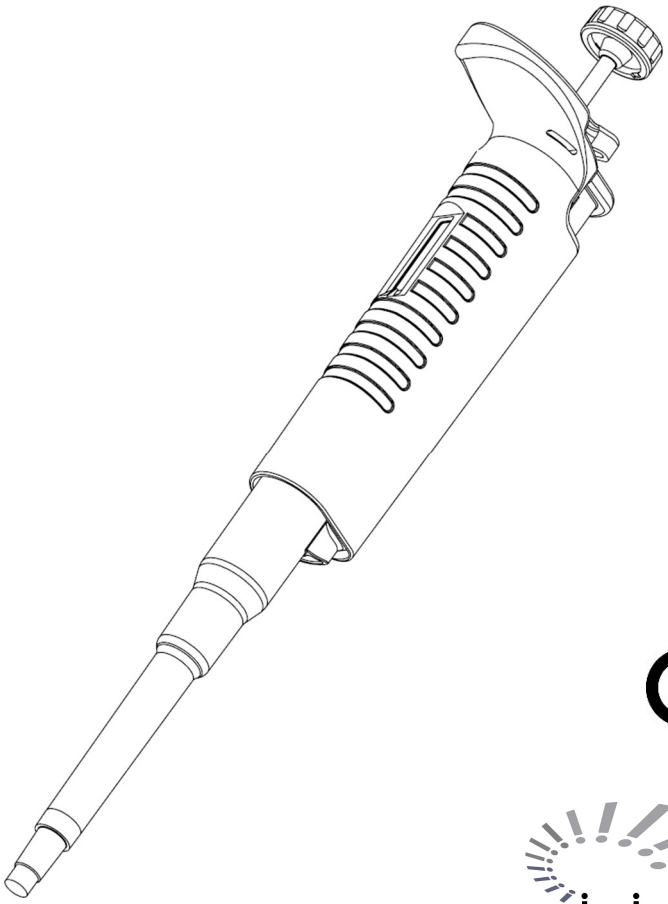
Nichipet EX III

User's Manual



CE

FUTURE LIFESCIENCE PARTNER
NICHIRYO

Thank you very much for purchasing Nichipet EX III.
Please read this manual carefully before using this device.

Safety Precautions

- Please read this manual carefully and have sufficient understanding of the contents and instructions, especially concerning matters of safety, prior to use.
- The notes stated here is for the safety of the user, and for the correct usage of the product.
- Contents marked with ⚠ "Danger Level Symbols" are matters that require the user's utmost attention, not only for using Nichipet EX III properly, but also to prevent users from injuries or death, harm to others, and/or property damage.
- After reading this manual, please keep it in a noticeable and accessible place for 'users of the device' to refer to at any time.
- Any serious incidents that has occurred in relation to the equipment shall be reported to the manufacturer and to the competent authority of the Member State in which the user and/or the patient is established.

Danger Levels

⚠ DANGER	Will lead to serious injuries or death.
⚠ WARNING	May lead to severe injuries or death.
⚠ CAUTION	May lead to light to moderate injuries, and/or cause property damage.
ⓘ	User information

Caution on disposal of this product

When disposing the pipette body and tips (including adhering liquid), please comply with the laws and regulations of each country related to disposal, or local ordinance or regulation.

Nichipet EX III

Table of Contents

1. Product overview

1.1 Features

- A wide range of sampling volume can be covered by eight models, from 0.1μL to 10,000μL.
- Nichipet EX III is made of UV resistant materials, and the volume indicator is made of glass, thus it can be used in a clean bench environment. (The surface of the pipette body might be deteriorated by long time UV irradiation. It does not affect the accuracy and precision.)
- Nichipet EX III is fully autoclavable at the condition of 121°C for 20 minutes.
- The volume lock mechanism prevents the setting volume from shifting. The volume setting can easily be performed by unlocking.
- Hyper blower system improves dispensing efficiency for 2μL, 10μL and 20μL.
- The tip can be removed without direct contact, by simply pressing the tip ejector.
- The ejector pipe can easily be removed, and it enables NPXIII to reach the bottom of narrow test tube.
- The filter is equipped with the front edge of the nozzle cylinder, and it absorbs the suction of the liquid to the inside of the pipette.

1.2 Standard accessories (Included)

Accessories	QTY
Tip (2μL, 10μL, 20μL, 100μL, 200μL, 1000μL,)	3
Tip (5000μL,10000μL)	1
Grease	1
Nozzle filter (1000μL,5000μL,10000μL)	3
User's Manual	1

When unboxing the package, check that all of the items above are included for the respective model.

1.3 Main illustration

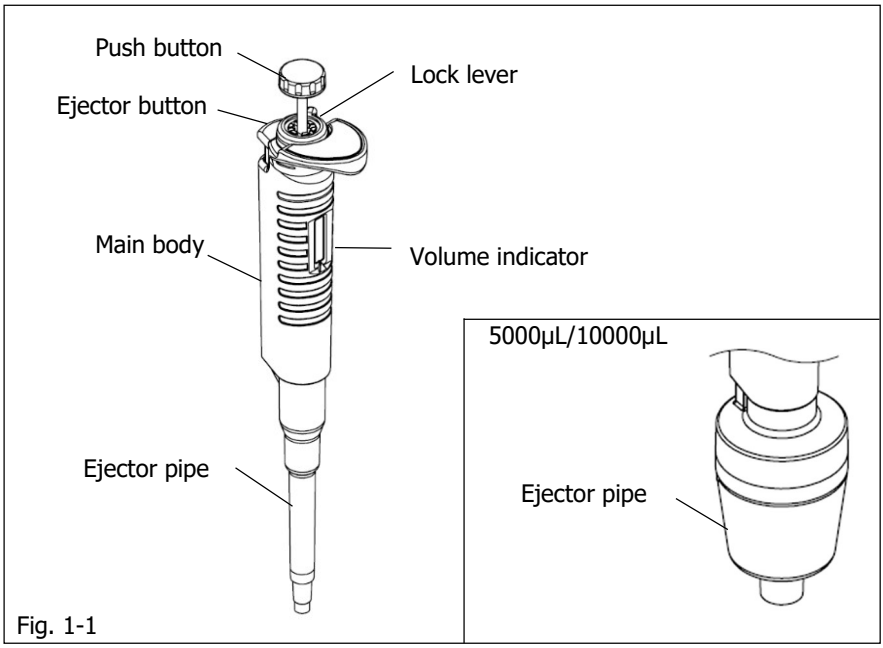


Fig. 1-1

2. Information on Safety

2.1 Intended Use

Nichipet EX III, used in conjunction with pipette tips recommended by Nichiryo, are designed and constructed for low-contamination transfer of liquids, especially for samples from the human body and for reagents within the scope of an in-vitro diagnostic application in order to allow the in-vitro diagnostic medical device to be used as intended.

Therefore, Nichipet EX III is subjected to the accessories of in-vitro diagnostic medical devices under Regulation (EU) 2017/746. The accessories is treated as in-vitro diagnostic medical devices in their own right under Regulation (EU) 2017/746. Nichipet EX III are intended for operation by qualified staff.

2.2 Warnings for intended use

⚠ DANGER

- ✓ When handling radioactive substances or infectious substances, always check and confirm the information first, and follow guidelines on their safety procedures.
- ✓ When using harmful liquids to the human body, be very careful in the handling of the substances.
- ✓ Never touch or come into direct contact with the used chips.
- ✓ Never touch filters directly that are contaminated by harmful or toxic substances.
- ✓ When liquids that are harmful to the human body adheres and/or contamination occurs, use appropriate measures to clean and decontaminate the device before continuing its use.
- ✓ This product is not intended for use on living organisms.

