ePET® Electronic Pipette

User Manual

ePET® Electronic Pipette

Contents

1. Intended Use

The ePET® pipette is intended to be used in liquid handling applications for dispensing liquids in the volume range of 0,2 µl to 5 ml. With ePET® pipettes it is recommended to use Sartorius Optifit Tips or SafetySpace™ Filter Tips to ensure the best compatibility and performance.

This liquid handling device is designed and manufactured to be used as general purpose laboratory equipment. Before operating, it is recommended to read this user manual, which contains useful information, for example, for good pipetting practice.

2. Product Description

Your new Sartorius ePET® electronic pipette offers a cost-effective electronic pipetting alternative by using a direct charging system, which requires no charging stand. The self-calibrating, microprocessor-based system reduces the possibility for human error and instrument contamination, by controlling all piston movements. Also, some models offer replaceable Safe-Cone Filters to help prevent contamination and damage.

Its light weight and ergonomic controls take the effort out of pipetting to help reduce the risk of repetitive strain injuries (RSI) that commonly occur in manual pipetting. All ePET® electronic pipettes operate on the air-displacement principle and use disposable tips.

2.1 ePET® Single-Channel Pipettes

Order No.	Volume Range µl	Increment µl	Tip µl
710521ET	0.2 - 10	0.1	10
710011ET	5 - 100	1	200 , 350
710041ET	50 - 1200	5	1200
710501ET	100 - 5000	50	5000

All pipettes include universal AC-adaptor (EU, UK, US/JPN, AUS, KOR and CHN plugs).

2.2 ePET® Multichannel Pipettes

Order No.	Volume Range µl	Increment µl	Tip µl
710201ET	8-Ch 0.2 - 10	0.1	10
710211ET	8-Ch 5 - 100	1	200 , 350
710221ET	8-Ch 25 - 250	5	350
710801ET	8-Ch 50 - 1200	10	1200

3. Pipette Tips

It is recommended that Sartorius Optifit Tips or SafetySpace™ Filter Tips are used with Sartorius pipettes. This ensures the best possible compatibility and thus best possible accuracy and precision, as these tips are designed for the pipette in question.

Optifit Tips and SafetySpace™ Filter Tips are also available as Low Retention Tips.

4. Unpacking

The ePET® pipette package contains the following items:

1. Pipette
2. Grease
3. AC/DC Adapter (acts as a recharging unit)
4. Instructions for use
5. Filters and tweezers (pipettes > 10 µl)
6. ISO8655-6 compliant performance certificate

Make sure that all items are included and that no damage has occurred during shipping.

NOTE! The pipette can only be charged with the original AC/DC Adapter supplied with the pipette.

4.1 Electrical Specifications

Battery

- Rechargeable NiMH battery
- Charging time a maximum of 12 hours for an empty battery

AC/DC Adaptor

- Input voltage and main plug according to local requirements
- Output voltage 9 VDC

4.2. Charging the Pipette

An ON/OFF switch is located at the top of the pipette. This switch protects the battery from discharging while the pipette is not in use and not connected to the charger.

1. Switch the pipette ON (the far left position).
2. Connect the charger to a compatible AC outlet and to the pipette's charger port.

NOTE! The charging light will remain illuminated, when properly connected to the AC/DC charger.

3. If the pipette is new, or the battery charge is low, keep the pipette connected to the charging unit for 12 hours to fully charge the battery before continuing use.
4. Display shows E Press the START button twice and the pipette is ready for the default pipetting at maximum volume or for program changes.

NOTE! The pipette will charge in both ON and OFF positions. Leaving the pipette switched ON while charging will retain user settings.
Switching it OFF will reset the unit to default settings.

NOTE! If the pipette is left ON for several days, the battery will discharge. As a result the display will turn off, and there will be no response from the keyboard or START button. This is because the charge of the battery is below operating level.

5. Pipette Parts and Materials

ePET® Single-Channel

Charger port cover (PC)

Finger support (at the back) (ASA/PC)

Power ON/OFF switch

Tip cone
10 µl (PVC)
100 µl (SS)
1200 µl (PPS)
5000 µl (PE)

Tip ejector bar (PETP)

Tip cones
10-250 µl (sealing: TPU)
10-250 µl (PVDF)
50-1200 µl (PPS)

ePET® Multichannel

6. Pipette Description

The control and the programming of the ePET® electronic pipette are performed using the control keys and display.

6.1. Controls

- Power Switch
- Charger Connection
- Battery Compartment

Control Keys:

S› Changes speed

M Moves to next mode

▲ Increases volume or speed

▼ Decreases volume or speed

E Confirms setting changes

✱ Switches Mixing on / off

Control Keys

Start Button

- Triggers all mechanical operations
- Colour-coded for easy identification of pipette volume

Tip Ejector Lever

- Squeeze to remove pipette tip(s)

6.2. Start Button

The START button triggers the aspiration and dispensing operations according to the selected operating mode. Only a quick click is required to operate the button. If the START button is held down, the piston will stop in the lowest position until the button is released. This feature is applicable to all modes of operation, except for multiple dispensing (d).

6.3. Direction Symbols

These symbols indicate the direction in which the piston moves upon pressing the START button. The small RIGHT ARROW in the display means that the next function is to aspirate the liquid. The small LEFT ARROW, in turn, indicates the dispensing function in accordance to the selected operating mode.

6.4. Display

The left side of the display is the status indicator. It informs the user about parameters to be programmed, functions to be performed and the number of dispensings available.
The right side of the display is used for programming and displaying the various volumes needed in different operating modes.

Visible seal when tip is loaded tightly

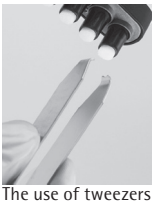
6.5. Loading and Ejecting Tips

Original Sartorius tips are recommended for use with Sartorius ePET® pipettes. Before fitting a tip make sure that the pipette tip cone is clean. Press the tip onto the cone of the pipette firmly, to ensure an airtight seal. The tip is tightly loaded, when a visible sealing-ring has formed between the tip and the tip cone.
Sartorius ePET® pipettes are designed for simple and light attachment and ejection of the tips. To eject the tip, simply place the pipette over the waste container and squeeze the tip ejector lever.

Squeeze the tip ejector lever, to eject the tip

6.6. Optional Filters

The tip cones of some ePET® electronic pipettes allow the use of a removable Safe-Cone Filter as an option. The filter prevents liquids and vapours from entering the pipette. The filter does not affect the calibration of the pipette. Sartorius filter-tweezers should be used to insert or remove a Safe-Cone Filter to avoid contamination through contact with it.



