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MICROLITAQUA

Electronic Micropipette
Single & Multichannel

Operation Manual

Index

1. Safety Instructions and Warnings

It is beyond the scope of this manual to address all of the potential risks associated with its use. It is the sole responsibility of the user to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations, prior to the usage of this instrument.

⚠ Please read the following instructions carefully.

- Read and understand this **Operation Manual** thoroughly before using the instrument.
- Follow general and safety instructions for hazard prevention, e.g., always wear protective clothing, and protective gear for the eyes and hands.
- Carefully observe the specifications provided by reagent manufacturers.
- Observe operating exclusions. When in doubt, contact the manufacturer or supplier.
- Always use the instrument in such a way that neither the user nor any other person is in danger.
- Use only original accessories and spare parts.
- Do not attempt to make any technical alterations.
- Do not dismantle the instrument any further than is described in the Operation Manual.
- Always check the instrument for visual damage before use.
- If there is any sign of a potential malfunction immediately stop operating.
- Consult the **'Troubleshooting'** section of this Operation Manual and contact the manufacturer if needed.

2. General Description

2.1 Intended Use

The AQUA electronic micropipette is an electronic volumetric instrument designed to measure and transfer liquids precisely and safely. It can measure and transfer volumes from 0.1 µl to 10 ml depending on the model.

The AQUA electronic micropipette is equipped with an LCD display (Tempered Glass Screen) that shows the pipetting volume and other parameters. The range of the volume of the aspirate liquid is shown on the pipetting key (Fig. 2.1A). The setting of the volume is done by turning the adjustment wheel (Fig. 2.1B).

(Fig. 2.1A)

(Fig. 2.1B)

2.2 Specifications

The AQUA pipettes are available in single (Table 1) and multi-channel (8 and 12 channels) (Table 2) variants.

This is a high-quality instrument that offers excellent accuracy and precision.

The accuracy and precision (repeatability) of liquid volume depend on the quality of tips used. The values for accuracy and precision given in the table below were obtained using compatible standard tips.

Electronic Single Channel Pipettes are available in 10 unique volume ranges

Model	Volume Range	Increment (µl)	Volume (µl)	Accuracy		CV	
				(+/- %)	(+/- µl)	(+/- %)	(+/- µl)
AQS-3	0.1-3 µl	0.05	3	1.3	0.039	0.8	0.024
AQS-10	0.2-10 µl	0.1	10	1	0.1	0.4	0.04
AQS-20	0.5-20 µl	0.1	20	1	0.2	0.3	0.06
AQS-100	2-100 µl	0.5	100	0.6	0.6	0.15	0.15
AQS-200	5-200 µl	0.5	200	0.75	1.5	0.2	0.4
AQS-300	10-300 µl	1	300	0.4	1.2	0.15	0.45
AQS-500	10-500 µl	2	500	0.4	2	0.16	0.8
AQS-1000	50-1000 µl	1	1000	0.4	4	0.15	1.5
AQS-5000	0.1-5 ml	10	5000	0.6	30	0.2	10
AQS-10000	1-10 ml	100	10000	0.6	60	0.16	16

(Table 1)

Electronic Multi-Channel Pipettes (8 and 12 channels) are available in 4 unique volume ranges

Model	Volume Range	Increment (µl)	Volume (µl)	Accuracy		CV	
				(+/- %)	(+/- µl)	(+/- %)	(+/- µl)
8 Channel							
AQE-10	0.2-10 µl	0.1	10	0.8	0.08	0.025	0.0025
AQE-100	5-100 µl	1	100	0.5	0.5	0.15	0.15
AQE-300	10-300 µl	1	300	1.2	3.6	0.15	0.45
AQE-1000	50-1000 µl	1	1000	4	40	0.15	1.5
12 Channel							
AQT-10	0.2-10 µl	0.1	10	0.8	0.08	0.025	0.0025
AQT-100	5-100 µl	1	100	0.5	0.5	0.15	0.15
AQT-300	10-300 µl	1	300	1.2	3.6	0.15	0.45
AQT-1000	50-1000 µl	1	1000	4	40	0.15	1.5

