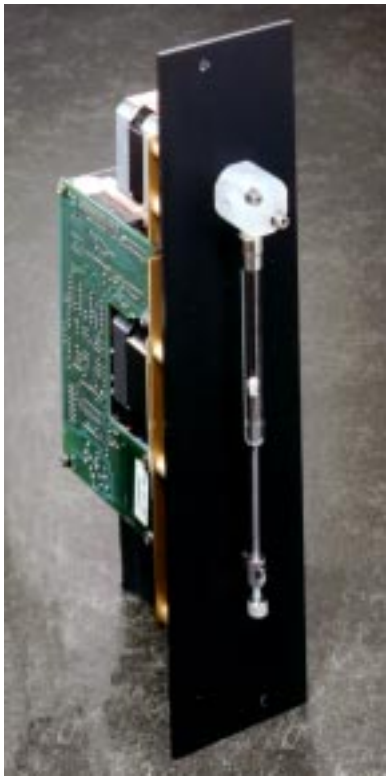
ADVANCED LIQUID HANDLING, INC.

- Zero backlash
- Absolute linearity
- Small size
- Versatile syringe interface
- Stepper-controlled valve rotation
- Quiet, reliable mechanism
- Stepper motor or DC servo drive
- Integrates with popular controllers
- Inert internal components
- Servo feedback optional
- Easily integrated into new and existing systems
- 24 VAC controller available



MBP2000
Syringe Pump

The **MBP2000** is the elegant solution for microliter fluid handling - simple, straight forward, yet advanced. The pump produces precise displacement for the aspiration and dispensing of a wide variety of fluids for many applications.

All of the MBP pumps have a proven, reliable drive and valve mechanism to assure it will operate quietly and precisely in the microliter range for many years.

The **zero backlash** mechanism provides for speed, less syringe wear, and no need for backlash compensation programming.

SIZE AND CONVENIENCE

The small size adds to the convenience by accommodating chassis and cavity parameters of existing equipment. This allows you to use our pump as a **drop-in** component to replace existing dispensing equipment. Additionally, the **MBP2000** can be easily integrated into new product designs so that the new system can take up less valuable counter space.

Because of the convenient mounting and easy access to tubing connections, this pump contributes to efficient manufacturing and maintenance.

COMPATIBILITY

The **MBP2000** is available with an inert valve and interconnect components to make it compatible with standard diagnostic fluids and reagents. It is compatible with clinical diagnostic industry standard controllers and syringes.

ELECTRONICS

Our new electronics module emulates either Hamilton ML-OEM® or Cavro XL3000® protocol. All you need is 24V AC and an RS232 connection to your computer [TX, RX, & Gnd]. In addition this new circuit board is sized to fit both of our digital syringe pumps the **MBP2000** and our new, smaller **MBP.5**

Specifications

Size:	As shown: 8"(203mm)H x 2.2"(56mm)W x 4"(100mm)D (behind panel)
Weight:	As shown: 38oz.(1.08kg)
Capacity:	Maximum syringe volume: 10 ml
Measured Volume:	Min: 0.001 x syringe volume Max: syringe volume
Force:	Up to 20 lbf (9 kgf)
Speed:	Syringe: Maximum 1 second full stroke Valve: 1/4 to 1/2 second switch time
Resolution:	2000 steps
Stroke:	60mm
Valve:	Teflon & Kel-F 3/4 way shear (as supplied)
Power:	Syringe Drive: 1.1 amp @ 4VDC Valve Drive: 0.95 amp @ 4VDC Sensors: 5VDC optical (totem pole output)
Firm ware:	Hamilton ML-OEM® or Cavro XL3000® protocol emulation

Accuracy and Precision:
Accuracy and precision are typically better than 1% and 0.01%, respectively depending on electronics, software and hydraulic connections.