⚠ WARNING

- ✓ Do not eject the tip with liquid inside of it.
- ✓ Do not eject the tip towards anybody.
- ✓ Do not expel or dispense any liquids towards anybody.
- ✓ Depending on the splashed liquid, there is danger of causing injuries to the human body.
- ✓ Please protect yourself in accordance with the general procedure of danger prevention, such as wearing protective clothing, protective glasses and gloves.

⚠ CAUTION

- ✓ Do not use the pipette for any other purpose, use only for pipetting and liquid dispensing.
- ✓ Do not modify the pipette, modification can lead to accidents.
- ✓ Do not stab the tip into the human body, or eject the tip towards anyone. The tip is very sharp and extremely dangerous.
- ✓ The filter replacement tool tip is very sharp and can be dangerous. Please handle it with caution.
- ✓ Since the main body of the pipette becomes extremely hot right after autoclaving and drying. In this state, please do not touch it directly with your hands. It can lead to accidents and burn injury.
- ✓ Do not use the pipette for any purpose other than pipetting and liquid dispensing, such as stirring liquid with this product. It can lead to loosening of the tip, the tip dropping off, liquid adhesion and contamination to the main unit of the device and accidents and/or injury.
- ✓ During operation and maintenance, if any worn, missing or broken parts are detected, discontinue use immediately. Order and replace the part or parts, before use.

2.3 Material information

⚠ CAUTION

- ✓ The use of highly reactive chemicals may damage the device. Please acknowledge the following materials that are used, and do not use liquids that will violate them.

Material of external parts

- Polyphenylsulfone (PPSU)
- Polycarbonate (PC)
- Polyphenylenesulfide (PPS)
- Polyetherimide (PEI)
- modified- Polyphenyleneether (m-PPE)
- Polyetheretherketone (PEEK)
- PolyVinylidene DiFuluoride (PVDF)
- Fluororubber (FKM)
- Stainless steel
- Aluminum alloy

3. Operation/Operating procedure

ⓘ

- ✓ Do not expose pipette to direct sunlight when using it, or for 2 hours prior to use, otherwise the pipette may lose its accuracy. Avoid working with pipettes in a high temperature, low temperature, low humidity environment, or when the temperature difference between the environment including the main body of the device and the liquid is large, accuracy and precision may not be guaranteed.
- ✓ Just prior to use, avoid touching the tip or nozzle cylinder as much as possible. If they are warmed up, accuracy may not be obtained.
- ✓ Original Nichiryo tips are recommended. Nichipet EX III is calibrated with the original Nichiryo tip(Premium Tip), if you use other tips, deviations in original factory settings may occur, and accuracy will not be guaranteed.

3.1 Volume setting

1) Turn the lock lever to the unlocking direction to loosen it (Fig. 3-1).
2) Turn the push button to set the volume indicator to a desired liquid volume.
   To increase the volume setting, turn the push button till it passes the designated volume setting by at least half a rotation of the push button dial, and then dial back to set the designated volume. To decrease the volume setting, simply turn it to the designated volume directly. When setting the liquid volume, set the indicator's minimum graduation scale to the triangle point marker in the lower part of the volume indicator. Please refer to the volume indicator and the minimum graduation unit for each model to set the measurement volume accordingly(Fig. 3-2).
3) After setting the liquid volume, turn the lock lever to the locking position to lock it (Fig. 3-1).

⚠ CAUTION

✓ Do not exceed the specified liquid volume limit, otherwise the pipette may be damaged or deteriorate in its quality.

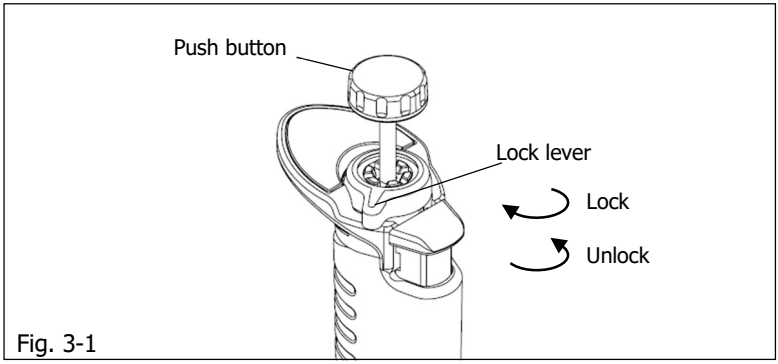


Fig. 3-1

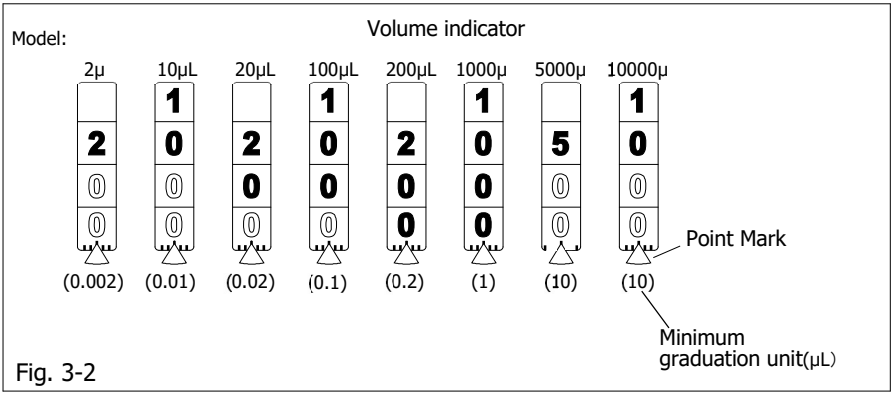


Fig. 3-2

3.2 Aspiration of liquid (Forward technique)

1) Attach a new tip to the nozzle end.

ⓘ ✓ It is recommended that tips are directly picked up from the rack. Do not twist the pipette when fixing tip on.

✓ Please be sure to mount the tip on the main nozzle securely. Failure to do so may cause the tip to drop off and liquid to splash.

⚠ CAUTION

✓ Do not perform pipetting with less liquid than the set volume. If the quantity of liquid is less than the set volume, it may cause the liquid to spray into the main body, and the pipette may be damaged or deteriorate in its quality.

2) Press down the push button fully to the first stop position "b" (Fig. 3-3) – ①.
3) Hold the pipette vertically and immerse the tip 2mm. to 3mm. below the surface of the liquid (Fig. 3-3) - ①.
4) To aspirate the set volume of liquid into the tip, release the push button slowly and let the push button go back to the initial position naturally. It takes 1 second (up to 3 seconds for a volume of 5000μL, 10000μL) to aspirate the liquid. During this operation, stop to wait for the suction process of the liquid to be totally completed, making sure that the liquid is drawn up into the tip with certainty (Fig. 3-3) -②.
5) Draw the tip of the pipette carefully vertically upward and away from the liquid surface, then touch the tip to the side of the tube to remove excess droplet adhering to the outside of the tip (Fig. 3-3) - ③.

- ✓ Do not aspirate when the push button is at '2nd position' (Fig. 3-3).
- ✓ We recommend using the forward technique as the operation method of this device for pipetting. Nichipet Air has been calibrated with the forward method, and precision may not be obtained when dispensing by any other means.
- ✓ Always change the tip when using different liquids to avoid cross-contamination.

⚠ CAUTION

- ✓ Please operate the push button slowly and gently.
  Sudden release of the push button, can lead to the aspiration of the liquid into the nozzle cylinder; not only precise accuracy will not be obtained, but also the quality of the device will be impaired.
- ✓ When using the pipette, be sure to always attach and use a tip. Failure to do so, will lead to liquid entering the inside of the device's nozzle cylinder and cause serious malfunctions.
- ✓ Never turn the device sideways or upside down with liquid in the tip. Liquid can enter inside the device's nozzle cylinder, which can cause ※contamination and breakdown.

