PRECISION LIQUID HANDLING

Diluters & Dispensers

HAMILTON
THE MEASURE OF EXCELLENCE™

Save Time Preparing Samples and Standards

Semi-automated Liquid Handling

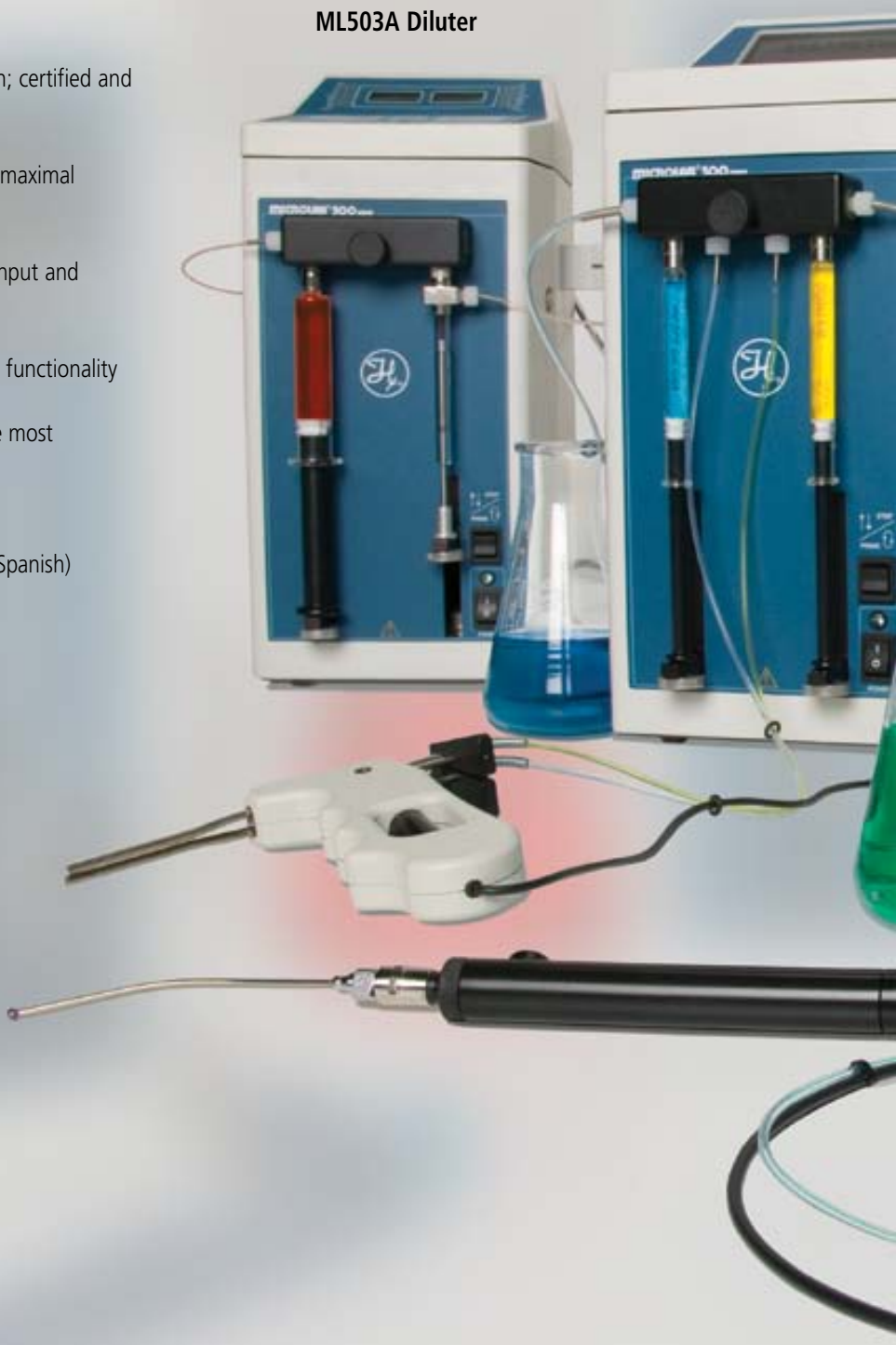
MICROLAB 500 diluters and dispensers are precision fluid measuring instruments based on Hamilton's world renowned syringe technology. The semi-automated instruments use positive displacement to achieve highly accurate and precise fluid aspirations and dispenses.

A simple touch of the hand probe button or a tap of the foot switch, actuates the precision syringe drives to fill or dispense a desired volume of fluid.

