

Lambda™ Plus

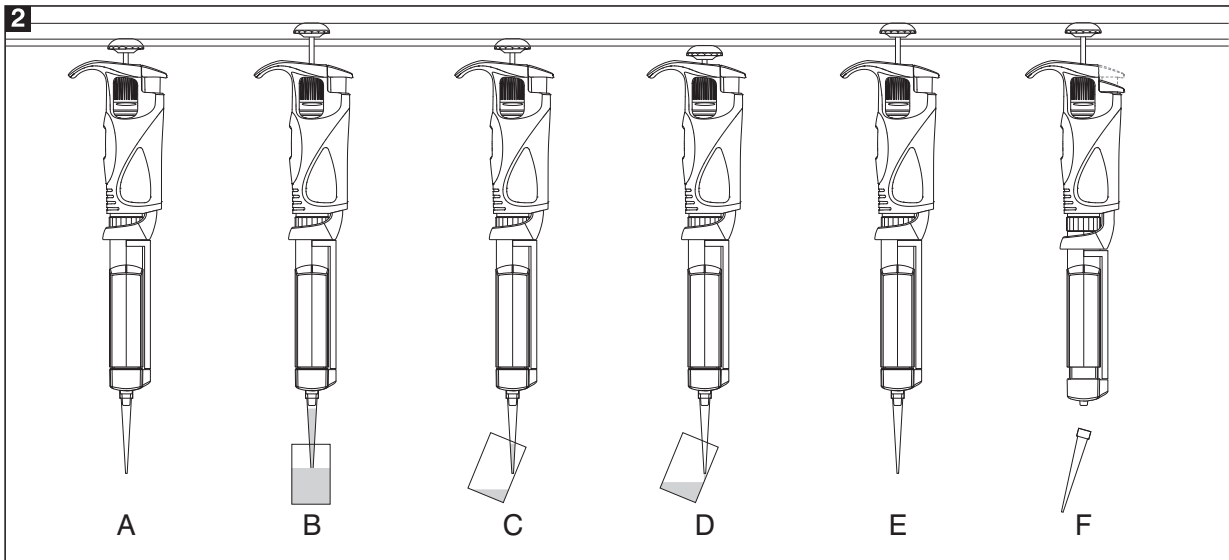
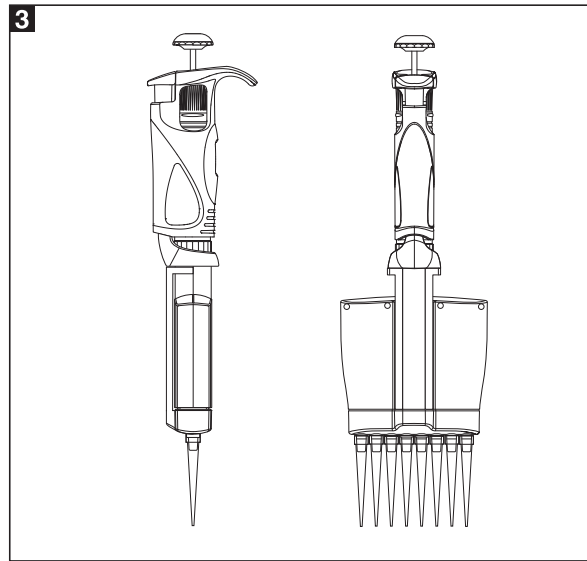
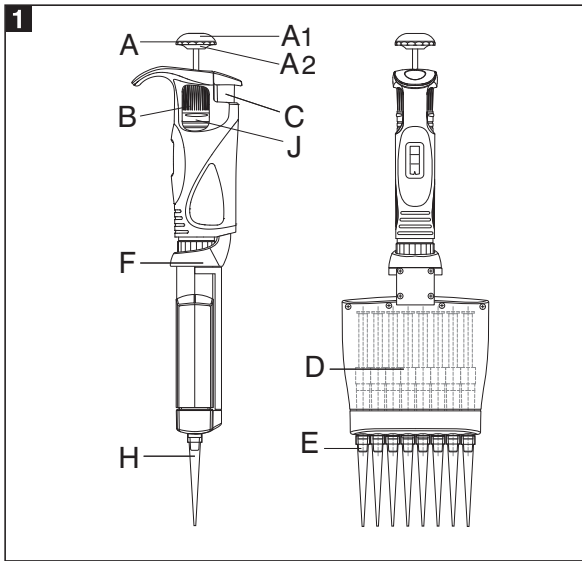
Multichannel Pipettor

