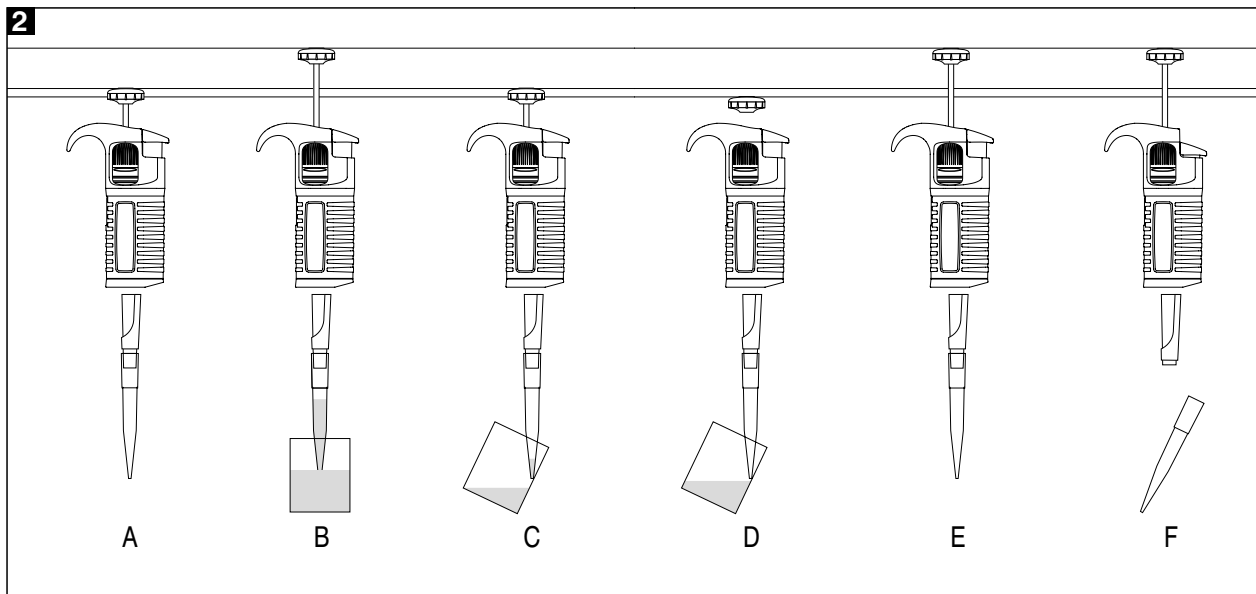
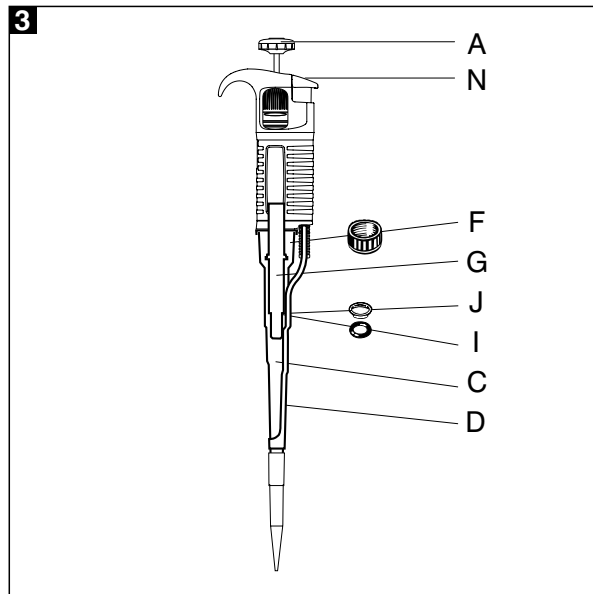
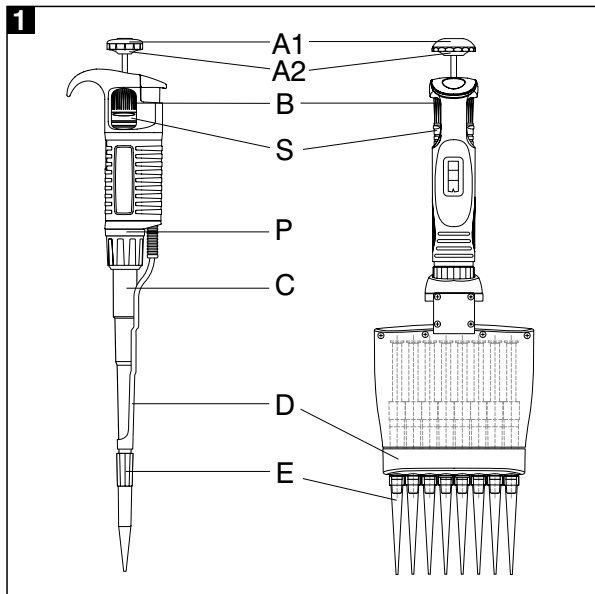
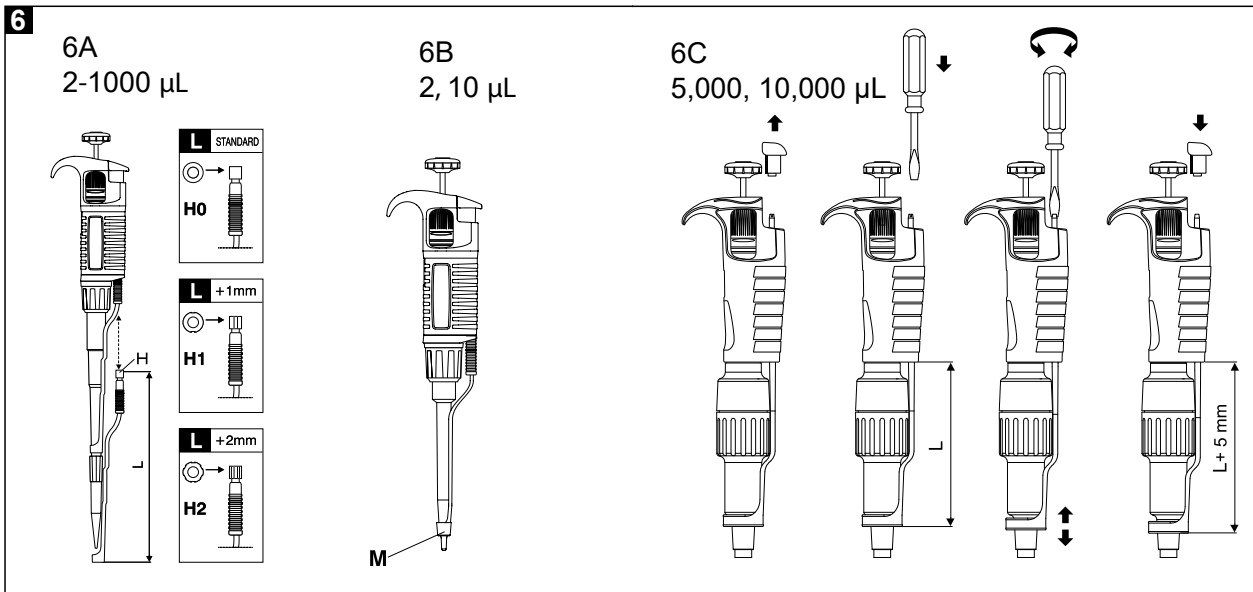