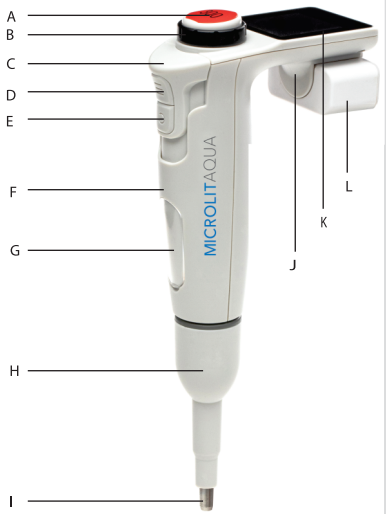
(Table 2)

NOTE:
The accuracy and precision are obtained with standard compatible tips, using a gravimetric method, performing at least 10 measurements of distilled water at a temperature of 20±1°C, according to EN ISO 8655 standards.

3. Overview

3.1 Detailed Description of Product Keys

(Fig.3.1)



(Fig. 3.1)

A. Pipetting Key-Confirmation Key:

Used for aspiration/discharging in the main pipette mode. This key works as an enter key when required.

B. Volume Adjustment Wheel:

Used for adjusting the liquid volume in the automatic/manual pipette interface. It can adjust the volume in manual mode (not aspirate), and the aspirate liquid is responsible for changing the direction of aspiration/ discharging. It is responsible for moving the cursor in the preset program mode.

C. Tip Ejection Key:

Used for seamless tip ejection.

D. Function Key-Program Key/Pipetting Mode Switch Key:

Used for switching freely between pipetting modes.

E. Speed Key:

Used for changing the aspiration/dispensing speed while operating. There are three dispensing speed modes- low, medium, and high.

F. Handgrip:

The good grip ensures steady control and stable pipetting for reliable results.

G.Label Window:

To mark your pipette descriptions.

H. Pipette Shaft:

This holds the piston assembly and helps in guided and smooth tip ejection.

I. Tip Cone:

304 Grade stainless steel tip cone designed to fit all standard tips.

J. Finger Rest:

It lets your hand rest and is useful for left and right-handers both for comfortable pipetting.

K .LCD Display:

1-inch tempered, color LCD display with user-friendly GUI.

L. External Lithium Battery:

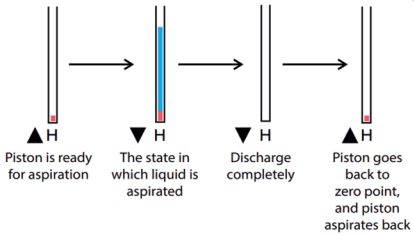
Knock-down rechargeable and detachable lithium battery of 4.2V ensures continuous usage with reliable power backup.

3.2 Symbols and Conventions

Symbol	Description
⚠	CAUTION - This symbol indicates a potential risk and alerts you to proceed with caution
	Fully Charged Battery
	Low Battery
▲H	Aspirate Indicator
▼H	Dispense Indicator

(Table 3)

3.3 Navigation Bar



3.4 Package Contents

Description	Quantity
Electronic Pipette	01
Battery	01
Power Adapter	01
USB Cable	01
Sample Tips	01
Grease	01
Calibration Certificate	01
Operation Manual	01

(Table 4)

4. Getting Started

4.1 Initializing

AQUA is supplied with a partially charged battery. However, it is recommended to fully charge the battery for at least an hour before first use. (Fig. 4.1A)

(Fig. 4.1A)

- To connect the battery, align and slide it to the back of the pipette. (Fig. 4.1B)

(Fig. 4.1B)

- Now, to charge the battery connect the charger to the USB port at the back. (Fig. 4.1C)

(Fig. 4.1C)

- To start the pipette, use the ON/OFF button on the back. (Fig. 4.1D)

(Fig. 4.1D)

4.2 Setup

4.2.1 Voltage Requirements

The input voltage required for the AQUA is 100-240 V ~50/60 Hz. The charger is supplied with a power adapter having an output voltage of 5V and 1A.