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MBP.5
Syringe Pump

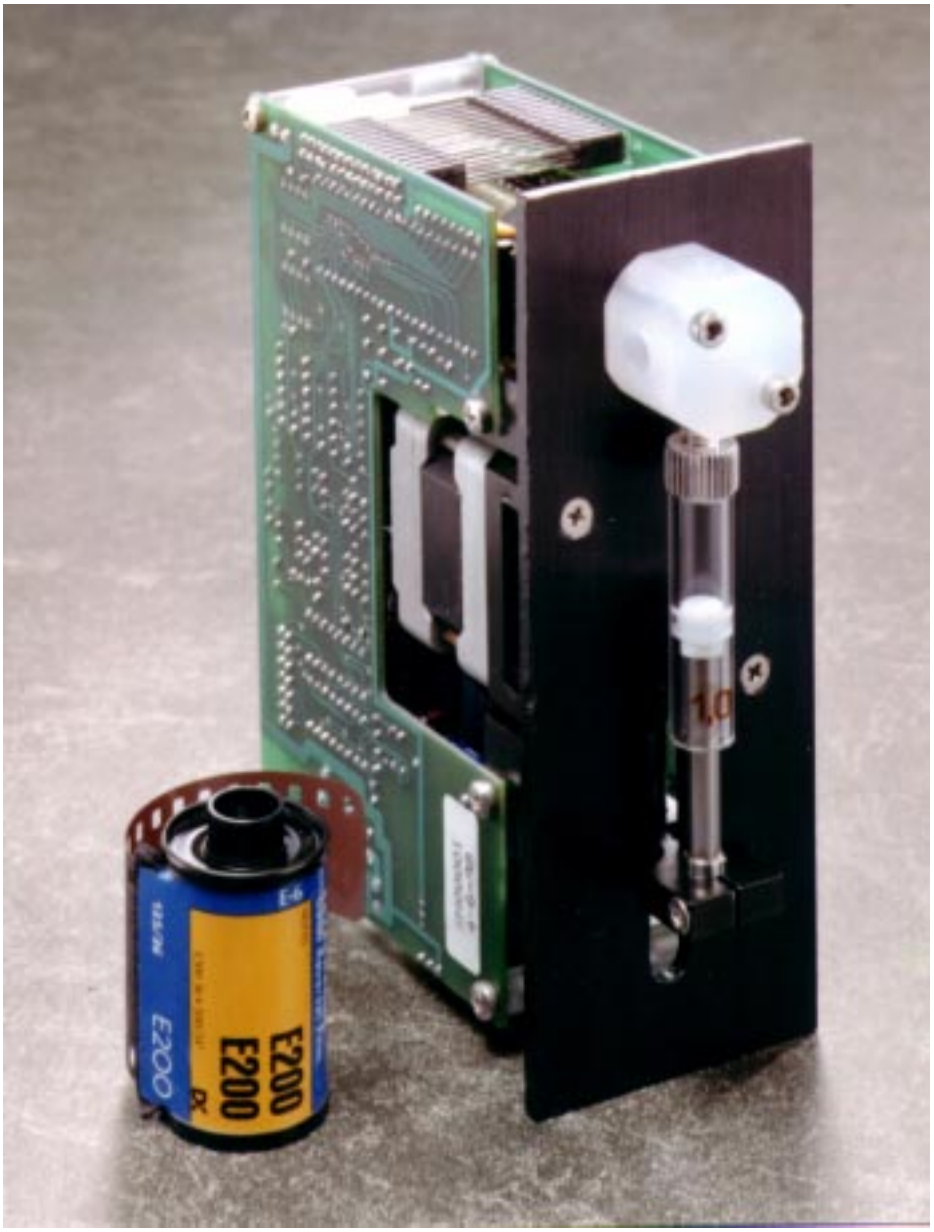
The **MBP.5** is the new petite solution for microliter fluid handling - simple, straight forward, yet advanced. The pump produces precise displacement for the aspiration and dispensing of a wide variety of fluids for many applications.

