

DILUTERS & DISPENSERS

MICROLAB® 500 Instruments Diluters and Dispensers

MICROLAB 500B/BP Series Instruments

- 21 program memory
- 1 to 250 seconds per stroke syringe speed
- 1 µL to 25,000 µL working volume range
- Syringe resolution of 0.1% of total syringe volume
- Print function capability
- Single and dual syringe models

The MICROLAB 500B series is a versatile, easily programmed line of instruments ideal for laboratories performing multiple dilute and dispense methods. The user can program and store up to 21 methods in the instrument's memory. The easy-to-use LCD menu allows the naming of programs using alphanumeric characters. Programmed methods are retained in memory after the power is disconnected.

MICROLAB 500BP instruments incorporate a print function to provide for the documentation of methods to help with compliance to regulations and standards, such as those of the EPA, FDA (GLP, GMP), and ISO. Three selectable print options are available:

1. Print method names
2. Print a stored method from memory
3. Print a method as it is run

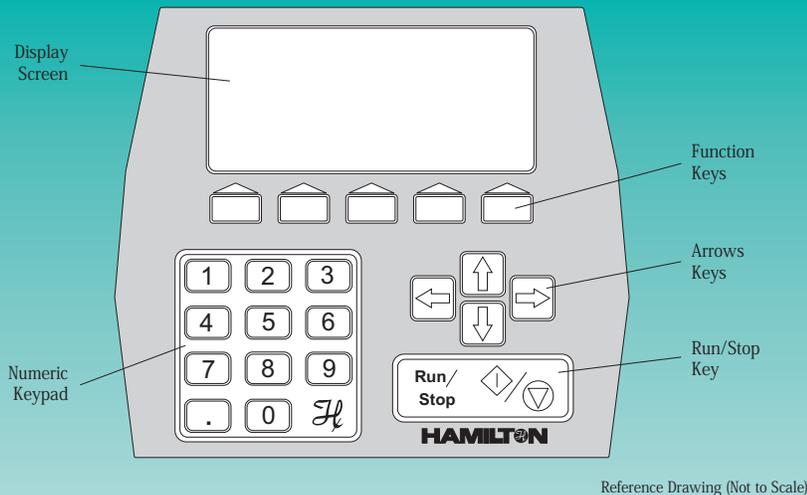
For ordering information, see page 97 for diluters and page 99 for dispensers.

MICROLAB 500C Series Instruments

The MICROLAB 500C instruments perform the same functions as the 500B series except that programming and method storage is performed using an IBM compatible computer and RS232C communication. The computer controls the MICROLAB 500C instrument based on the method selected or one that has been pre-programmed into the instrument's EEPROM (Electrically Erasable Programmable Read-Only Memory). Up to 16 instruments can be daisy-chained and controlled from the host computer. For ordering information, see page 97 for diluters and page 99 for dispensers.

DILUTERS & DISPENSERS

MICROLAB 500B/BP Controller Keypad



Reference Drawing (Not to Scale)

Method Types:

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

Program Options:

- Air gaps
- Syringe speed
- Time delays
- Wash commands
- Automated aspirate, dispense, and fill commands
- Return to reservoir

MICROLAB 500BP Print Options

1. Print method names

```
Company name: R&J DOE COMPANY
Operator name: JOHN DOE
Date: 05-01-97 Time: 07:00:00

Methods

SERIAL      SOS 1-4      GC 1-10
BASE 1-25   AA 1-50     LEAD 1-100
DIL 1-250   ICP 1-500   ACID 1-1000
```

2. Print a stored method from memory

```
Company name: R&J DOE COMPANY
Operator name: JOHN DOE
Date: 05-01-97 Time: 07:00:00

Instrument configuration: ML530
Left Syringe size (uL): 1000.0
Right Syringe size (uL): 250.0

Dilute method: BASE 1-25
Method revision date: 01-01-97
Ratio 1: 24.0
Dilution 1/ 25.0
Left Diluent volume (uL): 960.0
Right Air gap volume (uL): 0.0
Right Sample volume (uL): 40.0
Final volume (uL): 1000.0

Syringe fill speed: Left 3 Right
Syringe aspirate speed: 2
Syringe dispense speed: 3 2
Syringe fill mode: AUTO
Air gap mode: N/A
Air gap delay: N/A

Wash volume (uL): 0.0
Left Syringe fill speed: 3
Left Syringe dispense speed: 3

Signature _____ Date _____
```