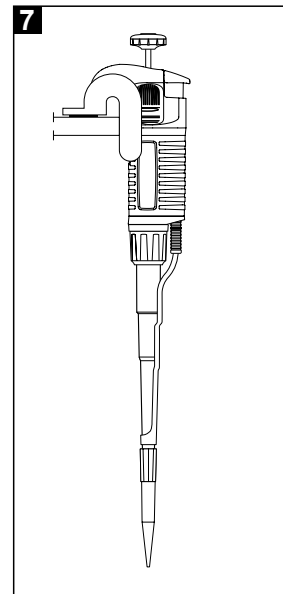
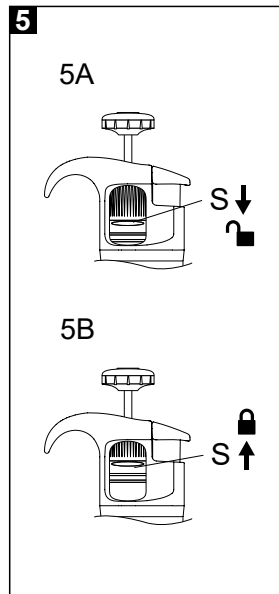
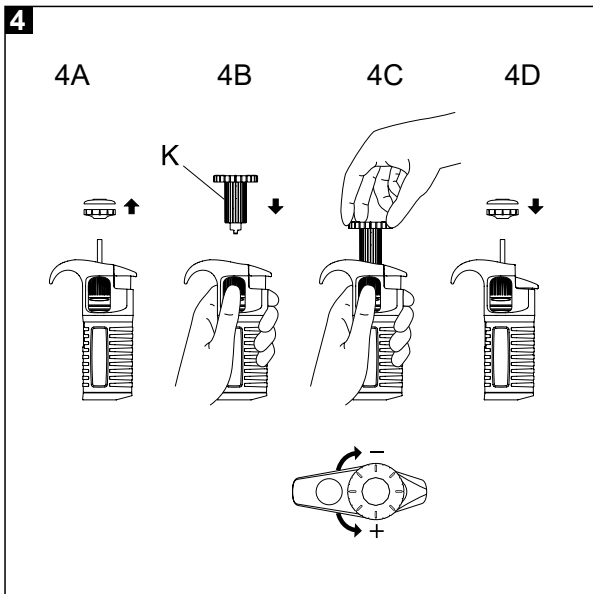