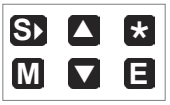
The use of tweezers to insert or remove a Safe-Cone Filter

Order Information

				Safe-Cone Filter	
Order No.	**Channels**	**Volume Range µl**	**Increment µl**	**Standard**	**Plus**
710521ET	1	0.2 - 10	0.1	N/A	N/A
710011ET	1	5 - 100	1	N/A	N/A
710041ET	1	50 - 1200	5	721006	721016
710501ET	1	100 - 5000	50	721006	721016
710201ET	8	0.2 - 10	0.1	N/A	N/A
710211ET	8	5 - 100	1	721014	N/A
710221ET	8	25 - 250	5	721014	N/A
710801ET	8	50 - 1200	10	721006	721016

7. Programming the Pipette

Programming is performed using the six-key keyboard and the LC-display. There are three operating modes offering special functions and varying speeds to choose from.



7.1. Mode Selection and Mode Recall

1. Press **M** repeatedly to view the available modes of the pipette.
2. Press **E** when the desired mode is displayed. The pipette is ready for use in the mode selected.

NOTE: The mode can only be activated when the piston is in its home position (arrow-right is lit), and not during an aspiration or dispensing cycle.

7.2. Setting Speeds

1. Press **S** to display the current aspiration speed.
2. Press ▲ or ▼ until desired aspiration speed is displayed ("5" Fast and "1" Slow).
3. Press **E** to confirm selected speed. Display shows the current dispense speed.
4. Press ▲ or ▼ until desired dispense speed is displayed ("5" being Fast and "1" Slow).
5. Press **E** to confirm speed selection.

NOTE: The speed may not be changed during aspiration or dispensing cycles.

NOTE: The default speed is 3 for all speed settings.

7.3. Pipetting Mode (P)

The pipette performs ordinary pipetting with blow-out.

Step 5 Aspiration (Pipetting Mode)

1. Press **M** to display **P**.
2. Press **E** to confirm the mode change.
3. Select the desired pipetting volume by using ▲ to increase, and ▼ to decrease.

NOTE: While holding down ▲ or ▼, the volume display starts to scroll faster.

4. Press **E** to confirm selection.
5. Position the tip to aspirate and press the START button.
6. Position the tip to dispense. Press the START button. The tip is emptied with a blow-out and is ready for the next pipetting.

Step 6 Dispensing (Pipetting Mode)

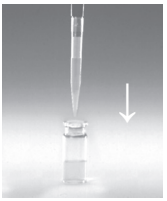
7.4. Multi-Dispensing Mode (d)

In the Multi-Dispensing Mode (d), the pipette performs repetitive dispensings of a selected volume. During this operation, the desired volume, plus the automatically selected excess volume, is aspirated into the tip.

1. Press **M** to display **d**.
2. Press **E** to confirm the mode change.
3. Press ▲ or ▼ until the multi-dispense volume is displayed.
4. Press **E** to confirm selection.
5. Press ▲ or ▼ until the desired number of aliquots is displayed.
6. Press **E** to confirm selection.
7. Position the tip to aspirate and press the START button. The * sign and ARROW LEFT are lit to indicate the reset function.
8. Position the tip to discard priming excess and press the START button.
9. To dispense, position the tip, press the START button and repeat until the cycle is complete.
10. Finally, position the tip to discard any remaining excess and press the START button twice.

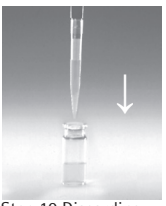
NOTE: Upon delivering the programmed volume, it is also possible to continue to aspirate and dispense the same volume without emptying in between. To continue, keep the START button pressed down and within one second the direction of the arrow will change. Keeping the button down, place the tip into the liquid again and the sample is aspirated into the tip by releasing the START button.

Step 7 Aspiration (Multi-Dispensing Mode)



Step 8 Discarding priming excess (Multi-Dispensing Mode)

Step 9 Dispensing repeatedly (Multi-Dispensing Mode)



Step 10 Discarding excess (Multi-Dispensing Mode)

7.5. Diluting Mode (dd)

In the Diluting Mode (dd), two different solutions separated by an air gap are aspirated and then dispensed together with an automatic blow-out. The purpose of the air gap is to prevent contamination while aspirating the second volume, but it will not prevent the two liquids from mixing in the tip.

1. Press M to display dd.
2. Confirm the mode change by pressing E.
3. Select the desired diluent volume (volume 1) by pressing ▲ or ▼.
4. Confirm by pressing E.
5. Press ▲ or ▼ to select the sample volume (volume 2) on the display.
6. Press E to confirm selection.
7. Position the tip to aspirate volume 1 and then press the START button.
8. With the tip in the air, press the START button again to aspirate air to form an air gap.
9. Position the tip to aspirate volume 2 and press the START button.
10. Finally, position the tip to dispense, and press the START button.

Step 7 Aspiration (Diluting Mode)

Step 8 Air aspiration for air-gap (Diluting Mode)

Step 9 Aspiration of 2nd fluid (Diluting Mode)

Step 10 Dispensing (Diluting Mode)

7.6. Mixing Mode with Pipetting or Diluting (*)

In the Mixing Mode, the piston is automatically moved up and down to mix the liquid in the delivery vessel. The mixing time is controlled by the START button.

1. Use M to select either P or dd on the display.
2. Press * to switch on mixing. The display should show either P* or dd*.

NOTE: Pressing * will alternately switch mixing on and off.

3. Confirm the mode change by pressing E.

For Pipetting:

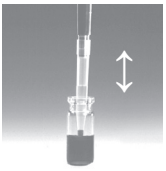
1. Press ▲ to increase, and ▼ to decrease.
2. Press E to confirm selection.
3. Position the tip to aspirate and press START button.
4. Position to dispense and press the START button.

For Diluting:

1. Select the desired diluent volume (volume 1) by using ▲ or ▼.
2. Confirm selection by pressing E.
3. Press ▲ or ▼ to select the sample volume (volume 2) .
4. Confirm selection by pressing E.
5. Position the tip to aspirate volume 1, and press the START button.
6. With the tip in the air, press the START button to aspirate air for an air gap.
7. Position the tip to aspirate volume 2 and press the START button.
8. Finally, position the tip to dispense and press the START button.

To Mix:

1. Position the tip in the solution, then press and hold the START button. The mixing is done automatically as long as the START button is held down.
2. Position the tip to dispense. Press the START button twice.



Step 1 Mixing (Mixing Mode)

Step 2 Dispensing (Mixing Mode)

NOTE: The mixing is done with about 70% of the total volume.

8. Pipetting Recommendations

By using the various operating modes and special functions, several different liquid handling procedures are possible. Modes P and dd feature an automatic blow-out and others leave the excess liquid in the tip. Follow the recommendations below to ensure optimal performance.

8.1. Dispensing with Blow-out

The P and dd modes have an automatic blow-out function, followed by an immediate return of the piston to the "home" position. To avoid accidental aspiration of the liquid back into the tip, it is recommended that the dispensing is always done above the surface of the liquid.

By holding the START button down, during dispensing, the piston will stop in the lowest position. This allows the tip to be placed against the bottom or the wall of the container. Once the liquid is dispensed, the tip can be removed from the container and the START button can be released.