3. Print a method as it is run

```
Company name: R&J DOE COMPANY
Operator name: JOHN DOE
Date: 05-01-97 Time: 07:00:00

Instrument configuration: ML530
Left Syringe size (uL): 1000.0
Right Syringe size (uL): 250.0

Dilute method: AA 1-50
Method revision date: 01-01-97

Test 1 Date: 05-01-97 Time: 07:05:00

Auto Dly Vol---LEFT-Spd Vol--RIGHT-Spd
1: Y Fil 980.0 3
2: Y Dis Asp 20.0 2
3: N Dis Asp 20.0 2
4: N Dis 980.0 3 Dis 20.0 2

Test 2 Date: 05-01-97 Time: 07:05:30

Auto Dly Vol---LEFT-Spd Vol--RIGHT-Spd
1: Y Fil 980.0 3
2: Y Dis Asp 20.0 2
3: N Dis Asp 20.0 2
4: N Dis 980.0 3 Dis 20.0 2

Test 3 Date: 05-01-97 Time: 07:06:00

Auto Dly Vol---LEFT-Spd Vol--RIGHT-Spd
1: Y Fil 980.0 3
2: Y Dis Asp 20.0 2
3: N Dis Asp 20.0 2
4: N Dis 980.0 3 Dis 20.0 2

Test 4 Date: 05-01-97 Time: 07:06:30

Auto Dly Vol---LEFT-Spd Vol--RIGHT-Spd
1: Y Fil 980.0 3
2: Y Dis Asp

TEST ABORTED.

Signature _____ Date _____
```

DILUTERS & DISPENSERS

MICROLAB® 500 Diluters

- Save time during sample preparation
- Eliminate technician-to-technician method variability
- Reduce solvent consumption and sample volume requirements
- Reduce waste disposal costs
- Achieve certified accuracy within $\pm 1.0\%$ and precision within $+ 0.2\%$, traceable to N.I.S.T.

MICROLAB 500 Diluters simplify the preparation of sample and standard dilutions. Common dilutions for concentrated out-of-range samples, such as 1/4, 1/10, 1/25, 1/50, 1/100, and greater can be prepared in half the time as compared to manual methods using volumetric flasks. Plus, due to the accuracy and precision possible with Hamilton syringes, dilutions can be made in small quantities to reduce solvent consumption and waste disposal costs, and to reduce the amount of sample or standard required. For example, sample and standard dilutions for analytical techniques, such as AA/ICP, GC, and HPLC, can be prepared directly into autosampler vials with final volumes as small as 1000 μL . See Figure 1.

How a MICROLAB Diluter Works

Simple dilutions can be made in three easy steps (after priming the instrument) as shown in Figure 2:

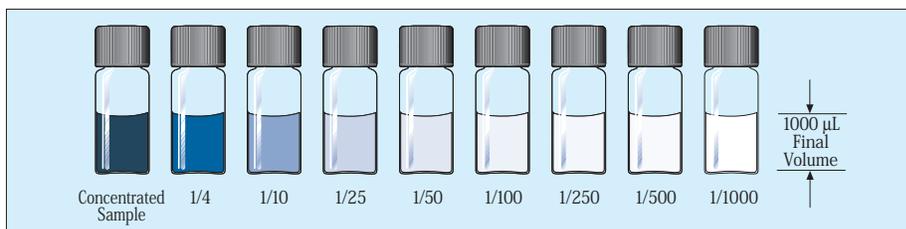
Step 1: Fill the left syringe with the programmed amount of solvent (diluent) from the reservoir.