※Cross-contamination with the entered liquid remaining inside the main body of the device can also occur, when switching liquids thereafter.

3.3 Dispensing the liquid

1) Touch the end of the tip against the inside wall of the recipient tube at a slight angle. (Fig. 3-3) - ③
2) Press the push button down slowly and smoothly to the 1st stop. Wait for a second, then press the push button down to the 2nd stop to expel the last droplet of liquid from the tip (Fig. 3-3) - ④⑤.
3) Keep the push button compressed. Remove the last droplet by slightly touching and running the end of the tip up against the inner wall of the tube, then move the tip of the pipette vertically straight up and out of the tube.
4) Press the ejector button to detach the tip to dispose (Fig. 3-3) - ⑥.

- ✓ We recommend the tip to be disposed of after each use.
  Repeated use may lead to and result in; loss of accuracy, precision, and may lead to contamination/cross-contamination due to adhesion and deposits from prior use.

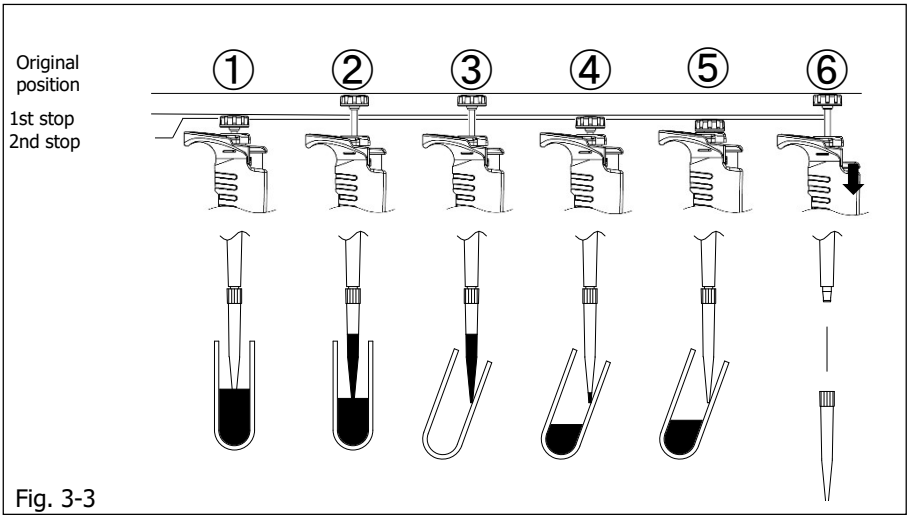


Fig. 3-3

3.4 Recommendation for accurate pipetting (Technique)

1) **Pre-Rinsing the tip**

Higher precision can be obtained by performing the pre-rinsing of the tip. When using a fresh pipette tip for the first time and before sampling, it is important to pre-rinse the tip at least two to three times with the target solution before pipetting. Repeat the aspiration and discharge to the position of the 1st stop consecutively for two to three times (Fig. 3-4).

When strict precision is required, this method is recommended for all kinds of liquid handling. Pre-rinsing is a fast and easy way to increase the accuracy.

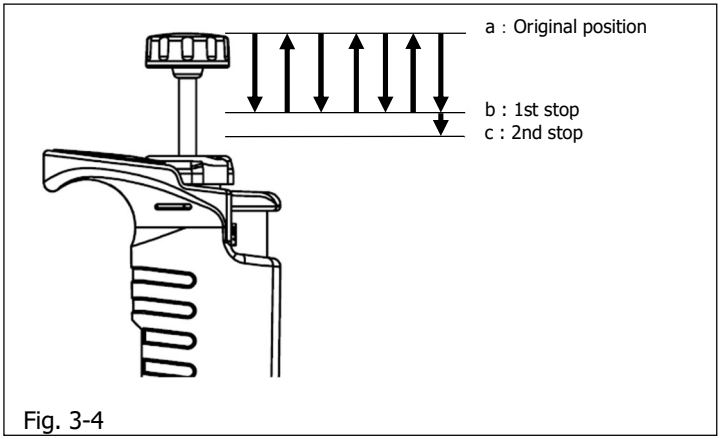


Fig. 3-4

2) **Handling of Viscous Solutions**

After aspirating the liquid into the tip, wait for more seconds than normal viscosity before removing the tip slowly from the surface of the liquid. When dispensing, wait 2 to 3 seconds at the first stop position before pushing into the second stop position (Fig. 3-3).

3) **Small volume dispensing**

Especially for volumes less than 50µL, please operate the pipette slowly and smoothly. Also, please pay close attention to the effect of evaporation loss, due to temperature and humidity.

4. Maintenance

4.1 Cleaning

When Nichipet EXIII's exterior is soiled, please use 70% ethanol on a clean soft cloth to wipe it off.
Also, if any symptom that is described in the "Troubleshooting" section occurs, disassemble and inspect the device (each part), and then check and follow the procedures in the 'Troubleshooting Table' to identify and isolate, correct and/or fix the situation or problem.

⚠ CAUTION

- ✓ Use of highly reactive liquids, may damage the device.
  After using a highly reactive liquid or/and if contamination occurs, perform the disassembly and cleaning of the device, accordingly to the following method in this manual.

ⓘ ✓ In order to keep and use Nichipet AIR in its best condition, we recommend the user carries out; periodic checks and maintenance, and volume inspection/calibration of the device.

4.1.1 Disassembling

1) Pulling out the ejector pipe (Fig.4-1)
   - 2µL-1000µL
     Turn the ejector pipe to the direction of the arrow while pushing the ejector button, and remove from the ejector connector to be pulled out.
   - 5000µL, 10000µL
     Turn the ejector pipe to the direction of the arrow to be matched the alignment mark, and pull it out.
2) Turn the nozzle cylinder('Nozzle securing nut' for 5000µL and 10000µL) to the direction of the arrow, and pull it out.(Fig. 4-1)

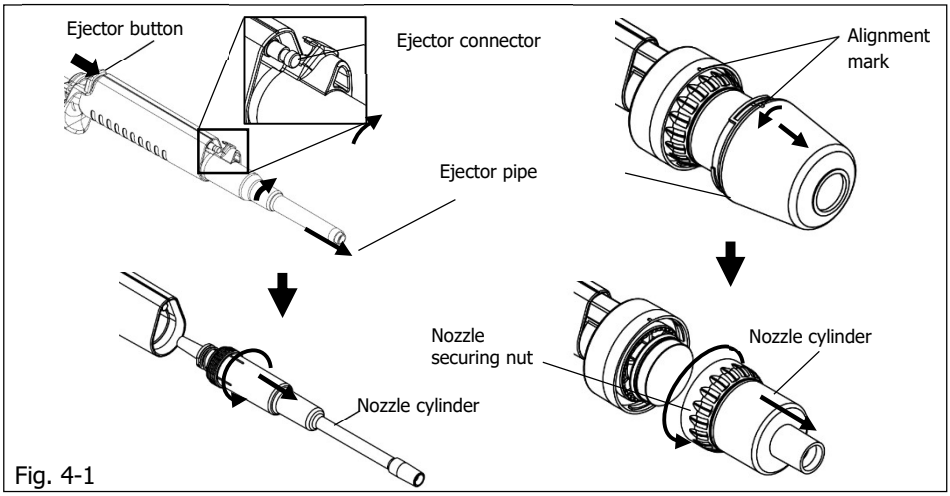


Fig. 4-1

⚠ CAUTION

✓ When removing the nozzle cylinder, disassemble it carefully, as the internal parts may pop out due to the action of the spring.

3) Take out each part as needed and accordingly.