- Better than 99% accuracy and precision; certified and traceable to N.I.S.T.
- Borosilicate and PTFE fluid path ensure maximal chemical resistance
- Precision syringe drives increase throughput and minimize sample waste
- Selectable valve configurations increase functionality
- Self-guiding software wizards make the most complex methods simple
- Operates in your preferred language. (English, French, German, Portuguese, Spanish)

ML503A Diluter

ML540B Dispenser



with MICROLAB® 500 Instruments

ML560 With Animal Dosing Probe

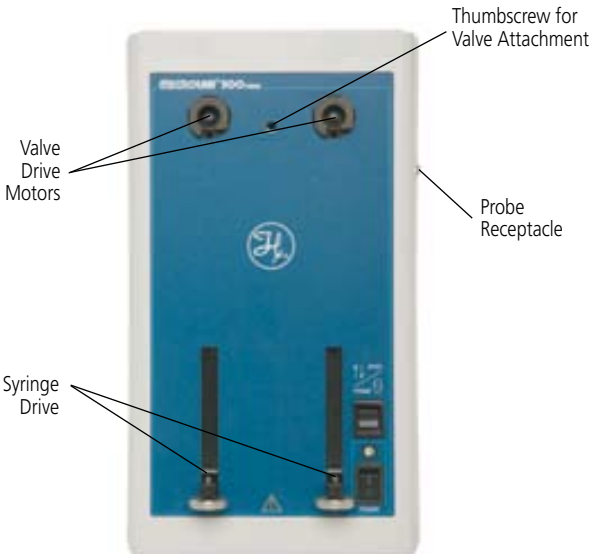
MICROLAB® ML500 Models

MICROLAB 500 Single Syringe Dispenser

The MICROLAB 500 Single Syringe Dispenser has one syringe drive and one valve positioner. The precision syringe drive accurately dispenses between 10% and 100% of the maximum volume for the attached syringe. The single syringe dispenser fits syringes from 10 µL* to 25 mL. This unit is typically used for dispensing an individual fluid where the maximum volume dispensed does not exceed the syringe volume.

MICROLAB 500 Dual Syringe Diluter

The MICROLAB 500 Dual Syringe Diluter has two syringe drives and one valve positioner over the left syringe. The unique fluid path accommodates two different syringe volumes in a single fluid path. The result is a larger range of volumes that can be accurately dispensed, allowing the ML500 Diluter to perform up to a 1 to 25,000 fold dilution in a single step. The dual syringe diluter fits syringes from 25µL to 25 mL. This unit is typically used for adding an internal standard or diluting a sample prior to analysis.