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, models ML530B, ML532BP, and ML531C instruments can also perform serial, and multi-sample/reagent (or internal standard addition) dilutions. See Figure 3.

MICROLAB 500 diluters meet or exceed Class A volumetric glassware accuracy and precision standards.



Dilution	Solvent Volume (Diluent)	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

Figure 1: Dilutions with final volumes of 1000 μL made directly into autosampler vials

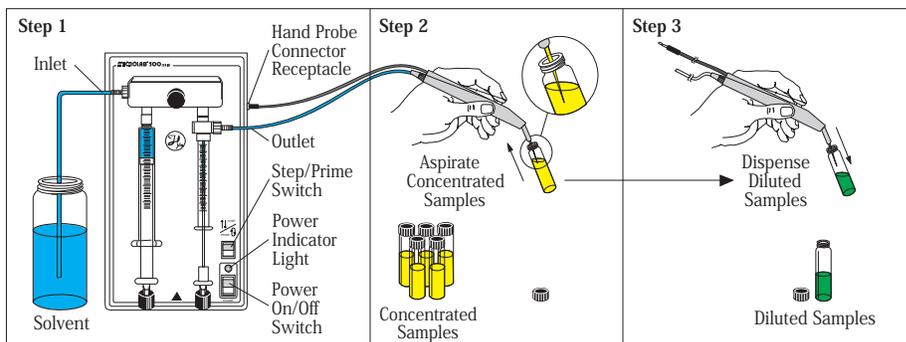


Figure 2: A simple dilution

Method Type	ML500 Series			Method Illustrations
	A	B/BP	C	
1. Simple dilution 2. Pipette (w/disposable tip)	◆	◆	◆	
Serial dilution (programmed)		◆	◆	<p>Varying dilution ratios with the same final volume</p>
Serial dilution (tube to tube)		◆	◆	<p>Transfer sample aliquots from tube 1 to tube 2...</p>
Multi-sample/reagent dilution (or internal standard addition)		◆	◆	
Return to reservoir		◆	◆	<p>Save reagent in the fluid path by returning to reagent reservoir</p>

Figure 3: Dilution method types

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

DILUTERS & DISPENSERS

Ordering Information

Single Program Memory, MICROLAB 500A Series



ML503A

MICROLAB® 500 Diluters

Model	Part #	Description
ML503A	ML503115	Dual Syringe Diluter, 115VAC
ML503A	ML503220	Dual Syringe Diluter, 220VAC

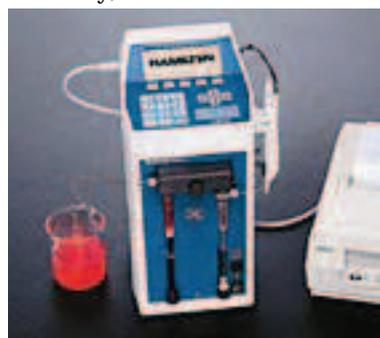
21 Program Memory, MICROLAB 500B Series



ML530B

Model	Part #	Description
ML530B	ML530115	Dual Syringe Diluter, 115VAC
ML530B	ML530220	Dual Syringe Diluter, 220VAC

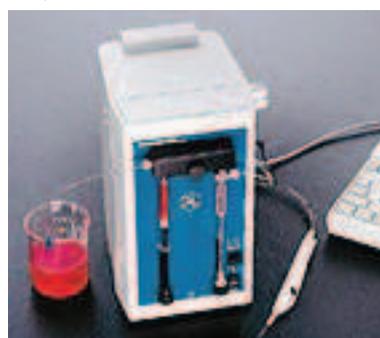
21 Program Memory, MICROLAB 500BP Series



Model	Part #	Description
ML532BP	ML532115	Dual Syringe Diluter with print function*, 115VAC
ML532BP	ML532220	Dual Syringe Diluter with print function*, 220VAC

* Includes printer and printer paper.