4.2.2 Basic Operating Instructions

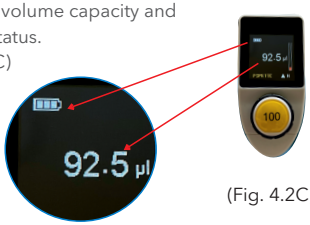
- When button is switched ON, LCD will display " PRESS PIP". (Fig. 4.2A)

(Fig. 4.2A)

- Press the Pipetting key and it will redirect to the Pipette/ Automatic Mode by default (Fig. 4.2B)

(Fig. 4.2B)

- The display will also show the pipette's volume capacity and battery status. (Fig. 4.2C)



(Fig. 4.2C)

- Now select the required operation mode to perform the experiment.

5. Operations and Pipetting Modes

There are 4 major pipetting modes:
Pipette mode, Manual mode, Aspirate mode, and Multi/Stepper mode.

5.1 Pipette Mode

This is the default mode when the pipette is ON.

(Fig. 5.1A)

This is the automatic mode i.e., the pipette will auto aspirate and dispense the volume set initially in the pipette.(Fig.5.1A)

1. To use this mode, turn the volume adjustment wheel to set the volume. (Fig.5.1B)


(Fig. 5.1B)

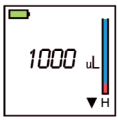
2. The aspirate indicator will be displayed. (Fig.5.1C)

(Fig. 5.1C)

3. Now press the pipetting key to aspirate the liquid. (Fig. 5.1D)


(Fig. 5.1D)

4. Once liquid is aspirated the display will show the dispense indicator. (Fig. 5.1E)



(Fig. 5.1E)

5. Press the pipetting key again to dispense the liquid.

One can also dispense the lesser amount than aspirated. Adjust the required volume using the volume adjustment wheel. This will activate the stepper mode (Fig.5.1F).

(Fig. 5.1F)

Now, corresponding steps will be calculated and liquid can be dispensed by pressing the pipetting key.

6. Once done, blowout mode will be activated to dispense the residual volume from the tip. (Fig.5.1G)

(Fig. 5.1G)

Pipette mode can also be used to perform **mixing liquids**.

(Fig. 5.2G)

- To use this, after setting the volume, press the pipetting key to aspirate the volume.
- Long press the pipetting key to automatically aspirate and dispense the liquid 5 times to complete the mixing.
- Once done, blowout mode will be activated to dispense the residual volume from the tip.

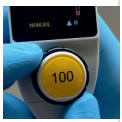
5.2 Manual Mode

Manual mode is equivalent to the non-electronic pipettes.

(Fig. 5.2A)

1. To select this mode, press the function key once. (Fig.5.2A)

2. Set the volume using the volume adjustment wheel. (Fig.5.2B)



(Fig. 5.2B)

3. Press the pipetting key for 2-3 seconds when the aspirate bar indicator is ON. This will aspirate the set volume inside the tip. (Fig. 5.2C)

(Fig. 5.2C)

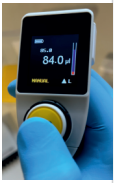
4. To dispense the liquid, press the pipetting key again when the dispense indicator is ON. (Fig.5.2D)

(Fig. 5.2D)

5. **Manual mode** can also be used for **small titration.** Give a long press to the pipetting key to aspirate the desired volume. Select the dispensing speed using speed key to "low" (Fig.5.2E) and give a short press to the pipetting key to titrate.