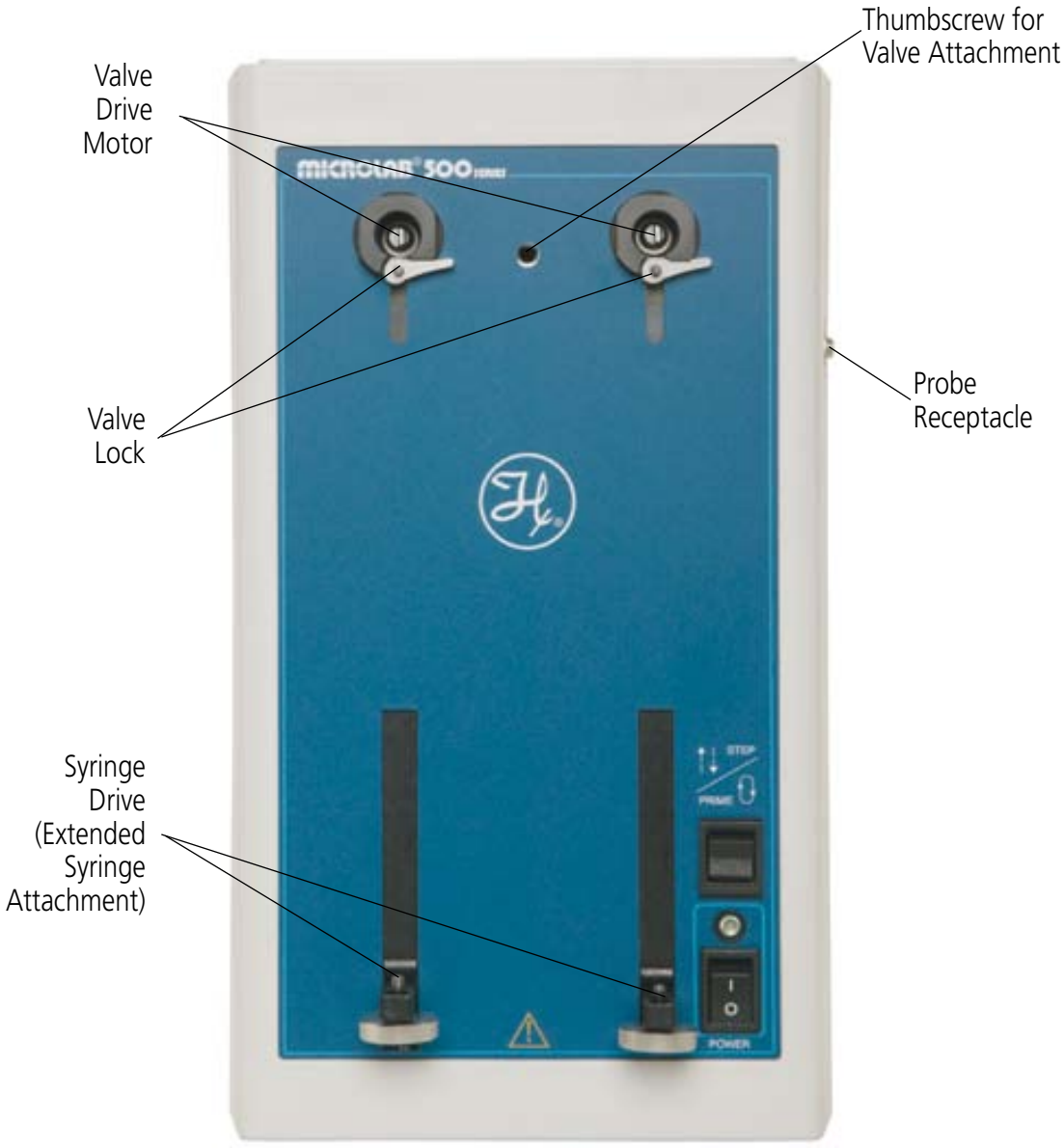


MICROLAB 500 Dual Syringe Dispenser

The MICROLAB 500 Dual Syringe Dispenser has two syringe drives and two valve positioners. The pump is designed for applications that require two unique fluid paths and accurate dispensing from 10% to 100% of the maximum volume for the attached syringe. The dual syringe dispenser fits syringes from 25 µL to 25 mL. This unit is typically used for pH adjustment, dispensing a single fluid where the volume dispensed is greater than the volume of the syringe, or for dispensing 2 different fluids into the same container.

* A 10 µL syringe is only available when using a valve with 1/4-28 threads.

MICROLAB® ML560 Model



MICROLAB 560 Dual Syringe Liquid Handler

The MICROLAB 560 Dual Syringe Liquid Handler not only accommodates all the valves used in the ML500 diluter and dispenser models, it also accepts a wide variety of solvent selection and distribution valves. By fitting the ML560 with the appropriate valve combination, complex fluid handling challenges are quickly solved. The computer control of the ML560 means that programming for a complex application is simple. The graphical display constantly informs the user of the program status. The dual syringe liquid handler can fit syringes from 10µL* to 50 mL**.

* A 10 µL syringe is only available when using a valve with 1/4-28 threads.
** A 50 µL syringe is only available for applications with a low duty cycle. Due to the large size the 50 mL syringe can wear out within 10,000 strokes.

MICROLAB® ML500 Controllers

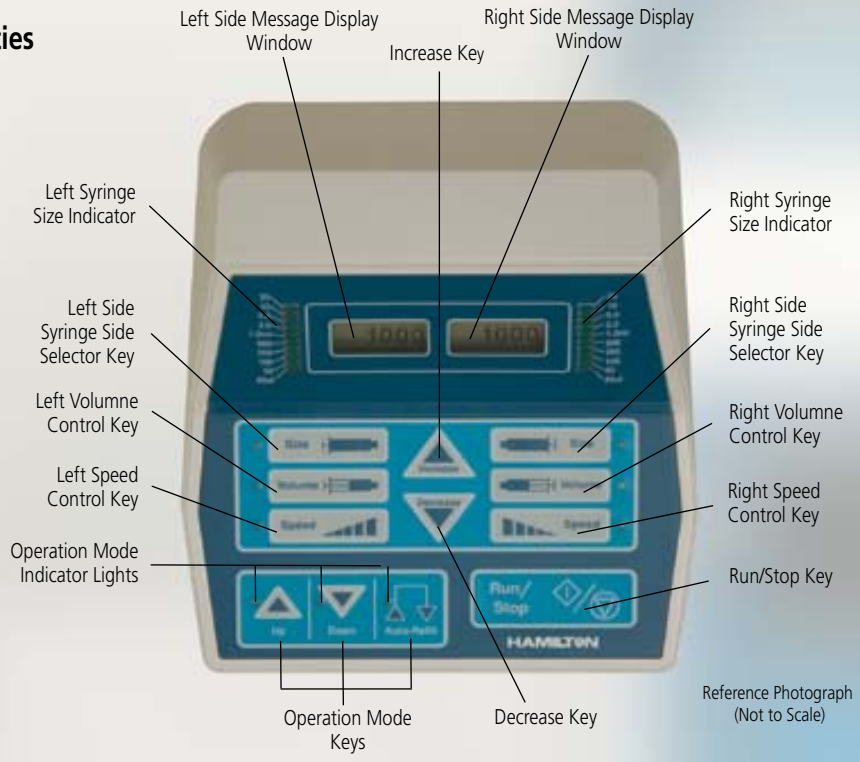
MICROLAB 500A Controller Capabilities

Method types:

- Simple Dilute
- Simple Dispense

Program Options:

- Syringe Speed (2-20 sec/stroke)
- Automatic Fill Command
- No Method Storage



Reference Photograph (Not to Scale)

MICROLAB 500B Controller Capabilities

Method types:

- Dilutions - simple, serial, multi-sample/reagent or internal standard addition
- Dispenses - aliquot, serial, simple
- Pipette
- Titrate
- Custom Method

Program Options:

- Air Gaps
- Syringe Speed (1-250 sec/stroke)
- Time Delay
- Wash Commands
- Automatic Aspirate, Dispense and Fill
- Return to Reservoir
- Storage of 21 Methods

Reference Photograph (Not to Scale)