- 2μL, 10μL:(Fig.4-2)
  Take out the plunger set, first spring, first spring retainer. (The hermetic part/airtight part is integrated with the nozzle cylinder. It cannot be disassembled furthermore.)
- 20μL : (Fig.4-3), 100μL : (Fig.4-4)
  Take out the plunger set, first spring, O-ring retainer and O-ring.
- 200μL : (Fig.4-5), 1000μL : (Fig.4-6)
  Take out the plunger set, first spring, first spring retainer, seal spring, O-ring retainer and O-ring.

ⓘ ✓ The shape of the O-ring retainer varies, depending on the volume type. Please be careful and refer to the figures for details.

2μL / 10μL

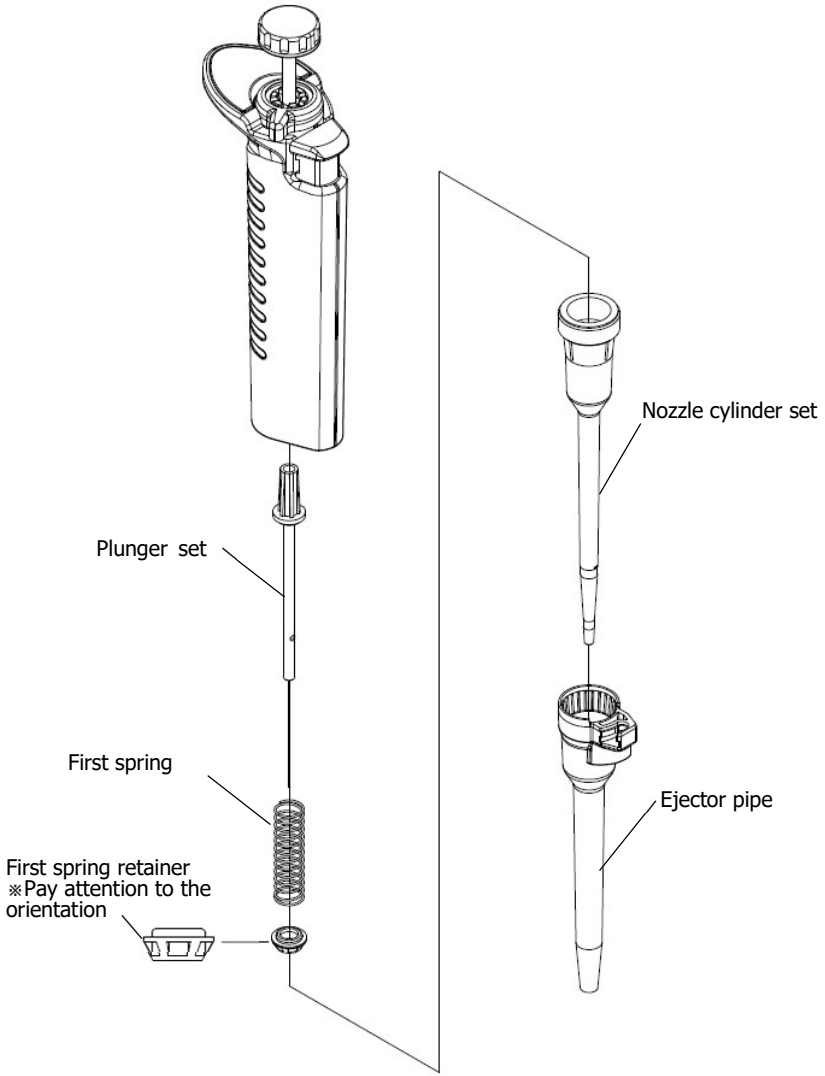


Fig. 4-2

20μL

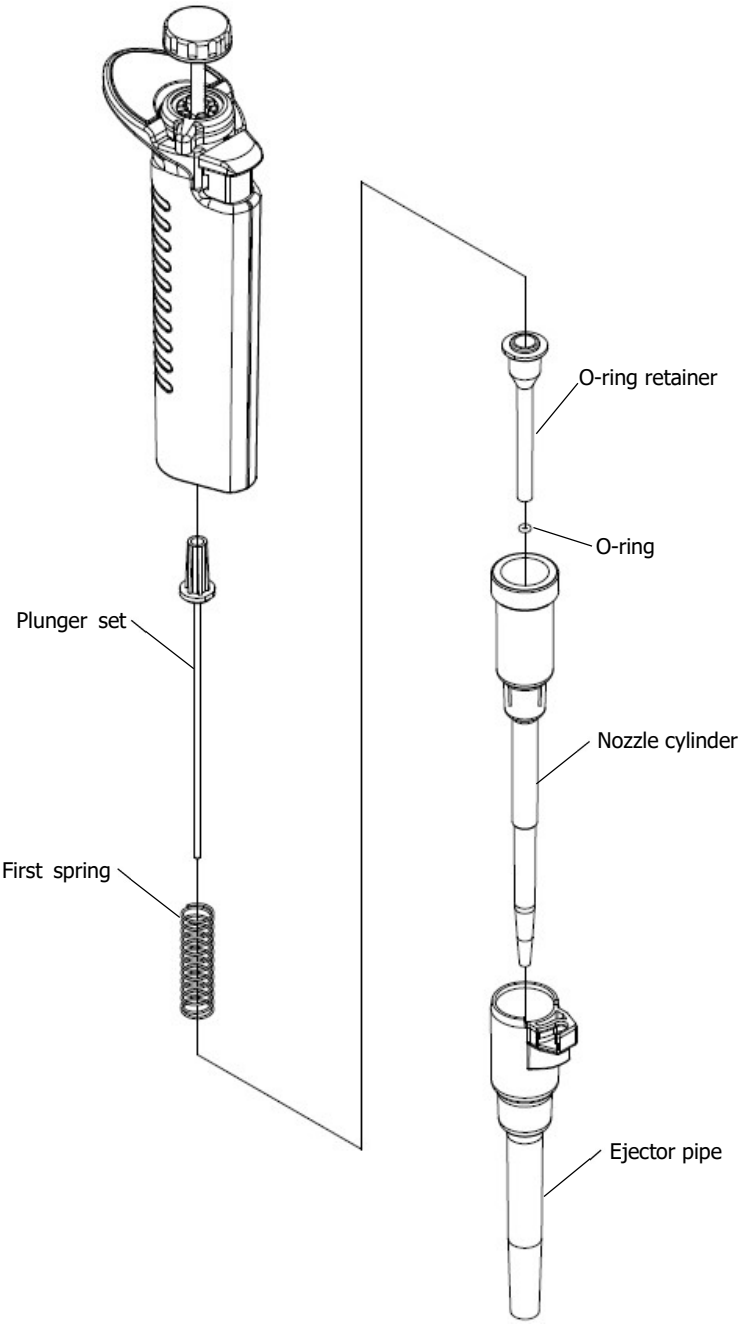

O-ring retainer
O-ring
Plunger set
Nozzle cylinder
First spring
Ejector pipe

Fig. 4-3

100μL

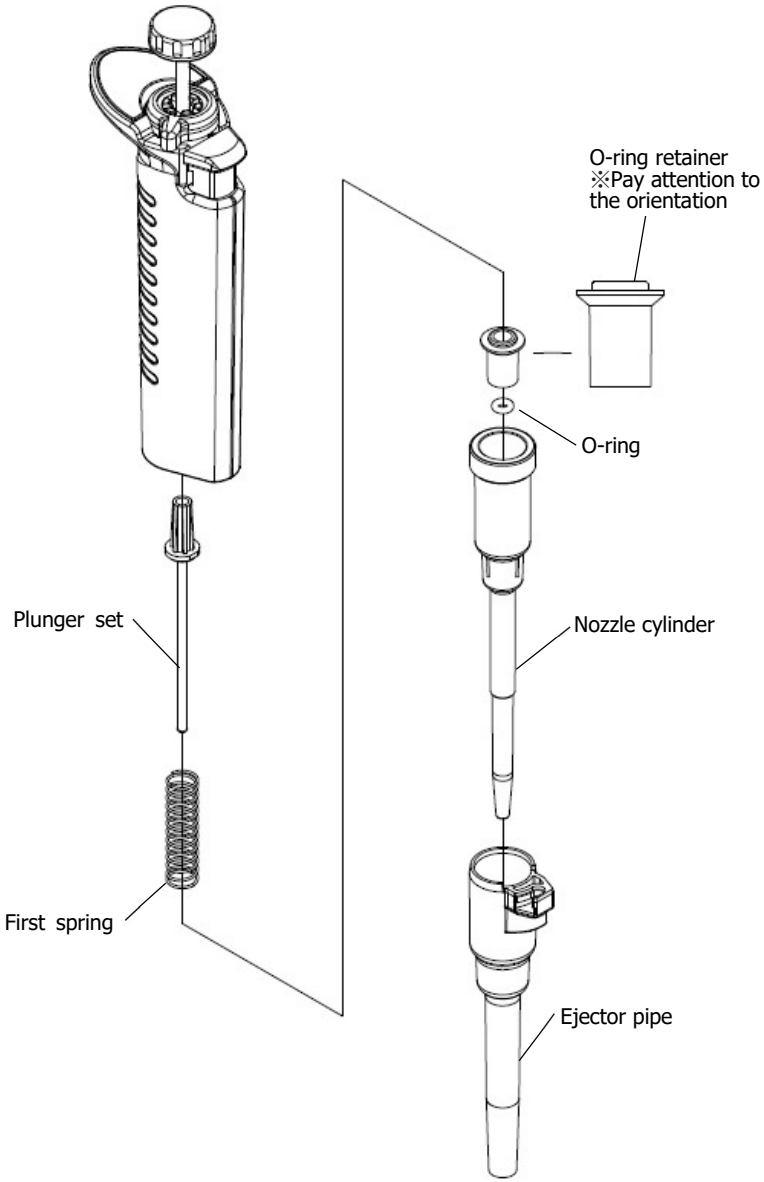

O-ring retainer
※Pay attention to
the orientation
O-ring
Plunger set
Nozzle cylinder
First spring
Ejector pipe

Fig. 4-4

200μL

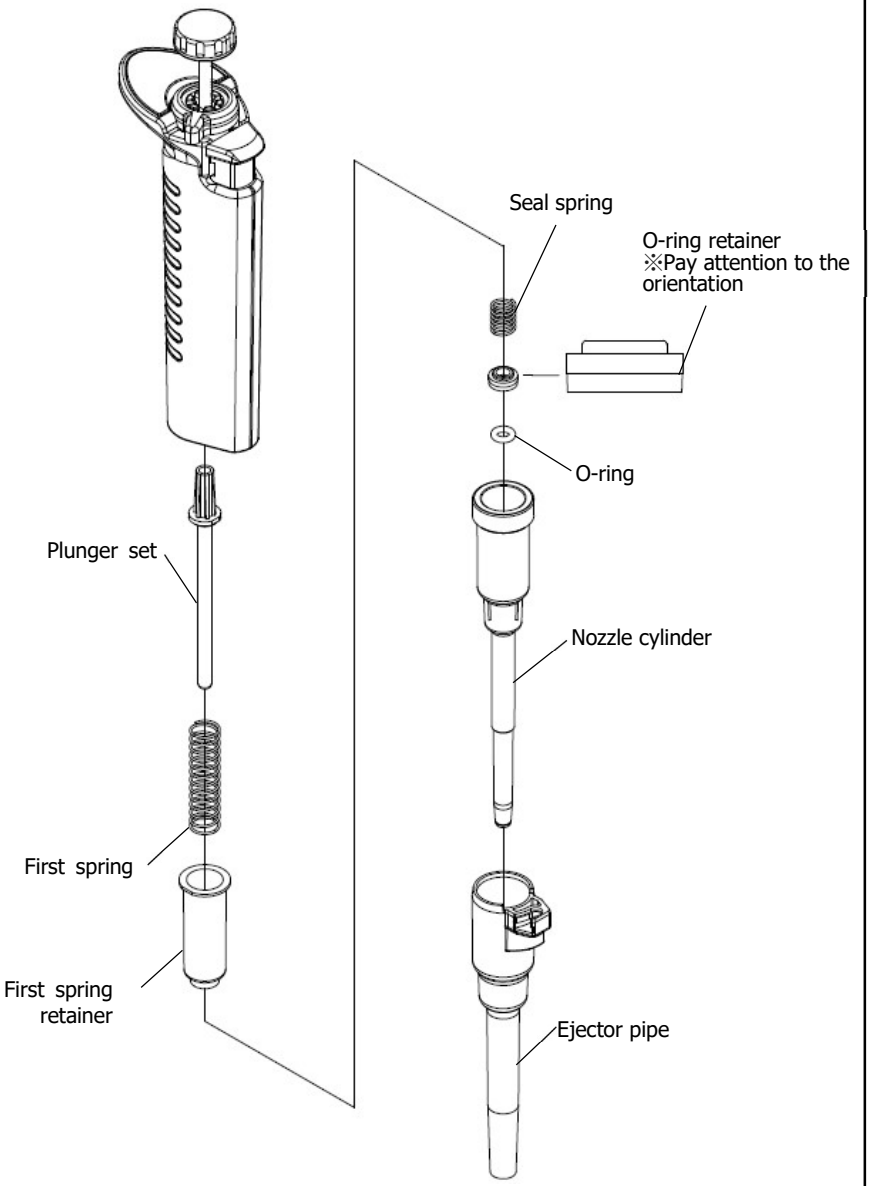

Seal spring
O-ring retainer
※Pay attention to the orientation
O-ring
Plunger set
Nozzle cylinder
First spring
First spring retainer
Ejector pipe