Instruction Manual



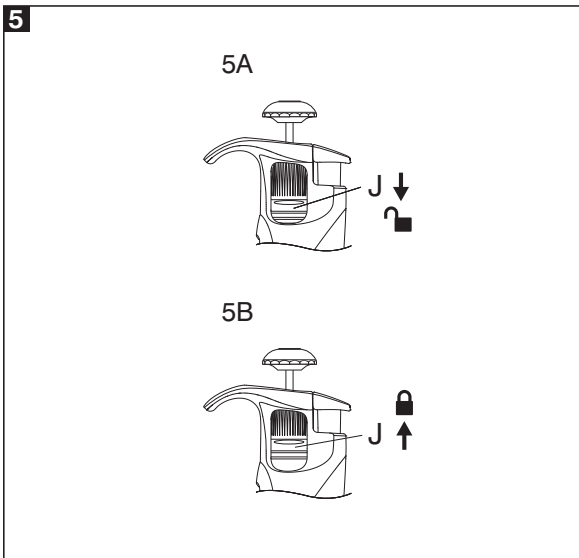
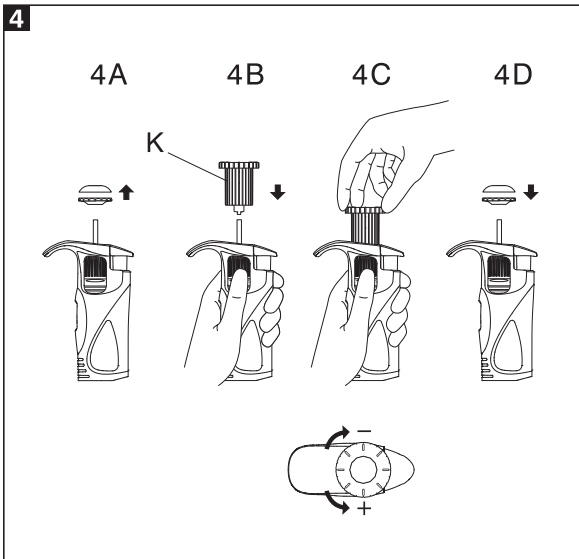
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1 - INTRODUCTION

The **Lambda™ Plus** multichannel adjustable pipettor series has been designed for the filling of laboratory microplates. The pipettors enable precise and simultaneous delivery of 8 or 12 preset-volume doses of liquid.

Lambda™ Plus multichannel pipettors are produced in four ranges of volumes: 1-10 μL , 5-50 μL , 20-200 μL and 50-300 μL .

Lambda™ Plus multichannel pipettors are equipped with a digital counter which shows the pipetting volume. The set volume is visible in the window on the handle. Volumes are set by either turning the pipetting pushbutton (Fig. 1A2) or the adjustment knob (Fig. 1B) in the correct direction. The pipettor design allows the user to lock the volume setting by sliding the locking ring upwards (Fig. 1J). The symbols printed on the handle show which position is locked and unlocked. The volume range of each model is shown on the pipetting pushbutton (Fig. 1A1).

Lambda™ Plus multichannel pipettor should be used with polypropylene disposable tips, to ensure safety and accuracy, (Fig. 1H). The shafts, which do not require O-rings, ensure the compatibility with a broad assortment of tips. The special ejector shape reduces the force required for their ejection. To protect the user against accidental contact with used tips, **Lambda™ Plus** multichannel pipettor incorporate tip ejectors, (Fig. 1F). The pipettor construction allows the lower multichannel module to be rotated through 360°. This allows the user to disable the ejector to avoid accidental use and to change its position to make filling of microplates more comfortable and convenient. It is recommended to turn the module clockwise.