PC Controlled, MICROLAB 500C Series



Model	Part #	Description
ML531C	ML531115	Dual Syringe Diluter without controller, 115VAC
ML531C	ML531220	Dual Syringe Diluter without controller, 220VAC

Note: MICROLAB 500C diluters are intended for industrial filling and OEM applications. Optional cabling includes: **part #35824**, DB-9 to RJ-11 communication cable, and **part #35833**, RJ-11 to RJ-11 daisy chain cable. Accessories, such as manuals, syringes, and tubing are listed on page 100. A PC (personal computer) is not supplied.

All MICROLAB 500A, 500B and 500BP diluters are shipped ready for immediate use. A user's manual in English is supplied unless another language is requested.

DILUTERS & DISPENSERS

MICROLAB® 500 Dispensers

- Save time during sample preparation
- Eliminate technician-to-technician method variability
- Perform aliquot, serial, simple, or titrate dispenses
- Reduce reagent and solvent consumption
- Achieve certified accuracy within $\pm 1.0\%$ and precision within $\pm 0.2\%$, traceable to N.I.S.T.

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 a hand probe button or a tap of a foot switch. Both single and dual syringe drives are available to either double throughput or double the volumes dispensed. Volumes less than 1 μL to 50 mL can be dispensed accurately and reproducibly.

How a MICROLAB Dispenser Works

Dispenses, including titrations, can be made in two easy steps (after priming the instrument) as shown in Figure 1.

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 MICROLAB 500 dispensers, models ML510B, ML512BP, ML540B, ML542BP, ML511C, and ML541C can also perform aliquot, serial, pipette and titrate dispenses. See Figure 2.

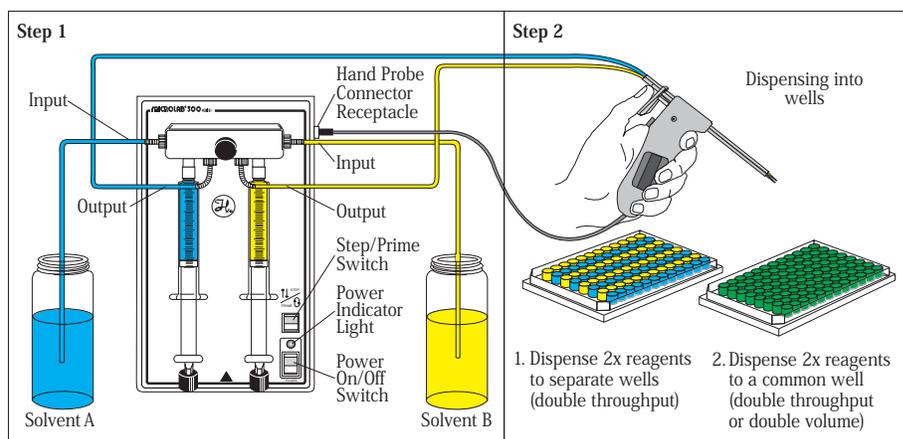


Figure 1: A simple, dual dispense

Method Type	ML500 Series			Method Illustrations
	A	B/BP	C	
Simple dispense	◆	◆	◆	Reagent is filled from a reservoir and dispensed
Aliquot dispense		◆	◆	Repetitive dispense with a 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

Figure 2 : Dispense method types

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

MICROLAB 500 instruments can reduce sample preparation time by a factor of 3.3!

DILUTERS & DISPENSERS

Ordering Information

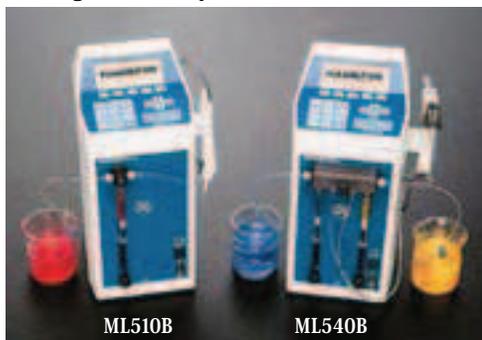
MICROLAB® 500 Dispensers

Single Program Memory, MICROLAB 500A Series



Model	Part #	Description
ML501A	ML501115	Single Syringe Dispenser, 115VAC
ML501A	ML501220	Single Syringe Dispenser, 220VAC
ML504A	ML504115	Dual Syringe Dispenser, 115VAC
ML504A	ML504220	Dual Syringe Dispenser, 220VAC