appPETTE



appleton®





## **CONTENTS**

- 1 – INTRODUCTION
- 2 – SETTING THE VOLUME
- 3 – ASPIRATING AND DISPENSING LIQUIDS
- 4 – PRE-RINSING
- 5 – DENSE AND VISCOUS LIQUIDS
- 6 – APPLETON PIPETTE TIPS
- 7 – RECOMMENDATIONS
- 8 – RECALIBRATION
- 9 – TROUBLESHOOTING
- 10 – CLEANING AND STERILISATION
- 11 – PIPETTOR KIT
- 12 – SPARE PARTS

## 1 – INTRODUCTION

**appPETTE** single-channel manual pipettors are designed to measure and transfer liquids precisely and safely. Nine sizes are available to measure and transfer volumes between 0.1 µL - 10,000 µL depending on the model.

**appPETTE** 8-channel and 12-channel pipettors have been designed for microplate filling. The pipettors enable precise and simultaneous delivery of 8 or 12 preset volume doses of liquid. These pipettors are produced in four volume ranges between 1 - 300 µL depending on the model.

The **appPETTE** pipettors have a digital counter which shows the pipetting volume. The set volume is visible in the window on the handle. Setting of the volume is done by turning the pipetting pushbutton (Fig. 1A2) or by turning the thumb wheel (Fig.1B). The pipettor design allows the user to lock the volume setting by pushing the locking ring upwards (Fig.1S). The position of the ring is indicated by the symbols located on the handle. The range of the volume of the aspirated liquid is shown on the pipetting pushbutton (Fig. 1A1).

Model	Volume range [µL]	Color Code
<b>Single-channel</b>		
P2	0.1 - 2	Red
P10	0.5 - 10	Red
P20	2 - 20	Yellow
P50	5 - 50	Yellow
P100	10 - 100	Yellow
P200	20 - 200	Yellow
P1000	100 - 1,000	Blue
P5000	500 - 5,000	White
P10000	1,000 - 10,000	White
<b>Multichannel</b>		
P10-8, P10-12	0.5 - 10	Red
P50-8, P50-12	5 - 50	Yellow
P200-8, P200-12	20 - 200	Yellow
P300-8, P300-12	50 - 300	Green
P2, P10	Measurement and transfer of micro-volumes, DNA sequencing and enzyme-assay applications.	
P20, P50, P100, P200, P300, P1000, P5000, P10000	Measurement and transfer of general aqueous solution, acids and bases	

To aspirate liquid, we recommend the attachment of disposable tips onto the pipettor shaft both to ensure maximum safety, and to eliminate cross contamination of liquid samples.

To protect the user from contaminated tips the **appPETTE** is equipped with a built-in tip ejector, (Fig. 1D).

## **Single-channel Pipettor Ejector**

The construction of the ejector enables the user to set up the length. The tip ejector is adjustable and can therefore accommodate multiple types of pipette tips. When using narrow tubes, it may be necessary to remove the tip ejector, which may be done by simply pulling it down.

### **Adjusting of the Tip Ejector Length**

- In 2-1,000  $\mu\text{L}$  pipettors (Fig. 6A).

The regulated "H" spacers, included in the box allow for regulating the length of tip ejector by +1mm or +2mm. An "H0" spacer is inserted on a standard basis. The outside shape of the spacer identifies the adjustment.

- In 2 and 10  $\mu\text{L}$  pipettors (Fig. 6B)

The 2  $\mu\text{L}$  - 10  $\mu\text{L}$  pipettors may require the use of an ejector cap "M" to efficiently eject certain brands of pipette tips. Simply place the cap, supplied with the pipettor, on the bottom of the pipettor shaft and slide the cap upwards until it surrounds the bottom of the tip ejector.

- In 5,000 and 10,000  $\mu\text{L}$  pipettors (Fig. 6C)

The length of tip ejector is regulated by screwing in or screwing out the tip ejector stem with a screwdriver. Turn the screwdriver counter clockwise to increase the length of tip ejector, and clockwise to reduce the length of tip ejector. The ejector can be adjusted in the range of 5 mm. If above described method of ejector adjustment is not sufficient or the diameter of the ejector opening is too large to eject the tip it is necessary to put the ejector cap "M" onto the ejector.