All of the **MBP** syringe pumps have a proven, patented **zero backlash** drive mechanism that provides for: less syringe wear; no backlash compensation programming; near absolute linearity; and quiet and precise operation in the microliter range for many years.

COMPATIBILITY & CONVENIENCE

This mechanism is available with industry standard electronics. An inert valve and interconnect components make it compatible with standard diagnostic fluids and reagents.

The compact **MBP.5** can be easily integrated into new product designs to provide a smaller footprint.



Fit Two in the Space of One

Specifications

Size:	As Shown: 5"(127mm)H x 1.75"(45mm)W x 3.5"(89mm)D (behind panel)
Weight:	Approximately 21oz (600g)
Capacity:	Maximum syringe volume: 2.5 ml
Measured Volume:	Min: 0.001 x syringe volume Max: syringe volume
Force:	Up to 9 lbf (4 kgf)
Speed:	Syringe: Maximum 1 second full stroke Valve: 1/4 to 1/2 second switch time
Resolution:	2000 steps
Stroke:	30mm
Valve:	Teflon & Kel-F 3/4 way shear (as shown)
Power:	Syringe Drive: 0.95 amp @ 4VDC Valve Drive: 0.20 amp @ 4.5VDC Sensors: 5VDC optical (totem pole output)
Firm ware:	Hamilton ML-OEM® or Cavro XL3000® protocol emulation

Accuracy and Precision:
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ADVANCED LIQUID HANDLING, INC.

