Single Channel Autoclavable Pipette
User Manual

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1. Your New Pipette

Your new hand held pipette is a general purpose pipette for the accurate and precise sampling and dispensing of liquid volumes. The pipettes operate on the air displacement principle and disposable tips.

The pipettes cover a volume range from 0.1µl to 10ml.

All pipettes have been quality tested according to ISO8655/DIN12650. T0he quality control according to ISO8655/DIN12650 involves gravimetric testing of each pipette with distilled water (quality 3, DIN ISO 3696) at 22℃ using the manufacturer's original tips.

1.1. Adjustable volume pipettes

Volume Range	Increment	Tips
0.1 -2.5µl	0.05µl	10µl
0.5-10µl	0.1µl	10µl
2-20µl	0.5 µl	200, 300µl
5-50µl	0.5µl	200, 300, 350µl
10-100µl	1µl	200, 300, 350µl
20-200µl	1µl	200, 300, 350µl
50-200µl	1µl	200, 300, 350µl
100-1000µl	5µl	1000µl
200-1000µl	5µl	1000µl
1000-5000µl	50µl	5m l
2-10ml	0.1ml	10ml
8-ch 0.5-10µl	0.1µl	10µl
8-ch 5-50µl	0.5µl	200, 300, 350µl
8-ch 50-300µl	5µl	350µl
12-ch 0.5-10µl	0.1µl	10µl
12-ch 5-50µl	0.5µl	200, 300, 350µl
12-ch 30-300µl	5µl	350µl

1.2. Fixed volume pipettes

Volume	Tips
5µl	10µl
10µl	10µl
20µl	200, 300,350µl
25µl	200, 300,350µl
50µl	200, 300,350µl
100µl	200, 300,350µl
200µl	200, 300,350µl
250µl	1000µl

500µl	1000µl
1000µl	1000µl
2000µl	5000µl
5000µl	5000µl

1.3. Fully autoclavable

The pipette can be fully autoclaved, withstanding steam sterilizing at 121℃, 1 atm for 20 minutes. Bothof single and multi channel pipettes can be autoclaved without special preparation. After autoclaving the pipette must be cooled down and left to dry over 12 hours. It is recommended to check the performance of the pipette after each autoclaving. It is also recommended to grease the piston and seal of the pipette after 10 autoclavings.

2. Unpacking

The pipette packing contains the following items：

- Pipette
- Calibration/ remove tool
- User manual
- Pipette holder
- Tips
- Quality control certificate