MICROLAB® ML500 Software

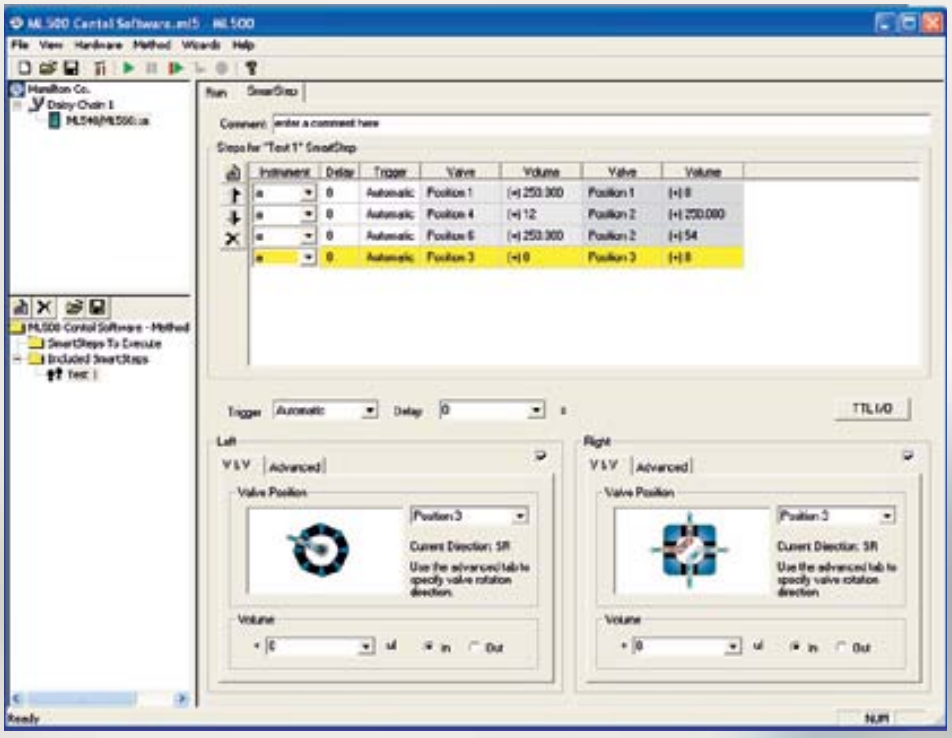
MICROLAB 500C Capabilities

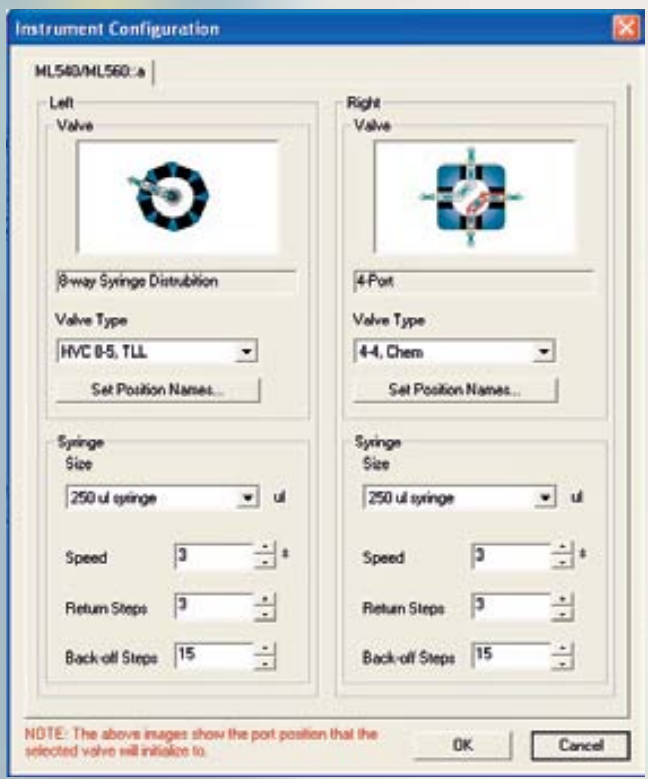
Method types:

