



Cavro[®] XCalibur Pump (XC)

High performance, compact design

The Cavro® XCalibur Pump is a high performance, compact OEM syringe pump designed for easy integration. It has the same footprint and command set as the Cavro XP 3000 Pump, and offers multiple valve options to optimize fluidic design.

Precise liquid handling

The Cavro XC Pump automates pipetting, diluting and dispensing with excellent accuracy and precision from $5 \mu\text{l}$ to 5 ml using a variety of syringes. Its compact, stepper motor-driven ball-screw has a travel length of 30 mm, and the drive incorporates a linear encoder with temperature compensation circuit for improved liquid handling accuracy. Pump speed ranges from 1.2 seconds to 20 minutes per stroke, with a resolution of 3,000 increments per stroke in standard mode and 24,000 increments per stroke in micro-stepping mode.

Intelligent integration

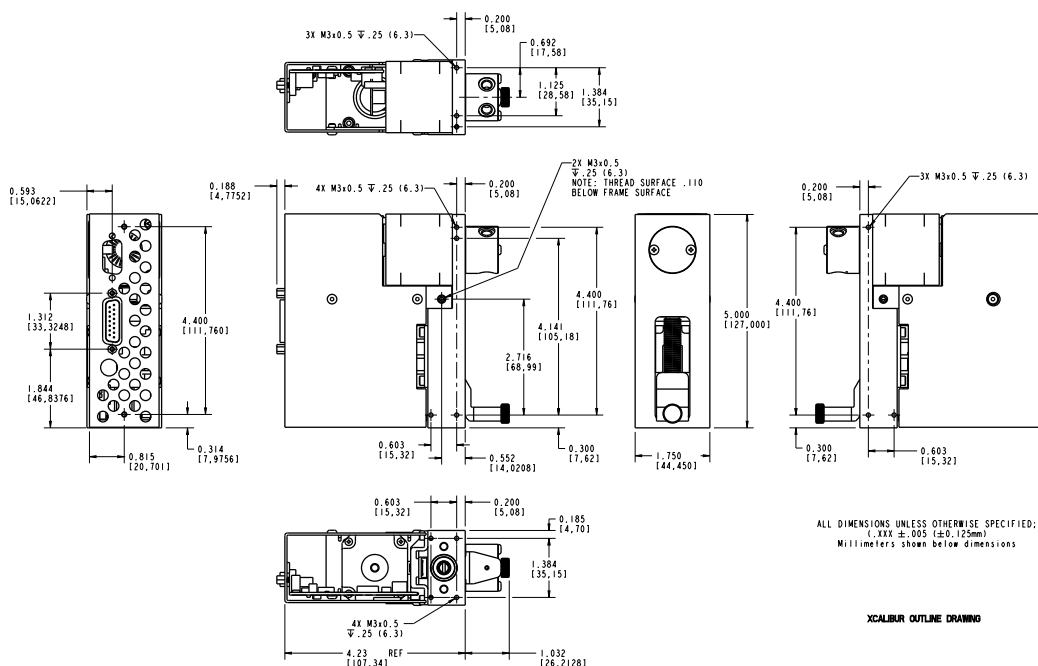
The pump's hardware and firmware has been developed to simplify instrument design and in-service operation. Its machined aluminum frame has numerous pre-drilled holes for ease of mounting, and a range of valve types are available to reduce fluidic hardware requirements. The pump's robust ball-screw drive does not require lubrication and can be manually lowered for easy syringe replacement, while valve and plunger move counters help to plan preventive maintenance operations.

The Cavro XC Pump is fully programmable, and can operate as a standalone module or be controlled by an external computer or microprocessor to automate pipetting, diluting and dispensing operations. Intelligent

firmware enables the user to optimize liquid handling performance by programming start speed, top speed and cut-off speeds, and to program ramp-up and ramp-down rates. The pump communicates through RS-232, RS-485 or CAN interfaces, with multi-pump arrangements of up to 15 modules using a single serial or CAN communication bus. Pumps are controlled via OEM or data terminal protocol at a rate of 9,600 or 38,400 baud for RS-232/485 or up to 1 MB for CAN. The Cavro XC Pump also provides two digital inputs and three outputs for TTL level signals that can be used for synchronization with external devices, further increasing integration flexibility.