8.2. Dispensing without Blow-out

The pipette will not perform the blow-out function while using the d mode. Therefore, it is recommended that dispensing is always performed with the tip set against the wall or the bottom of the container. The use of the d mode is especially useful when pipetting small volumes or solutions that have a tendency to foam, or have a high viscosity.

8.3. Other Recommendations

- Hold the pipette vertically and place the tip a few millimeters into the liquid when aspirating.
- Pre-rinse the tip by filling and emptying the tip five times. This is important when dispensing liquids which have a viscosity and density different from water or a temperature other than ambient.
- Check that the pipette, tip and liquid are at room temperature.
- Avoid contaminating the tip cone.
- Connect the pipette charger when the pipette is not in use. Switch the pipette OFF when not in use, if it is not connected to the charging unit.
- Never strike the tip cone against a tip tray when mounting tips, as this can damage several internal components.
- Do not drop the pipette or AC/DC-adaptor, as this may cause excessive shock.
- Avoid exposing the unit to extreme temperature changes, humidity and dust.
- Avoid rough handling. Moderate pressure is all that is required when using the keyboard or START-button.
- Avoid leaving the pipette laying on its side with liquid in the tip. The liquid might leak into the pipette's mechanism.
- Always dispense against the inside wall of the receiving vessel. Remove the tip by drawing it up along the inside wall.
- Change the filter on the tip cone regularly (after 50 - 250 pipettings).

9. Storage

When not in use, it is recommended that the pipette is stored on a Sartorius Linear stand, with the ePET® pipette in the ON position and connected to the charger. The green charging light should be lit.

Order No.	Item
725620	Linear Stand for all Sartorius pipettes

Linear Stand

10. Performance Testing

It is recommended, the performance of your ePET® pipettes be checked regularly (e.g. every 3 months), and always after in-house maintenance. However, the user should establish a regular testing routine for their pipettes with regard to accuracy requirements of the application, frequency of use, number of operators using the pipette, nature of the liquid dispensed and the acceptable maximum permissible errors established by the user. (ISO 8655-1.)

10.1. Testing the performance

Performance testing should take place in a draught-free room between 15° and 30°C, kept constant within +/- 0.50°C, and with the relative humidity above 50%. The pipette, tips and the test water should have stood in the test room for a sufficient length of time (at least 2 hours) to reach equilibrium with the room's conditions. Use distilled or de-ionised water (grade 3, ISO 3696). Use an analytical balance with a readability of 0.01 mgs. (ISO 8655-6.)

Weighing

1. Adjust the desired test volume V_S.
2. Carefully fit the tip onto the tip cone.
3. Fill the tip with test water and expel it as waste five times to achieve humidity equilibrium in the dead air volume.
4. Replace the tip. Pre-wet the tip by filling it once with test water and expel it as waste.
5. Aspirate the test water, immersing the tip only 2-3 mm below the surface of the water. Keep the pipette vertical.
6. Withdraw the pipette vertically and touch the tip against the inside wall of the test water container.
7. Pipette the water into the weighing vessel, touching the tip against the inside wall of the vessel just above the liquid surface at an angle of 30° to 45°. Withdraw the pipette by drawing the tip 8-10 mm along the inner wall of the weighing vessel.
8. Read the weight in mgs (m_i).
9. Repeat the test cycle until 10 measurements have been recorded.
10. Convert the recorded masses (m_i) to volumes (V_i)
    $V_i = m_i * Z$ Z = correction factor

(Table follows)

Z-values (µl/mg):

Temp. (°C)	Air Pressure (kPa)			
	95	100	101.3	105
20.0	1.0028	1.0028	1.0029	1.0029
20.5	1.0029	1.0029	1.0030	1.0030
21.0	1.0030	1.0031	1.0031	1.0031
21.5	1.0031	1.0032	1.0032	1.0032
22.0	1.0032	1.0033	1.0033	1.0033
22.5	1.0033	1.0034	1.0034	1.0034
23.0	1.0034	1.0035	1.0035	1.0036
23.5	1.0036	1.0036	1.0036	1.0037

11. Calculate the mean volume ($\overline{V}$) delivered: $\overline{V} = (\Sigma V_i)/10$
12. To evaluate conformity, calculate the systematic error e_S of the measurement:

    in µl: $e_S = \overline{V} - V_S$ V_S = selected test volume

    or in %: $e_S = 100\ (\overline{V}\text{-}V_S)/V_S$

13. To evaluate conformity, calculate the random error of the measurement:

    as standard deviation $s = \sqrt{\frac{\Sigma(Vi - \overline{V})^2}{n - 1}}$

    n = number of measurements (10)

    or as a coefficient of variation CV = 100s/$\overline{V}$

14. Compare the systematic error (inaccuracy) and random error (imprecision) with the values in the performance specifications (p. 49) or the specifications of your own laboratory. If the results fall within the specifications, the pipette is ready for use. Otherwise, check both systematic and random errors and, when necessary, proceed to recalibrate (Chapter 9.2).

NOTE: Systematic error (inaccuracy) is the difference between the dispensed volume and the selected test volume. Random error (imprecision) is the scatter of the dispensed volumes around the mean of the dispensed volume. (ISO 8655-1.)

NOTE: Sartorius specifications are achieved in strictly controlled conditions (ISO 8655-6). The user should establish own specifications based on the field of use and the accuracy requirements placed on the pipette (ISO8655-1).

NOTE: This method is based on ISO 8655.

11. Maintenance

To maintain the best results with your ePET® pipette, the cleanliness of every unit should be checked daily. Particular attention should be paid to the tip cone(s).

ePET® pipettes have been designed for easy in-house service. However, Sartorius also provides a complete repair and recalibration service, which includes a service report and performance certificate(s). Please return your pipette to your local representative for repair or performance test/recalibration. Before returning it, please make sure that it is free of any contamination. Please advise our Service Representative of any hazardous materials, which may have been used with your pipette.

NOTE: Check the performance of your ePET® pipette regularly e.g. every 3 months and always after in-house service or maintenance.

11.1. Cleaning and Decontaminating the Pipette

Your ePET® pipette should be checked every day for cleanliness. To clean and decontaminate the outer surface of your pipette use ethanol (70%), isopropanol (60%) or a mild detergent as a cleaning agent.

Gently clean the surface of the pipette with a moistened cloth and then wipe dry. Pay special attention to the tip cone. Change the Safe-Cone Filter if needed (Chapter 6.6.)

11.2. In-house Maintenance

1. Remove the tip ejector collar: Gently twist the tip ejector collar anti-clockwise and slide it off.
2. Using 70% ethanol, 60% isopropanol, or a mild detergent, and a soft lint-free cloth, disinfect the tip ejector collar and the tip cone.
3. Unscrew, anti-clockwise, the tip cone and remove it, exposing the piston. In the event the piston sticks to the tip cone, remove the piston with a pair of tweezers.

4. To avoid scratching the surface of the piston use ethanol (70%), isopropanol (60%) or a mild detergent, and a lint-free tissue when cleaning the piston. Leave the parts to dry.