## **8-channel and 12-channel Pipettor Ejector**

The 8-channel and 12-channel pipettor construction allows the lower 8-channel and 12-channel module to be rotated 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 **appPETTE** is a high quality pipettor which offers excellent accuracy and precision.

The accuracy and precision (reproducibility) of the volume of pipetted liquid depends on the quality of tips used. Appleton pipette tips were used in the table below to get values for accuracy and precision via a gravimetric method, by performing at least 10 measurements of distilled water at a reference temperature of  $20\pm 1^{\circ}\text{C}$ , according to the EN ISO 8655 standard.

### Single-channel Pipettors

Model	Cat. No.	Volume [ $\mu\text{L}$ ]	Accuracy [%]	Precision [%]	Non-filter tips [ $\mu\text{L}$ ]
P2	AEL020	Min. 0.1	$\pm 40.0$	$\leq 12.0$	10
		0.2	$\pm 12.0$	$\leq 6.0$	
		1	$\pm 2.7$	$\leq 1.3$	
		Max. 2	$\pm 1.5$	$\leq 0.7$	
P10	AEL021	Min. 0.5	$\pm 4.0$	$\leq 2.8$	10
		1	$\pm 2.5$	$\leq 1.8$	
		5	$\pm 1.0$	$\leq 0.6$	
		Max. 10	$\pm 0.5$	$\leq 0.4$	
P20	AEL022	Min. 2	$\pm 3.0$	$\leq 1.5$	200
		10	$\pm 1.0$	$\leq 0.5$	
		Max. 20	$\pm 0.8$	$\leq 0.3$	
P50	AEL023	Min. 5	$\pm 2.5$	$\leq 2.0$	200
		25	$\pm 1.0$	$\leq 0.6$	
		Max. 50	$\pm 0.8$	$\leq 0.4$	
P100	AEL024	Min. 10	$\pm 1.6$	$\leq 0.80$	200
		50	$\pm 0.8$	$\leq 0.24$	
		Max. 100	$\pm 0.8$	$\leq 0.20$	
P200	AEL025	Min. 20	$\pm 1.2$	$\leq 0.60$	200
		100	$\pm 0.8$	$\leq 0.25$	
		Max. 200	$\pm 0.6$	$\leq 0.20$	
P1000	AEL027	Min. 100	$\pm 1.6$	$\leq 0.40$	1,000
		500	$\pm 0.7$	$\leq 0.20$	
		Max. 1,000	$\pm 0.6$	$\leq 0.15$	
P5000	AEL028	Min. 500	$\pm 1.2$	$\leq 0.50$	5,000
		1,000	$\pm 0.6$	$\leq 0.25$	
		2,500	$\pm 0.6$	$\leq 0.20$	
		Max. 5,000	$\pm 0.5$	$\leq 0.15$	
P10000	AEL031	Min. 1,000	$\pm 2.5$	$\leq 0.6$	10,000
		5,000	$\pm 0.8$	$\leq 0.3$	
		Max. 10,000	$\pm 0.5$	$\leq 0.2$	

## Multichannel Pipettors

Model	Cat. No.	Volume [ $\mu\text{L}$ ]	Accuracy [%]	Precision [%]	Non-filter tips [ $\mu\text{L}$ ]
P10-8, P10-12	AEM030, AEM034	Min. 0.5	$\pm 10.0$	$\leq 8.0$	10
		1	$\pm 8.0$	$\leq 6.0$	
		5	$\pm 4.0$	$\leq 2.0$	
		Max. 10	$\pm 2.0$	$\leq 1.2$	
P50-8, P50-12	AEM031, AEM035	Min. 5	$\pm 4.0$	$\leq 2.5$	200
		25	$\pm 3.0$	$\leq 1.2$	
		Max. 50	$\pm 1.6$	$\leq 0.6$	
P200-8, P200-12	AEM032, AEM036	Min. 20	$\pm 3.0$	$\leq 1.5$	200
		100	$\pm 1.5$	$\leq 0.8$	
		Max. 200	$\pm 1.0$	$\leq 0.6$	
P300-8, P300-12	AEM033, AEM037	Min. 50	$\pm 1.6$	$\leq 1.5$	300
		150	$\pm 1.2$	$\leq 1.0$	
		Max. 300	$\pm 1.0$	$\leq 0.6$	

The pipettor design enables the user to perform the recalibration process according to the rules presented in section 8.