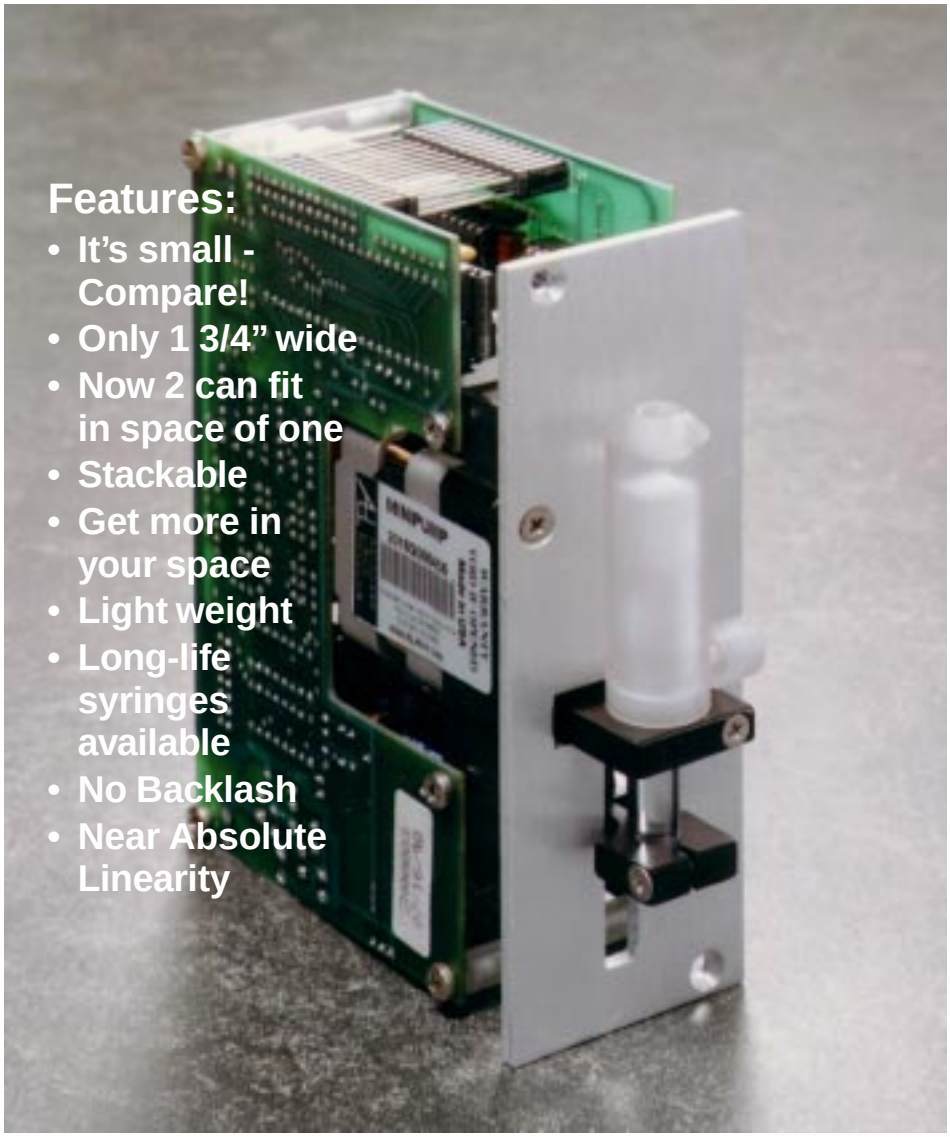
Minipump
Syringe Pump

You can go to the head of your class with our new **Minipump**. This versatile little pump uses standard protocols and is adaptable to your many needs.

Choices:

- With or without electronics
- With or without valve
- With or without front panel
- Stand alone case or none
- Long life displacement syringes or standard short (3cm) syringes

As with all ALH pumps, the **Minipump** features our patented **ZERO-BACKLASH** technology



A Pump You Can Play With

Call Us
1-800-55 99 254

Typical Specifications

Size:	As Shown: 5"(127mm)H x 1.75"(45mm)W x 3.5"(89mm)D (behind panel)
Weight:	As Shown: 19oz (540g)
Capacity:	Maximum syringe volume: 2.5 ml
Force:	Up to 9 lbf (4 kgf)
Speed:	Syringe: Maximum 1 second full stroke
Resolution:	2000 steps
Stroke:	30mm

Syringe	Volume	1ml (as shown) up to 2.5 ml
	Body Material:	Polycarbonate/polyolefin
	Piston Material:	Borosilicate glass
Valve:	Teflon & Kel-F 3/4 way shear (as supplied)	
Firm ware:	Hamilton ML-OEM® or Cavro XL3000® protocol emulation	
Imprecision:	<0.01% C.V. at full stroke	

Specifications subject to change without prior notice. ®Registered Trademarks are the property of their respective owners.

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ADVANCED LIQUID HANDLING, INC.

SMPL5

Microsyringe Drive

Let ALH **SMPL5** your life with our new microsyringe drive. Our patented microsyringe drive is designed to give everyone a hand -- from the industrial, mechanical, and electrical designers to the users in the lab.

Its small footprint allows the industrial designer easy design options for a small, attractive package. The mechanical designer is helped with the easy installation, and the tested and customer friendly design that has NO backlash. The electrical designer can be happy because we use standard stepper motors and sensors.

The lab users are given a big hand because of our manually removable syringe, that eases cleaning and changing. It is not necessary to operate the syringe from a remote electrical source. It is manually positionable and removable.

Let ALH give you a hand with your autosampling for GC, reagent additions, and transfer pipetting. Do you need to **SMPL5** your application?

Can We GiveYou a Hand?

Features and Benefits

- Complete package
- No backlash
- Near absolute linearity
- Easily, manually removable syringe
- Positionable without power
- Redefines economical
- Small **and** Compact
- Quiet
- Light weight
- Elegantly simple
- Adaptable
- Custom mounting
- Flexible / user- defined installation

Specifications

Size:	5.25"(133mm)L x 2.5"(64mm) W x 1.88"(48mm)D
Weight:	9.5 oz(270g)
Capacity:	Maximum syringe volume: 1 ml
Force:	Up to 5 lbf (2.25kgf)
Speed:	Typical Max= 1 second full stroke
Resolution:	2000 steps @ 60mm stroke
Power:	0.95 amp @ 4 VDC
Sensor:	5 VDC optical (totem pole output)

Accuracy and Precision:
Accuracy and precision are typically better than 1% and 0.01%, respectively depending on electronics, software and hydraulic connections.