NOTE: For complete decontamiantion, place the tip cone, tip ejector collar, piston, O-ring and spring into a beaker containing 70% ethanol, 60% isopropanol, or a mild detergent, and leave for at least 30 minutes. Rinse the parts with distilled water, then dry, preferably with warm air.

5. Apply a thin layer of grease to the piston, using the grease provided. Do not use any other grease. Check that no lint or particles are on the surface of the piston. Avoid excess grease, especially at the bottom of the piston.
6. Reassemble the pipette by screwing the piston and tip cone into their places, replace the tip ejector collar, allowing the ejector handle connection to snap into the notch for the ejector collar. Replace the filter if fitted.
7. Test the pipette by pressing the START-button several times. Test the operation of the tip ejector.

NOTE: Check the performance of your Sartorius ePET® pipette regularly, e.g. every 3 months, and always after in-house service or maintenance.

11.3. Battery Replacement

If the battery is not sufficiently charged for proper operation of the pipette, follow these steps for replacement of the battery.

1. Switch the unit "OFF".
2. Remove the top two screws on the back of the pipette and remove the battery cover.
3. Carefully remove the battery by lifting it straight out of the holder.
4. Install the new NiMH-battery by pressing the positive (+) end against the contact spring at the bottom of the holder.
5. Replace the cover and the screws. Do not overtighten the screws.
6. Dispose of the old battery appropriately.

Battery replacement

12. Troubleshooting

The ePET® electronic pipette has a built-in monitoring program to control the performance of each pipetting action. If the error message ER1 appears on the display, this means the pipette has been unable to perform the attempted action properly. If you receive the error message please do the following:

1. Connect the pipette to the charger for 15 minutes.
2. Clear the error message from the display by pressing E.
3. Press START button, which will set the pipette to its home position.

NOTE: As this procedure will empty the tip, it is recommended that you remove the tip before resetting the pipette.

The occasional ER1 situations can be caused by electrical outlets that have been switched off, or if the pipette has been in the OFF position during charging.

Repeated occurence of the the ER1 message is caused by an internal error; a failure to complete the execution of the pipetting. In which case, it would be necessary to return the pipette to your local Sartorius representative for repair.

Troubles, causes and solutions

Trouble	Possible cause	Solution
Droplets left inside the tip	Unsuitable tip	Use original Sartorius tips
	Non-uniform wetting of the tip plastic	Attach new tip
Laeakage or pipetted volume too small	Tip incorrectly attached	Attach firmly
	Unsuitable tip	Use original Sartorius tips
	Foreign particles between tip and tip cone	Clean the tip cone, attach new tip
	Instrument contaminated	Clean and grease O-ring and piston, clean the tip cone (*)
	Insufficient amount of grease on piston and O-ring	Grease accordingly
	O-ring not correctly positioned or damaged	Change the O-ring
	Incorrect operation	Follow instructions carefully
	Calibration altered or unsuitable for the liquid	Recalibrate according to instructions
	Instument 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	Remove ejector collar, clean with 75% ethanol, isopropanol (60%) or a mild detergent

13. Warranty Information

Sartorius products are meant to be used as described in this user manual.
ePET® electronic pipettes are covered by a warranty for two years against workmanship and defects in materials excluding battery.

ANY WARRANTY WILL, HOWEVER, BE DEEMED AS VOID IF THE FAULT IS FOUND TO HAVE BEEN CAUSED BY MISTREATMENT, MISUSE, UNAUTHORIZED MAINTENANCE OR SERVICE OR NEGLIGENCE OF REGULAR MAINTENANCE AND SERVICE, ACCIDENTAL DAMAGE, INCORRECT STORAGE OR USE OF THE PRODUCTS FOR OPERATIONS OUTSIDE THEIR SPECIFIED LIMITATIONS, OUTSIDE THEIR SPECIFICATIONS, CONTRARY TO THE INSTRUCTIONS GIVEN IN THIS MANUAL OR WITH TIPS OTHER THAN THE MANUFACTURER'S ORIGINAL ONES.

Each ePET® electronic pipette is tested before shipping by the manufacturer. The Sartorius Quality Assurance Procedure guarantees that the ePET® electronic pipette you have purchased is ready for use. Each ePET® electronic pipette is CE marked, fulfilling the requirements of the EN 55014, 1993/EN 55104, 1995/ ISO 13485:2003 and Directive (98/79 EC).

14. Recycling Instructions (WEEE)

In compliance with European Directive, WEEE (2002/96EC) on waste and reduction of hazardous substances in electrical and electronic equipments, this device must not be recycled as unsorted municipal waste. Instead this device must be collected separately in accordance to the local recycling regulations.

Batteries should be disposed of in accordance with local legal regulations. Do not dispose of batteries with domestic waste.

15. Performance Specifications

The manufacturer's specifications (p. 49) are guaranteed only when the manufacturer's original tips are used. The manufacturer's specifications should be used as guidelines when establishing your own performance specifications in accordance with ISO 8655.

Specifications

ePET® Single and 8-Channel Pipettes

Order No.	Channels	Volume range µl	Test Volume µl	Systematic Error %	Random Error %
710521ET	1	0,2 - 10	10	0,90	0,50
			5	1,00	0,70
			1	2,50	1,50
710011ET	1	5 - 100	100	0,40	0,15
			50	0,70	0,30
			10	2,00	1,00
710041ET	1	50 - 1200	1200	0,40	0,15
			600	0,70	0,30
			120	2,00	0,60
710501ET	1	100 - 5000	5000	0,50	0,15
			2500	0,80	0,20
			500	0,80	0,30
710201ET	8	0,2 - 10	10	0,90	0,50
			5	1,50	0,80
			1	4,00	4,00
710211ET	8	5 - 100	100	0,50	0,15
			50	0,70	0,20
			10	2,50	1,30
710221ET	8	25 - 250	250	0,40	0,15
			125	0,60	0,20
			25	1,50	1,00
710801ET	8	50 - 1200	1200	0,50	0,15
			600	1,00	0,20
			120	3,00	1,20

目录

1. 用途

ePET® 电子移液器的量程范围覆盖从 0.2-5000µl。推荐使用 Optifit 吸头或 SafetySpace™ 吸头，最好的兼容性和性能。

这种液体处理装置的设计和作为通用制造的实验室设备。操作之前，推荐阅读本用户手册，更好的操作 ePET® 移液器。

2. ePET® 电子移液器

新型赛多利斯 ePET® 电子移液器采用不需要充电支架的直接充电系统，提供了一种颇具成本效益的电子移液替代方案。该自校正、基于微处理器的系统通过控制活塞的所有运动，减少了人为误差和仪器污染。此外，选择的型号还提供可更换的吸头锥体过滤器，有助于防止污染和损坏。

该电子移液器重量轻，带人机控制，使移液毫不费力，可以减少手动移液经常引起的重复性劳损 (RSI)。所有 ePET® 电子移液器根据空气置换原理操作，并采用一次性吸头。