3. Installing The Pipette Holder

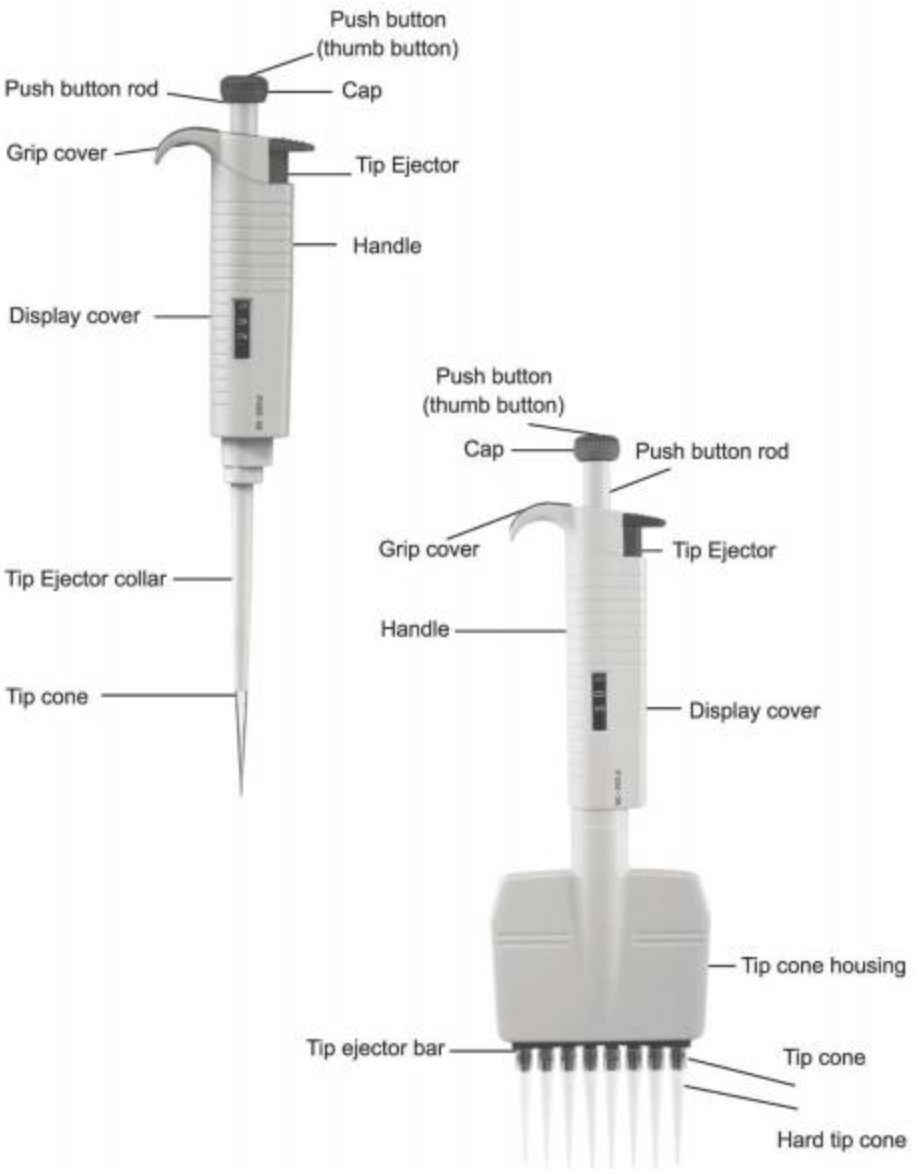
For convenience and safety always keep the pipette vertically on its own holder when not in use. When installing the holder, please follow the instruction below:

1. Clean the shelf surface with ethanol.
2. Remove the protective paper from the adhesive tape.
3. Install the holder as described in Figure 2A. (Make sure the holder is pressed against the edge of the shelf.)
4. Place the pipette onto the holder as shown in Figure 2B.

Figure 2A

Figure 2B

4. Pipette Components



5.Pipette Operation

5.1. Volume setting

The volume of the pipette is clearly shown through the handle grip window. The delivery volume (variable volume pipette only) is set by turning the thumb button clockwise is anticlockwise (Fig.3).
When setting the volume, please make sure that:

- The desired delivery volume clicks into place
- The digits are completely visible in the display window
- The selected volume is within the pipette's specified range

Using excessive force to turn the push button outside the range may jam the mechanism and damage the pipette.

Fig.3

5.2. Sealing and ejecting tips

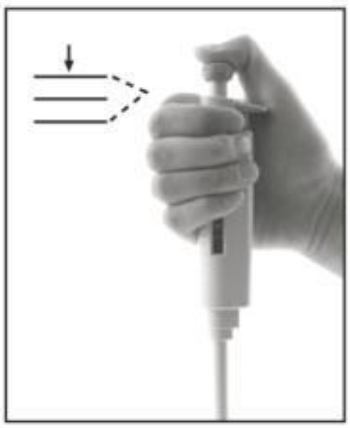
Before fitting a tip makes sure that the pipette tip cone is clean. Press the tip on the cone of the pipette firmly to ensure an airtight seal. The seal is tight when a visible sealing ring forms between the tip and the black tip cone (Fig.4).
Each pipette is fitted with a tip ejector to help eliminate the safety hazards associated with contamination. The tip ejector needs to be pressed firmly downwards to ensure proper tip ejection (Fig.5). Make sure the tip is disposed of into a suitable waster container.