Fig. 4-5

1000µL

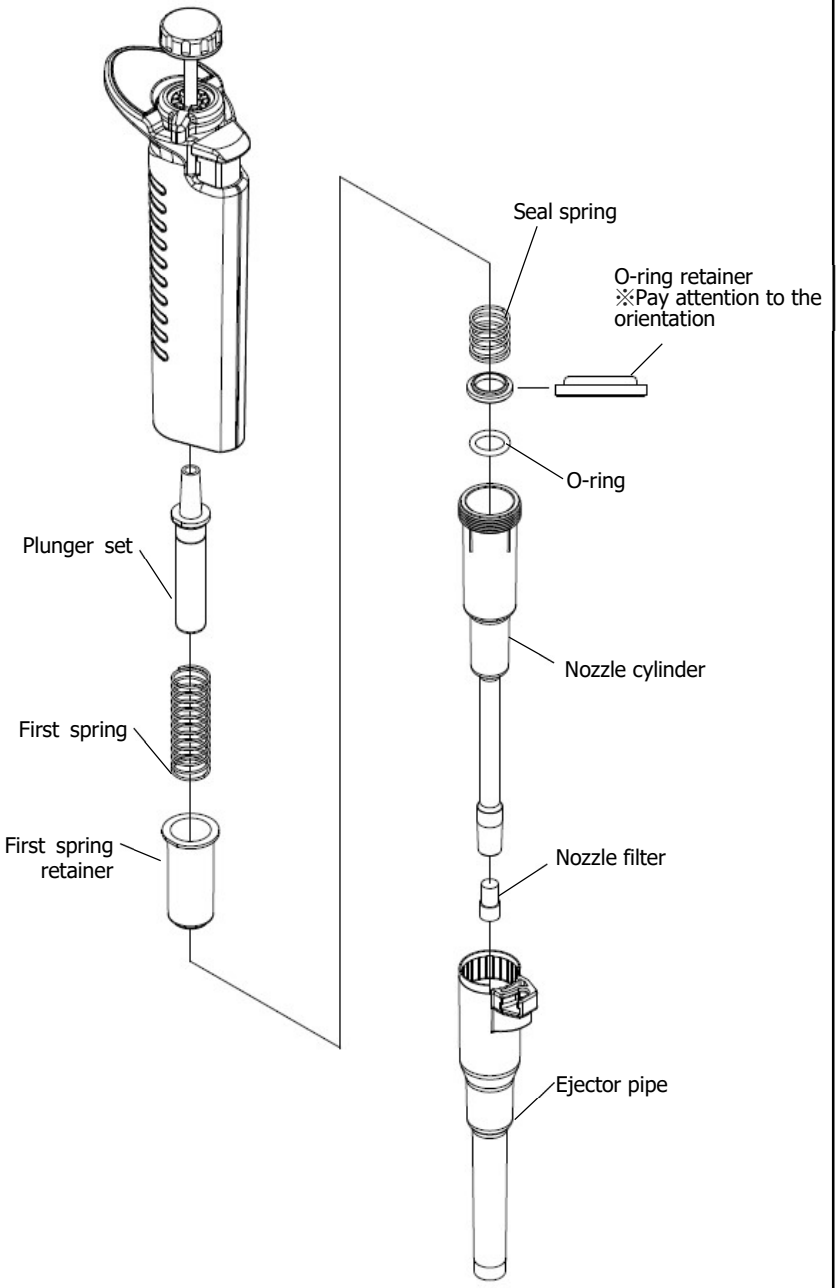


Fig. 4-6

5000μL / 10000μL

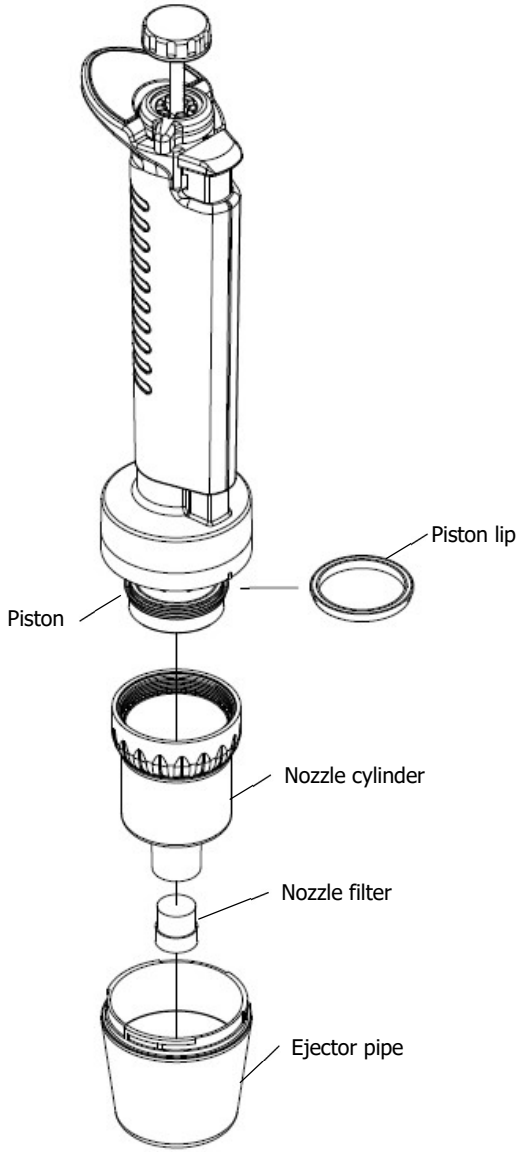


Fig. 4-7

4.1.2 Reassembling

1) Installation of the nozzle cylinder

- 2μL, 10μL : (Fig.4-2)
  Insert the parts in the order of the first spring and first spring retainer to the plunger set, and turn the nozzle cylinder set clockwise to be secured.
- 20μL : (Fig.4-3), 100μL : (Fig.4-4)
  Insert the parts in the order of the first spring, O-ring retainer and O-ring to the plunger set, and turn the nozzle cylinder set clockwise to be secured.
- 200μL : (Fig.4-5), 1000μL : (Fig.4-6)
  Insert the parts in the order of the first spring, first spring retainer, seal spring, O-ring retainer and O-ring to the plunger set, and turn the nozzle cylinder set clockwise to be secured.
- 5000μL, 10000μL : (Fig.4-7)
  Insert the piston to the nozzle cylinder set and turn the nozzle securing nut clockwise to be secured.

- ✓ When assembling, be careful not to make any mistakes in the order and the mounting orientation of the O-ring retainer and O-ring. If installed in an opposite way (upside down), airtightness cannot be maintained, causing malfunctions, such as, water leaks, accuracy errors, or liquids not being aspirated.
- ✓ When replacing the piston lip, be careful not to damage the piston lip. Also, pay attention to the correct mounting orientation. (Right-side up.)

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2) Attach the ejector pipe(Fig.4-8)

- 2μL-1000μL
  Attach the ejector pipe to the ejector connector while pushing ejector button.
- 5000μL, 10000μL
  Attach the ejector pipe so that the alignment marks are aligned, and turn it in the direction of the arrow to be fixed.

3) For the 1000μL, 5000μL, 10000μL types, the attached nozzle filter can be attached to the nozzle as required. Insert the nozzle filter firmly into the nozzle before use. (Fig. 4-9)

⚠ CAUTION

- ✓ Never directly touch nozzle filters that are contaminated with liquids that are harmful to the human body.

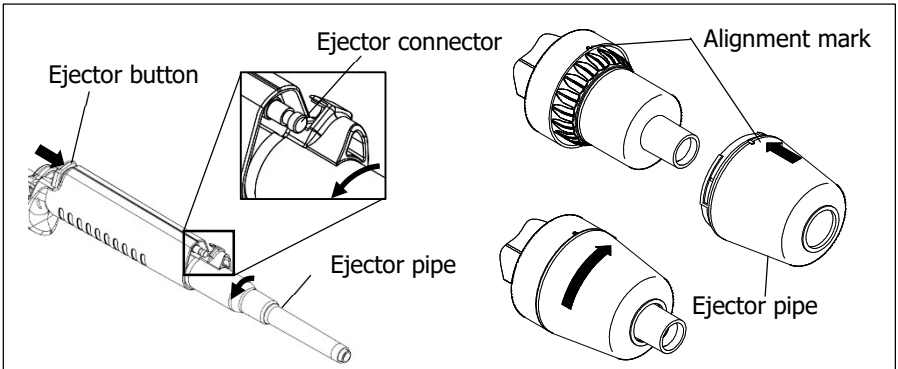

Fig. 4-8

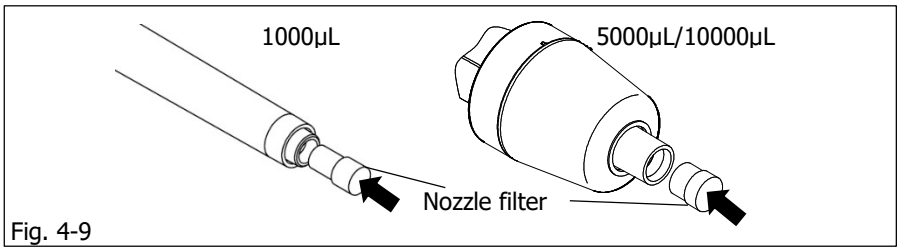

Fig. 4-9

4.1.3 Lubrication/Greasing

- 2μL-1000μL (Fig.4-10)
  Disassemble it according to '4.1.1 Disassembling', and apply a thin layer of the supplied grease to the designated area of plunger set.
- 5000μL, 10000μL (Fig.4-10)
  Apply a thin layer of the supplied grease to the designated area of inner part of the nozzle cylinder set.