2.1. ePET® 单道电子移液器

产品编号	量程 (µl)	可变量 (µl)	吸头 (µl)
710521ET	0.2 - 10	0.1	10
710011ET	5 - 100	1	200, 350
710041ET	50 - 1200	5	1200
710501ET	100 - 5000	50	5000

所有的移液器包含有通用的AC-适配器（欧盟，英国，美国/日本，澳大利亚，韩国和中国）。

2.2. ePET® 多道电子移液器

产品编号	通道数	量程 (µl)	可变量 (µl)	吸头 (µl)
710201ET	8	0.2-10	0.1	10
710211ET	8	5-100	1	200, 350
710221ET	8	25-250	5	350
710801ET	8	50-1200	10	1200

3. 移液器吸头

建议将 Sartorius Optifit 吸头或 SafetySpace™ 滤芯吸头配合 Sartorius 移液器一同使用。这些吸头是针对上述移液器设计的，因此能够确保最佳的兼容性，从而获得最佳的准确性和精确性。

Optifit 吸头和 SafetySpace™ 滤芯吸头同样具有低吸附特性的型号。

4. 打开移液器包装

移液器包装包含下列物品：

1. 移液器
2. 润滑油脂
3. 交流 / 直流适配器 (其功能是作为充电装置)。
4. 使用说明书
5. 过滤器与过滤器镊子 (移液器 > 10 µl)
6. 符合 ISO 8655-6 的性能证书。

确保包装包含所有以上物品，并确保在运输期间以上物品未发生任何损坏。

注！移液器只能采用与移液器一起供应的原装交流 / 直流适配器进行充电。

4.1. 电气规格

电池

- 充电 NiMH 电池
- 充电时间：空电池最多充 12 小时

交流 / 直流适配器

- 根据当地要求输入电压与电源插头
- 输出电压 9 VDC

4.2. 移液器充电

移液器顶部有一处“开 / 关 (ON/OFF)”开关。此开关可保护移液器在未使用时不放电，移液器不能与充电装置连接。

1. 打开移液器 (ON)(远左端位置)。
2. 只需将交流 / 直流适配器与兼容的交流电插座连接，并与移液器连接。

注！当与交流 / 直流适配器 / 充电装置正确连接时，充电灯一直亮着。

3. 如果移液器是新的，或电池电量低，在继续使用前，将移液器与充电装置连接，充电 12 小时，将移液器充满电。
4. 显示屏显示 E 按“开始 (START)”按钮两次，移液器准备就绪，处于最大移液体积的默认移液位置或准备就绪可进行程序更改。

注！移液器在“开 (ON)”与“关 (OFF)”两个位置都可充电。移液器处于“开”位置时，若与充电装置连接，则保持用户选择的设置，而当移液器处于“关”位置时，若与充电装置连接，则将使移液器复位到默认设置。

注！若移液器处于“开”位置时几天不充电，因为电池电压低于操作水平，显示将会消失，键盘或“开始”按钮将无任何反应。

5. 移液器材料

ePET® 单道移液器

显示屏
(玻璃)

键盘
(硅胶)

开始按钮
(聚甲醛)

吸头退除杆
(聚甲醛)

手柄
(丙烯腈/
苯乙烯/
丙烯酸酯共聚
物/聚碳酯)

止推环
(聚丙烯)

充电接口
(PC)

手指支撑
(背部)
(ASA/PC)

充电开/关按钮

ePET® 多道移液器

显示屏
(玻璃)

键盘
(硅胶)

开始按钮
(聚甲醛)

手柄
(丙烯腈/
苯乙烯/
丙烯酸酯共聚
物/聚碳酯)

旋转式分液头
(丙烯腈/
苯乙烯/
丙烯酸酯共聚
物/聚碳酯)

安全圆锥过滤器
10 µl (聚氯乙烯)
100 µl (SS)
1200 µl (聚苯硫醚)
5000 µl (聚乙烯)

吸头退除杆
(聚甲醛)

吸头推出器架
(聚对苯二甲酸乙二酯)

安全圆锥过滤器
10–250 µl (密封热塑性
聚氨酯弹性体)
10–250 µl (聚偏二氟乙烯)
50–1200 µl (聚苯硫醚)

6. 移液器说明

ePET® 电子移液器的控制与编程通过键盘与显示屏完成，详情如下所示。

6.1. 控制

- 电源开关
- 充电连接
- 电池盒

控制键：

S 改变速度
M 移动到下一模式
▲ 增加体积或提高速度
▼ 减少体积或降低速度
E 确认设置更改
✱ 切换混合开 - 关

“开始”按钮

- 启动所有机械操作
- 量程彩色标识

吸头退除器杆

- 挤压可以退除移液器吸头

6.2. 开始按钮

“开始”按钮启动吸液操作及根据选择的操作模式进行分液的操作。操作此按钮仅需快速按一次。若“开始”按钮保持按下位置，则活塞将停在最低位置，直到松开“开始”按钮。该特点适用于所有操作模式，多次分液除外。

6.3. 方向符号

这些符号表明按下“开始”按钮时活塞移动的方向。显示屏中的小“右箭头”指的是下一功能是吸取液体。反之，“左箭头”指的是根据选择的操作模式进行分液的功能。

6.4. 显示

左边的显示是状态指示器。它为用户提供有关编程参数、待执行功能及可分液数量的信息。

右边显示用于编程及显示不同操作模式需要的不同体积。

可见密封环时，表明密封严密

6.5. 密封与退除吸头

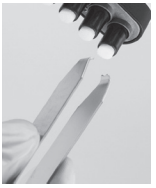
建议采用原装赛多利斯吸头与 ePET® 电子移液器一起使用。在安装吸头之前，确保移液器吸头锥体洁净。将吸头紧套到移液器锥体上，确保密封良好。当吸头与吸头锥体之间形成可见密封环时，表明密封严密。

赛多利斯 ePET® 移液器的设计使吸头的连接与退除简单轻松。退除吸头时，只需将移液器放到废品容器上方，挤压吸头退除杆即可。

挤压吸头退除杆，退除吸头

6.6. 安全圆锥过滤器

选定赛多利斯 ePET® 电子移液器的吸头锥体允许采用可选可拆卸的安全圆锥过滤器。过滤器避免液体与液体蒸汽进入移液器。过滤器不影响移液器的校正。采用赛多利斯过滤器镊子，避免用手接触污染的过滤器。



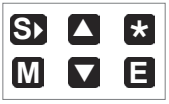
使用镊子插入或去除一个安全圆锥过滤器

订购信息

				安全圆锥过滤器	
产品编号	**通道数**	**量程 (µl)**	**可变量 (µl)**	**标准型**	**增强型**
710521ET	1	0.2 - 10	0.1	N/A	N/A
710011ET	1	5 - 100	1	N/A	N/A
710041ET	1	50 - 1200	5	721006	721016
710501ET	1	100 - 5000	50	721006	721016
710201ET	8	0.2 - 10	0.1	N/A	N/A
710211ET	8	5 - 100	1	721014	N/A
710221ET	8	25 - 250	5	721014	N/A
710801ET	8	50 - 1200	10	721006	721016