Fig.4 Fig.5

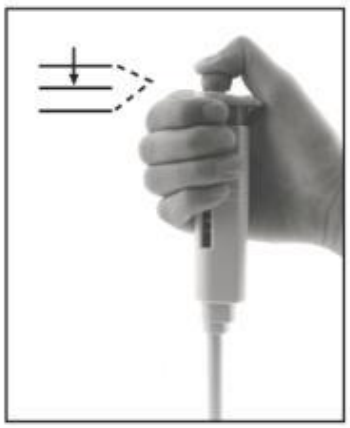
6.Pipetting Techniques

6.1. Forward pipetting

Make sure that the tip is firmly attached to the tip cone. For best results the thumb button should be operated slowly and smoothly at all times, particularly with viscous liquids.
Hold the pipette vertically during aspiration. Make sure that the liquid and container vessel are clean and that the pipette, tips and the liquid are at the same temperature.
1. Depress the thumb button to the first stop (Fig.6B).
2. Place the tip just under the surface of the liquid (2- 3mm) and smoothly release the thumb button. Carefully withdraw the tip from the liquid, touching against the edge of container to remove excess.
3. Liquid is dispensed by gently depressing the thumb button to the first stop (Fig.6B). After a short delay continue to depress the thumb button to the second stop (Fig.6C). This procedure will empty the tip and ensure accurate delivery.
4. Release the thumb button to the ready position (Fig.6A). If necessary change the tip and continue with pipetting.



Starting position Fig.6A



First stop Fig.6B

Second stop Fig.6C

6.2. Reverse pipetting

The reverse technique is suitable for dispensing liquids that have a tendency to foam or have a high viscosity. This technique is also used for dispensing very small volumes when it is recommended that the tip is first primed with the liquid before pipetting. This is achieved by filling and emptying the tip.
1. Depress the thumb button all the way to the second stop (Fig.6C). Place the tip just under the surface of the liquid (2-3mm) and smoothly release the thumb button.
2. Withdraw the tip from the liquid touching against the edge of the container to remove excess.
3. Deliver the preset volume by smoothly depressing thumb button to the first stop (Fig.6B). Hold the thumb button at the first stop. The liquid that remains in the tip should not be included in the delivery.
4. The remaining liquid should now be discarded with the tip or delivered back into the container vessel.

7. Pipetting Recommendations

●Hold the pipette vertically when aspirating the liquid and place the only a few millimeters into the liquid

●Prerinse the tip before aspirating the liquid by filling and emptying the tip 5 times. This is important especially when dispensing liquids which have a viscosity and density different from water

●Always control the push button movements with the thumb to ensure consistency

●When pipetting liquids at a temperature different from ambient, prerinse the tip several times before use.

8. Storage

When not in use it is recommended that your pipette is stored in a vertical position.

9. Performance Test And Recalibration

Each pipette has been factory-tested and certified at 22℃ according to ISO8655/DIN12650. The following table shows the maximum permitted errors (Fmax) for manufacturers gives in ISO8655/DIN 12650, which further advises each user to establish their own maximum permitted errors (Fmax user).

The Fmax user should not exceed the Fmax by more than 100%.

Note: Pipette specifications are guaranteed only with manufacturer's tips.

9.1. Performance test (Checking calibration)

●Weighting should take place at 20-25℃, constant to ±0.5℃.

●Avoid drafts.

1. Set the desired testing volume of your pipette.
2. Carefully fit tip onto the tip cone.
3. Prerinse tip with distilled water by pipetting the selected volume 5 times.
4. Carefully aspirate the liquid, keeping the pipette vertical.
5. Pipette distilled water into a tared container read the weight in mgs. Repeat at least five times and record each result. Use an analytical balance with a readability of 0.01 mgs. To calculate the volume, divide the weight of the water by its density (at 20℃: 0.9982). This method is based on ISO8655/DIN12650.
6. Calculate the F-value by using the following equation:

F=|inaccuracy (µl) |+2×imprecision (µl) Compare the calculated F-value to the corresponding Fmax user. If it falls within the specifications, the pipette is ready for use. Otherwise check both your accuracy and, when necessary, proceed to recalibration procedure.