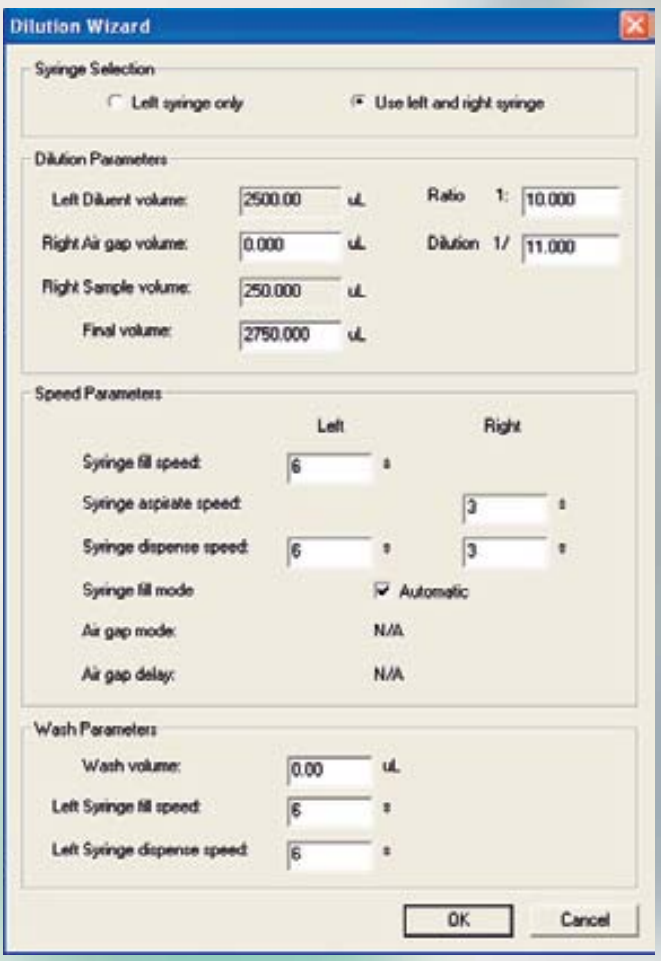
- All ML500 A and B Methods
- Continuous Dispensing

Program Options:

- All ML500 A & B Options
- Syringe Speed (1-250 sec/stroke)
- TTL Communication
- Command Looping
- Execution Counters
- Instrument Daisy Chaining







Applications

Diluter Applications	Industry
Atomic Absorption (AA) and Inductively Coupled Plasma Spectroscopy (ICP)	• Environmental (Monitoring rivers, seawater, drinking water, air, petrol, wine, beer, and juice) • Pharmaceutical (Quantitation of Catalyst) • Industry (Quantitation of toxic impurities like lead) • Mining (Quantity of gold in a rock sample)
Liquid Scintillation	• TLC Spot Quantitation • Counting Samples bound by filters • Counting Tissue Samples • Counting $^{14}CO_2$ • Counting samples purified by Electrophoresis • Wipe testing to identify radioactive contamination
Blood Alcohol Analysis	Blood alcohol analysis is used by law enforcement to determine if a driver was unlawfully operating a vehicle. The results will be used in a court of law, therefore it is important to minimize systematic and operator error.
Scheduled Oil Sampling (SOS)	• Aviation • Road Maintenance • Construction • Transportation • Mining

Dispenser Applications	Industry
Ink Cartridge Filling	The ML500 is used to fill new and recycled ink cartridges. The syringe pump ensures accuracy and is chemically resistance to the viscous inks.
Contact Lens Manufacturing	The ML500 is used to dispense an accurate volume of monomer into a mold to create a contact lens.
Lab Animal Studies Injection (LASI)	The LASI system was developed for dispensing volumes between 25 nL and 25 µL. An innovative syringe and valve assembly allows for recovery of all liquid contained in the fluid path.
Continuous Dispensing	Automated dispensing applications require rapid dispense capabilities. The continuous dispenser fill one syringe while the other syringe is dispensing to eliminate the time lost during the fill stroke.

Full application notes available at **www.hamiltoncompany.com/diluters/pdf_downloads.asp**

Demonstration Program

Do you have an application in mind?

Call and speak with a product specialist to select the best ML500 for your application. The right pump and valve configuration can perform a variety of common tasks from a single instrument setup. Get the most out of your pump by utilizing the full potential of the MICROLAB® 500.

Do you need help choosing the correct instrument?

1. Contact a Product Specialist **(800) 648-5950** or **sales@hamiltoncompany.com**
2. Identify the Best ML500 for the Application
3. Place an order for the Demonstration ML500
4. A new instrument will be drop shipped for a 30 day trial

Standard MICROLAB® 500 Operation

MICROLAB Diluters

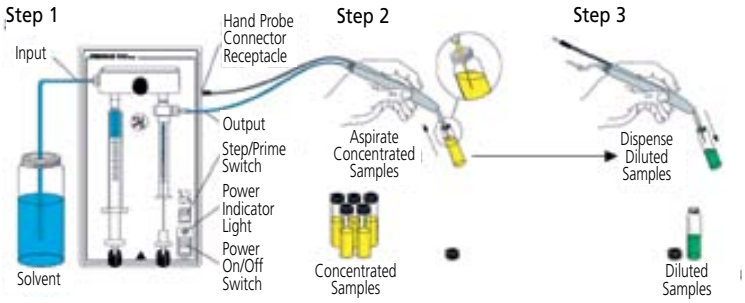
After priming the instrument, simple dilutions can be made in three easy steps.

Step 1: Fill the left syringe with the programmed amount of solvent (diluent) from the reservoir.

Step 2: Aspirate the programmed amount of concentrated sample into the end of the probe using the right syringe.

Step 3: Dispense the sample and solvent into a vial to complete the dilution.

In addition to simple dilutions performed on all MICROLAB 500 diluters, the B/C series Dispensers can perform serial and multi-sample/reagent (or internal standard addition) dilutions.