7. 移液器编程

采用六键键盘与液晶显示屏进行编程。
有三种操作模式，提供特殊功能、改变速度，以供您的选择。



7.1. 模式选择与模式调出

1. 重复按M查看移液器提供的模式。
2. 当需要的模式显示时，按E。此时，移液器处于选择模式的准备状态。

注！只有当活塞处于原始位置（右键标志亮）而不是处于吸液中或分液循环时，才能激活模式。

7.2. 设置速度

1. 按S显示当前吸液速度。
2. 按▲或▼，直到吸液速度显示（“5”快速，“1”慢速）。
3. 按E，确认速度选择。显示屏显示当前分液速度。
4. 按▲或▼，直到要求的分液速度显示（“5”快速，“1”慢速）。
5. 按E确认速度选择。

注！在吸液或分液循环中间不能改变速度。

注！所有速度设置的默认速度是 3。

7.3. 移液模式 (P)

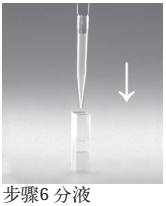
移液器执行通常的吹出移液。

1. 按M，以显示P。
2. 按E确认模式更改。
3. 使用▲增加，▼减少，所需的移液体积。

步骤5 吸液
(移液模式)

注！按住▲或▼，体积显示开始快速滚动。

4. 按E确认选择。
5. 将吸头定位到吸液位置，按下“开始”按钮。
6. 将吸头定位到分液位置。按“开始”按钮。吸头通过吹出清空，并为下一次移液做好准备。



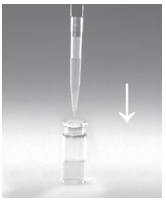
步骤6 分液
(移液模式)

7.4. 多次分液模式 (d)

移液器执行所选体积的重复分配。在此操作中，所需体积加上自动选择的过量体积被吸到吸头中。

步骤7 吸液
(多次分液模式)

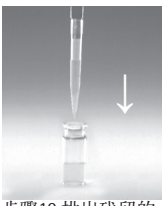
1. 按M，以显示 d。
2. 按E确认模式更改。
3. 按▲或▼，直到显示多次分液体积。
4. 按E确认选择。
5. 按▲或▼，直到显示要求的等分数量。
6. 按E确认选择。
7. 将吸头定位到吸液位置，按“开始”按钮。
   * 标志与左箭头亮，表明复位功能。
8. 将吸头定位，排出多余液体，按下“开始”按钮。
9. 为了分液，定位吸头，按“开始”按钮，重复，直到完成循环。
10. 最后，将吸头定位，排出残留的多余液体，按“开始”按钮两次。



步骤8 排出
多余液体
(多次分液模式)

注！在移取编程体积时，不带清空功能也可以继续移取与分配相同体积。为了继续，保持“开始”按钮处于按下位置，在一秒内，箭头方向将改变。保持按钮按下，将吸头再次放入液体中，通过松开“开始”按钮，样品被吸入到吸头内。

步骤9 重复分液
(多次分液模式)



步骤10 排出残留的
多余液体
(多次分液模式)

7.5. 稀释模式 (dd)

在稀释模式 (dd) 中，移取被空气隔层分开的两种不同溶液，然后采用自动吹出分液。空气隔层的作用是当移取第二体积时避免污染，但其不能避免两种液体在吸头内混合。

1. 按M，以显示 dd。
2. 按E确认模式更改。
3. 采用▲或▼，选择所需的稀释体积（体积 1)。
4. 按E确认选择。
5. 按▲或▼，选择显示屏上的样品体积（体积 2)。
6. 按E确认选择。
7. 将吸头定位到吸液体积 1 位置，按“开始”按钮。
8. 吸头在空气中时，再次按“开始”按钮，吸取空气隔层。
9. 将吸头定位到吸液体积 2 位置，按“开始”按钮。
10. 最后，将吸头定位到分液位置，按“开始”按钮。

步骤7 吸液
(稀释模式)

步骤8 吸取
空气隔层
(稀释模式)

步骤9 吸液体积2
(稀释模式)

步骤10 分液
(稀释模式)

7.6. 移液后混合 (* 或 + 混合) 模式

活塞自动上下移动混合输送容器中的液体。
混合时间由“开始”按钮控制。

1. 使用M在显示屏上显示选择 P 或 dd。
2. 按✱打开混合。显示应为 P✱ 或 dd✱。

注！按✱将交替打开混合“开”与“关”。

3. 按E，确认模式更改。

对移液来说：

1. 按▲增加，按▼减少。
2. 按E确认选择。
3. 将吸头定位到吸液位置，按“开始”按钮。
4. 将吸头定位到分液位置，按“开始”按钮。

对稀释来说：

1. 采用▲或▼，选择所需的稀释体积 (体积 1)。
2. 按E确认选择。
3. 按▲或▼，选择样品体积 (体积 2)。
4. 按E确认选择。
5. 将吸头定位到吸液体积 1 位置，按“开始”按钮。
6. 吸头在空气中时，按“开始”按钮，吸取空气隔层。
7. 将吸头定位到吸液体积 2 位置，按“开始”按钮。
8. 最后，将吸头定位到分液位置，按“开始”按钮。

对混合来说：

1. 将吸头放到溶液中，然后按下并保持“开始”按钮。只要开始按钮一直按下，则混合自动进行。
2. 将吸头定位到分液位置，按“开始”按钮两次。

步骤1 混合
(混合模式)

注！混合采用总体积的大约 70% 进行。

步骤2 分液
(混合模式)

8. 移液建议

采用不同的操作模式与特殊功能，可以进行几种不同的液体处理方法。模式 P 与 dd 的特点是自动吹出，而其它模式的特点是在吸头内保留过量液体。
遵守以下建议，以确保获得最佳性能。

8.1. 采用吹出模式进行分液

P 及 dd 模式具有自动吹出功能，随后紧接着活塞立即返回到“初始”位置。为了避免将液体意外吸回到吸头，建议分液总是在液体表面上方进行。

通过在分液期间一直保持“开始”按钮按下，活塞将停在最低位置。这允许吸头靠容器底部或容器壁放置。一旦液体被分配，吸头可从容器取出，松开“开始”按钮。

8.2. 不采用吹出模式进行分液

当采用这种模式时，移液器将不执行吹出功能。因此，建议分液总是在吸头靠容器壁或底部时进行。当移取少量溶液或移取容易产生泡沫或高粘度的溶液时，采用模式 d 特别有用。

