



# Operating Instructions 使用说明书



8-Channel Adjustable Volume Pipette

8通道可调移液器

MP10 / MP50 / MP300

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# 1. Product Introduction

## 1.1 Product features

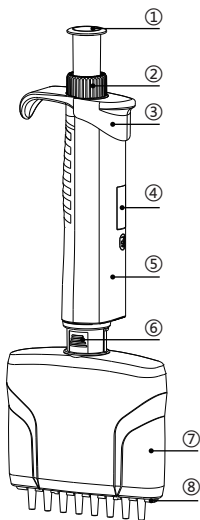
- Ergonomic design allows comfortable grip and fatigue-free pipetting
- Wide volume range: from 0.5~300ul
- 4-digit volume display provides accurate volume setting and visibility
- Easy to disassemble the lower part for replacement or cleaning
- Tip contact parts are chemical-resistant
- Easy to calibrate and maintain with tools supplied.
- Different volume range is identified by different color top
- Each pipette is calibrated in accordance with ISO8665
- The lower part can be autoclaved

## 1.2 Box contents

Item	Qty.	Item	Qty.
Pipette	1	Tip	8
Operating instruction	1	Certificate	1
Calibration tool	1	"ADJ" sticker	1
Grease	1		

### 1.3 Product structure

- ① Control button (ASA/PC)
- ② Volume setting ring (ASA/PC)
- ③ Ejector button (ASA)
- ④ Display window (PC)
- ⑤ Handle (ASA)
- ⑥ Detach button (PEI)
- ⑦ 8-Channel lower part (PEI)
- ⑧ Ejector sleeve (PEI)



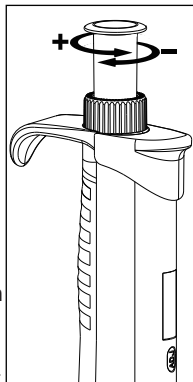
### 1.4 Specifications

Model	Volume Range ( $\mu$ l)	Testing Volume ( $\mu$ l)	Maximum permissible systematic error		Maximum permissible random error	
MP10	0.5-10	10	2.00%	0.200ul	1.00%	0.100ul
		5	4.00%	0.200ul	2.00%	0.100ul
		1	8.00%	0.080ul	5.00%	0.050ul
MP50	5-50	50	1.00%	0.500ul	0.40%	0.200ul
		25	1.50%	0.375ul	0.80%	0.200ul
		5	3.00%	0.150ul	2.00%	0.100ul
MP300	30-300	300	0.60%	1.800ul	0.30%	0.900 $\mu$ l
		150	1.00%	1.500ul	0.50%	0.750ul
		50	3.00%	1.500ul	1.00%	0.500ul

## 2.Operation

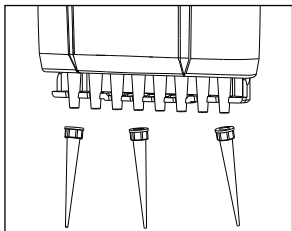
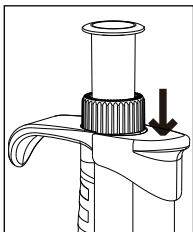
### 2.1 Setting volume

- Turn the volume setting ring shown as above to set the volume.
- The height of the control button changes as the volume is adjusted. The higher the button is, the bigger the volume will be. **DO NOT** turn the volume setting ring excessively to set the volume outside of range, which would jam the mechanism and damage the pipette.
- The side viewing window displays the set volume.
- The numbers on the volume display are to be read from the top to the bottom. The decimal places start after the underscored digit.



### 2.2 Attaching and ejecting tips

- The pipette can only be used after a pipette tip has been attached.
- Make sure the tip cone is clean before attaching the tip.
- Make sure it is a tight fit between the tip and the tip cone for accurate transferring of liquids.
- When attaching a tip by hand, it must be handled in a way that prevents both the contamination and hand-warming of the pipette tip.
- Press the ejector button firmly downwards to eject the tips.



## 3. Pipetting

### 3.1 Notes

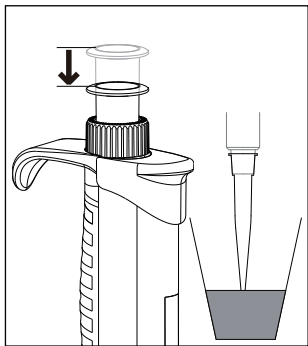
- To ensure maximum precision and accuracy, we recommend initially wetting each new tip by aspirating and dispensing the liquid three to five times.
- To aspirate liquid, immerse the pipette tip vertically in the liquid at a specific immersion depth (refer table below) and maintain the immersion depth to ensure no air is aspirated. Carefully wipe the pipette tip against the tube inner wall to ensure that no outer wetting remains on the tip.
- To dispense liquid, place the tip on the tube inner wall at an angle. Hold down the control button to dispense the liquid and wipe the tip on the tube inner wall.