Method Type	ML500 Series A	ML500 Series B/C	Method Illustrations
1. Simple dilution 2. Pipette (w/disposable tip)	●	●	Fill diluent; Aspirate sample; Dispense sample & diluent
Serial dilution (programmed)		●	1/10; 1/25; 1/50; 1/100 — Varying dilution ratios with the same final volume
Serial dilution (tube to tube)		●	Sample; 1/10; 1/100; 1/1000 — Transfer sample aliquots from tube 1 to tube 2...
Multi-sample/ reagent dilution (or internal standard addition)		●	Fill diluent; Aspirate; Aspirate standard; Dispense standard, sample & diluent
Return to reservoir		●	Save reagent in the fluid path by returning to reagent reservoir

Blue = diluent Yellow = sample Orange = standard
Green = diluted sample Purple = diluted sample + standard

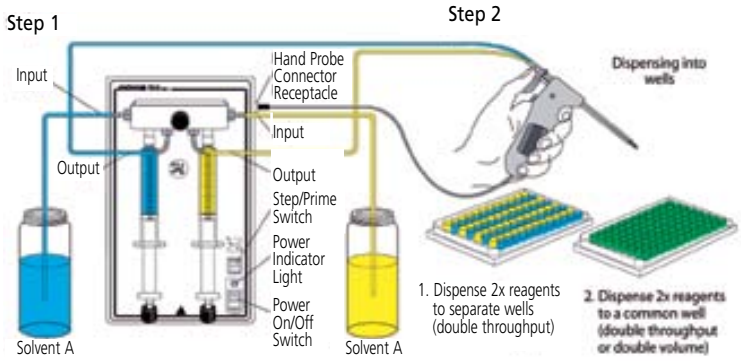
MICROLAB Dispensers

Dispenses, including titrations, can be made in two easy steps after priming the instrument.

Step 1: Fill the syringe(s) with the programmed amount of reagent from the reservoir.

Step 2: Dispense the programmed amount(s) into a microwell plate, test tube, vial, etc. to complete the dispense cycle.

In addition to simple dispenses performed in all ML500 dispensers, the B/C series Dispensers can perform aliquot, serial, pipette and titrate dispenses.



Method Type	ML500 Series A	ML500 Series B/C	Method Illustrations	
Simple dispense	●	●		Reagent is filled from a reservoir and dispensed
Aliquot dispense		●		Repetitive dispense with constant final volume
Serial dispense		●		Repetitive dispense with a variable final volume
Pipette		●		Aspirate sample then dispense
Titrate		●		Repetitive dispense to endpoint
Reagent dilution (dual syringe only)	●	●		Addition of two reagents to a common vial
Return to reservoir		●		Save reagent in the fluid path by returning to reagent reservoir

Blue = diluent Yellow = sample Green = diluted sample Purple = titration endpoint

Technical Specifications for MICROLAB 500 Diluters and Dispensers

Specifications	MICROLAB 500A	MICROLAB 500B/C
Accuracy	Within ±1%	Within ±1%
Precision	Within ±0.2%	Within ±0.2%
Resolution	0.1% of syringe volume	0.1% of syringe volume (0.05% w/PC control)
Volume Increment	0.1% to 100% of total syringe volume	0.1% to 100% of total syringe volume
Speed	2 to 20 seconds per full syringe stroke	1 to 250 seconds per full syringe stroke
Syringe Drive Mechanism	Stepper motor driven high precision lead screw	Stepper motor driven high precision lead screw
Power Requirements	100-240VAC; 50-60Hz	100-240VAC; 50-60Hz
Power Rating	80 VA	80 VA
Program Memory	One program retained while power is on	21 programs retained in battery back-up memory, unlimited storage with PC control
Communication Interface	MICROLAB 500A controller only	MICROLAB 500B controller, and software package RS-232, baud rate selectable; TTL out
Baud Rate	Factory set	1,200 - 38,400 Selectable
Certifications	CE, CSA, TÜV/GS	CE, CSA, TÜV/GS

All MICROLAB 500 Diluters and Dispensers are shipped from the factory fully tested, traceable to N.I.S.T. standards.

MICROLAB® 500 Diluters

MICROLAB® 500 Diluters

- Save time during sample preparation
- Eliminate technician-to-technician method variability
- Simplify compliance to method documentation requirements for regulations and standards, such as those of the EPA, FDA (GLP, GMP), and ISO

ML503A with Disposable Tip Hand Probe

Dilution	(Diluent)	Solvent Volume Sample Volume	Final Volume (Diluted Sample)
1/4	750 µL	250 µL	1000 µL
1/10	900 µL	100 µL	1000 µL
1/25	960 µL	40 µL	1000 µL
1/50	980 µL	20 µL	1000 µL
1/100	990 µL	10 µL	1000 µL
1/250	996 µL	4 µL	1000 µL
1/500	998 µL	2 µL	1000 µL
1/1000	999 µL	1 µL	1000 µL

ML530B

ML560C with Large Volume Probe Package

Ordering Information

Model	Part #	Description	Accessories
ML503A	ML503115	Diluter with A series controller, 115VAC	Ships Complete with a 2.5mL Diluent and 250µL Sample Syringe
ML530B	ML530115	Diluter with B series controller, 115VAC	Ships Complete with a 2.5mL Diluent and 250µL Sample Syringe
ML531C	ML531115	Diluter Software Controlled (PC not included), 115VAC	Requires syringes and part number DILPKG
ML560C	ML560115	Liquid Handler Software Controlled (PC not included), 115VAC	Requires syringes and part number DILPKG

To order the 220VAC version of an ML500 change the last three digits of the part number to 220.
For example the 220VAC version of part number ML503115 would be ML503220.