(Fig. 5.2E)

6. One can measure the unknown liquid present in a vial/tube using manual mode. To use this, short press the pipetting key frequently after each second. The display will show the total volume aspirated. (Fig.5.2F)



(Fig. 5.2F)

5.3 Aspirate mode

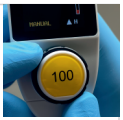
This mode is mainly used to aspirate the highly volatile liquid as in other modes the liquid may drip due to high volatile tension. This is a multi-aspiration mode that can be used for equal and unequal aspiration in combination with stepper and pipette mode.

This can also be used to mix two types of liquids.

1. To select this mode, press the function key twice. (Fig.5.3A)

(Fig. 5.3A)

2. Set the volume using the volume adjustment wheel. (Fig.5.3B)



(Fig. 5.3B)

3. Press the pipetting key till the aspirate bar indicator is ON to aspirate the liquid. (Fig.5.3C)

(Fig. 5.3C)

4. Withdraw the tip from the liquid and aspirate a bit of air. In case of mixing, aspirate again the other liquid. (Fig.5.3D)

(Fig. 5.3D)

Note: The aspirate indicator will be ON in this mode.

5. To dispense the liquid, press the function key once to go back to the pipette mode.

6. Now, the dispense indicator will be ON and press the pipetting key again to dispense the liquid. (Fig.5.3E), Once done, blowout mode will be activated to dispense the residual volume from the tip.

(Fig. 5.3E)

5.4 Multi-mode

This is a multi-dispensing mode and can also be used for stepper. This mode can be used for reverse or repetitive pipetting. This mode can be used for equal and unequal dispensing in combination with aspirate and pipette modes.

1. Press the function key thrice to select the multi mode. (Fig.5.4A)

(Fig. 5.4A)

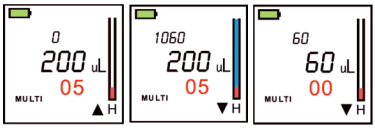
2. Set the volume using the volume adjustment wheel. As per the set volume, the steps will be defined automatically.

3. Press the pipetting key to aspirate the liquid when the aspirate indicator is ON. (Fig.5.4B)

(Fig. 5.4B)

4. When the dispense indicator is ON, press the pipetting key to dispense the volume.

5. Each time the pipetting key is pressed one dispensing step is performed. The display shows the number of dispensing steps left.



6. Then press the pipetting key again for a blow-out.

5.5. Other Pipetting Operations

With the combination of different pipetting modes, one can use the pipette for different pipetting operations. These combinations can be used for different types of liquids such as viscous, volatile liquids, acids, foaming liquids, heterogeneous solvents, and more. Here are some common pipetting techniques mentioned:

1. **Forward Pipetting** is a technique to dispense a measured quantity of liquid by means of an air displacement pipette. The technique is mainly recommended for aqueous solutions such as buffers, diluted acids, or alkalis. This is the best pipetting method for fast and easy processing of routine applications, by simply setting the desired volume and aspirating & dispensing in a single click.

2. **Heterogeneous Sample Pipetting** is used for pipetting heterogeneous samples, such as blood or serum.

Typically, pre-rinsing the tip is not possible and the full sample should be dispensed for accurate analysis.

3. **Reverse Pipetting** is a technique to dispense a measured quantity of liquid by means of an air displacement pipette. The technique is mainly recommended for solutions with a high viscosity or a tendency to foam as it reduces the risk of splashing, foam, or bubble formation. Reverse pipetting is more precise in dispensing small volumes of liquids containing proteins and biological solutions. (Refer to page no. 10 of Pipette mode.)

4. **Manual Pipetting** is suitable for the pipetting of supernatants, for measuring an unknown amount of liquid, for titration, or for loading gels. It is perfect for those who only occasionally pipette or pipette in low volumes. Herein, the volume is aspirated and dispensed manually as per the user's requirement.

5. **Titration** is carried out when the total volume is aspirated and then manually dispensed drop by drop until the wanted reaction is achieved. (Refer to page no. 11 of Manual mode.)