### 3.2 Forward pipetting

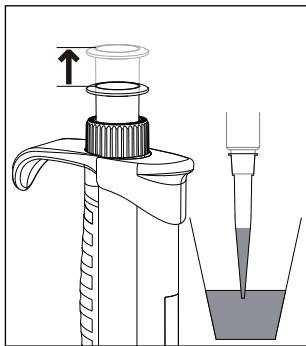
- Press down the control button to the first stop.
- Vertically immerse the pipette tip into the liquid at a specific immersion depth (refer table below)

Sample volume	Immersion depth	Waiting time
0.5-100ul	2-3mm	1s
100ul-300ul	2-4mm	1s
> 1000ul	3-6mm	3s

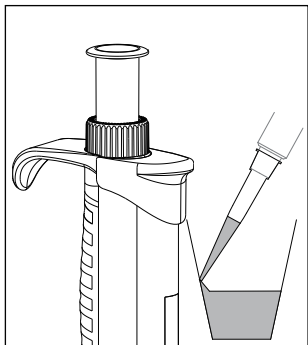
- Allow the control button to slide back slowly. Maintain the immersion depth to ensure no air is aspirated.
- Wait before removing the pipette tip from the liquid. The waiting time is based on how large volume is aspirated.
- To dispense the liquid, press down the control button slowly until the first stop.
- To empty the tip, press the control button until the second stop.
- Allow the control button slide back to the starting point slowly.
- To eject the tip, press the ejector button.



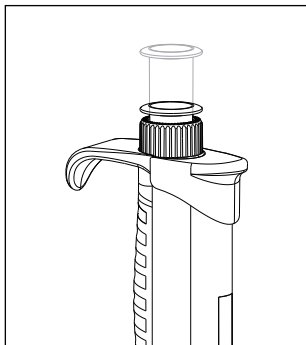
1. Press down the control button to the first stop.



2. Let the control button slide back slowly.



3. Place the pipette tip against the tube inner wall, at an angle of around 45°. Press the control button slowly to the first stop position and wait until the flow of liquid stops.



4. To empty the tip, press down the control button to the second stop. Hold down the control button and wipe the tip on the tube inner wall.

### 3.3 Reverse pipetting

Reverse pipetting is used to dispense bubbling liquid, highly viscous liquid and can also be used for very small volume. Before pipetting, please wet the tip by aspirating and dispensing the liquid.

- Press down the control button to the second stop.
- Vertically immerse the pipette tip approx. 2-3mm into the liquid.
- Allow the control button to slide back slowly. Maintain the immersion depth to ensure no air is aspirated.
- To dispense the liquid, press the control button slowly until the first stop.
- The remaining liquid together with tips should be discarded.

## 4. Performance Test and Calibration

### 4.1 Performance test

Performance test should be performed in a draught-free room at 15-30°C (constant to  $\pm 0.5^\circ\text{C}$ ) and the relative humidity above 50%. Keep the pipette, tips and test water in the test room for at least 2 hours prior to the test. Please perform the tests with the distilled water or deionized water (grade 3, ISO3696) and the analytical balance (accuracy up to 0.01mg).

- Attach the tip to the pipette properly.
- Wet the tip by aspirating and dispensing the set volume 3 to 5 times.
- Press down the control button to the first stop
- Vertically immerse the pipette tip approx. 4mm into the liquid.
- Allow the control button to slide back slowly. Maintain the immerse depth to ensure no air is aspirated.
- Dispense the liquid into the weighing container and place the tip on the container inner wall at an angle. Hold down the control button and wipe the tip on the container inner wall.
- Read the weight in mg.
- Repeat the same tests for 10 times and record each reading.
- Convert each weight reading to volume by multiplying the error correction Z ( $Z=1.0033$ ,  $22^\circ\text{C}$  and  $101.3\text{ Kpa}$ ).