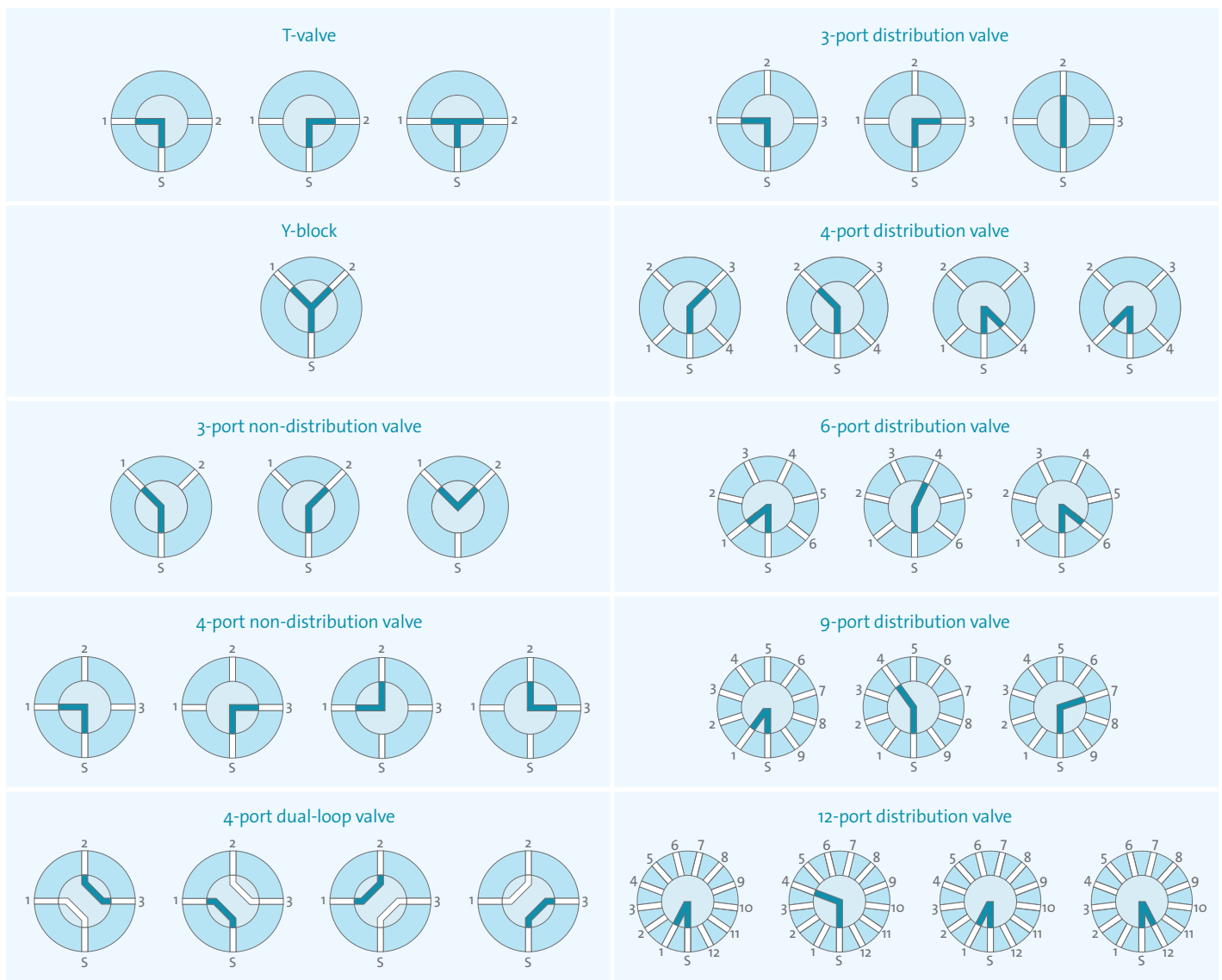
Faster product development

In today's fast-paced environment, time-to-market is a major consideration for any instrument designer. Selecting proven off-the-shelf components is a sure way to accelerate your instrument development. You can also speed up and simplify validation of your instruments by choosing OEM components that have already been extensively tested and approved. The Cavro XC Pump is constructed to meet ISO 13485 and ISO 9001 requirements, and to comply with national and regional standards, including Europe's 2006 RoHS Directive and the US FDA's QS regulations. It is UL recognized (standard UL 61010A-1) and bears the UL designation label, streamlining instrument validation and approval for a shorter time to market.