## 2 – SETTING THE VOLUME

The volume display shown by the counter has three digits, which should be read from top to bottom. In addition the lowest counter drum is printed in a scale which enables the setting of the volume in the minimum graduation range.

### Examples of Counter Indications

The decimal point in the volume of aspirated liquid ( $\mu\text{L}$  or  $\text{mL}$ ) is indicated by change in colour of digits. Black digits represent integer numbers, and red digits represent decimal fractions.

1	red	0	red
2		3	
5		5	

Volume Ranges	0.1-2 $\mu\text{L}$	5-50 $\mu\text{L}$	100-1,000 $\mu\text{L}$
Set Volume	1.25 $\mu\text{L}$	35 $\mu\text{L}$	750 $\mu\text{L}$ (0.75 $\text{mL}$ )
Increment	0.002 $\mu\text{L}$	0.2 $\mu\text{L}$	2.0 $\mu\text{L}$

The volume of the pipettor is set by the knob in the pipetting pushbutton (Fig. 1A2) or by the black thumb wheel (Fig. 1B). The volume adjustment can be performed when the locking ring is set in the lower position (Fig. 5A).



When the desired volume is selected, the locking ring should be set in the upper position (Fig. 5B). To attain maximum accuracy, the set volume must be approached from a higher value by decreasing counter readings.

- If the desired volume is lower than set volume shown by the counter, turn the pipetting pushbutton (Fig. 1A2) or the black thumb wheel (Fig. 1B) to the direction which will increase counter readings to the required volume. Before achieving the required volume slowly rotate the thumb wheel and observe carefully how the reading decreases in order to avoid accidentally by passing the required setting.
- If the desired volume is higher than set volume shown by the counter, simply turn the pipetting pushbutton (Fig. 1A2) or the black thumb wheel (Fig. 1B) to increase the value until the lower figure wheel comes 1/3 of a turn beyond the required setting and then slowly backward until the setting reaches the desired volume. Make sure not to pass the set value.

If the thumb wheel is accidentally turned too far, the process must be repeated. The desired volume must always be set from the higher value in the order of decreasing value.

Following volume adjustment, set the locking ring into the upper position, thus locking the thumb wheel and preventing accidental volume change.

### **3 – ASPIRATING AND DISPENSING LIQUIDS**

#### **• Single-channel Pipettors**

Place a pipette tip on the shaft of the pipettor. See Section 6 for the appropriate pipette tip. Press the pipette tip on firmly using a slight twisting motion. This will ensure an airtight seal.

#### **• 8-channel and 12-channel Pipettors**

To put pipet tips on the shafts: hold the pipettor vertically and press it against the tips in the rack box until the shafts retract approximately 1.5 mm into the manifold. The suspension system of the shafts ensures even and tight sealing of the pipet tips. The rocking movement does not have to be performed to seal the pipet tips tightly.

**Important: Never aspirate liquids into the *appPETTE* without a pipette tip attached.**

## Aspiration

Press the pushbutton to the first positive stop, (Fig. 2A). Holding the pipettor vertically, immerse the pipette tip into the sample liquid. The depth to which the pipette tip should be immersed in the sample liquid depends on the model used.

Model Volume Range [μL]	Immersion depth [mm]
2	≤ 1
10	≤ 1
20, 50, 100	2-3
200, 300, 1,000	2-4
5,000	3-6
10,000	5-7

Release the pushbutton slowly and smoothly to aspirate the sample, (Fig. 2B). Wait one second and then withdraw the pipette tip from the liquid. To prevent air from entering the disposable pipette tip, take care to immerse the pipette tip to an adequate depth into the liquid sample and also avoid rapid release of the pipetting pushbutton.

Avoid touching the orifice of the pipette tip.

## Dispensing

- Place the end of the pipette tip against the inside wall of the vessel at an angle of 10 to 40 degrees.
- Press the pushbutton smoothly to the first stop, (Fig. 2C). Wait one second.
- Press the pushbutton to the second stop to expel any remaining liquid, (Fig. 2D).
- Keeping the pushbutton depressed to the very end, remove the pipettor by drawing the pipette tip against the inside surface of the receiving vessel.
- Release the pushbutton to its starting position, (Fig. 2E).
- Eject the pipette tip by pressing the tip ejector button, (Fig. 2F). Remember to change the pipette tip whenever a different kind of liquid is to be sampled.

## 4 – PRE-RINSING

When pipetting liquids of higher viscosity or lower surface tension than water (e.g. sera or organic solvents), a film of liquid is formed on the inside wall of the pipette tip. This film can create an error. Since the film remains relatively constant in successive pipetting operations with the same pipette tip,

this error can be avoided by forming the film before transferring the first sample. This is done by aspirating a sample and dispensing it back into the same vessel. Since the film is already formed, all of the subsequent samples will have better accuracy and reproducibility of dispensed volume.