### 4.2 Calibration

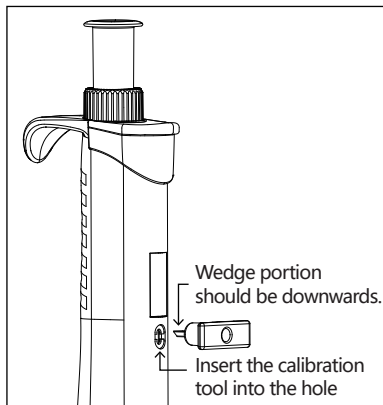
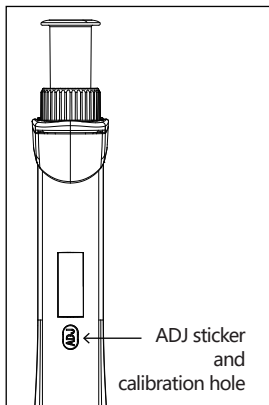
- Remove the "ADJ" sticker.
- Insert the calibration tool into the hole where the "ADJ" sticker is

located. Please make sure the wedge portion is facing downwards.

- Turn the volume setting ring to adjust the volume. To increase the volume, adjust in the counterclockwise direction and to decrease the volume adjust in clockwise direction.
- Rotate the volume setting ring counterclockwise to increase the displayed volume (if it is smaller than the actual volume) or rotate the volume setting ring clockwise to decrease the displayed volume (if it is larger than the actual volume) until the displayed volume is same with the actual volume.
- Attach the "ADJ" sticker after calibration.
- Perform tests as mentioned above to verify the calibration.

**Note:** Each pipette is calibrated at our facility before shipment.

Recalibration is to eliminate the errors caused after long-term use.



## 5. Maintenance

Aggressive substances may damage the pipette, pipette tip and accessories. Faulty dispensing results are sometimes due to lack of maintenance.

- Check the resistance to chemicals before using organic solvents or aggressive chemicals.
- Only use liquids whose vapors do not corrode the used materials.

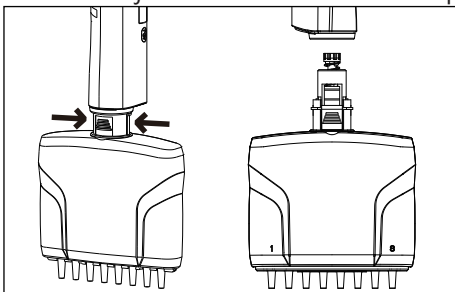
### 5.1 Cleaning

The lower parts are wear parts. Clean them after contamination or use of aggressive chemicals. If the lower parts are worn or damaged, replace these parts. Unsuitable cleaning agents can damage the device.

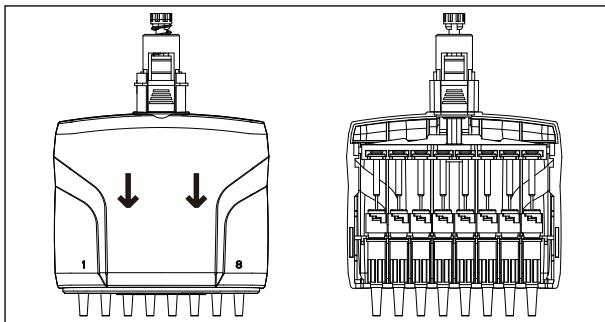
- Moisten a cloth with a cleaning agent / alcohol.
- Remove external contamination.
- Moisten a new cloth with water.
- Wipe down the housing.

### 5.2 Maintenance

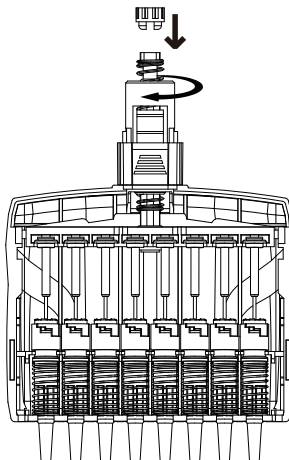
- Press both sides of the ejector sleeve to detach the lower part.



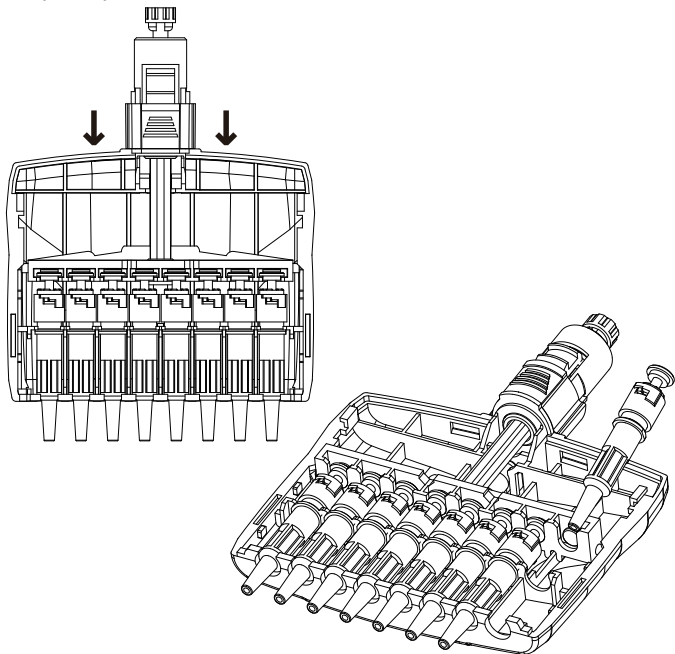
- Slide the cover plate downwards to open (The side with number "1" & "8" should face the operator).