Specifications subject to change without prior notice.

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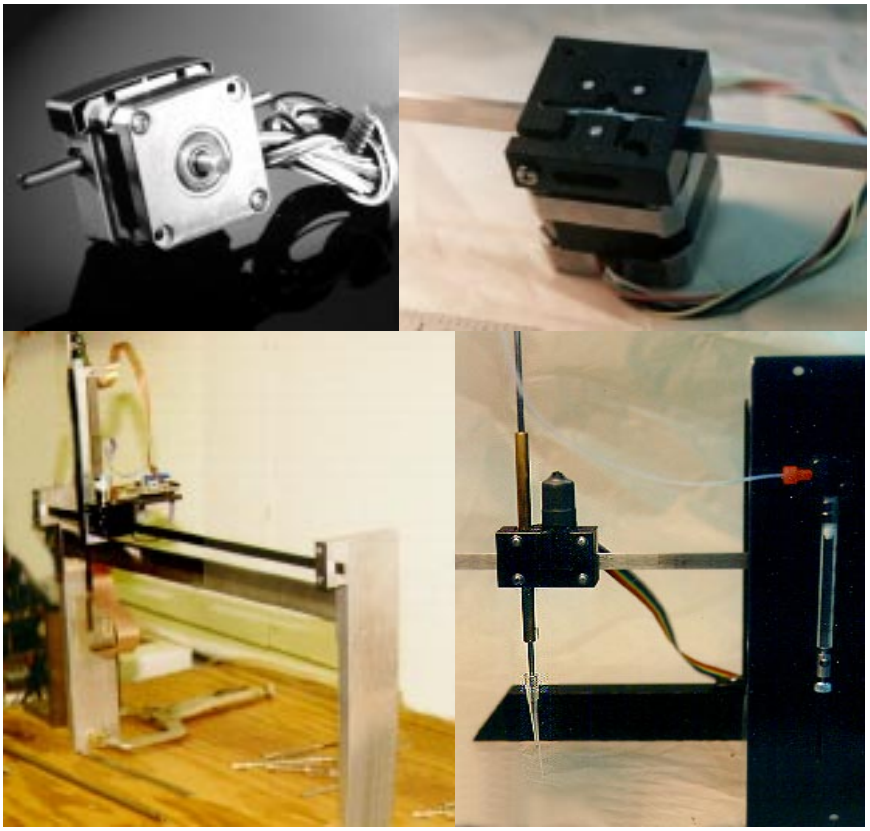
ADVANCED LIQUID HANDLING, INC.

How many ways could you use a linear drive?

- Pick and place operations
- Positioning
- Dispensing / delivery
- Moving trays, lenses, etc.
- In an XYZ configuration
- Sample injection
- For robotics
- Lab automation



Linear Drives
"The Crawlers"

- Positive motion
- **ZERO** backlash
- Near Absolute Linearity
- Versatility
- Simplicity
- Accuracy
- Ease of integration
- Pre-packaged
- Drop-in
- No belts, pulleys, gears
- Any length travel

Typical Specifications -
(Custom-made to Customer Needs)

Size: 150% of motor volume + rail
Weight: 150% of motor weight
Force: Up to 30 lbf (Adjustable)
Speed: 3"/sec or 2000 steps/sec at 0.006"/step is standard.

Guide Rail/Output shaft length:
Any length to fit customer application

Accuracy and Precision:
Depends on electronics and software.

Electrical: Hybrid stepper - or - servo motor

Specifications subject to change without prior notice.

Everything is there. All you do is frame it. ALH provides an easily integrated linear drive mechanism.

Let us put our expertise to work with yours to create your next linear or multi-axis system.