MICROLAB® 500 Dispensers

MICROLAB® 500 Dispensers

- **Save time during sample preparation**
- **Eliminate technician-to-technician method variability**
- **Simplify compliance to method documentation requirements for regulations and standards, such as those of the EPA, FDA (GLP, GMP), and ISO**

MICROLAB 500 dispensers simplify sample preparation methods requiring sample or reagent dispensing. Aliquot, serial, simple, and titrate dispenses can easily be performed with a simple touch of hand probe button or tap of foot switch. Dual syringe drives are available to either double throughput or double the quantity dispensed. Volumes from 25 nL to 50 mL can be dispensed accurately and reproducibly.

ML504A Dual Syringe Dispenser

ML510B with LASI

ML560 with Continuous Dispenser Package

Ordering Information

Model	Part #	Description	Accessories
ML501A	ML501115	Single Syringe Dispenser with A series controller, 115VAC	Ships Complete with a 1mL Syringe
ML510B	ML510115	Single Syringe Dispenser with B series controller, 115VAC	Ships Complete with a 1mL Syringe
ML511C	ML511115	Single Syringe Dispenser Software Controlled (PC not included),115VAC	Requires a syringe and part number SDISPKG
ML504A	ML504115	Dual Syringe Dispenser with A series controller, 115VAC	Ships Complete with 1mL Syringes
ML540B	ML540115	Dual Syringe Dispenser with B series controller, 115VAC	Ships Complete with 1mL Syringes
ML541C	ML541115	Dual Syringe Dispenser Software Controlled (PC not included),115VAC	Requires syringes and part number SDISPKG
ML560C	ML560115	Liquid Handler Software Controlled (PC not included),115VAC	Requires syringes and part number SDISPKG

To order the 220VAC version of an ML500 change the last three digits of the part number to 220.
For example the 220VAC version of part number ML501115 would be ML501220.

One Pump, Unlimited Possibilities

The New MICROLAB® 560

- Unsurpassed accuracy and precision
- Configurable for dispensing, diluting and general liquid handling
- Software control provides increased functionality

Valve and Probe Packages

ML560 Valve and Probe packages are available for all ML500 applications. Switch between multiple applications with a simple valve change. Ideal for labs that perform a variety of different liquid handling tasks.
More packages are available at
www.hamiltoncompany.com/diluters/ValvePackages.asp.

Dispenser Valve and Probe Package
For use with the ML541 and ML560

	Part Number	Description
Top Level	DISPKG	Dispenser Kit ML560
Consisting of:	35767	Dual Push Button Hand Probe
	35887	2 X Tubing Kit (Fill and Dispense tubing)
	53172-01	ML560 Dispenser Valve

Diluter Valve and Probe Package
For use with the ML531, ML541 and ML560

	Part Number	Description
Top Level	DILPKG	Diluter Kit ML560
Consisting of:	35529	Concorde Push-Button Hand Probe
	35887	Tubing Kit (Fill and Dispense tubing)
	53175-01	ML560 Diluter Valve

Continuous Dispenser Valve and Probe Package
For use with the ML560

	Part Number	Description
Top Level	CNTPKG	Continuous Dispenser Package ML560
Consisting of:	35529	Concorde Push-Button Hand Probe
	88942	Fill tubing 12 gauge (Non-tapered)
	8894	Dispense tubing 12 gauge (Tapered)
	39107	Loop Tubing
	39222	Inactive Valve
	39300	4-port Loop Valve

LASI Syringe, Valve and Needle Package
For use with the ML511 and ML560

	Part Number	Description
Top Level	LASIPKG	Dispenser Kit ML560
Consisting of:	51301-01	LASI Backfill Syringe and Valve Assembly
	51315-02	LASI Needle, 24 inch long, 32 gauge
	77004	ML500 Foot Switch

Probes and Accessories

GASTIGHT® Syringes

DX, Diluter Syringe with Stop

TLLX, PTFE Luer Lock Syringe with Stop

TLL, PTFE Luer Lock Syringe

Ordering Information

GASTIGHT® Syringes

Diluter Syringes	Volume Model	25 µL 1702	50 µL 1705	100 µL 1710	250 µL 1725	500 µL 1750	1 mL 1001	2.5 mL 1002	5 mL 1005	10 mL 1010	25 mL 1025
Right Side (DX)		80226	80926	81026	81126	81226	81326				
Left Side (TLL/TLLX)		80222	80922	81022	81122	81222	81323	81420	81520	81620	82521
Dispenser Syringes											
Right & Left Sides (TLL/TLLX)		80222	80922	81022	81122	81222	81323	81420	81520	81620	82521