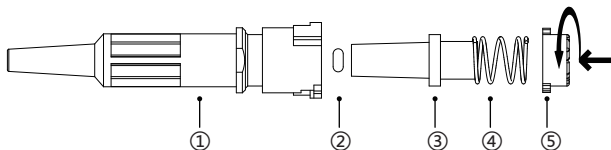
- Press down and rotate to take out the spring mount and the spring.



- Push down the slide block towards the piston cylinders. After this, carefully release the piston cylinder. Insert a tool (like screwdriver) below the top portion of the piston cylinder and move it upward to release it from its position. ( To reinsert the piston cylinder, the bottom portion should be secured in the slot first, and then push down the top into position.)



- To disassemble the piston cylinder, press down and rotate the piston mount to separate the piston spring, O-ring and piston guide.



- ① Piston cylinder
- ② O-ring
- ③ Piston guide
- ④ Piston spring
- ⑤ Piston mount

- Wipe the piston cylinder, piston pin, spring, fixed seat, O-ring and ejector sleeve. After cleaning, brush moderate amount of silicone grease onto the piston pin, fixed seat and O-ring.

**Note:** excessive silicone grease may interfere with smooth movement of the piston.

- After re-assembly, push the control button several times to make sure the silicone grease is uniform. (The pipette is without any liquid when doing this operation.)

## 6. Pipette Tips Compatibility

Brand	Volume	MP10	MP50	MP300
Eppendorf	10uL			
	200uL			
	300uL			
Axyen	10uL(universal)			
	10uL(long)			
	200uL			
	300uL			
QSP (Thermo scientific)	10uL			
	200uL			
Gilson	10uL			
	200uL			
Kirgen	KG1011(0.1-10uL)			
	KG1111(0.5-10uL)			
	KG1212(1-200uL)			
	KG1213(1-300uL)			
Cellpro	10uL			
	200uL			
	300uL			
Pakgent	UFRT-10R			
	UFRT-10R-L			
	UFRT-10ER			
	UFRT-10ER-L			
	UFRT-200R			
	UFRT-200R-L			
	UFRT-200ER			
	UFRT-200ER-L			

## 7. Spare Parts List

	Part No#			
Volume Range	Piston cylinder	Piston rod	Tip O-ring	Piston spring
0.5-10 $\mu$ l	3.1.305235000	2.3.205235100	/	3.2.405222004
5-50 $\mu$ l	3.1.305227000	2.3.205227100	3.4.605222001	3.2.405222004
30-300 $\mu$ l	3.1.305222009	2.3.205222100	3.4.605222001	3.2.405222004

## 8. Troubleshooting

Problem	Cause	Solution
Residual liquid and/or liquid is dripping from the tip and /or the dispensed volume is too small.	<ul style="list-style-type: none"> <li>• Incompatible tip.</li> <li>• The tip is not wet uniformly.</li> <li>• Tip incorrectly attached.</li> <li>• Foreign particles between the tip and the piston cylinder.</li> <li>• Insufficient grease on the piston and O-ring; O-ring positioned incorrectly, or the O-ring is damaged.</li> <li>• Malperation; The calibration is changed, or the pipette is damaged.</li> </ul>	<ul style="list-style-type: none"> <li>• Use compatible tip.</li> <li>• Attach new tip.</li> <li>• Attach the tip firmly.</li> <li>• Clean the piston cylinder and attach new tip.</li> <li>• Clean and grease the O-ring and piston. Reinstall or replace the O-ring.</li> <li>• Recalibrate and repair the pipette</li> </ul>
The control button jams and does not move smoothly.	The piston is dirty. The pipette is blocked.	Clean the piston cylinder and ejector sleeve.
The pipette is blocked, or the dispensed volume is too small.	Insufficient silicone grease on O-ring. Foreign particles on the piston pin and O-ring.	Clean and lubricate the O-ring and piston. Clean the end of piston cylinder.
The ejector sleeve is blocked or does not move smoothly.	The spring jams.	Grease the spring.