9.2. Recalibration procedure

1. Place the calibration tool into the holes of the calibration adjustment lock (under the thumb button) (Fig.7).
2. Turn the adjustment lock anticlockwise to decrease and clockwise to increase the volume.
3. Repeat performance test (Checking calibration) procedure from step 1 until the pipetting results are correct.

Fig. 7

10. Maintenance

To maintain the best results from your pipette each unit should be checked every day for cleanliness. Particular attention should be paid to the tip cone (s).
The pipettes have been designed for easy in-house service.
However, we also provide complete repair and calibration service including a service report and performance certificate(s). Please return your pipette to your local representative for repair or recalibration. Before returning please make sure that it is free from all contamination. Please advise our Service Representative of any hazardous materials which may have been used with your pipette.
Note: Check the performance of your pipette regularly e.g. every 3 months and always after in-house service or maintenance.

10.1. Cleaning your pipette

To clean your pipette using ethanol and a soft cloth or lint-free tissue. It is recommended to clean the tip cone regularly

10.2. In-house maintenance

1. Hold down the tip ejector.
2. Place the tooth of the opening tool between the tip ejector and the tip ejector collar to release the locking mechanism (Fig.8).
3. Carefully release the tip ejector and remove the ejector collar.
4. Place the wrench end of the opening tool over the tip cone, turning it anticlockwise. Do not use any other tools (Fig.9).
The 5 ml tip cone is removed by turning it anticlockwise. Do not use any tools (Fig.10).
5. Wipe the piston, the O-ring and the tip cone with ethanol and a lint-free cloth.
Note: Models up to 10µl have a fixed O-ring located inside the tip cone. Therefore, the O-ring cannot be accessed for maintenance.
6. Before replacing tip cone it is recommended to grease the piston slightly using the silicone grease provided.
Note: Excessive use of grease may jam the piston.
7. After reassembling use the pipette (without liquid) several times to make sure that he grease is spread evenly.
8. Check the pipette calibration.

Fig.8

Fig.9

Fig.10

11. Trouble Shooting

Trouble	Possible cause	Solution
Droplets left inside the tip	Unsuitable tip	Use original tips
	Non-uniform wetting of the plastic	Attach new tip
Leakage or pipetted volume too small	Tip incorrectly attached	Attach firmly
	Unsuitable tip	Use original tips
	Foreign particles between tip and tip cone	Clean the tip cone, attach new tip
	Instrument contaminated or insufficient amount of grease on piston and O-ring	Clean and grease O-ring and piston, clean the tip cone Grease accordingly
	O-ring not correctly positioned or damaged	Change the O-ring
	Incorrect operation	Follow instruction carefully
	Calibration altered or	Recalibrate
	unsuitable for the liquid	according to instructions
	Instrument damaged	Send for service
Push button jammed or moves erratically	Piston contaminated	Clean and grease O-ring and piston, clean the tip cone
	Penetration of solvent vapours	Clean and grease O-ring and piston, clean the tip cone
Pipette blocked aspirated volume too small	Liquid has penetrated tip cone and dried	Clean and grease O-ring and piston, clean the tip cone
Tip ejector jammed or moves erratically	Tip cone and/or ejector collar contaminated	Clean the tip cone and the ejector collar

12. Warranty Information

The pipettes are warranted for one year against defects in materials and workmanship. Should it fail to function in any period of time, please contact your local representative immediately. The warranty will not cover defects caused by normal wear or by using the pipette against the instructions gives in this manual.

Each pipette is tested before shipping by the manufacturer.

The Quality Assurance Procedure is your guarantee that the pipette you have purchased is ready for use.