Tubing and Valves

PTFE Tubing

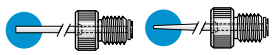
Diluter Valve

Single Dispenser Valve

Dual Dispenser Valve

Ordering Information

PTFE Tubing Assemblies



Gauge/Length/Hub, Style	Used with Syringe Volumes	Fill Tubing (Non Tapered)	Dispense Tubing (Tapered)
18/650 mm/1 hub, M6	≤ 1 mL	240010	
18/900 mm/1 hub, M6	≤ 1 mL		240130
12/650 mm/1 hub, M6	> 1 mL	240000	
12/900 mm/1 hub, M6	> 1 mL		240360

Custom length tubing available at
www.hamiltoncompany.com/diluters/accessories.asp

Diluter and Dispenser Valves

Part #	Valve Type	For use on instrument model
35825	Single dispenser valve	ML501A, ML510B, ML511C, ML560C
35844	Diluter valve	ML503A, ML530B, ML531C
35842	Dual dispenser valve	ML504A, ML540B, ML541C
53175-01	Diluter valve	ML503A, ML530B, ML531C, ML560C
53172-01	Dual dispenser valve	ML504A, ML540B, ML541C, ML560C

Additional ML560 valves are available at
www.hamiltoncompany.com/diluters/accessories.asp

Hand Probes

Concorde Probe

Dual Probe

Luer Lock Probe

Large Volume Probe

Disposable Tip Probe
1 to 35 µL or 1 to 125 µL

Foot Switch

Ordering Information

Hand Probes and Tips

Part #	Description
35529	Concorde Push-button Hand Probe
35767	Dual Push-button Hand Probe
35899	Luer Lock Needle Push-button Hand Probe
35898	Large Volume Sample Hand Probe
75702	Tips for PN 35898, 250/pk

Part #	Description
77006	Disposable Tip Push-button Hand Probe, 1 to 35 µL
75700	Tips for PN 77006, 1000/pk
77007	Disposable Tip Push-button Hand Probe, 1 to 125 µL
9766-01	Tips for PN 77007, 96/rack, 5 racks/box
77004	Foot Switch

Part #39111
Reagent Bottle Holder

Part #88990
Tubing Clips, 5/pk

HAMILTON
THE MEASURE OF EXCELLENCE™

Hamilton Company
4970 Energy Way
Reno, Nevada 89520 USA
Toll-Free: 800-648-5950
Telephone: +1-775-858-3000
Fax: +1-775-856-7259
e-mail: sales@hamiltoncompany.com

Hamilton Bonaduz AG
Via Crusch 8
CH-7402 Bonaduz/Switzerland
Toll-Free: 00800-660-660-60
Telephone: +41-(0)81-660-60-60
Fax: +41-(0)81-660-60-70
e-mail: marketing@hamilton.ch

Hamilton Deutschland GmbH
Daimlerweg 5A
64293 Darmstadt/Germany
Telephone: +49-(0)6151-66706-0
Fax: +49-(0)6151-66706-66
e-mail: sales@hamiltongmbh.de

Hamilton Northern Europe
Unit 2, Lyne Riggs Estate
Lancaster Road
Carnforth, GB-Lancashire LA5 9EA, U.K.
Telephone: +44-(0)1524-720-650
Fax: +44-(0)1524-720-651
e-mail: sales@hamiltonautomation.com

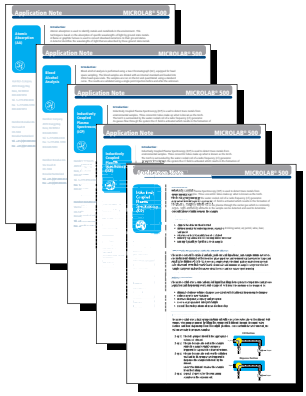
Hamilton France S.A.R.L.
Parc de Haute Technologie-Silic N°18
1 Rue Georges Besse
F-92182 Antony Cedex
France
Telephone: +33-(0)1-55-59-18-18
Fax: +33-(0)1-55-59-18-19
e-mail: Hamilton.France@wanadoo.fr

Quality Hamilton Products:
MICROLITER™ Syringes
GASTIGHT® Syringes
Chromatography Syringes
Syringes for Life Science
Instrument Syringes
SoftGrip™ Pipettes
Miniature Valves
Modular Valve Positioner
Laboratory Fittings, Adapters & Tubing
Precision Syringe Pumps
Diluters & Dispensers
MICROLAB® Robotic Workstations
Electrochemical Sensors
DURACAL™ Buffer Solutions
HPLC Columns & Resins

Laboratory Automation for:
Drug Discovery
Genomics
Proteomics
Forensics
In Vitro Diagnostics

Related Literature:

- LASI - Lab Animal Studies Injecttor
- MICROLAB® 560
- ML500 Software
- General Diluting
- General Dispensing



ML500 Application Notes

- Blood Alcohol Analysis
- Inductively Coupled Plasma Spectroscopy (ICP)
- Liquid Scintillation
- Atomic Absorption (AA)
- Scheduled Oil Sampling

More literature is available at **www.microlabtech.co.uk/literature.html**

Sales/Support 01702 208044
www.microlabtech.co.uk
email: sales@microlabtech.co.uk

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