



## Cavro<sup>®</sup> Multi-Channel Pump (XMP)

The economical solution for parallel liquid handling

In today's fast-paced environment, time-to-market is a major consideration for any instrument designer. However, the efforts required to comply with regulatory standards often have an impact on development and production timelines. The need for extensive component testing and validation data can hold up release of new products, potentially harming your position in the marketplace.

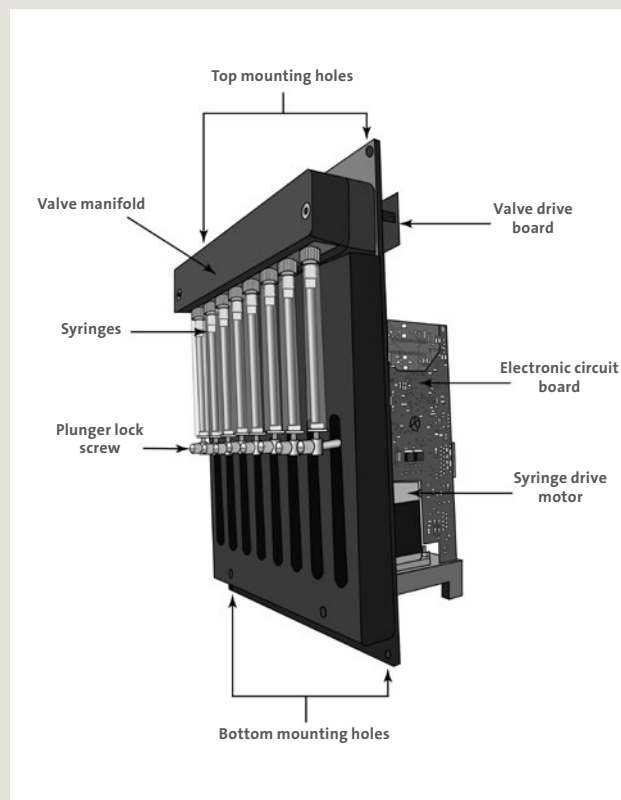
**One way to simplify regulatory approval of your instruments is to use OEM components** that have already been extensively tested and approved. Tecan Cavro OEM components are designed and manufactured to the highest quality standards, meeting ISO 9001 and ISO 13485 requirements, EU RoHS directives and the QSR compliant quality system.

**The Cavro XMP 6000 Pump is Tecan Systems' multi-channel OEM syringe pump** for liquid handling applications in the 10  $\mu$ l to 5 ml range. The unit is available in 2-, 4-, 6- and 8-channel configurations, and is ideal for multi-probe liquid handling tasks such as sample transfer, dilutions, mixing, reagent addition and plate reformatting.

**The design of the pumps offers a compact solution for parallel liquid handling applications**, minimizing logistical restrictions in your instrument design. By choosing Cavro XMP 6000 Pumps, your instruments will benefit from the long life and low maintenance requirements of our robust and reliable pumps, helping to maintain your reputation and, ultimately, leading to greater customer satisfaction.

**The Cavro XMP 6000 Pump is available with 100  $\mu$ l, 250  $\mu$ l, 500  $\mu$ l, 1.0 ml, 2.5 ml and 5.0 ml syringe volumes** and features individual valve control per channel.

**The pump is offered with either a standard inlet/outlet valve configuration, or a bypass valve option** to allow rapid flushing, charging and priming of the system with external liquid handling units. This offers significant time savings in set-up and maintenance operations without excessive syringe pump operation or loss of liquid handling precision.



## Technical features

### Syringe drive

The Cavro XMP 6000 Pump uses a PTFE coated leadscrew, with anti-backlash nut, driven by a stepper motor. The travel length of the plunger is 60 mm and the drive incorporates a quadrature encoder for step loss detection.