## **9.Warranty**

Each pipette is calibrated and tested before shipping and it's ready for use.

The pipette is covered by warranty for one year against defects in materials and workmanship. If your pipette failed to function, please contact your local representative.

Any warranty will, however, be deemed as void if fault is found to have been caused by maltreatment, misuse, unauthorized maintenance of service or negligence of regular maintenance and service, accidental damage, incorrect storage or use of the products for operations outside their specifications, contrary to the instructions given in this manual or with other than the manufacturer's original tips or compatible tips recommended by the manufacturer.

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# 1. 产品介绍

## 1.1 产品性能

符合人体工学设计，按压轻便

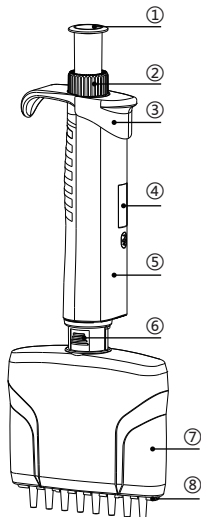
- 量程范围0.5ul-300ul
- 4位数字显示，显示精度0.01ul
- 简易拆装便于保养清洗
- 管嘴连件耐化学腐蚀
- 提供的附件工具能简单快速地校准和维修
- 不同颜色上盖区分不同量程移液器
- 每支移液器都遵照ISO8655进行校准
- 下半支可高温高压消毒

## 1.2 包装内容

项目	数量	项目	数量
移液器	1	吸头	8
说明书	1	合格证书	1
校准工具	1	ADJ标贴	1
硅脂	1		

### 1.3 产品结构

- ① 控制按钮 (ASA/PC)
- ② 调节旋钮 (ASA/PC)
- ③ 管嘴推出器 (ASA)
- ④ 显示窗 (PC)
- ⑤ 手柄 (ASA)
- ⑥ 推套 (PEI)
- ⑦ 移液单元 (PEI)
- ⑧ 推板 (PEI)



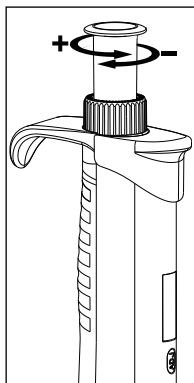
### 1.4 产品参数

产品 型号	容量 ( $\mu$ l)	测量体积 ( $\mu$ l)	允许最大系统误差 (准确度)		允许最大随机误差 (精密度)	
MP10	0.5-10	10	2.00%	0.200ul	1.00%	0.100ul
		5	4.00%	0.200ul	2.00%	0.100ul
		1	8.00%	0.080ul	5.00%	0.050ul
MP50	5-50	50	1.00%	0.500ul	0.40%	0.200ul
		25	1.50%	0.375ul	0.80%	0.200ul
		5	3.00%	0.150ul	2.00%	0.100ul
MP300	30-300	300	0.60%	1.800ul	0.30%	0.900 $\mu$ l
		150	1.00%	1.500ul	0.50%	0.750ul
		50	3.00%	1.500ul	1.00%	0.500ul

## 2. 操作说明

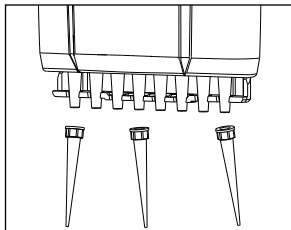
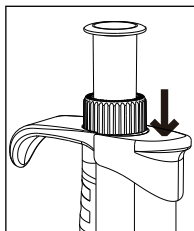
### 2.1 量程设置

- 按照上图转动调节旋钮设置量程。
- 控制按钮的高度随着量程调节变化而变化。按钮位置越高，量程越大。不要过多旋转调节旋钮超出量程，否则会卡住机械装置，损坏移液器。
- 手柄数字窗显示设置量程。
- 数字窗里的数字从上往下读取。连字符号以下是小数点位。



### 2.2 安装以及推出吸头

- 移液器安装吸头之后才能使用。
- 吸头安装前，确保管嘴连件清洁。
- 为确保准确移液，吸头需牢固安装在管嘴连件上。
- 如果手动安装吸头，需避免吸头污染以及过热。
- 往下按压管嘴推出器推出吸头。



## 3. 移液

### 3.1 注意事项

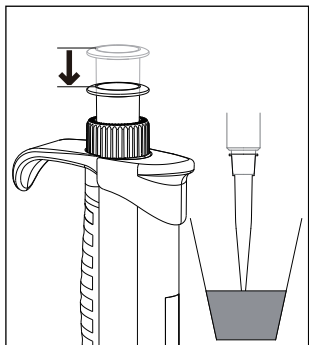
- 为确保最大精准度，我们建议正式移液前，吸液/移3-5次湿润吸头
- 吸液时，请将吸头垂直没入液体一定深度（具体参照表格），并保持这样的深度以免空气吸入。小心将吸头在容器壁上停靠一下，以去除多余液体。
- 移液时，将吸头斜靠在容器壁上，保证液体准确转移。