This pre-rinsing operation should be repeated when the volume to be aspirated is changed or when a new pipette tip is used.

## 5 – DENSE AND VISCOUS LIQUIDS

The **appPETTE** specifications of accuracy and precision are based on pipetting distilled water. A gravimetrically checked compensation of the volume setting may be necessary when handling liquids which differ significantly from water in terms of their physical properties of density, viscosity and surface tension. Normally the degree of error resulting from heavy or viscous liquids is negligible if the pipetting is done slowly and carefully. It is very important to give liquids time to follow the change of pressure by holding the pipette tip in its position for at least 2 seconds after the aspiration and the blow out stroke.

If in extreme cases this method of operation does not result in accurate values, a compensation can be achieved as follows:

- Weigh the liquid pipetted when the **appPETTE** is set to the nominal value. Then calculate the set-off from the nominal value:

$$\text{Corr: val.} = 2 \times \text{nom. val.} - \frac{m}{\gamma}$$

m – weight of the sample

$\gamma$  – density of liquid

- Check this operation once again and correct if necessary. Note the corrected value for subsequent pipetting of the same kind of liquid.

## 6 – APPLETON PIPETTE TIPS

**Appleton** pipette tips are made from high performance polypropylene and their quality guarantees the precision and accuracy associated with the **appPETTE**. Strict control is maintained throughout the manufacturing process to ensure the highest quality.

The accuracy and precision figures for the **appPETTE** are only guaranteed when **Appleton** pipette tips are used. The performance of the **appPETTE** is dependent on using high quality pipette tips.

## **10 µL pipette tips**

These pipette tips are used for volumes between 0.1 µL and 10 µL. They are used with the P2, P10, P10-8 and P10-12 models which come with red pushbuttons.

## **50 µL pipette tips**

These pipette tips are used for volumes between 5 µL and 50 µL. They are used with the P50-8 and P50-12 models which come with yellow pushbuttons.

## **200 µL pipette tips**

These pipette tips are used for volumes between 2 µL and 200 µL. They are used with the P20, P50, P100, P200, P200-8 and P200-12 models which come with a yellow pushbuttons. Note that the P20 model can be used with 200 µL non-filter pipette tips.

## **300 µL pipette tips**

These pipette tips are used for volumes between 50 µL and 300 µL. They are used with the P300-8 and P300-12 models which come with green pushbuttons.

## **1250 µL pipette tips**

These pipette tips are used for volumes between 100 µL and 1,000 µL. They are used with the P1000 model, which comes with a blue pushbutton.

## **5,000 µL pipette tips**

These pipette tips are used for volumes between 500 µL and 5,000 µL. They are used with the P5000 model, which comes with a white pushbutton.

## **10,000 µL pipette tips**

These pipette tips are used for volumes between 1,000 µL and 10,000 µL. They are used with the P10000 model, which comes with a white pushbutton.

## **7 – RECOMMENDATIONS**

Observing the following recommendations will ensure maximum possible accuracy and precision of liquid sampling.

- When pipetting the **appPETTE** should have the volume setting locked with the locking ring in the upper position.
- Be careful to operate the **appPETTE** slowly and smoothly.
- Immerse the pipette tip to a minimum depth in the sample liquid and keep that depth constant during aspiration.
- The **appPETTE** should be held in a vertical position.

- Change the pipette tip when volume setting is changed or when a different liquid is to be aspirated.
- Change the pipette tip if a droplet remains on the end of the tip from the previous pipetting operation.
- Each new pipette tip should be pre-rinsed with the liquid to be pipetted.
- Liquid should never enter the **appPETTE** shaft. To prevent this:
  - Press and release the pushbutton slowly and smoothly.
  - Never turn the pipettor upside down.
  - Never lay the pipettor on its side when there is liquid in the pipette tip.
- Never force the volume setting beyond its recommended limits.
- When pipetting liquids with temperatures different from ambient temperature, we recommend pre-rinsing the pipette tip several times before use.
- Do not pipette liquids with temperatures above 70°C.
- When pipetting acids or corrosive solutions which emit vapours, we recommend disassembling the shaft and rinsing the piston and seal with distilled water after pipetting is completed.

## 8 – RECALIBRATION

**Appleton** pipettors are calibrated by a gravimetric method, using **Appleton** tips and distilled water, according to the ENISO 8655 standard.

The **appPETTE** pipettor needs to be re-calibrated, if the accuracy error (the difference between the real aspirated volume and the preset volume) exceeds the permissible value given in the table in section 1.