21 Program Memory, MICROLAB 500B Series



Model	Part #	Description
ML510B	ML510115	Single Syringe Dispenser, 115VAC
ML510B	ML510220	Single Syringe Dispenser, 220VAC
ML540B	ML540115	Dual Syringe Dispenser, 115VAC
ML540B	ML540220	Dual Syringe Dispenser, 220VAC

21 Program Memory, MICROLAB 500BP Series



Model	Part #	Description
ML512BP	ML512115	Single Syringe Dispenser with print function*, 115VAC
ML512BP	ML512220	Single Syringe Dispenser with print function*, 220VAC
ML542BP	ML542115	Dual Syringe Dispenser with print function*, 115VAC
ML542BP	ML542220	Dual Syringe Dispenser with print function*, 220VAC

* Includes printer and printer paper

PC Controlled, MICROLAB 500C Series



Model	Part #	Description
ML511C	ML511115	Single Syringe Dispenser without controller, 115VAC
ML511C	ML511220	Single Syringe Dispenser without controller, 220VAC
ML541C	ML541115	Dual Syringe Dispenser without controller, 115VAC
ML541C	ML541220	Dual Syringe Dispenser without controller, 220VAC

Note: MICROLAB 500C dispensers are intended for industrial filling and OEM applications. Optional cabling includes: part #35824, DB-9 to RJ-11 communication cable, and part #35833, RJ-11 to RJ-11 daisy chain cable. Accessories, such as manuals, syringes, and tubing are listed on page 100. A PC (personal computer) is not supplied.

All MICROLAB 500A, 500B and 500BP dispensers are shipped ready for immediate use. A user's manual in English is supplied unless another language is requested.

DILUTERS & DISPENSERS

Accessories for MICROLAB® 500 Instruments

- GASTIGHT® syringes
- Diluter and dispenser valves
- TEFLON® FEP tubing assemblies
- Instruction manuals
- Print function upgrade kits

GASTIGHT Syringes



Model	Volume	Reagent Syringe* (left side)		Sample Syringe** (right side)
		TEFLON-coated plunger	Stainless Steel (sst) plunger	Stainless Steel (sst) plunger
		TLL	TLLX (w/stop)	DX (w/stop)
1702	25 µL		80222	80226
1705	50 µL		80922	80926
1710	100µL		81022	81026
1725	250 µL		81122	81126
1750	500 µL		81222	81226
1001	1 mL	81320	81323‡	81326
1002	2.5 mL	81420		
1005	5 mL	81520		
1010	10 mL	81620		
1025	25 mL	82521		

*All TLL and TLLX syringes can be used on the left or right side of ML500 Series diluters and dispensers.

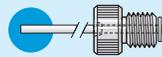
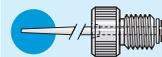
**All DX Syringes are used only on the right side of ML500 Series diluters, i.e., ML503A, ML530B, ML532BP and ML531C.

‡ TEFLON-coated aluminum plungers.

Diluter and Dispenser Valves

Part #	Valve Type	For use on instrument model
35825	HV, single valve	ML501A, ML510B, ML512BP, ML511C
35844	Diluter, dual valve	ML503A, ML530B, ML532BP, ML531C
35842	Dispenser, dual valve	ML504A, ML540B, ML542BP, ML541C

TEFLON FEP Tubing Assemblies

Gauge/Length/Hub Style	Approx Dead Volume µL	Used with Syringe Volumes	 Non-Tapered Tubing	 Tapered Tubing
			Fill Tubing	Dispense Tubing
18/650 mm/1 hub, M6	510	≤ 1 mL	240010	
18/900 mm/1 hub, M6	702	≤ 1 mL		240130
12/650 mm/1 hub, M6	2042	> 1 mL	240000	
12/900 mm/1 hub, M6	2827	> 1 mL		240360