13. Performance indicators

Adjustable volume pipette

Range	Measuring volume（μl）	Maximum allowable system error (inaccuracy)		Allow maximum random error (imprecision)	
		%	μl	%	μl
0.1-2.5μl	2.5	2.50%	0.0625	2.00%	0.05
	1.25	3.00%	0.0375	3.00%	0.0375
	0.25	12.00%	0.03	6.00%	0.015
0.5-10μl	10	1.00%	0.1	0.80%	0.08
	5	1.50%	0.075	1.50%	0.075
	1	2.50%	0.025	1.50%	0.015
2-20μl	20	0.90%	0.18	0.40%	0.08
	10	1.20%	0.12	1.00%	0.1
	2	3.00%	0.06	2.00%	0.04
5-50μl	50	0.60%	0.3	0.30%	0.15
	25	0.90%	0.225	0.60%	0.15
	5	2.00%	0.1	2.00%	0.1
10-100μl	100	0.80%	0.8	0.15%	0.15
	50	1.00%	0.5	0.40%	0.2
	10	3.00%	0.3	1.50%	0.15
20-200μl	200	0.60%	1.2	0.15%	0.3
	100	0.80%	0.8	0.30%	0.3
	20	3.00%	0.6	1.00%	0.2
50-200μl	200	0.60%	1.2	0.15%	0.3
	100	0.80%	0.8	0.30%	0.3
	50	1.00%	0.5	0.40%	0.2
100-1000μl	1000	0.60%	6	0.20%	2
	500	0.70%	3.5	0.25%	1.25
	100	2.00%	2	0.70%	0.7
200-1000μl	1000	0.60%	6	0.20%	2
	500	0.70%	3.5	0.25%	1.25

	200	0.90%	1.8	0.30%	0.6
1000-5000μl	5000	0.50%	25	0.15%	7.5
	2500	0.60%	15	0.30%	7.5
	1000	0.70%	7	0.30%	3
		%	μl	%	μl
2-10	10000	0.60%	60	0.20%	20
	5000	1.20%	60	0.30%	15
	2000	3.00%	60	0.60%	12

8-channel adjustable pipette

Range	Measuring volume（μl）	Maximum allowable system error (inaccuracy)		Allow maximum random error (imprecision)	
		%	μl	%	μl
0.5-10μl	10	1.50%	0.15	1.50%	0.15
	5	2.50%	0.125	2.50%	0.125
	1	4.00%	0.04	4.00%	0.04
5-50μl	50	1.00%	0.5	0.50%	0.25
	25	1.50%	0.375	1.00%	0.25
	5	3.00%	0.15	2.00%	0.1
50-300μl	300	0.70%	2.1	0.25%	0.75
	150	1.00%	1.5	0.50%	0.75
	50	1.50%	0.75	0.80%	0.4

12-channel adjustable pipette

Range	Measuring volume（μl）	Maximum allowable system error (inaccuracy)		Allow maximum random error (imprecision)	
		%	μl	%	μl
0.5-10μl	10	1.50%	0.15	1.50%	0.15
	5	2.50%	0.125	2.50%	0.125
	1	4.00%	0.04	4.00%	0.04
5-50μl	50	1.00%	0.5	0.50%	0.25
	25	1.50%	0.375	1.00%	0.25
	5	3.00%	0.15	2.00%	0.1
50-300μl	300	0.70%	2.1	0.25%	0.75
	150	1.00%	1.5	0.50%	0.75
	50	1.50%	0.75	0.80%	0.4

Fixed volume pipette

Range	Measuring volume（μl）	Maximum allowable system error (inaccuracy)		Allow maximum random error (imprecision)	
		%	μl	%	μl
5μl	5μl	1.3%	0.065	1.2%	0.06

10µl	10µl	0.8%	0.08	0.8%	0.08
20µl	20µl	0.6%	0.12	0.5%	0.1
25µl	25µl	0.5%	0.125	0.3%	0.075
50µl	50µl	0.5%	0.25	0.3%	0.15
100µl	100µl	0.5%	0.5	0.3%	0.3
200µl	200µl	0.4%	0.8	0.2%	0.4
250µl	250µl	0.4%	1.0	0.2%	0.5
500µl	500µl	0.3%	1.5	0.2%	1.0
1000µl	1000µl	0.3%	3.0	0.2%	2.0
2000µl	2000µl	0.3%	6.0	0.15%	3.0
5000µl	5000µl	0.3%	15	0.15%	7.5

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