The specifications for accuracy and precision shown in the following table are obtained using **Corning®** tips. These figures are only guaranteed when **Corning®** tips are used.

Lambda™ Plus 8 channel pipettor

SPECIFICATIONS				
Model	Volume [μL]	Accuracy [%]	Precision [%]	Fit to tips μL
8-10	Min 1	± 8.0	± 6.0	10
	5	± 4.0	± 2.0	
	Max 10	± 2.0	± 1.2	
8-50	Min 5	± 4.0	± 2.5	200
	25	± 3.0	± 1.2	
	Max 50	± 1.6	± 0.6	
8-200	Min 20	± 3.0	± 1.5	200
	100	± 1.5	± 0.8	
	Max 200	± 1.0	± 0.6	
8-300	Min 50	± 1.6	± 1.5	300
	150	± 1.2	± 1.0	
	Max 300	± 1.0	± 0.6	

Lambda™ Plus 12 channel pipettor

SPECIFICATIONS				
Model	Volume [μL]	Accuracy [%]	Precision [%]	Fit to tips μL
12-10	Min 1	± 8.0	± 6.0	10
	5	± 4.0	± 2.0	
	Max 10	± 2.0	± 1.2	
12-50	Min 5	± 4.0	± 2.5	200
	25	± 3.0	± 1.2	
	Max 50	± 1.6	± 0.6	
12-200	Min 20	± 3.0	± 1.5	200
	100	± 1.5	± 0.8	
	Max 200	± 1.0	± 0.6	
12-300	Min 50	± 1.6	± 1.5	300
	150	± 1.2	± 1.0	
	Max 300	± 1.0	± 0.6	

The specifications for the volumetric performance are derived from extensive gravimetric tests according to EN ISO 8655 standard.

Condition of measurements: distilled water at temperature $20 \pm 1^\circ\text{C}$.

The pipettor design enables the user to perform the recalibration process according to the rules described in section 5.

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2 - SETTING THE VOLUME

Setting the volume of the aspirated liquid can be done using either the lower section of the pushbutton (Fig. 1A2) or by the adjustment knob (Fig. 1B). The volume display shown by the counter is indicated by three digits, which should be read from top to bottom. Typical volumeter readings are shown in the following table:

Model	Counter readings	Set volume	Basic degree
8-10 12-10	0 3 5	3.5 μ L	0.02 μ L
8-50 12-50	0 6 5	6.5 μ L	0.10 μ L
8-200 12-200	0 8 5	85.0 μ L	0.20 μ L
8-300 12-300	2 5 0	250.0 μ L	1.0 μ L

To set the required volume, use the lower section of the pipetting pushbutton (Fig. 1A2) or the adjustment knob (Fig. 1B), to increase or reduce the volume. The volume adjustment can only be performed when the locking ring is set in the lower position (Fig. 5A). When the desired volume is set, the locking ring should be moved to the upper position (Fig. 5B). All volume setting procedures should end in the the reduction of volume setting from a position just above the desired level to that level. As further examples:

- When moving from a high volume setting to a lower value, the pushbutton or adjustment knob should be rotated at normal speed, clockwise, to a setting just above the desired level. It should then be further rotated very slowly till the desired volume is shown on the digital volume display.
- In the event that you overshoot the desired setting, repeat the procedure by increasing the volume to a position just above the desired volume and then once again, slowly adjust to the desired level.

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- When moving from a low volume setting to a higher value, the pushbutton or adjustment knob should be rotated at normal speed, counterclockwise, to a setting position just above the desired level. Then slowly rotate clockwise back to where the desired volume is shown on the digital display.
- Once again, in the event that you overshoot the desired setting, repeat the procedure by increasing the volume to a position just above the desired volume and then slowly adjust to the desired level.

Following volume adjustment, move the locking ring to the upper position, to lock the knob and prevent accidental volume change.