### 3.2 正向移液

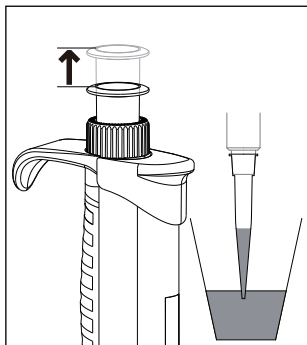
- 按压控制按钮到第一停点。
- 将吸头垂直没入液体一定深度（具体参照表格）

体积范围	浸入深度	等待时间
0.5-100ul	2-3mm	1s
100ul-300ul	2-4mm	1s
> 1000ul	3-6mm	3s

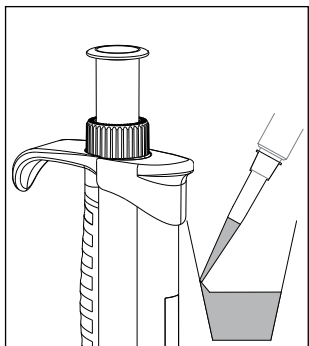
- 慢慢松开按钮，回到原点。保持吸头在液体里的深度以免空气吸入。
- 移取一定容量液体时，根据量程选择对应等待时间然后再将吸头提出。
- 按压按钮到第一停点直到液体排出。
- 按压按钮到第二停点直到吸头排空液体。
- 慢慢松开按钮回到原点。
- 往下按压管嘴推出器推出吸头。



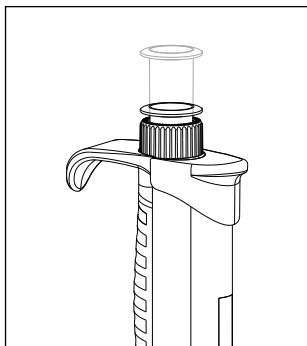
1. 将移液按钮按至第一停点。



2. 缓慢放开移液按钮。



3. 将吸头靠在容器壁上，吸管与杯壁行程45°，按压按钮到第一停点直到液体排出。



4. 将按钮按至第二停点排空液体。按住按钮，将吸头在容器壁上停靠一下。

### 3.3 反向移液

反向移液技术用于移取易起泡液体，高粘度液体或用于极小量移液。移液前，请用吸液、移液湿润吸头。

- 按压按钮到第二停点。
- 将吸头垂直没入液体约2-3mm。
- 慢慢松开按钮回到原点，保持吸头在液体里的深度以免空气吸入。
- 按压按钮到第一停点直到液体排出。
- 多余液体随吸头丢弃废物容器中。

## 4. 性能测试与校准

### 4.1 性能测试

性能测试应该在无气流，温度在15-30°C (恒定在 $\pm 0.5^\circ\text{C}$ )，湿度大于50%的室内进行。将移液器，吸头以及测试用水放在测试房至少2小时，以便与室内条件达到平衡。测试用蒸馏水或去离子水(3级, ISO3696)以及精度为0.01mg的分析天平。

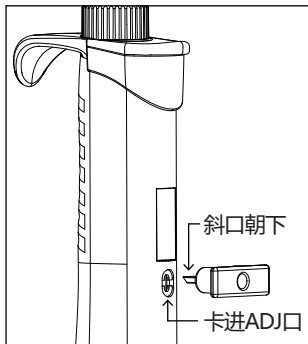
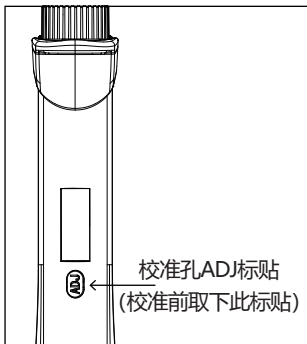
- 将吸头牢固安装在管嘴推出器上。
- 在设定容积下移液3-5次以预湿吸头。
- 更换吸头之后，用同样方式预湿吸头。
- 将吸头垂直没入液体约4mm。
- 慢慢松开按钮，回到原点。保持吸头在液体里的深度以免空气吸入。
- 将液体吸到称重容器中，使吸头靠近液体表面上方轻触一下容器内壁。
- 读取以mg为单位的重量。
- 重复同样测试10次，记录每次重量测试值。