8.3. 其它建议

- 吸取液体时，垂直拿着移液器，将吸头放在液体中几毫米深处。
- 通过装满与清空吸头五次，预先清洗吸头。当分配粘度及密度与水不同的液体时或分配不是室温的液体时，这一点非常重要。
- 检查移液器、吸头与液体都处于室温。
- 避免污染吸头锥体。
- 当移液器未使用时，连接移液器充电装置。若其未与充电装置连接，当其未使用时，将移液器“关 (OFF)”上。
- 当安装吸头时，不要将吸头锥体对着吸头盘撞击，因为这可能损坏几种内部部件。
- 不要摔落移液器或交流 / 直流适配器，因为这可能导致过度震动。
- 避免将移液器曝露在温度变化大、高湿度与高尘埃环境中。
- 避免粗心操作。当使用键盘或“开始”按钮时，只需适当按压即可。
- 避免在吸头内有液体时将移液器侧放，这可能会使液体回渗到移液器内部。
- 总是紧靠接收容器壁移取。将吸头紧靠内壁，上拉拿出吸头。
- 定期更换吸头上的过滤器 (移液 50-250 次之后)。

9. 贮存

当移液器不使用时，建议将移液器放在移液器支架上，处于“开”位置，与充电装置连接。绿色充电灯应为亮。

产品编号	项目
725620	倾斜支架 (不带充电功能)

倾斜支架

10. 性能测试

建议定期（如每 3 个月）测试赛多利斯移液器的性能，在自行维护后必须测试性能。用户应该根据移液器使用的精准度要求、使用频率、移液器的操作人员数量、分配液体的性质以及可接受的最大允许误差 (ISO 8655-1) 等来确定定期测试。

10.1. 性能测试

性能测试应该在无风的房间中进行，房间温度为 15-30°C，波动为 ±0.5°C，相对湿度高于 50%。移液器、吸头以及测试水应该在房间里放足够长的时间（至少 2 小时），达到和房间条件的平衡。使用蒸馏水或者去离子水（ISO 3696，等级 3）。使用根据 ISO 8655-6 标准的分析天平。

称重

1. 调整所需测试体积 V_S。
2. 将吸头小心地安装到吸头圆锥上。
3. 将吸头注满测试用水，然后排出，重复 5 次，达到滞留空气体积的湿度平衡。
4. 更换吸头。将测试用水注满吸头进行预湿润然后排出废弃。
5. 吸取测试水，将吸头浸在水面以下 2-3mm。保持移液器垂直。
6. 垂直提起移液器，将吸头在测试用水的容器侧壁上碰一下。
7. 将水排出到称量容器中，将吸头倾斜 30° 到 45°，刚好在液体表面的容器内壁上碰一下。沿着称量容器的内壁提起移液器 8-10 mm，使最后一滴液体流下。
8. 读取以 mg 为单位的重量 (m_i)。
9. 重复测量，直至记录 10 次测量值。
10. 将记录的质量 (m_i) 乘以校正因子 Z 转化为体积 V_i

    $V_i = m_i * Z$　　Z = 修正系数

(表如下)

Z- 值 (µl/mg):

温度 (°C)	气压 (kPa)			
	95	100	101.3	105
20.0	1.0028	1.0028	1.0029	1.0029
20.5	1.0029	1.0029	1.0030	1.0030
21.0	1.0030	1.0031	1.0031	1.0031
21.5	1.0031	1.0032	1.0032	1.0032
22.0	1.0032	1.0033	1.0033	1.0033
22.5	1.0033	1.0034	1.0034	1.0034
23.0	1.0034	1.0035	1.0035	1.0036
23.5	1.0036	1.0036	1.0036	1.0037

11. 计算得到的平均容量$\overline{V}$：$\overline{V} = (\Sigma V_i)/10$
12. 为了进行一致性分析，计算测量值的系统误差 e_S：
    以 µl 表示：$e_S = \overline{V} - V_S$
    V_S = 选定的测试容量
    或以 % 表示：$e_S = 100(\overline{V} - V_S)/V_S$
13. 为了进行一致性分析，计算测量值的随机误差，将其作为标准偏差：

$$s = \sqrt{\frac{\sum(V_i - \overline{V})^2}{n - 1}}$$

n= 测量次数（10）

或以变动系数表示 CV=100s/ $\overline{V}$

14. 将系统误差（不准确度）和随机误差（不精确度）与实验室要求的性能规范值比较。

注！系统误差是移取的容量和选定测试容量之间的差异。随机误差是多次移取的液体容量与其平均值的分散程度（ISO 8655-1）。

注！赛多利斯产品的技术参数是在严格控制的条件下获得的 (ISO 8655-1)。用户应根据移液器的应用领域以及对移液器的准确要求确定可接受的最大允许误差 (ISO 8655-1)。

注！这种方法是基于 ISO 8655。

11. 维护

赛多利斯 ePET® 电子移液器要求定期进行清洗，确保无故障操作。定期更换吸头圆锥过滤器。

ePET® 移液器已经被设计为便于清洗和保养。然而，赛多利斯还提供了一个完整的维修和校准服务，包括服务报告和性能证书。请内部维护或将您的移液器寄回测试 / 校准。在寄出之前，请确保没有任何污染。请告知我们的客服移液器被用于什么危险材料。

注！定期检查 ePET® 移液器（例如每 3 个月），总是内部服务或维修后。

11.1. 清洗消毒

ePET® 电子移液器应该每天检查清洁情况。用 70% 乙醇，60% 的异丙醇或者温和型清洁剂对表面去污。

用湿布轻擦移液器表面并拭干。请额外注意吸头连件，如果需要的话请更换安全圆锥过滤器。（6.6 章）

11.2. 内部维护

1. 取下吸头推出器套。轻轻地逆时针转动吸头推出器，并将其滑下。
2. 使用 70% 的乙醇，60% 异丙醇或者温和型清洁剂，用不起毛的软布给吸头推出件和吸头锥体拭擦干净。
3. 逆时针旋松吸头锥体，并将其取下，曝露活塞。活塞可能与吸头锥体粘结，若发生这种情况，用镊子取下活塞。
4. 为了避免刮伤活塞表面，使用不起毛的软布沾 70% 乙醇，60% 异丙醇或者温和型清洁剂清洁活塞，并让它干燥。

注！对全面的清洁来说，将吸头锥体、吸头推出器环管、活塞、O 形环与弹簧放到一个盛有 70% 乙醇，60% 异丙醇或者温和型清洁剂的烧杯中至少 30 分钟，采用蒸馏水冲洗部件，然后最好是在暖风中干燥。

5. 采用提供的润滑油脂在活塞上薄薄地涂上一层。不要使用任何其它润滑油脂。检查活塞表面上无任何绒屑或颗粒。避免油脂涂得太多，尤其是在活塞底部不要涂得太多。
6. 将活塞与吸头锥体重新旋回其原位，安装移液器，更换推出器环管，使推出器手柄连接卡进推出器套的连接槽内。若安装了过滤器的话，更换过滤器。
7. 按“开始”按钮几次，试验移液器。试验吸头推出器操作。