6. **Gel Loading Pipetting** is loading acrylamide or agarose gels with standard pipette tips. Using specialized gel tips for polyacrylamide gels speedsup the loading process and is used for various applications.

7. **Multi-Stage Aspiration Technique** is the consecutive aspiration of equal/unequal volumes of supernatants in one pipette tip at your desired speed and volume. This feature is useful in the pooling of protein, peptide, or virus-containing supernatants for subsequent analysis.

8. **Mix Pipetting** enables the aspiration of a specific amount of liquid followed by a user-defined mixing step. This program is ideal for increasing your reproducibility and preventing RSIs, as it minimizes manual

plunger use during operation. (Refer to page no. 10 of Pipette mode.)

9. **Sample Dilution Technique** allows researchers to add, dilute and mix samples in a single pipetting operation. The diluent is aspirated first, followed by the air gap and then the sample. This ensures effective mixing and flushing of the concentrated sample from the tip, saving time while improving the accuracy and reproducibility of results.

10. **Stepper Technique or Multiple Dispensing Mode**, the pipette divides one aspirated volume (e.g. 1000 µL) into multiple dispensing of a smaller volume (e.g. 100 µL × 10 times). Repeated dispensing of a selected volume with equal or unequal steps is possible with this mode. This mode is particularly suitable for microplate applications.

11. **Sequential Dispensing** means to aspirate once and dispense various user-defined volumes in sequential order in one go.

12. **Repetitive Pipetting** is just a variation of reverse pipetting involving repeated pipetting of the same liquid volume.

Note: Incase you wish to dispense controlled volume or exit any of the pipetting modes after aspirating, you need to long-press the speed button. Then blow-out mode will be activated and you can dispense the residual liquid in a go by pressing the plunger button.

5.6 Selecting Pipetting Modes

Pipetting Techniques ↓	Selecting the Pipetting Modes of the AQUA			
	Pipette Mode	Manual Mode	Aspirate Mode	Multi-Mode
Forward Pipetting	✓	✓		
Heterogenous Sample Pipetting	✓			✓
Reverse Pipetting	✓			✓
Manual Pipetting/Measurement		✓		
Titration		✓		
Gel Loading Pipetting	✓			✓
Multi-Aspiration			✓	
Mixing	✓	✓	✓	
Dilution	✓			✓
Multi-Dispensing/Stepper				✓
Sequential Dispensing	✓		✓	✓
Repetitive Pipetting	✓			✓

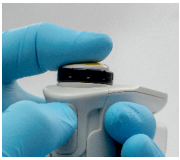
(Table 5)

6. Memory

AQUA has been smartly designed and programmed to improve the user experience.

AQUA offers a memory section that helps save your performed programs, which can be used later with a click.

1. To use the memory section, long press the programming key. (Fig. 6A)



(Fig. 6A)

2. A selection screen will be opened. (Fig. 6B)

(Fig.6B)

3. You can select any of the programs as per the pipetting section and save. (Fig.6C)

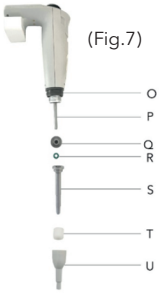
(Fig. 6C)

4. To exit the memory, press the function key again.

7. Assembly and Calibration

Disassembly

(Fig.7)



(Fig.7)

O - Upper Part of ejector
P - Piston
Q - Piston Unit
R - O-Ring
S - Shaft
T - Shaft Nut
U - Lower part of ejector

1. Unscrew the lower part of the ejector (U) and then the shaft nut (T) by rotating it in anti-clockwise direction

2. Now pull out the magnetic shaft (S) of the pipette. The O-ring (R) of the pipette is inside the shaft (S). Change the O-Ring only if required.

3. This will expose the piston unit (Q) and piston (P). The lower part of the ejector (U), shaft nut (T), shaft (S), O-ring (R) and piston unit (Q) can be sterilized.