⚠ CAUTION

✓ Be sure to only use the specified grease. Use of any other grease will void the warranty.

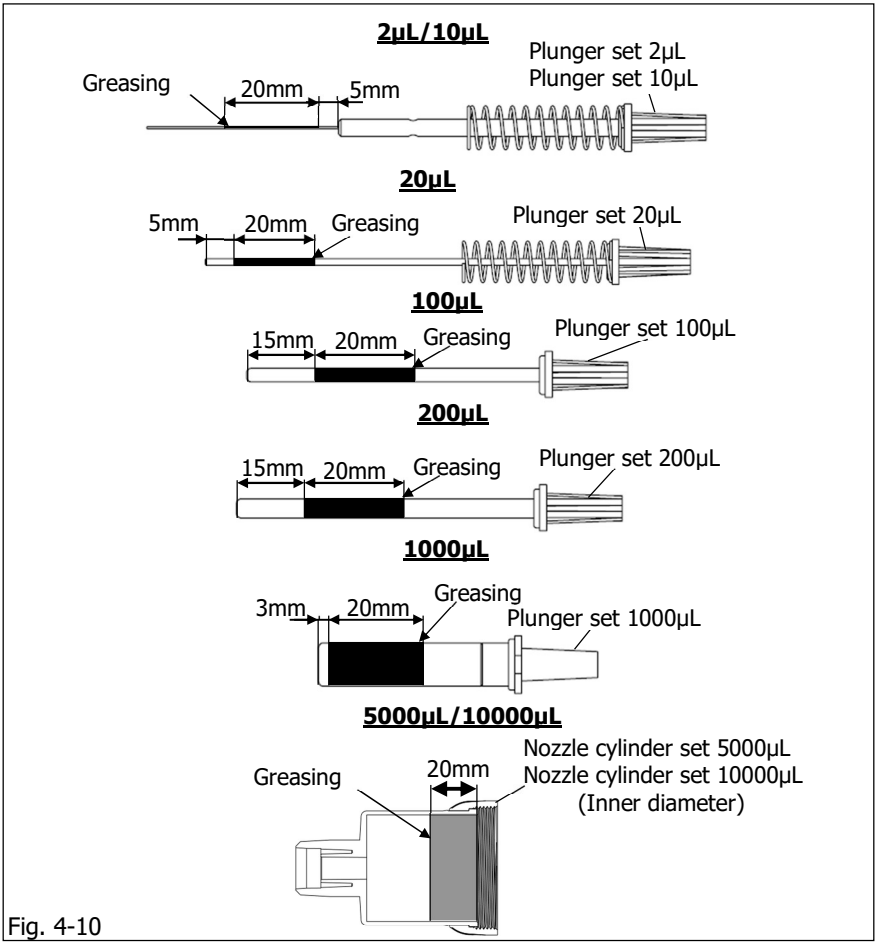

Fig. 4-10

4.2 Autoclaving

The whole pipette is autoclavable. Carry out the autoclaving process at 121°C for 20 minutes, following the procedure below.

4.2.1 Autoclave implementation procedure

1) For Models: 1000µL, 5000µL and 10000µL, remove the nozzle filter.
2) When autoclaving, always check and be sure to set the volume indicator to the 'Maximum Volume' of the pipette's volume range. (It is 1000µL in case of 1000µL model)
3) Start the autoclaving process. After autoclaving is done, please promptly dry out the pipette.

⚠ WARNING

✓ Due to high temperature and high pressure use in autoclave sterilization, it is very dangerous. Please operate equipment according to safety guidelines and standards.

⚠ CAUTION

✓ When autoclaving, do not stack items on top of each other, do not place the nozzle downward, or lean the device diagonally against anything, as this will apply load and stress to the heated structure.
Always autoclave the pipette with the nozzle facing upward and standing.
Although the pipette is made of autoclave compatible material, due to the high temperature and pressure used in the sterilizer, there is a risk that heated parts subjected to load and stress to deform.

✓ Do not autoclave at temperatures above 121°C (There is a risk of causing damage.)

4.2.2 Drying procedure

After autoclaving is done, please promptly dry out the pipette.
Use a blower type constant temperature dryer with the condition of 60°C 60 minutes.

1) Remove the ejector pipe according to '4.1.1 Disassembling'.
2) Loosen the nozzle cylinder('nozzle securing nut' for 5000µL and 10000µL) by making a half turn counterclockwise.
3) Put the disassembled parts into a blower type constant temperature dryer to be heated. Confirm these parts are completely dried out after heating.
4) After drying, confirm these parts have returned to room temperature, turn the nozzle securing nut clockwise to be fixed into the nozzle cylinder, and reattach the ejector pipe.

⚠ CAUTION

- ✓ Immediately after autoclaving and drying, the pipette and parts are extremely hot, so please do not touch them directly with your hands.
- ✓ When autoclaving, there is a possibility of damage, and performance may be affected, due to other items that are in the autoclave at the same time, and/or by substances that may be present in the water that is being used in the autoclave.
- ✓ Assembling the pipette in a heated or warm condition after drying, can lead to damage, such as stripping of the threads. Please let it cool down first. Also, if used in a heated or warm condition, accuracy will not be obtained.

ⓘ

- ✓ Accuracy and precision may change with the autoclaving conditions, and also with many other various factors. We recommend testing the accuracy and precision after autoclaving, and at other times when needed.

5. Specifications (Accuracy/Precision)

Table-1 Maximum Permissive Errors

Models (Code)	volume range	Volume(μL)	Accuracy (systematic error) Es (%)	Precision (random error) CV (%)
2μL (00-NPX3-2)	0.1～2 (μL)	0.2	±12.0*	≦6.0*
		1	±2.5	≦1.5
		2	±1.5	≦0.7
10μL (00-NPX3-10)	0.5～10 (μL)	1	±2.5	≦1.8
		5	±1.5	≦0.8
		10	±1.0	≦0.4
20μL (00-NPX3-20)	2～20 (μL)	2	±5.0	≦1.5
		10	±1.2	≦0.6
		20	±1.0	≦0.3
100μL (00-NPX3-100)	10～100 (μL)	10	±3.0	≦1.0
		50	±1.0	≦0.3
		100	±0.8	≦0.2
200μL (00-NPX3-200)	20～200 (μL)	20	±2.5	≦0.7
		100	±1.0	≦0.3
		200	±0.6	≦0.2
1000μL (00-NPX3-1000)	100～1000 (μL)	100	±3.0	≦0.6
		500	±1.0	≦0.2
		1000	±0.8	≦0.2
5000μL (00-NPX3-5000)	500～5000 (μL)	500	±2.4	≦0.6
		2500	±1.2	≦0.25
		5000	±0.6	≦0.15
10000μL (00-NPX3-10000)	1000～10000 (μL)	1000	±3.0	≦0.6
		5000	±0.8	≦0.2
		10000	±0.6	≦0.15

* The AC and CV of NPX3-2 below 0.2μL and NPX3-10 below 1μL depend on the sampling skill and the sampling condition where pipettes are used.

- Tips used: Premium Tip (BMT2)
- Measurement temperature: Between 20°C to 25°C
- Relative humidity: above 50%
- Measurement medium: distilled water
- Barometric pressure, 101kPa

Volume measurement is in accordance with ISO 8655-6.

6. Calibration (Adjustments)

Perform the volume adjustment, and volume inspection, by following the procedures detailed below.
If you want to adjust the volume yourself, we recommend that you record and manage the details of the adjustment.
Please note that when the customer adjusts the volume, the accuracy and precision of the volume, and subsequent malfunctions will not be covered by the warranty.

✓ The volume adjustment jig used for adjustments is not included with this product. If necessary, please contact us.