Valve options

Ceramic valve options	Non-distribution: 3-port, 4-port, 4-port dual loop Distribution: 3-port, 6-port, 6-port chamfer, 9-port, 12-port
Plastic valve options	Non-distribution: 3-port, 3-port T-valve, 4-port, 4-port dual loop, 3-port Y-block Distribution: 3-port, 4-port



There are more than thirty available configurations of the Cavro XC Pump. Please contact your local Tecan representative to determine the best configuration for your needs.

Cavro XCalibur Pump specifications

Plunger drive	Principle	Ball screw drive with linear encoder step loss detection
	Travel	30 mm
Syringes	Sizes	50 µl, 100 µl, 250 µl, 500 µl, 1.0 ml, 2.5 ml, 5.0 ml
Valve/valve drive	Switch time	≤ 250 ms between adjacent ports
Valves	Valve options	T-valve, Y block
	Ceramic valve options	Non-distribution: 3-port, 4-port, 4-port dual-loop Distribution: 3-port, 6-port, 6-port chamfer, 9-port, 12-port
	Plastic valve options	Non-distribution: 3-port, 4-port, 4-port dual-loop, 3-port Y-block Distribution: 3-port, 4-port
	Turn time	≤250 ms between adjacent ports
	Drive	Stepper motor with optical encoder for positioning feedback
	Standard fittings	1/4-28 or M6 for tubing ports, 1/4-28 syringe fitting
	Firmware	Programmable ramps, cut-off velocity, backlash compensation, plunger speeds, delays and loops, change speeds on the fly, terminate moves, diagnostics, absolute and relative positions
Dimensions	Height	127 mm (5.0 in)
	Width	44.5 mm (1.8 in)
	Depth	111.8 mm (4.4 in)
Power requirements	Supply voltage	24 VDC ± 10 %
	Current	Peak: 1.5 Amps
	Resolution	3,000 increments in standard mode and 24,000 increments in microstep mode
	Speed	1.2 seconds-20 minutes/full stroke depending upon syringe size and tubing
Precision	≤0.05 % CV within run at full stroke (at room temperature, with 1 ml syringe using deionized water)	
	≤0.5 % CV within run at 10 % stroke (at room temperature, with 1 ml syringe using deionized water)	
	Accuracy	≤1.0 % deviation from expected value at full stroke (at room temperature with 1 ml syringe using deionized water).
Interface	Type	RS-232, RS-485, or CAN BUS
	Baud rate	RS-232/485: 9,600 or 38,400 CAN: 100Kb, 125Kb, 250Kb, 500Kb, and 1Mb
	Format	Data bits: 8 parity: none stop bit: 1 half duplex
	Addressing	Up to 15 pumps can be addressed individually
	Communications	Data terminal and OEM protocol (Serial); Cavro CAN (CAN)
Environmental	Operating temperature (mechanism)	15°-40°C (59°-104°F)
	Humidity (non-condensing, mechanism)	20-80 % RH at 40°C (104°F)

Tecan – Who we are

Tecan (www.tecan.com) is a leading global provider of laboratory instruments and solutions in biopharmaceuticals, forensics and clinical diagnostics. The company specializes in the development, production and distribution of automated workflow solutions for laboratories in the life sciences sector. Its clients include pharmaceutical and biotechnology companies, university research departments, forensic and diagnostic laboratories. As an original equipment manufacturer (OEM), Tecan is also a leader in developing and manufacturing OEM instruments and components that are then distributed by partner companies. Founded in Switzerland in 1980, the company has manufacturing, research and development sites in both Europe and North America and maintains a sales and service network in 52 countries.

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Safety and regulatory compliance

Tecan Cavro OEM components are designed and manufactured to the highest quality, meeting EU RoHS directives. Many Tecan Cavro components are UL-recognized components. Tecan Systems' Quality Management System (QMS) is compliant with ISO 9001, ISO 13485, and the Quality System Regulations (QSR).

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