7.1 Assembly

To reassemble the piston assembly, follow the below:

1. Place the O-Ring (R) back and onto the magnetic shaft (S) and put them back.

2. Screw the shaft nut (T), followed by the lower part of the ejector (U) into the upper part of the ejector (O) one by one. The assembly is now completed.

7.2 Calibration

All the micropipettes are factory calibrated and adjusted to give the volume as specified with distilled or deionized water, using the forward pipetting technique.

It must be noted that the use of other pipetting techniques may affect the calibration results. he micropipettes are constructed to permit re-adjustment for other pipetting techniques or solutions/reagents of different temperatures and viscosities.

If the dispensed volume of the micropipette (as read by an analytical balance) is not within permissible ISO 8655 limits (as given in Micropipette Specifications), the pipette can be recalibrated by following the procedure below:

1. Perform 7 measurements on the nominal volume of the pipette and calculate the average weighted volume as displayed by an analytical balance.

2. After turning switch key of the pipette to the ON position. (Fig. 7.2A)

(Fig. 7.2A)

3. Press and hold the function program key and speed key simultaneously at the same time to enter the setting interface. (Fig. 7.2B)

(Fig. 7.2B)

4. Go to the menu section and select Calibrate. (Fig. 7.2C)

5. Select the Four Points to enter the calibration value. (Fig. 7.2D)

6. Pre-adjust the calibration value (measured average liquid value) and save the calibration to start the calibration. (Fig. 7.2E)

(Fig. 7.2C)

(Fig. 7.2D)

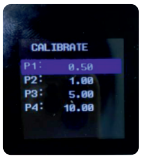
(Fig. 7.2E)

Calibration Check Points:

Checkpoints	Description	Adjustment
P1	Lowest Value	No adjustment required
P2	10 % of Nominal Value	At each point, 7 measurements are to be taken on the analytical balance. The corresponding systematic and random error has to be calculated and calibration must be readjusted.
P3	50 % of Nominal Value	
P4	Maximum/Nominal Value	

(Table 6)

7. If the readjusted value does not fall under the permissible limit, reperform calibration at all three checkpoints. (Fig. 7.2F)



(Fig. 7.2F)

8. If the systematic error is positive, the calibration value needs to be adjusted upwards. If the error is negative, the calibration value needs to be adjusted slightly. The adjusted figure is one-half of the systematic error.

8. Maintenance

8.1 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 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 following samples will have better accuracy and repeatability. Pre-rinsing allows you to flush out residual substances and prevent cross-contamination. (Fig.8.1)

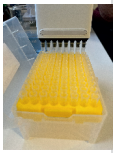
(Fig. 8.1)

It also increases the humidity resulting in less evaporation (evaporation can cause significant sample loss).

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

8.2 Aspirating and Dispensing Liquid

- Place a tip on the shaft of the pipette. Press the tip on firmly using a slight twisting motion. This will ensure an airtight seal. (Fig.8.2A)



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

(Fig. 8.2A)

Aspiration

- Hold the pipette vertically, and immerse the tip into the sample liquid. The depth to which the tip is immersed in the sample liquid depends on the model. (Fig.8.2B)

(Fig. 8.2B)

Model	Immersion depth (mm)
AQ-10	≤1
AQ-200/AQ-1000	2-4
AQ-5000	3-6

(Table 7)

- Press the pipetting key to aspirate the sample, (Fig. 8.2C).

(Fig. 8.2C)

- Wait for one second and then withdraw the tip from the liquid. When the pipette tip is immersed not as deeply as the recommended depth, the air may enter the disposable tip.

.

- Avoid touching the orifice of the tip.

Dispensing

- Place the end of the tip against the inside wall of the vessel at an angle of 10 to 40 degrees. Press the pipetting key (Fig. 8.2D).

- Wait one second. Remove the pipette by draw ing the tip against the inside surface of the receiving vessel.

