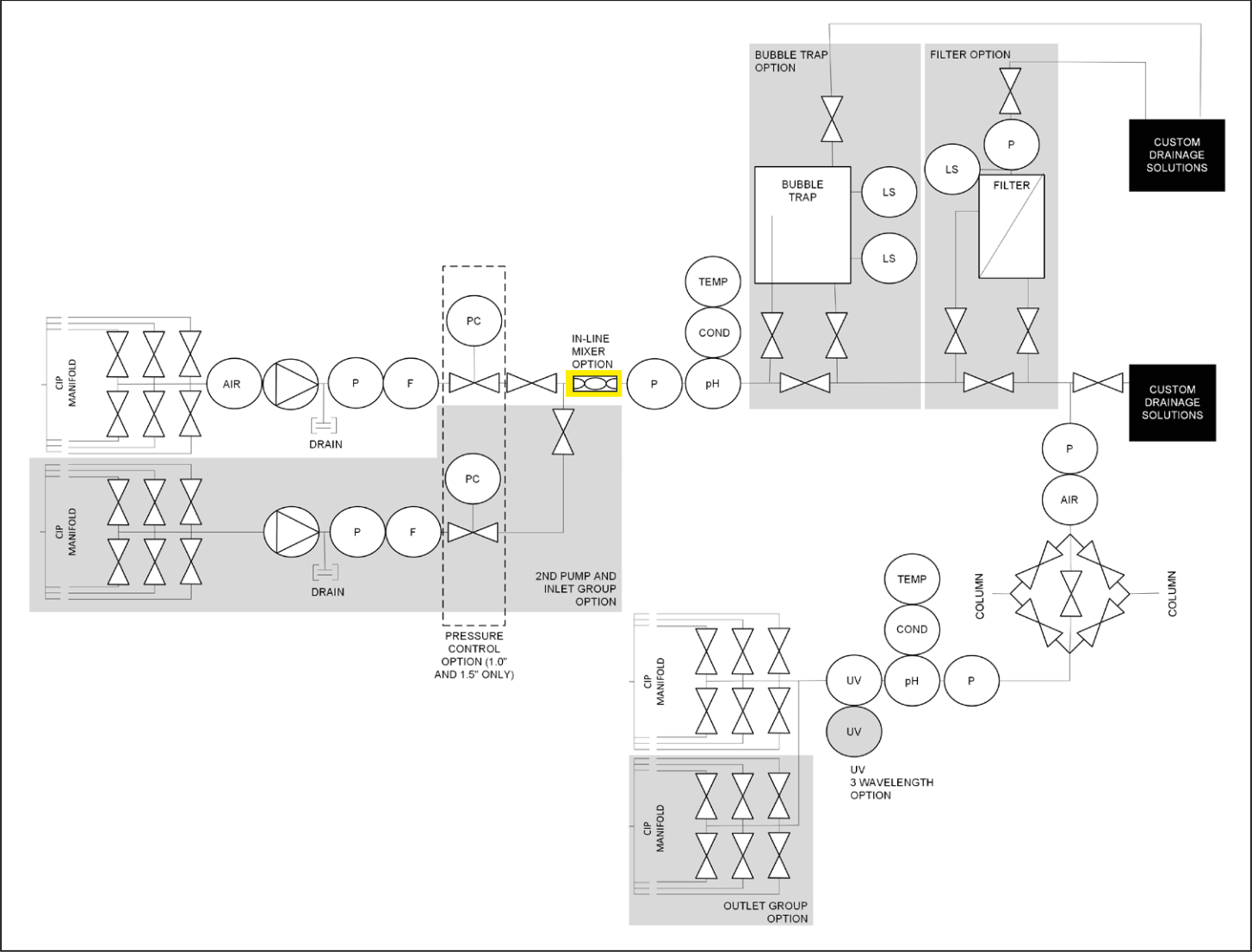
Equipment	Details
Process pump, four-piston diaphragm	Quattroflow® OEM Pump Series (PSG Germany)
Pneumatic valves, diaphragm	Multi-port valve blocks (GEMÜ)
Liquid filter housing	Sartorius
Bubble trap	Sartorius
Inline mixer	Optional
Pressure control device	Optional

The position of these instruments in the system flow path are shown in Figure 1.