3 - METHOD OF PIPETTING

Fit the tips onto shafts of the multichannel module. To fit tips on the multichannel shafts, hold the pipettor vertically and press it against the tips in the rack box, until the shafts retreat about 1.5 mm into the multichannel module. The suspension system of the shafts ensures even and tight sealing of tips. A rolling movement does not have to be performed to seal the tips tightly. The liquid aspirated into the tips should not leak if the tips are fitted properly. While holding the pipettor in a vertical position, tips should be immersed in the liquid to a depth of 2-4 mm, and flushed once by drawing a dose of liquid and dispensing it with a slow and steady movement. Next, still holding the pipettor vertically, the operator should press the pipetting button until the first resistance point is felt, and immerse the tips in the liquid to the depth of 2-4 mm (Fig. 3B). Releasing the pipetting button with a slow and uniform movement over 2-3 seconds, the liquid should be drawn into the tips (Fig. 3B) which should then be lifted above the liquid's surface. The pipettor should next be positioned at an angle of 10-45° in relation to the inner walls of the destination vessels and tips should be emptied by pressing the pipetting button slowly until the first resistance point is felt (Fig. 3C). After waiting a further second, the pipetting button should be pressed to the second resistance point in order to expel any remaining liquid (Fig. 3D). The tips should then be lifted out from the vessels while maintaining contact between the ends of the tips and the inner walls of the vessel until the pipetting button has been released (Fig. 3E). Finally, pressing the ejector button, the operator should separate the tips from multichannel module's shafts (Fig. 3F).

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4 - RECOMMENDATIONS

To achieve maximum safety, precision and reliability, the following principles should be observed:

- do not draw liquids without tips fitted on the pipettor shafts
- do not lay the pipettor down with tips filled
- do not draw volumes of liquid exceeding the pipettor's volume range
- check if the tips are fitted properly
- while operating, the pipettor must be held vertically, tips should be immersed in liquid to the depth of 2 to 4 millimeters and the pipetting button should be depressed and released slowly and evenly
- new tips must be re-wetted prior to pipetting, by drawing and expelling the liquid to be measured. This is especially important when working with liquids of viscosities and densities different to that of water and in temperatures different from ambient
- when pipetting liquids which tend to wet walls of tips, such as serums, proteins or organic solvents, measuring must be performed much slower than with other liquids,
- tips must be replaced with new ones, when changing from one liquid to another, or if drops of liquid remain inside the tips
- after use, the pipettor should be stored vertically in a holder with tips removed.

5 - RECALIBRATION

Lambda™ Plus multichannel pipettors are calibrated gravimetrically, using **Corning** tips and distilled water, at the temperature $20 \pm 1^\circ\text{C}$, according to EN ISO 8655 standard.

If during pipettor operation, you find that the accuracy error (the difference between the real aspirated volume and the preset volume) exceeds the permissible value shown in the table in section 1, the pipettor recalibration procedure should be carried out.

Before starting the recalibration procedure it is necessary to check whether the following requirements were met during error determination:

- the ambient temperature, and the temperature of the pipettor, tips and water was identical
- the density of the liquid used is close to that of distilled water

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- a balance with appropriate sensitivity has been used

Volume checked [μL]	Balance sensitivity [mg]
0.1 - 10	≤ 0.001
10 - 100	≤ 0.01
> 100	≤ 0.1

- mg/ μL conversion factor has been taken into account
- the requirements given in sections 3 and 4 have been met

If the above conditions are satisfied and the accuracy error for selected volume given in section 1 exceeds the permissible value, the pipettor recalibration procedure should be carried out.

The recalibration can be performed within one full turn of the key to the right or to the left only.

Recalibration conditions:

- Ambient temperature and the temperature of the pipettor, tips and liquid should be within the range $20-25^\circ\text{C}$ and stabilized during weighing within $\pm 0.5^\circ\text{C}$.
- Measurements should be conducted using distilled water.
- Balance sensitivity should be suitable for the volume to be measured.