- Eject the tip by pressing the tip ejection key. (Fig. 8.2.E)

(Fig. 8.2D)

(Fig. 8.2E)

- Remember to change the tip whenever a different kind of liquid is to be sampled.

8.3 Dense and Viscous Liquid

The specifications of accuracy and precision are based on pipetting distilled water. The accuracy of the pipette may differ with the handling of liquids with different physical parameters like 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 most important to give the liquids some time to follow the change of pressure by holding the pipette tip in its position for at least seconds after the aspiration and the blow-out stroke.

However, if in extreme cases this method of operation does not result in accurate values, accurate results could be achieved as follows:

Set the pipette to the nominal volume and weigh the liquid, then calculate the set-off from the nominal value:

Correction value = 2 x nominal value - m/γ
m - the weight of the sample
γ - density of liquid

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

8.4 Dos and Don'ts

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

(Fig. 8.4)

- Make sure to operate the AQUA slowly and smoothly.

- The depth of immersion in the sample liquid should be the minimum necessary and should remain constant during aspiration.

- The pipette should be held in a vertical position (Fig.8.4).

- For smaller volumes, it is recommended to dispense at medium to low speeds.

- To achieve a proper tip fitment and prevent any leakage, it is recommended to hammer the tips two or three times to seal the tips firmly on the tip cone.

- Change the tip when the volume setting is changed or when a different liquid is to be aspirated.

- Change the tip if a droplet remains on the end of the tip from the previous pipetting operation.

- Each new tip should be pre-rinsed with the liquid to be pipetted

- Liquid should never enter the AQUA shaft. To prevent this:
  - Press and release the push button slowly and smoothly.

- Never turn the pipette upside down.
- Never lay the pipette on its side when there is liquid in the tip.

- Never force the volume setting beyond its recommended limits.

- When pipetting liquids with temperatures different from the ambient temperature, it is recommended to pre-rinse the tip several times before use.

- Do not pipette liquids with temperatures above 70°C.

- When pipetting acids or corrosive solutions that emit vapors, it is recommended to disassemble the shaft rinse the piston, and seal it with distilled water after finishing the pipetting operation.

9. Cleaning and Sterilization

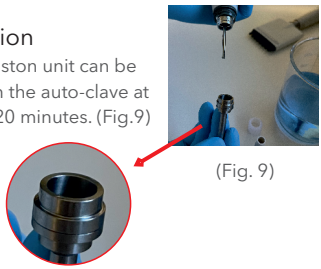
Cleaning

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 pipette during pipette disassembly may be washed with distilled water or isopropyl alcohol.

Sterilization

Only the piston unit can be sterilized in the auto-clave at 121°C for 20 minutes. (Fig.9)



(Fig. 9)

After sterilization, the pipette should be dried and cooled to room temperature.

it is recommended to sterilize the pipettes in an autoclave with an initial vacuum and drying cycle. Prior to sterilization unscrew the shaft nut slightly in the pipette. After autoclaving these parts should be screwed tight again.

The precision of the results should not alter if the exploitation of the pipette and the autoclaving process are done correctly.

10. Troubleshooting

If you notice an improper pipette operation identify the cause and eliminate the fault. To do this, follow the instructions as given below.

Issue	Cause	Solution
Piston fault	1. Piston is Installed too tightly	Refit the piston
	2. Insufficient piston lubrication	Grease the piston
	3. Solidification of lubricating grease on piston surface	Remove old lubricating grease and apply new lubricating grease
	4. Foreign matter on or damage to piston surface	Clean or replace the piston
	5. Impurities or particles between the piston, O-ring, and tip ejector sleeve	Clean and lubricate the ring and tip ejector sleeve
	6. O-ring is damaged	Replace the O-ring
Inaccurate pipetting volume or leakage	1. Tip is not properly installed	Reinstall the tip
	2. Tip is incompatible	Clean the tip holder and replace the tip
	3. Impurities between tip and tip holder	Clean the tip holder and replace the tip
	4. Tip is damaged	Replace with new tip
	5. Fluid was removed too quickly	Adjust the pipetting speed/replace and place fluid more slowly