Instruction Manuals

Language	MICROLAB 500A Series	MICROLAB 500B/C Series
English	69175	69176
French/Français	69181	69182
German/Deutsch	69179	69180
Portuguese/Português	69185	69186
Spanish/Español	69187	69188

Print Function Upgrade Kits

Part #	Description
35905	ML500B Print Function Upgrade Kit*, 115VAC includes: controller, cable, printer, and printer paper
35906	ML500B Print Function Upgrade Kit*, 220VAC includes: controller, cable, printer, and printer paper
2697-01	Printer Cartridge
2695-01	Printer Paper, rolls 5/pk

Accuracy tolerances of the MICROLAB 500 instruments far exceed those of volumetric flasks, graduated cylinders, measuring pipets, and burets.

* For use with ML500B instruments, e.g. ML510B, ML530B and ML540B.

DILUTERS & DISPENSERS

Ordering Information



Concorde Probe



Dual Push-Button Probe



Disposable Tip Probe



Luer Lock Push-Button Probe



Large Volume Probe



Foot Switch



Bottle Holder



Tubing Clip

Part #	Instrument
35529	ML500 Series

Part #	Instrument
35767	ML500 Series

Part #	Instrument	Volume
77006	ML500 Series	1 to 35 μ L
77007	ML500 Series	1 to 125 μ L
75700	100 μ L Tips, 1000/pk	
1006-06	300 μ L Tips, 96/rack, 10 racks/box	

Part #	Instrument
35899	ML500 Series

Part #	Instrument
35898	ML500 Series
75702	Disposable Tips (250/pk)

Part #	Instrument
77004	ML500 Series

Part #	Description
39111	Bottle Holder
88990	Tubing Clips (5/pk)

Accessories for MICROLAB® 500 Instruments

Concorde Push-button Hand Probe

Fits easily into the hand for index-finger actuation. Accommodates either 12-gauge or 18-gauge tubing.

Dual Push-button Hand Probe

Fits into your hand in a pistol-grip fashion for thumb actuation. Accommodates either 12-gauge or 18-gauge tubing.

Disposable Tip Push-button Hand Probe

Designed for blood and serum work where sample cross-contamination is a concern. This probe has a single-dispense button and a tip ejection button. Available in two volumes.

Luer Lock Needle Push-button Hand Probe

Allows you to install Kel-F® hub needles for injection into animals, piercing of a septum or dispensing fluids onto a small surface.

Large Volume Sample Hand Probe

Ideal for large volume sampling (1 - 5 mL) and diluting viscous fluids. A disposable tip eliminates sample cross-contamination.

Foot Switch

Activate your diluter and dispenser with the tap of a foot instead of by hand.

Reagent Bottle Holder and Tubing Clips

The bottle holder helps minimize tubing dead volume from reagent bottle to hand probe. The tubing clip holds TEFLON® tubing (12 or 18 gauge) to most lab vessels.

