

# PUMP COMPARISON

## Your search for a replacement pump is over! See the PSD/4 Precision Syringe Pump from Hamilton.

The current Cavro XP 3000 Syringe Pump will be obsolete by the end of 2006. The Hamilton Company PSD/4 Precision Syringe Pump is a true plug-and-play replacement for the Cavro XP 3000 offering even better performance. The physical size and mounting connections are identical along with the same communication options.

For 50 years, Hamilton has been helping customers satisfy end-users' needs by providing high performance fluid handling systems for the entire flow path: pumps, valves, syringes, and needles. Our team is ready to help you find the best design and get your product to market faster. Call our OEM Technical Support Group today at 1-800-648-5950 or send your specs and questions to: [oem@hamiltoncompany.com](mailto:oem@hamiltoncompany.com)

	<b>Hamilton PSD/4</b>	<b>Cavro XP 3000</b>
<b>Precision</b>		
≥ 250 µL Syringes 12.5 µL and 25 µL Syringes ≥ 50 µL Syringes	≤ 0.05% CV at 100% stroke length < 0.2% CV at 100% stroke length < 0.1% CV at 100% stroke length with 50 µL to 125 µL syringes	Same Unknown < 0.1% CV at 100% stroke length with 50 µL and 100 µL syringes
<b>Accuracy</b>		
25 µL to 12.5 mL Syringes	±1% at 100% stroke length with 25 µL to 12.5 mL syringes	±1% at 100% stroke length (syringes unknown)
<b>Dimensions</b>		
Height x Width x Depth	5.0 in. x 1.75 in. x 4.20 in. (front to back of pump)	Same
<b>Mounting</b>		
Height x Width x Thread	4.4 in. x 1.384 in. x M3	Same
<b>Power Requirements</b>		
Peak Supply Voltage	24 VDC ±10%	Same
Peak Current	1.5A	Same
Holding Supply Voltage	24 VDC	Same
Holding Current	≤ 150 mA	150 mA
<b>Resolution</b>		
Pump	Selectable 3,000 steps/24,000 steps	Same
<b>Syringe Drive</b>		
Drive Mechanism	Stepper motor with driven lead screw	Stepper motor with rack and pinion
Feedback Mechanism	Optical encoder	Same
Stroke Length	30 mm	Same
<b>Syringe Speeds</b>		
Resolution	1 sec to 20 min stroke	Same

**Hamilton PSD/4****Cavro XP 3000****Syringes**

Sizes	12.5 µL to 12.5 mL	50 µL to 5 mL
Material		
Barrel	Glass	Same
Plunger	Stainless Steel	Same
Tip	PTFE or UHMW-PE	Same

**Valve and Valve Drive**

Valve Drive Speed	250 ms per 120° rotation	Same
Drive	Stepper motor with optical encoder (with 15° resolution)	Stepper motor with optical encoder (resolution unknown)
Standard Fitting	¼"-28 fitting	Same

**Communication**

Type	RS-232, RS-485, or CAN	Same
Baud Rate	9600 or 38,400 (RS-232, RS-485) 100k or 125k (CAN)	Same
Format		
Data Bits	8	Same
Parity	None	Same
Stop Bit	1	Same
	Half duplex	Same
Addressing	Up to 16 pumps individually	Up to 15 pumps individually
Protocols	Terminal Protocol and Standard Protocol	Same
Programmable Capabilities		
Ramps	Same	Same
Cutoff Velocity	Same	Same
Backlash Compensation	Same	Same
Syringe Speeds	Same	Same
Delays	Same	Same
Loops	Same	Same
On-the-Fly Speed Changes	Same	Same
Terminate Moves and Delays	Same	Same
Error Detection	Same	Same
Valve Rotation Selection	Available	N/A
Enhanced "h" Factor Capabilities (includes valve rotation CW and CCW)	Available	N/A

**Fluid Contact**

Materials	Includes PTFE, UHMW-PE, CTFE, ceramic, and glass	Same
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**Environmental Operating Range**

Temperature	59 °F (15 °C) to 104 °F (40 °C)	Same
Humidity	20% to 95% RH at 104 °F (40 °C)	Same

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