Recalibration procedure:

- Set the dose volume depending on the pipettor volume according to the following table:

Model	Range of the pipettor volumes [μL]	Preset volume [μL]	Permissible volumes [μL]	Volume change ΔV for full turn of the calibration key [μL] (24 increments)
8-10 12-10	1 - 10	1	0.92 - 1.08	0.33
8-50 12-50	5 - 50	5	4.8 - 5.2	1.67
8-200 12-200	20 - 200	20	19.4 - 20.6	6.30
8-300 12-300	50 - 300	50	49.2 - 50.8	10.00

- Perform three aspiration series (each series should include the aspirations from all channels), weigh each time and calculate the average value of the aspirations.
- Calculate average aspirated volume in μL multiplying the average aspiration amount [mg] by the distilled

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water density coefficient [$\mu\text{L}/\text{mg}$], which depends on temperature and pressure according to the following table:

Temperature [°C]	Pressure [kPa]		
	95.0	101.3	105.0
20	1.0028	1.0029	1.0029
21	1.0030	1.0031	1.0031
22	1.0032	1.0033	1.0033
23	1.0034	1.0035	1.0036
24	1.0037	1.0038	1.0038
25	1.0039	1.0040	1.0040

If the average aspirated volume exceeds the permissible value, the following should be done:

- Remove the pipetting pushbutton (Fig. 4A).

Warning: The pipetting pushbutton consists of 2 parts: the lower volume setting section (Fig. 1A2) and the upper button (Fig. 1A1). After removal of the pushbutton, both parts are separated.

- Holding the volume setting knob to protect it against rotation, insert the calibration key into the cuts of the calibration screw (Fig. 4B).
- Turn the key clockwise to reduce the aspirated volume, or counterclockwise to increase the volume. One full turn of the calibration key changes the pipettor aspiration volume by the amount shown in the table, (Fig. 4C).
- Take out the key and re-fit the pipetting pushbutton (Fig. 4D). The pipetting pushbutton should be fixed by placing the lower volume setting section on the arbor first (Fig. 1A2) and then the upper button (Fig. 1A1).

Determine the average aspirated volume. The average volume should be within the permissible range given in the table. If the volume exceeds the values stated, the recalibration procedure should be repeated.

6 - CLEANING AND STERILIZATION

Cleaning

External surfaces of the pipetting pushbutton, the ejector button, the handgrip, shaft and the adjustment knob may be cleaned using a cloth dampened in isopropyl alcohol.

Sterilization:

The pipettor can be sterilized in the autoclave at 121°C for 20 minutes. After sterilization, the pipettor should be dried and cooled to room temperature.

It is recommended:

- unscrew the shaft nut slightly prior to sterilization and re-tighten after autoclaving,
- set the locking ring in the lower (unlocked) position prior to sterilization,
- sterilize the pipettor in the autoclave with an initial vacuum and drying cycle.

The precision of the results should not alter if the pipetting process and autoclaving are carried out as described in this manual. Because a slight change in the accuracy of the dosage may occur, it is recommended to check the calibration of the pipettor after the initial first, third and fifth autoclaving cycles and then after every 10 autoclaving cycles.

7 - PIPETTOR KIT

The materials are delivered in this kit include:

- Pipettor
- Instruction manual
- Calibration key
- Identification labels

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8 - SPARE PARTS

The spare parts for multichannel in, (Fig. 1, 4 and 5):

A: Pipetting pushbutton

A1: Pushbutton

A2: Knob

B: Adjustment knob

C: Ejector button

D: Piston assembly

E: Shaft

F: Ejector

G: Calibration key

J: Locking ring

Please contact Corning Customer Service to inquire about availability of spare parts. Model of pipettor and name of the part required should be specified.

Warning: The replacement of the plunger requires conducting the calibration procedure according to section 5.

Before returning a pipettor for service, please ensure that the pipettor is completely free of any chemical, biological or radioactive contamination and please provide information on the kind of liquids that have been measured.

To find your nearest service center and for technical support, visit <http://www.corning.com/lifesciences>

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