Process measurement

Equipment	Details	Resolute® Flowdrive MU range	Resolute® Flowdrive MU accuracy
Pressure transmitter switch, diaphragm seal	Series CV3110 (Labom)	–1.0–6.0 bar	±0.2 bar
Air sensor	SAC (AQ M-Tech)	n/a	n/a
Level switches bubble trap	KAS-80-A23 (Rechner Sensors)	n/a	n/a
Level switch filter	NCS-61P/PNP (Anderson-Negele)	n/a	n/a
Flow transmitter	Promass P 100 Coriolis (Endress+Hauser)	Dependent on system size	±2% of reading (above minimum flow range)
Conductivity	ACF60 (Optek)	0–150.0 mS/cm	±2.0 mS/cm
Temperature	Integrated within conductivity sensor	0–90.0 °C	±1.0 °C (not checked during calibration)
pH	InPro3100 20/PT1000 (METTLER TOLEDO)	0–14.0	±0.2
UV sensor (dual wavelength)	AF45 (Optek)	0–2.00 AU	±0.06 AU
UV sensor (variable; three different wavelengths)	UV detector (Sartorius)	On request	On request

Figure 1: Schematic showing the system flowpath and instrumentation architecture



Key software functions

Description	Specification
Inline dilution (ILD)	Yes (two-pump systems only) Control to: conductivity, flowrate, and pump speed
Gradient	Linear and step Control to: conductivity, flowrate, and pump speed
Pressure limit	Yes (set maximum pressure applied to consumables during processing)
Batch reporting	Yes
Live trending	Yes; iFIX native
Data analysis	Yes. Sartorius data analysis software is installed on the system and can perform all common chromatographic calculations and historical trending duties
Electronic signatures	Yes

Ordering Information

Resolute® Flowdrive MU systems can be configured to meet specific customer needs. The following table describes the options available:

Description	Standard specification	Options on request
Type	FMU: Resolute® Flowdrive MU	—
Flowrate range and pipe ID	▪ M: 20 – 400 L/h (0.5") ▪ L: 30 – 1,200 L/h (0.75") ▪ XL: 60 – 2,500 L/h (1.0") ▪ XXL: 150 – 5,000 L/h (1.5")	—
Design	▪ CE: CE marked ▪ UL: UL certified	—
Pressure control (1.0" and 1.5" only)	No pressure control	Pressure control on each pump (1.0" and 1.5" only)
Gradient ILD	Second pump with six inlets	No gradient or ILD functionalities
Inline mixer	No inline mixer	Inline mixer at convergence of both pumps
Bubble trap	Bubble trap with bypass valves, located before the column	No bubble trap
Filter	One filter with bypass valves, located before the column	No filter
UV	Two UV wavelengths on outlet of column	Three UV wavelengths on outlet of column
Fractions	6 fractions	12 fractions

The standard system configurations are given below:

System Code	Type	Description
FMUMCENANAAA06	Flowdrive MU M (20 – 400 L/h) CE	Two-pump gradient and ILD-capable chromatography system with filter, bubble trap, six outlets and two UV wavelengths
FMUMULNANAAA06	Flowdrive MU M (20 – 400 L/h) UL	
FMULCENANAAA06	Flowdrive MU L (30 – 1,200 L/h) CE	
FMULULNANAAA06	Flowdrive MU L (30 – 1,200 L/h) UL	
FMUXLCENANAAA06	Flowdrive MU XL (60 – 2,500 L/h) CE	
FMUXLULNANAAA06	Flowdrive MU XL (60 – 2,500 L/h) UL	
FMUXXLCENANAAA06	Flowdrive MU XXL (150 – 5,000 L/h) CE	
FMUXXLULNANAAA06	Flowdrive MU XXL (150 – 5,000 L/h) UL	

Please contact your local sales representative for a quote. Lead times are confirmed during order placement.

Peripherals and Accessories

CIP manifolds are included with the system to link inlet and outlet groups, allowing a single connection point for each group during CIP and neutralization.

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