DILUTERS & DISPENSERS

Technical Specifications for MICROLAB® 500 Instruments

Specifications	MICROLAB 500A	MICROLAB 500B/BP	MICROLAB 500C
Accuracy	Within ±1%	Within ±1%	Within ±1%
Precision	Within +0.2%	Within +0.2%	Within +0.2%
Resolution	0.1% of syringe volume	0.1% of syringe volume	0.1% of syringe volume
Volume Increment	0.1% to 100% of total syringe volume	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	1 to 250 seconds per full syringe stroke
Syringe Drive Mechanism	Stepper motor driven high precision lead screw with encoder	Stepper motor driven high precision lead screw with encoder	Stepper motor driven high precision lead screw with encoder
Power Requirements	100-240V; 50-60Hz	100-240V; 50-60Hz	100-240V; 50-60Hz
Power Rating	80 VA	80 VA	80 VA
Program Memory	One program retained while power is on	21 programs retained in battery back-up memory, 1 program stored in EEPROM	1 program stored in EEPROM (program must be down-loaded from a PC or 500B/BP controller)
Communication Interface	MICROLAB 500A Controller only	MICROLAB 500B & 500BP Controllers; RS 232, Baud rate selectable; TTL out	RS 232, Baud rate selectable; TTL out
Baud Rate	Factory set	1200 - 38,400 Selectable	1200 - 38,400 Selectable
Weight	10 lbs 6 oz (4.7 Kg)	10 lbs 6 oz (4.7 Kg)	10 lbs 6 oz (4.7 Kg)
Height	13 1/8" (33.34 cm)	13 1/8" (33.34 cm)	11 1/8" (28.26 cm)
Width	6 1/8" (15.56 cm)	6 1/8" (15.56 cm)	6 1/8" (15.56 cm)
Depth	7" (17.78 cm)	7" (17.78 cm)	7" (17.78 cm)
Fluid Path	TEFLON® PTFE and borosilicate glass	TEFLON PTFE and borosilicate glass	TEFLON PTFE and borosilicate glass
Shipping Weight	20 lbs (9.07 Kg)	20 lbs (9.07 Kg)	19 lbs (8.6 Kg)
Certifications	CE, CSA, TÜV/GS	CE, CSA, TÜV/GS	CE, CSA, TÜV/GS

All MICROLAB 500 Diluters and Dispensers are shipped from the factory fully tested, traceable to NIST standards.

MICROLAB 500 instruments can reduce sample preparation time by a factor of 3.3 and result in cost savings of as much as a factor of 884!

MICROLAB 500 diluters meet or exceed Class A volumetric glassware accuracy and precision standards.

DILUTERS & DISPENSERS

Technical Specifications for MICROLAB® 500 Instruments

Specifications	MICROLAB 500A	MICROLAB 500B/BP	MICROLAB 500C
Accuracy	Within ±1%	Within ±1%	Within ±1%
Precision	Within +0.2%	Within +0.2%	Within +0.2%
Resolution	0.1% of syringe volume	0.1% of syringe volume	0.1% of syringe volume
Volume Increment	0.1% to 100% of total syringe volume	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	1 to 250 seconds per full syringe stroke
Syringe Drive Mechanism	Stepper motor driven high precision lead screw with encoder	Stepper motor driven high precision lead screw with encoder	Stepper motor driven high precision lead screw with encoder
Power Requirements	100-240V; 50-60Hz	100-240V; 50-60Hz	100-240V; 50-60Hz
Power Rating	80 VA	80 VA	80 VA
Program Memory	One program retained while power is on	21 programs retained in battery back-up memory, 1 program stored in EEPROM	1 program stored in EEPROM (program must be down-loaded from a PC or 500B/BP controller)
Communication Interface	MICROLAB 500A Controller only	MICROLAB 500B & 500BP Controllers: RS 232, Baud rate selectable; TTL out	RS 232, Baud rate selectable; TTL out
Baud Rate	Factory set	1200 - 38,400 Selectable	1200 - 38,400 Selectable
Weight	10 lbs 6 oz (4.7 Kg)	10 lbs 6 oz (4.7 Kg)	10 lbs 6 oz (4.7 Kg)
Height	13 1/8" (33.34 cm)	13 1/8" (33.34 cm)	11 1/8" (28.26 cm)
Width	6 1/8" (15.56 cm)	6 1/8" (15.56 cm)	6 1/8" (15.56 cm)
Depth	7" (17.78 cm)	7" (17.78 cm)	7" (17.78 cm)
Fluid Path	TEFLON® PTFE and borosilicate glass	TEFLON PTFE and borosilicate glass	TEFLON PTFE and borosilicate glass
Shipping Weight	20 lbs (9.07 Kg)	20 lbs (9.07 Kg)	19 lbs (8.6 Kg)
Certifications	CE, CSA, TÜV/GS	CE, CSA, TÜV/GS	CE, CSA, TÜV/GS

Distributed by:

All MICROLAB 500 Diluters and Dispensers are shipped from the factory fully tested, traceable to NIST standards.



Carl Stuart Limited

ADVANCED APPLIED TECHNOLOGIES

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