Affordable Automation

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ADVANCED LIQUID HANDLING, INC.

Electronics

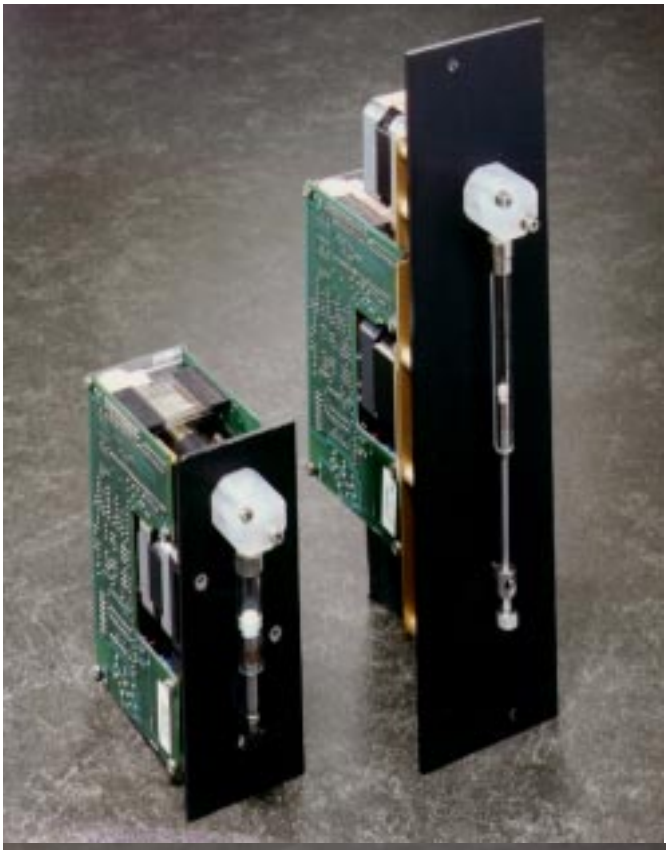
Our new electronics modules emulate either Hamilton ML-OEM® or Cavro XL3000® protocol. All you will need is 24Volts and an RS-232 connection to your computer. It is sized to conveniently fit on either of our MBP units, the **MBP2000** and the new **MBP.5**.

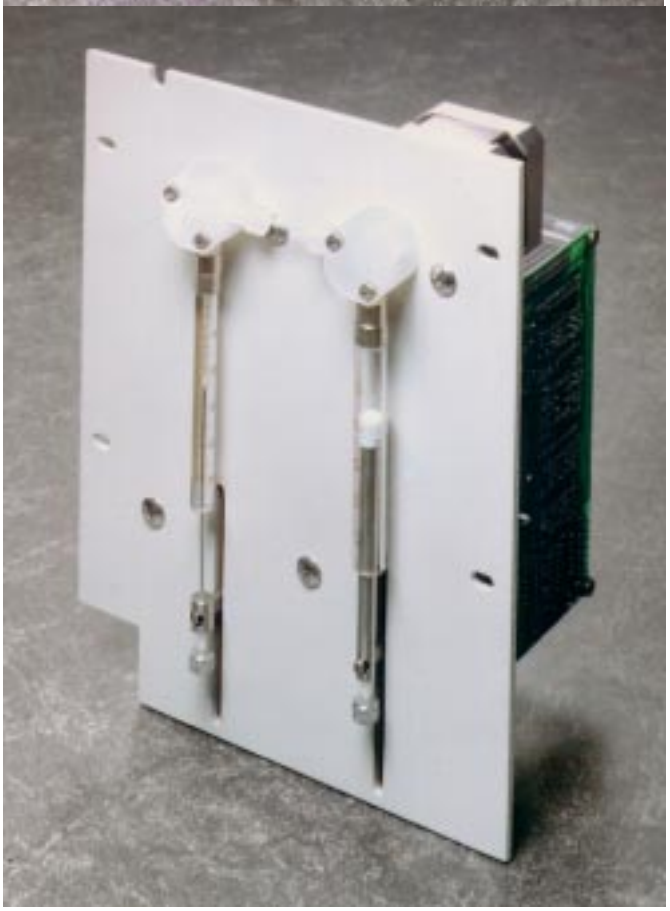
The electronics module is made in two sections in order to accomodate both the packaging requirements and to facilitate customization. Only a single power input of 24 Volt AC or DC is required. The control is RS-232 [TX, RX & Gnd]. Up to sixteen circuit boards may be controlled from a single communication port.