- 将每次重量测试值乘以误差修正值 ( $Z=1.0033$ ,  $22^{\circ}\text{C}$ 室温,  $101.3\text{Kpa}$ 大气压)折算成体积。

## 4.2 校准

- 取下校准孔上的“ADJ”标贴取下。
- 将校准工具卡进“ADJ”标贴的孔中。请将斜口朝下，才能有效校准。
- 转动调节旋钮调整量程。逆时针旋转增大容量，顺时针旋转减小容量。
- 如果视窗读数比实际测量读数小，则逆时针旋转调大容量；如果视窗读数比实际测量计数大，则顺时针旋转减小容量，直到视窗读数等于实际测量读数为止。
- 校准完毕，在原位置上贴上“ADJ”标贴。
- 按以上方式进行性能测试以检查校准情况，直至得到准确结果。

**注意：**每支移液器在出厂前都已校准。重复校准是为了避免移液器长期使用导致精度误差。



## 5. 维护

腐蚀性物质会损坏移液器，吸头以及配件。错误的移液结果有时候是因为缺乏维护

- 在使用有机溶剂或腐蚀性物质前确认耐化学性
- 只使用蒸汽不会腐蚀所用材质的液体

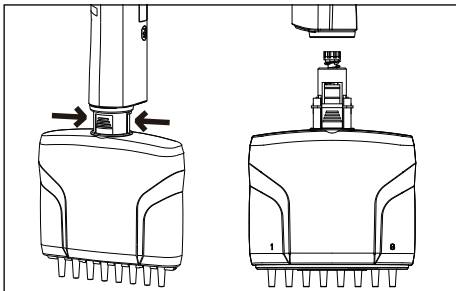
### 5.1 清洁

移液器的下半部份是易损件，请在污染，或使用腐蚀化学品后清洁。如果下半部份损坏，请更换。不合适的清洁剂会损坏移液器。

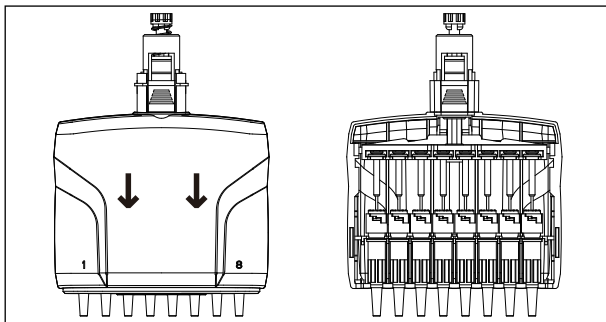
- 用清洁剂或酒精打湿布
- 擦掉外部脏污
- 用水打湿布
- 擦拭外壳

### 5.2 维护

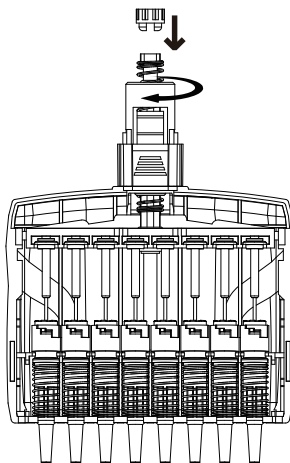
- 拇指和食指同时按住推套两边向上推，弹出移液单元



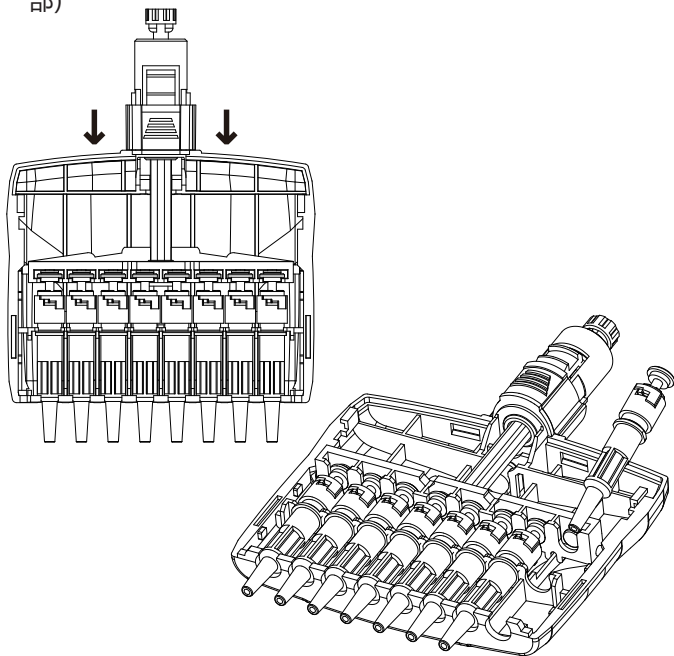
- 双手拇指同时向下推，推出移液单元面壳(有数字1，8面向自己)