	6. Tip was moved away from the fluid surface too quickly	When removing large volumes of viscous fluids, pause for a few seconds before moving the tip away from the surface of the fluid
	7. Foreign matter on or damage to piston surface	Clean or replace the piston
	8. Impurities and particles between the piston, O-ring, and tip holder	Clean and lubricate the o-ring and the tip holder
	9. Insufficient lubrication of the o-ring and the piston	Apply lubricating grease evenly
	10. O-ring is damaged	Replace the o-ring
	11. Incorrect operation	Follow the instructions
There is residue in the tip	1. Tip is incompatible	Use a suitable tip
	2. Tip is not properly installed	Reinstall the tip
	3. Tip is highly absorbent	Replace with a low-absorbent tip
	4. Excessive liquid viscosity	Pre-wash the tip and reduce the suction speed
Noise during operation	1. Insufficient piston lubrication	Apply lubricating grease evenly to the piston
	2. Foreign matter on piston	Clean the piston and grease it
	3. O-ring is loosening	Ensure the o-ring is installed correctly
Suction function is weak or does not draw fluid	1. The battery has reached the end of its lifespan	Replace the battery
	2. Battery is low	Charge the battery
Inaccurate dispensing of special fluids	1. Incorrect calibration, needs to be recalibrated for high viscosity fluids	Recalibrate with the problem liquid
	2. Remove fluids that are volatile or which have a significantly different density to water	Pre-wash tips or recalibrate
Tip is detached or difficult to fit	1. Poor quality tips	Use a high quality tip
	2. Tip has been damaged	Replace with a new tip

(Table 8)

11. Attention

Read these instructions carefully and use the product in strict accordance with them.

- Use the product within its chemical corrosion limits.
- Do not remove highly flammable fluids.
- If the removed fluid does not match the temperature of the pipette or tip, the results may be inaccurate. the temperature of the fluid, pipette and tip should therefore be the same.
- Do not use the product in areas where there is an explosion hazard.
- Do not use force to disassemble the product.
- If the instrument is not functioning properly, discontinue use immediately and refer to the Troubleshooting section.
- The operating temperature should be kept between15-40°C, and the relative humidity should be 80% or less.
- Handle the pipette and charger carefully to prevent them from being accidentally dropped and damaged.

12. Warranty Policy

Microlit warrants that this product will be free from defects in material and workmanship for a period of two (2) years from the date of delivery. If a defect is present, Microlit will, at its option and cost, repair, replace, or refund the purchase price of this product to the customer, provided it is returned during the warranty period.

We are not liable for damage resulting from any actions not described in the operating manual or

non-original spare parts or components being used.

This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, or from ordinary wear and tear.

If the required maintenance and inspection services are not performed according to the manuals and any local regulations, such warranty turns invalid, except to the extent, that the defect of the product is not due to such non-performance.

Items being returned must be insured by the customer against possible damage or loss.

This warranty shall be limited to the aforementioned remedies.

13. Disposal

The adjoining symbol means that storage batteries and electronic devices must be disposed of separately from household trash (mixed municipal waste) at the end of their service life.

According to the Directive 2002/96/EC of the European Parliament and of the Council on Waste Electrical and Electronic Equipment (WEEE) published on 27 January 2003, electronic equipment requires disposal according to the relevant national disposal regulations.

Batteries contain substances that can have harmful effects on the environment and human health. Therefore, according to the Directive 2006/66/EC of the European Parliament and the Council on Waste Batteries of 6 September, 2006, batteries require disposal according to the relevant national disposal regulations.

Dispose the batteries only when they are completely discharged.

Do not short-circuit the battery to discharge it.
Subject to technical modifications without notice.
Errors accepted.