Tools for Science & Medicine

from Cheminert®

# M Series Liquid Handling Pumps

- Continuous, bidirectional flow
- Four basic models:
  - M6: 5 nl/min to 5 ml/min at 100 psi
  - M6HP: 5 nl/min to 5 ml/min up to 1500 psi
  - M50: 1 µl/min to 25 ml/min at 100 psi
  - M50HP: 1 µl/min to 25 ml/min up to 500 psi
- USB and RS-422/485 control
- Available with aluminum or stainless body

## Description

The Cheminert® M Series liquid handling pump is a syringe-free pump capable of delivering a bidirectional flow to six orders of magnitude. It is a positive displacement pump, which means that it is self-priming and tolerant of any gas which may find its way into the fluid lines. Since there is no separate fill cycle, the pump can be operated continuously, and volumetric capacity is limited only by time. *(Note: High speed continuous flow will reduce the pump lifetime.)*

All are offered with an advanced aluminum body that dramatically reduces the weight of the pump body (by up to 40%) and improves heat dissipation.

USB and RS-422/485 communication protocols are incorporated into the microprocessor-driven controller. (USB interface requires an adapter.)

The pump comes complete with MSLHS software, which employs standard liquid handling terminology and an integrated valve control package in a familiar Windows format for everyday lab usage.

## Operating Principle

The mechanics of the pump are surprisingly simple. The core of the pump is a rotor housing four pistons. As the microstepper motor turns the rotor, the pistons float on a stationary cam. At any given moment, one piston is filling, one is dispensing, and the other two are in transit between the fill and dispense positions.

## Applications

The M Series pump is recommended for any liquid handling applications requiring accuracy and precision. It is particularly suited for applications with a wide range of volumes (which entail laborious syringe changes with other pumps) and for applications which benefit from the versatility provided when the pump is coupled with the optional multiposition reagent selection valve. Typical applications include:

- Calibration source for mass spectroscopy
- Flow-based electrochemical systems
- Flow cytometry, cell and drug perfusion
- HTS and robotic systems
- Infusion and micro-dialysis
- LC applications – micro flow, micro gradients
- Mass spectroscopy sample introduction
- Micro diluters/dispensers for nl to ml range applications
- Micro liquid transfers for micro arrays
- Microtiter plate dispensing using multiposition valves
- Post-HPLC column reagent addition, stop flow, peak collection
- Precision dispensers and sampling devices (such as autosamplers)
- Sample introduction systems for ICP nebulizers

## Specifications

| Power requirement | All Models | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rest current draw | 50 mA | | | | | | | |
| Operational current draw | Typical 750 mA (RMS) | | | | | | | |
| Voltage | Typical 24 VDC, input voltage 12 - 48 VDC | | | | | | | |
| **Communications (COM1 or COM2)** | | | | | | | | |
| Type | RS-422/485 | | | | | | | |
| Baud rate | Default 9600 bps, Full range 4.8 - 115.2 kbps | | | | | | | |
| Parity | None | | | | | | | |
| Data bits per character | 8 | | | | | | | |
| Stop bits | 1 | | | | | | | |
| Error checking | None | | | | | | | |
| Mode | ASCII | | | | | | | |
| **Environmental** | | | | | | | | |
| Operating Temperature | 0 - 50°C | | | | | | | |
| Operating Humidity | < 90% non-condensing | | | | | | | |
| Storage Temperature | -20°C – 70°C (dry) | | | | | | | |
| **Motor** | | | | | | | | |
| Type | 2 Phase Bipolar (1.8° per step) | | | | | | | |
| **Planetary Gear Assembly** | **M6** | | **M6HP** | | **M50** | | **M50HP** | |
| Ratio | 4.75:1 | | 4.75:1 | | 9.86:1 | | 9.86:1 | |
| **Physical Specifications** | **Al version** | **SS version** | **Al version** | **SS version** | **Al version** | **SS version** | **Al version** | **SS version** |
| Weight – Pump | 300 g | 520 g | 355 g | 575 g | 320 g | 540 g | 365 g | 590 g |
| Weight – Motor and gear assy. | 570 g | 570 g | 570 g | 570 g | 660 g | 660 g | 660 g | 660 g |
| Weight – MForce controller | 80 g | 80 g | 80 g | 80 g | 80 g | 80 g | 80 g | 80 g |
| Weight – Power supply | 512 g | 512 g | 512 g | 512 g | 512 g | 512 g | 512 g | 512 g |
| Resolution | MSEL=256 | | MSEL=256 | | MSEL=256 | | MSEL=256 | |
| Minimum flow | 5 nL/min | | 5 nL/min | | 1 µL/min | | 1 µL/min | |
| Maximum continuous flow | 5 mL/min | | 5 mL/min | | 25 mL/min | | 25 mL/min | |
| Maximum intermittent flow* | 10 mL/min | | 10 mL/min | | 35 mL/min | | 35 mL/min | |
| Maximum back pressure | 100 psi | | Up to 1500 psi | | 100 psi | | Up to 500 psi | |
| Volume accuracy (%error) | < ±0.5% | | < ±0.5% | | < ±0.5% | | < ±0.5% | |
| Volume precision (%CV) | <0.1% at 1.25 mL<br><0.5% at 125 µL | | <0.1% at 1.25 mL<br><0.5% at 125 µL | | <0.1% at 8 mL<br><0.5% at 800 µL | | <0.1% at 8 mL<br><0.5% at 800 µL | |
| Fittings | 1/16" Valco detail (10-32) | | 1/16" Valco detail (10-32) | | 1/8" Cheminert (1/4-28) | | 1/8" Cheminert (1/4-28) | |
| Fluid contact | PTFE, Sapphire, PAEK, Viton®, and Valcon P | | PTFE, Ceramic, PAEK | | PTFE, Ceramic, Valcon H2 | | PTFE, Ceramic, XPTFE | |

* High speed continuous flow or the use of chemicals incompatible with the wetted surfaces will reduce pump lifetime.

## Ordering Information

For best service, please call to discuss your application before placing your order.

| | | *Aluminum body* | *Stainless steel body* |
|---|---|---|---|
| **Model M6** | 5 nl to 5 ml, <100 psi<br>Pump with controller and stepper motor | CP2A-4841-F1 | CP2-4841-F1 |
| **Model M6HP** | 5 nl to 5 ml, <1500 psi<br>Pump with controller and stepper motor | CP2A-4141-F1HP | CP2-4141-F1HP |
| **Model M50** | 100 nl to 25 ml, <100 psi<br>Pump with controller and stepper motor | CP3A-8182-F2 | CP3-8182-F2 |
| **Model M50HP** | 100 nl to 25 ml, <500 psi<br>Pump with controller and stepper motor | CP3A-8112-F2HP | CP3-8112-F2HP |

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