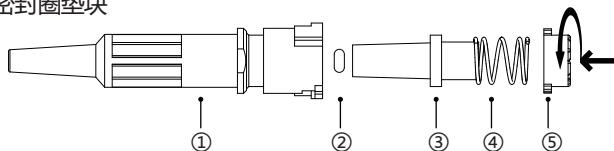
- 向下压旋转取出弹簧限位座与弹簧



- 活塞杆固定滑块推至活塞筒附近，用工具（如：小螺丝刀）挑出活塞筒头部取出活塞筒组件（安装时候活塞筒尾部先装后扣紧顶部）



- 抽出活塞针，按压并旋转密封圈固定件，分离出弹簧、O形圈、密封圈垫块



- ① 活塞筒
- ② O形圈
- ③ 密封圈垫块
- ④ 弹簧
- ⑤ 密封圈固定件

- 擦拭活塞筒，活塞针，弹簧，固定座，O形圈以及推套建议在清洁完后在活塞针，固定座，O形圈上先涂一层薄薄的硅脂。

**注意：**过度的硅脂可能造成活塞的移动受阻。

- 重装后，按压按钮数次以确保润滑剂涂抹均匀（在移液器不含液体的情况下进行该操作）

## 6. 移液器吸头兼容性

品 牌	容 量	MP10	MP50	MP300
德国艾本德	10uL			
	200uL			
	300uL			
美国爱思进	10uL(universal)			
	10uL(long)			
	200uL			
	300uL			
QSP (Thermo scientific)	10uL			
	200uL			
Gilson	10uL			
	200uL			
上海科进	KG1011(0.1-10uL)			
	KG1111(0.5-10uL)			
	KG1212(1-200uL)			
	KG1213(1-300uL)			
苏州赛普	10uL			
	200uL			
	300uL			
苏州莱杰	UFRT-10R			
	UFRT-10R-L			
	UFRT-10ER			
	UFRT-10ER-L			
	UFRT-200R			
	UFRT-200R-L			
	UFRT-200ER			
	UFRT-200ER-L			

## 7. 更换件明细表

容量	产品型号			
	活塞筒	活塞杆	吸头密封圈	活塞筒弹簧
0.5-10 $\mu$ l	3.1.305235000	2.3.205235100	/	3.2.405222004
5-50 $\mu$ l	3.1.305227000	2.3.205227100	3.4.605222001	3.2.405222004
30-300 $\mu$ l	3.1.305222009	2.3.205222100	3.4.605222001	3.2.405222004

## 8. 故障排除

问题	可能原因	解决方法
吸头内有残液漏液或者移液量太少	<ul style="list-style-type: none"> <li>吸头不匹配</li> <li>吸头塑料湿润性不均一</li> <li>吸头安装不正确</li> <li>吸头和活塞筒之间有异物颗粒移液器被污染</li> <li>活塞或O形圈上的润滑剂不够O形圈未在正确的位置或O形圈损坏</li> <li>操作不当校准被改变或所移液体不合适移液器被损坏</li> </ul>	<ul style="list-style-type: none"> <li>使用原厂吸头</li> <li>安装新吸头</li> <li>请牢固安装</li> <li>清洁活塞筒, 安装新吸头</li> <li>清洁并润滑O形圈和活塞, 清洁吸头活塞筒, 涂抹润滑剂重新安装或更换O形圈</li> <li>认真按照指导操作/根据指导重新</li> </ul>
顶针帽按钮卡住或运动不畅	活塞被污染有气溶胶渗透	清洁活塞筒
移液器锁住或吸液量少	O形圈上的润滑剂不够, 活塞针和O形圈有异物	清洁并润滑O形圈和活塞, 清洁活塞筒末端
推板卡住或移动不畅	弹簧卡住	弹簧处涂抹润滑油

## 9. 保修

每支移液器在出厂前都进行了校准与测试。您购买的移液器能即时使用。

移液器针对材料和制造工艺上的缺陷享有一年保修。如果您的移液器出现问题，请与您当地的代表处联系。

但是，如果我们发现出现的问题是因处理不当，误用，未经授权的维护或维修，忽视了定期维护和维修，意外损坏，不正确的储存，在规定使用范围之外使用该产品，在技术参数以外使用该产品，未按本手册中规定的说明书或未遵照厂商的原始提示使用该产品等原因引起的，则所声明的保修将失效。



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