The controller board provides the power regulation, communication, position sensing, program storage and processing. Currently we have two emulations available for compatability with Hamilton® and Cavro® protocols.

The driver board contains two, three, or four Bi-Polar stepper motor driver circuits.

Our solution to the Pipetter-Diluter electronics is an example of cost effective customization. Even though there are two syringe drives, all of the commands and operations can be handled by one set of boards. It is simply a matter of programming changes. This saves the customer and ALH time and money.





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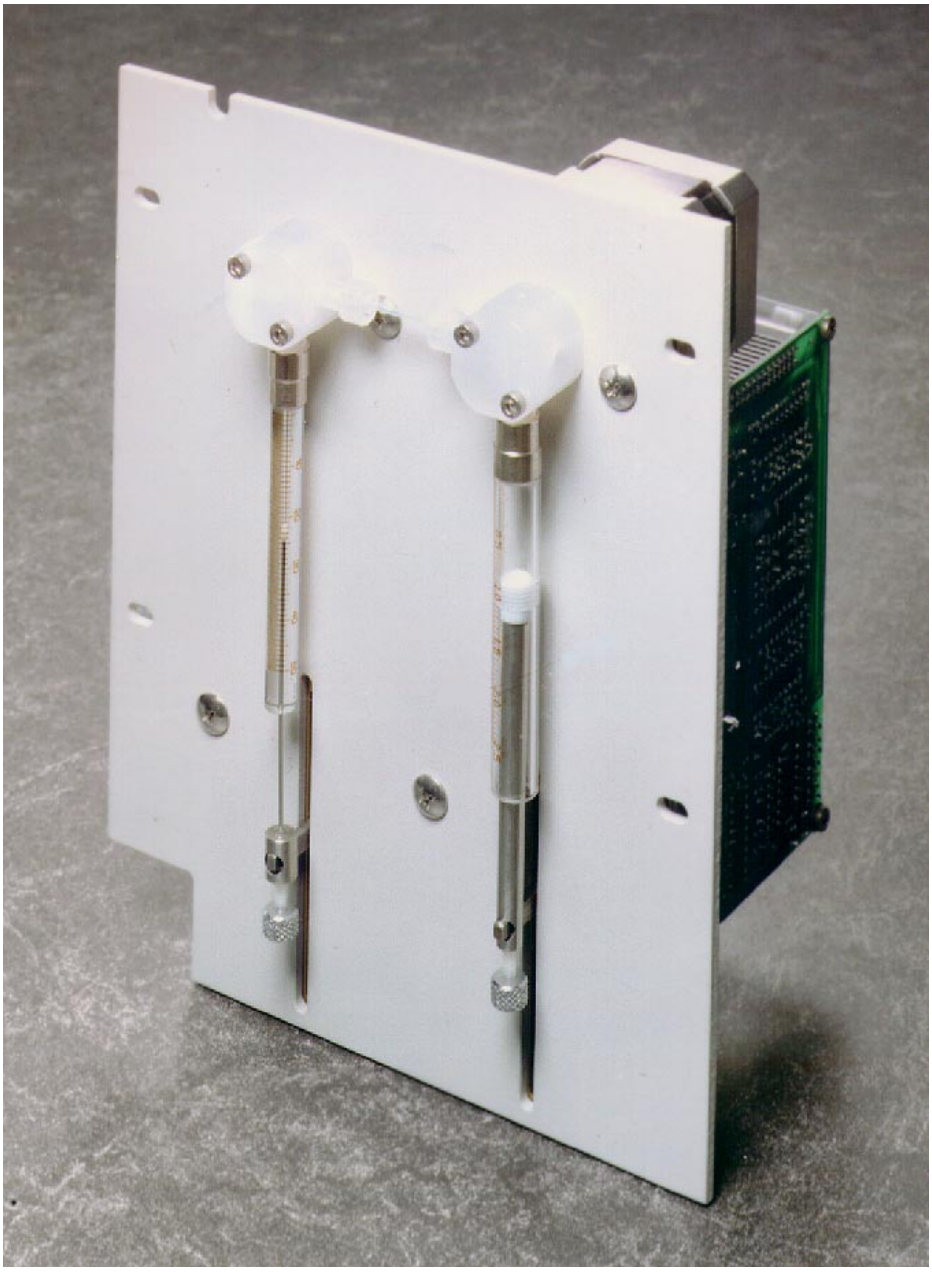
ADVANCED LIQUID HANDLING, INC.