注！定期检查赛多利斯 ePET® 的性能，如每三个月进行一次，并在内部维护或维修之后总是检查其性能。

11.3. 电池更换

若电池无法保持足够的电力来维持移液器的正常操作，按照下述步骤更换电池。

1. 将移液器关上 (OFF)。
2. 取下移液器背部的两颗顶部螺钉，取下电池盖。
3. 上抬使电池脱出电池座，小心取出电池。
4. 安装新 NiMH- 电池，正极端对准电池座底部的接触弹簧
5. 重新放回电池盖与螺钉。螺钉不要拧得太紧。
6. 适当处置电池。

电池更换

12. 故障排除

赛多利斯 ePET® 电子移液器具有内部监控程序，控制每次移液操作的性能。若错误信息 ER1 出现在显示屏上，意味着移液器无法正确进行预定操作。若看到这种错误信息，请按照下述方法处理：

1. 将移液器连接充电器充电 15 分钟。
2. 按 **E**，清除屏幕上的错误信息。
3. 按“开始”按钮，设置移液器到其初始位置。

注！由于此步将清空吸头，建议重新安装移液器前，取下吸头。

有时 ER1 情况可能会因切断的电源插座而起，或为移液器在充电期间处于“关”位置。

重复出现 ER1 信息，是因为出现内部错误，无法完成移液操作。移液器需要返回当地赛多利斯代表处修理。

故障，可能原因和解决方案

故障	可能原因	解决方案
吸头内部残留液滴	吸头不合适	采用原装吸头
	塑料湿润不均匀	连接新的吸头
泄漏或移取体积太小	吸头连接不正确	连紧
	吸头不合适	采用原装吸头
	吸头与吸头锥体之间存在外部杂质颗粒	清洁吸头锥体，连接新的吸头
	仪器污染	清洁和润滑O形环和活塞，清理过滤圆锥（*）
	活塞与O形环的润滑油涂得不够	对活塞与吸头锥体进行清洁与涂润滑油脂。进行相应的润滑。
	O形环不正确定位或损坏	更换O形圈
	错误操作	仔细按照指示
	校准或改变不适合的液体	根据指令调整
	仪器损坏	送去维修
按钮卡住或移动不正常	活塞污染	清洁和润滑O形环和活塞，清理过滤圆锥
	液体渗过吸头锥体	清洁和润滑O形环和活塞，清理过滤圆锥
移液器堵塞，移取体积太小	液体渗过吸头锥体，并干燥	清洁和润滑O形环和活塞，清理过滤圆锥
吸头推出器卡住或不规律移动	吸头锥体污染	移除止推环，使用75%乙醇，60%异丙醇或温和型清洁剂进行清洁

13. 保修信息

Sartorius 的产品应当按照本手册中的描述使用。ePET® 针对除电池以外的工艺及材质缺陷提供 2 年的质保。

然而，若故障的产生被视为由误用、滥用、未经授权的保养和维修或疏忽定期的保养维护、意外损坏、错误的存放或将产品用于超出其参数规格之外的操作、违背本手册中给出的操作或使用非原厂吸头所造成，则不承担保修责任。

每支赛多利斯 ePET® 在生产商发货之前都进行了试验。赛多利斯质量保证程序保证您购买的赛多利斯 ePET® 能够随时可用。

每支赛多利斯 ePET® 是 CE - 标记的，符合 EN 55014, 1993 / EN 55104, 1995 / ISO 13485: 2003 及 IVD 指令 (98/79 EC) 的要求。

14. 回收说明 (WEEE)

根据欧洲指令 WEEE (2002/96EC) 关于电气电子设备废物与减少有害物质的要求，本设备不得按未分级的城市废物回收利用。相反，该设备必须根据当地回收法规，独立回收。

电池必须根据当地法规丢弃，不能丢弃在普通垃圾桶。

15. 性能规格

所提供的性能参数使用原装吸头测得。当您根据 ISO8655 确定自己的性能参数时，厂家参数仅供参考。

规格

ePET® 单道和 8 道移液器

产品编号	通道数	量程 (µl)	测量体积 (µl)	系统误差 (%)	随机误差 (%)
710521ET	1	0,2 - 10	10	0,90	0,50
			5	1,00	0,70
			1	2,50	1,50
710011ET	1	5 - 100	100	0,40	0,15
			50	0,70	0,30
			10	2,00	1,00
710041ET	1	50 - 1200	1200	0,40	0,15
			600	0,70	0,30
			120	2,00	0,60
710501ET	1	100 - 5000	5000	0,50	0,15
			2500	0,80	0,20
			500	0,80	0,30
710201ET	8	0,2 - 10	10	0,90	0,50
			5	1,50	0,80
			1	4,00	4,00
710211ET	8	5 - 100	100	0,50	0,15
			50	0,70	0,20
			10	2,50	1,30
710221ET	8	25 - 250	250	0,40	0,15
			125	0,60	0,20
			25	1,50	1,00
710801ET	8	50 - 1200	1200	0,50	0,15
			600	1,00	0,20
			120	3,00	1,20

16. 售后服务

与移液一样，实验室还必须注意日常工作常用的工具和设备的质量和性能。为使您的液体处理工具确保连续的准确度和精确度，我们提供广泛的优质服务，如质量控制、维修服务、预防性维护和校准服务。定期做到这些，您的移液器就能保持良好的工作状态并有助于延长其寿命。

赛多利斯移液器服务中心是国内最专业的移液器维修和校准服务中心。

赛多利斯移液器服务中心是总公司在全球推广的最高级别的移液器售后服务。

赛多利斯移液器服务中心的技术人员是经过赛多利斯和英国移液器维修中心的认真培训，同时我们的技术人员具有丰富的维修和校准经验。

赛多利斯校准实验室于 2011 年 7 月 11 日正式获得中国合格评定国家认可委员会 (CNAS) 的“检测与校准实验室”认可。

在这里，我们不仅可以提供赛多利斯移液器的维修和校准服务，还可以提供赛多利斯以外的其他品牌移液器的维修和校准服务：

- 所有类型的移液器
- 所有规格的移液器
- 所有量程的移液器

维修热线：0512-66168157、66168159
邮箱：service@pipettedoctor.cn
网址：www.pipettedoctor.cn

在我们的服务中心，您的移液器将会得到最高标准的维修和校准服务。
以下是我们的优势：

- 专业的一站式服务
- 无需将不同品牌移液器寄回不同售后服务中心
- 方便快捷，无需您费神
- 我们的服务合约为您节约维修成本

移液器家族其他成员

eLINE®电子移液器

强大的功能加上杰出的人体工程学设计，让您轻松完成移液。

mLINE®手动移液器

舒适的手感及量程锁设计带给您轻而易举的精准。

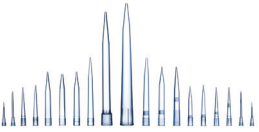
Proline® Plus手动移液器

优良的耐化学性、出色的性能，是您的不二选择。

全新低吸附吸头

疏水表面减少液体在吸头中的残留量，节省珍贵的试剂和样品。

Proline®
手动移液器



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