Before starting the recalibration it is necessary to check whether the following requirements have been fulfilled during error determination:

- The ambient temperature, and the temperature of the pipettor, tips and water should have been identical
- The density of the liquid used should have been close to that of distilled water
- A balance with appropriate sensitivity needs to have been used.

Volume checked [ $\mu\text{L}$ ]	Balance sensitivity [mg]
0.1 - 10	$\leq 0.001$
10 - 100	$\leq 0.01$
> 100	$\leq 0.1$

- Mg/ $\mu\text{L}$  conversion factor should have been taken into account
- The requirements given in sections 3 and 7 should have been fulfilled.

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, pipette tips and liquid should be within the range 20-25°C and stabilised 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 controlled

Recalibration procedure:

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

## Single-channel Pipettors

Model	Range of the pipettor volumes [ $\mu\text{L}$ ]	Preset volume [ $\mu\text{L}$ ]	Permissible volumes [ $\mu\text{L}$ ]	Volume change V for full turn of the calibration key [ $\mu\text{L}$ ] (24 increments)
P2	0.1 - 2	0.2	0.176 - 0.224	0.06
P10	0.5 - 10	0.5	0.48 - 0.52	0.33
P20	2 - 20	2	1.94 - 2.06	0.63
P50	5 - 50	5	4.875 - 5.125	2.50
P100	10 - 100	10	9.84 - 10.16	2.50
P200	20 - 200	20	19.76 - 20.24	6.30
P1000	100 - 1,000	100	98.4 - 101.6	25.00
P5000	500 - 5,000	500	494 - 506	125.00
P10000	1,000 - 10,000	1,000	975 - 1,025	250.00

## 8-channel and 12-channel Pipettors

Model	Range of the pipettor volumes [μL]	Preset volume [μL]	Permissible volumes [μL]	Volume change V for full turn of the calibration key [μL] (24 increments)
P10-8 P10-12	0.5 - 10	1	0.92 - 1.08	0.33
P50-8 P50-12	5 - 50	5	4.8 - 5.2	1.67
P200-8 P200-12	20 - 200	20	19.4 - 20.6	6.30
P300-8 P300-12	50 - 300	50	49.2 - 50.8	10.00

- Perform 5 aspirations, weigh each one, and calculate the average value of the aspirations.
- Perform 3 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 water density coefficient [μL/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 knob (Fig. 1A2) and the pushbutton (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 counter-clockwise to increase the volume, (Fig. 4C). One full turn of the calibration key changes the pipettor aspiration volume by the amount given in the table.
- Take out the key and fix the pipetting pushbutton (Fig. 4D). The pipetting pushbutton should be fixed by placing the knob on the arbor first (Fig. 1A2) and then the pushbutton (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.

When pipetting liquids with physical properties considerably different from those of water, follow the rules given in section 5.

## 9 – TROUBLESHOOTING

If you notice the pipettor is not working as it should, identify the cause and eliminate the fault. To do this, follow the instruction in the sequence provided. Replacement of parts should be required only occasionally, and should not occur under normal pipettor use.

Problem	Cause	Solution
Droplets of liquid remain in the pipette tip.	The pipette tip is emptied too fast.	Decrease the speed of pressing the pipetting pushbutton.
	The pipette tip wettability has increased due to extensive use.	Replace the pipette tip with a new one.
Droplets of air appear in the liquid aspirated into the pipette tip.	The pipette tip immersion is too shallow.	Immerse the pipette tip deeper as specified in Section 7, Recommendations.
	The pipette tip is incorrectly pressed onto the pipettor shaft.	Press the pipettor firmly onto the pipettor shaft.
The pipettor incorrectly aspirates the liquid or liquid drops out from the pipette tip.	The pipette tip is damaged or worn out due to extensive use.	Replace the pipette tip with a new one.
	The pipette tip is incorrectly pressed onto the pipettor shaft.	Press the pipettor firmly onto the pipettor shaft.