### Design and maintenance

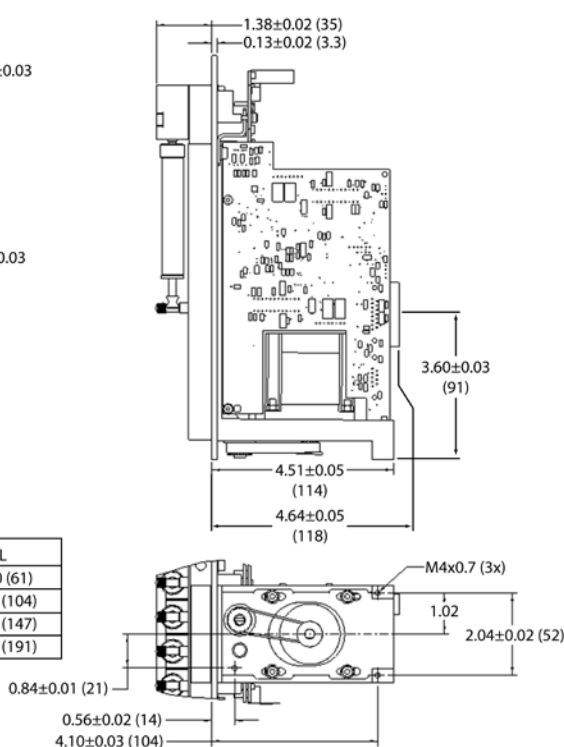
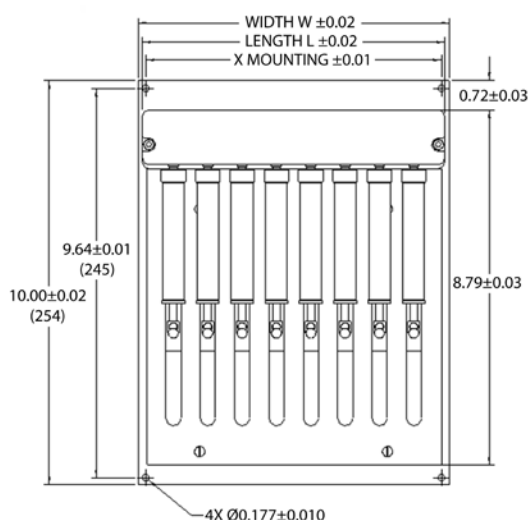
The Cavro XMP 6000 Pump leadscrew does not require lubrication. Valve and plunger move counters have been added to the firmware to help plan preventive maintenance replacement of valves and syringes.

### Speed selection

Pump speed ranges from 1.2 seconds to 160 minutes per stroke. The firmware allows the user to optimize liquid handling performance by changing the start speed, top speed and cut off speeds, with ramp up and ramp down rates also programmable.

### Interface and control

The pump's firmware automatically detects the communication interface (RS232, RS485, or CAN) and communication protocol (OEM or data terminal). Multi-module communication is possible through either RS485 or CAN interfaces, addressing up to 15 modules through a single communication bus. The pump also provides two digital inputs and three outputs for TTL level signals that can be used for synchronization with external devices.



## Product ordering information

Description	Valve type	Material number
XMP 6000 8-channel ¼-28 Bypass	3-way bypass	20737363
XMP 6000 8-channel M6 Bypass	3-way bypass	20737365
XMP 6000 8-channel ¼-28	3-way	20737367
XMP 6000 8-channel M6	3-way	20737369

Description	Valve type	Material number
XMP 6000 6-channel ¼-28	3-way	20737371
XMP 6000 6-channel M6	3-way	20737373
XMP 6000 4-channel ¼-28	3-way	20737422
XMP 6000 4-channel M6	3-way	20737424
XMP 6000 2-channel ¼-28	3-way	20737375
XMP 6000 2-channel M6	3-way	20737377

## Specifications

	Principle	Stepper motor-driven lead screw with quadrature encoder for step loss detection and home flag
<b>Plunger drive</b>	Travel	60 mm
	Plunger speed	5 – 6,000 pulses per second
<b>Resolution</b>	6,000 steps in standard mode and 48,000 steps in fine-positioning and microstep mode	
	Sizes	100 µl, 250 µl, 500 µl, 1.0 ml, 2.5 ml and 5.0 ml
	Barrel material	Borosilicate glass
<b>Syringes</b>	Plunger material	Stainless steel
	Seal material	Virgin PTFE
	Precision	≤ 0.05 % CV average at full stroke (250 µl syringe and above) ≤ 0.1 % CV average at full stroke (50 µl and 100 µl syringes)
<b>Valve drive</b>	Accuracy	< 1 % at full stroke
	Switch time	≤ 250 ms
	Drive	Independently operated solenoid valves
<b>Valves</b>	Diaphragm material	FFKM
	Body material	PEEK™
	Fittings	¼ - 28" or M6 tubing fittings
	Valve options	3-way, 3-way with bypass option
<b>Power requirements</b>	Voltage	24 V DC ± 10 %
	Current	2.0 A (peak) for standard configurations 2.5 A (peak) for bypass configurations
	Type	RS-232, RS-485 or CAN
	Baud rate	9,600 or 38,400 (RS-232 and RS-485) 100K, 125K, 250K, 500K and 1M (CAN)
<b>Interface</b>	Format	Data bits: 8
		Parity: No
		Stop bit: 1
		Half duplex
<b>Communications</b>	Addressing	Up to 15 individual addresses available
	Communications	Data terminal and OEM protocol (with error recognition)
<b>Firmware</b>	Programmable ramps	Terminate moves
	Programmable plunger speeds	Diagnostics
	Programmable backlash compensation	Absolute or relative positions
	Change speed on the fly	Programmable non-volatile memory
<b>Inputs</b>	Two TTL level inputs with 4.7k pull-ups	
<b>Outputs</b>	Three outputs, CMOS (HC) level	
	Operating temperature (mechanism)	15 – 40 °C (59 – 104 °F)
<b>Environmental</b>	Operating humidity (mechanism)	20-80 % RH at 40 °C (104 °F)
	Storage temperature	20 – 65 °C (-4 – 149 °F)

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