MBP-PD
Pipetter-Diluter



The ALH **MBP-PD** is a perfect example of integrated engineering. We start with two of our proven **MBP2000** digital syringe pumps. We then use only one set of electronics to control both pumps.

When we designed our circuit board electronics we had the foresight to provide the ability to drive two pumps with one set of electronics. This reduces the costs to both you, the customer, and ALH since two sets of electronics do not have to be purchased.

The panel, syringes and mounting considerations are configured to the customer's needs.

Specifications For Typical Configuration

Size:	As shown: 9"(289mm)H x 6.5"(165mm)W x 4"(100mm)D (distance behind panel)
Weight:	<5lbs (2kg)
Capacity:	Syringe volume: 10 ml
Speed:	Syringe: Maximum 1 second full stroke Valve: 1/4 to 1/2 second switch time
Resolution:	2000 steps @ 60mm stroke
Valve:	Teflon & Kel-F 3/4 way shear
Power:	24Volt AC or DC
Communication:	RS-232 Serial [TX, RX & Gnd]
Firm ware:	Hamilton ML-OEM® or Cavro XL3000® protocol emulation

Accuracy and Precision:
Accuracy and precision are typically better than 1% and 0.01%, respectively.

Specifications subject to change without prior notice. ®Registered Trademarks are the property of their respective owners.

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ADVANCED LIQUID HANDLING, INC.

Fixed Volume Pumps FVP & Pipetter-Diluter FVPD

- **No power supply** (120/240V AC)
- **No Computer**
- **No Programming**
- **No Electronics**
- **Fixed Volume**
- **Lower Cost**

ALH does many custom projects for companies as well as continued internal research and development. One of these projects resulted in the design of two devices: Manually adjustable, fixed-volume dispensers and a fixed volume pipetter- diluter.

These are manually adjusted units with no electronics to worry about. Just plug it in. Set the volume. Flip the switch. Away it goes. They will pump the same volume each time the switch is operated.

Perfect for those seldom changed activities or relatively disposable applications. They would be ideal for multi-channel applications where the volume pipetted or dispensed does not need to be dynamically altered. They would also be useful in a manual or semi-automatic testing environment due to their extreme precision coupled with low cost and ease of use. These are very economical solutions for any laboratory or field application.

Manual •

Mechanical •

Independent •

Accurate •

Simple •

Specifications

Size:	As Shown 5"H x 3"W x 3"D	**Resolution:**	Infinite
Weight:	1 pound	**Valve Material:**	Teflon and Kel-F
Capacity:	1ml as shown(can be scaled up/down)	**Power:**	110 / 220 Volt AC
Measured Volume:	Up to 1ml (as shown)	**Precision:**	0.01% C.V. or better
Speed:	2-4 seconds per cycle		

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