Problem	Cause	Solution
The pipettor incorrectly aspirates the liquid or liquid drops out from the pipette tip.	The shaft nut is loose (Figure 2F) in the single-channel pipettors 2 - 1,000.	Tighten the shaft nut.
	The sealing surface of the shaft is cracked or scored.	Remove the tip ejector. Unscrew the shaft nut, inspect the shaft and the piston assembly. Replace the damaged parts (see Section 12). When reassembling the pipettor, the nut should be hand tightened. In the models P2, P10 and P20, the damage of the shaft may also cause a damage of the piston assembly. Replace the damaged parts (see Section 12). When reassembling the pipettor, the nut should be hand tightened.
	The pipettor is reassembled incorrectly.	Disassemble the pipettor and reassemble it, observing the proper sequence of steps (Fig. 3).
	Damage to the piston or seal due to prolonged use with the aggressive liquids.	Disassemble the pipettor as described above. Replace the piston, seal and O-ring (see Section 12). Rinse the inside of the shaft in distilled water and dry.  Lubricate the seal and O-ring with the grease, that has been included with each pipettor. The replacement of the piston will require the user to carry out the calibration procedure.  <b>Note:</b> The parts of P2 and P10 pipettor should be lubricated evenly with a minimum amount of piston grease.
	No grease on the sealing elements.	Remove the tip ejector. Unscrew the shaft nut, remove the shaft, piston assembly, seal and O-ring. Rinse the removed parts in distilled water and dry thoroughly. Lightly lubricate the inside surfaces of the seal and the O-ring with the included grease. Reassemble the pipettor in the reverse order.

Problem	Cause	Solution
The pipettor incorrectly aspirates the liquid or liquid drops out from the pipette tip.	Contamination of the inside of the pipettor due to extensive aspiration of chemically aggressive liquids or due to liquid getting inside.	Remove the tip ejector. Unscrew the nut, remove the shaft, piston assembly, seal and O-ring. Rinse the removed parts with distilled water and dry thoroughly. Lightly lubricate the inside surfaces of the seal and the O-ring with the grease. Reassemble the pipettor in the reverse order.
	An increase in the force of pipetting, which can happen after repetitive autoclaving of the pipettor.	Remove the tip ejector. Unscrew the shaft nut, and then remove the shaft, piston assembly, seal and O-ring. Rinse the removed parts in distilled water and dry. Lubricate the internal surfaces of the seal and O-ring with grease that has been included with each pipettor. Reassemble the pipettor in opposite order.

**Note: All parts of the pipettor can be autoclaved (see Section 10)**

If the problem continues after carrying out the above steps, contact your **Appleton** representative.

Before returning the pipettor, please ensure that it is completely free of any chemical, radioactive or microbiological contamination which could pose a threat during transport and repair. As far as it is possible, clean it thoroughly.

## 10 – CLEANING AND STERILISATION

### **Cleaning:**

External surfaces of the pipetting pushbutton, the ejector pushbutton, the handgrip, the shaft nut and the adjustment knob may be cleaned using a cloth dampened in isopropyl alcohol. The remaining parts removed from the pipettor during disassembly may be washed with distilled water or isopropyl alcohol.

### **Sterilisation:**

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

***It is recommended:***

- That the pipettors are sterilised in an autoclave with an initial vacuum and drying cycle.
- That prior to sterilisation, the shaft nut is unscrewed slightly in P2-P1000 pipettors; after autoclaving these parts should be screwed tight again.
- That the locking ring is set in the lower (unlocked) position prior to sterilisation.
- The shaft of the P5000 and P10000 models should be autoclaved without the filter.

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, we recommend:

- Checking that the pipettor is accurately calibrated after the very first, third and fifth autoclave cycles and thereafter, checking its calibrations every 10 autoclave cycles.

## **11 – PIPETTOR KIT (AEL060)**

***Kit components are:***

- 4 single-channel variable pipettors (P10, P20, P200, P1000)
- Instruction manual
- Calibration key
- Pipettor stand
- Ejector regulation spacers (for pipettor models P2- P1000)
- Ejector cap (for pipettor models P2 and P10)
- 3 racks of pipette tips (10  $\mu$ L, 200  $\mu$ L and 1,250  $\mu$ L)
- Identification labels
- Piston grease
- Colour Identification rings (for pipettor models P2-P1000)

The stand assembly diagram is shown in Fig. 7.

## 12 – SPARE PARTS AND ACCESSORIES

The spare parts indicated in Fig. 1, 3, 4, 5 and 6 are as follows:

**A: Pipetting pushbutton    A1: Pushbutton    A2: Knob**

**B: Thumb wheel**

**C: Shaft**

**D: Ejector**

**F: Shaft nut**

**G: Piston assembly**

**H: Spacer**

**I: O-ring**

**J: Seal**

**K: Calibration key**

**M: Ejector cap**

**N: Ejector pushbutton**

**P: Identification ring**

**S: Locking ring**

These can be ordered from **Appleton Woods** (the type of pipettor and the name of the part for this pipettor should be specified).

**Warning: The replacement of the piston requires conducting of calibration procedure according to section 8.**

All rights reserved. Product described in this manual is subject to availability and technical modification. Errors excepted.

Appleton Woods Ltd reserves the right to improve, enhance or otherwise modify its products without prior notification.

© 2023 Appleton Woods Ltd.