6.1 Volume adjustment method

First, adjust the volume with the minimum volume for each model.
E.g. (100 µL for the 1000 µL model).
Confirm that the volume accuracy of the minimum volume is within the numerical value compared to the standard accuracy table. (Table-1)
Then proceed in order, to check the volume accuracy of the maximum volume.

<Procedure>

1) Measure the volume adjustment value in advance (The actual volume dispensed is the volume that is to be used for volume adjustment.) by the volume inspection method described in the next section. It is recommended to use the average value of multiple measurements in consideration of measurement deviation.

※ (Example) The following describes an example in which the volume setting of the pipette is 100 µL, and the actual measured dispensing volume is "95 µL".

2) Unlock the lock lever, and set the volume approx. 50% of the maximum volume. (Fig. 6-1)

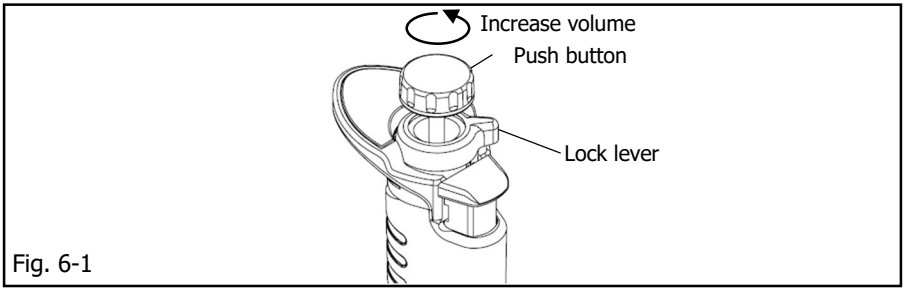

Fig. 6-1

3) Set the front edge of the volume adjustment tool to the groove portion of the adjustment screw.

4) Hold the pipette in one hand so as not to rotate the volume adjustment tool, and rotate the push button clockwise to decrease the volume for 5µL with watching the volume indicator. (In case the actual measured dispensing volume is more than 100 µL, it shall be rotated counterclockwise) (Fig. 6-2)

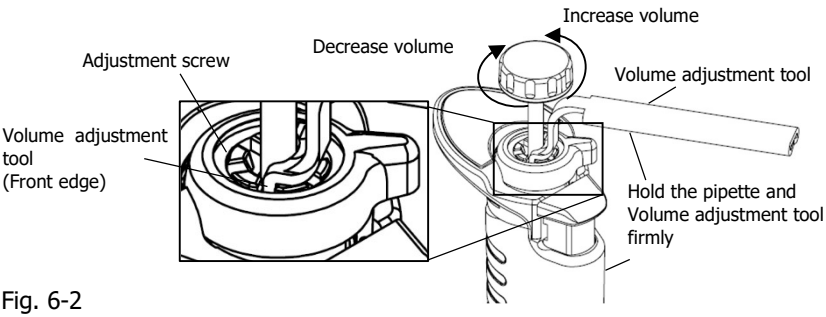

Fig. 6-2

6.2 Volume measurement/Inspection procedure

1) In order to avoid influence from temperature differences, ready the pipettes for inspection, the distilled water, the balance and tips 2 to 3 hours before use, in the environ where the measurement is to be conducted to attain temperature equilibrium.
※ The measurement room should be in a controlled temperature between 20°C to 25°C, and the measurement should be held where there is no direct influence from wind blowing from an air-conditioner, heater or fan.

   Please use the Nichiryo Original Premium Tip Series (volume compatible ones), and be sure to install it on the pipette from the rack.

2) Using distilled water as the sample, aspirate and dispense the volume to be calculated inside the weighing vessel on the balance. Please use a vessel with a lid for the weighing vessel inside the balance. Also, include a small amount of distilled water in the vessel, prior to adjusting the balance and measurement.

3) Read the mass (mg) measured with the balance, and then convert it with the "Z correction Factor for Distilled Water[table3]" to obtain the dispensed measured volume (μL).

$$V_i = m_i \times Z$$

V_i : Volume
m_i : Measured mass
Z : Z correction factor

4) Add together the 10 volumes delivered and divide the sum by 10 to provide the mean volume.

$$\overline{V} = \frac{1}{10} \times \sum_{i=1}^{n} V_i$$

$\overline{V}$: Mean volume

5) Calculate the systematic error e_s [%] with the equation below.

$$e_s = 100 \times \frac{\left(\overline{V} - V_s\right)}{V_s}$$

e_s : systematic error [%]
V_s : selected volume

6) Calculate the random error CV [%] with the equation below. Where n is the number of measurements, in this case n=10 .

$$\mathrm{CV} = \frac{100}{\overline{V}} \times \sqrt{\frac{\sum_{i=1}^{n}\left(V_i - \overline{V}\right)^2}{n-1}}$$

CV : random error [%]

Table-3 Z correction factor for distilled water (Mass / Volume Conversion Factor)

Temperature (°C)	Air Pressure (kPa)			
	95.0	100.0	101.3	105.0
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
24.0	1.0037	1.0037	1.0038	1.0038
24.5	1.0038	1.0039	1.0039	1.0039
25.0	1.0039	1.0040	1.0040	1.0040

7. Troubleshooting

Symptom	Possible cause	Remedy
Tip cannot be ejected.	The nozzle cylinder(2-1000μL) or nozzle securing nut(5000, 10000μL) are loose	Tighten up the nozzle cylinder(2-1000μL) or nozzle securing nut(5000, 10000μL) securely
	The ejector pipe is loose	Replace the ejector pipe correctly.
Pipette fails to aspirate liquid.	Nozzle tip is clogged (Foreign matter adhered)	Clean or replace nozzle cylinder parts
	The nozzle cylinder(2-1000μL) or nozzle securing nut(5000, 10000μL) are loose	Tighten up the nozzle cylinder(2-1000μL) or nozzle securing nut(5000, 10000μL) securely
	O-ring and O-ring retainer are assembled in reverse order	Replace the O-ring and O-ring retainer by following the instruction on this manual.
	Grease in the hermetic part/ airtight part is depleted	Apply grease by following the instruction on this manual.
	Filter is soaked with liquid(1000μL or more)	Replace the filter with a new one (supplied as a standard accessory, or purchase a filter set for replacement).
Extracted liquid leaks from the tip.	The tip is loosely attached.	Reattach the same loosened tip, or with a new one firmly.
	Grease in the hermetic part/ airtight part is depleted	Apply grease by following the instruction on this manual.
	The nozzle cylinder(2-1000μL) or nozzle securing nut(5000, 10000μL) are loose	Tighten up the nozzle cylinder(2-1000μL) or nozzle securing nut(5000, 10000μL) securely
	The nozzle is loose	Replace the nozzle cylinder set
	The O-ring is loose	Replace the O-ring. ※Replace the nozzle cylinder set for 2μL and 10μL.
Push button moves stiffly.	The liquid has aspirated and leaked inside the nozzle cylinder.	If the push button does not work well after dispensing, or it is sticking to the body, disassemble the pipette and wash/clean every part (or wipe down every part with a soft cloth). If some parts get rusty or corroded inside the body, replace the part(s) with new one(s).
	Grease in the hermetic part/ airtight part is depleted	Apply grease by following the instruction on this manual.

✓ When the pipette cannot be fixed after examining and conducting the above mentioned procedure, immediately stop using the pipette and ask us or our agent to repair it.
Before bring the pipette for repair, be sure to check whether it has been contaminated with microbes, and/or harmful or toxic substance. Otherwise, it cannot be undertaken the repair.

8. Replacement parts list

8.1 Consumables

● Premium Tip (Bulk tip, Autoclavable)

Code	Applicable models	Length of tip (External size)	Q'ty
00-BMT2-UT	2μL, 10μL	31.5mm	1000
00-BMT2-SG	20μL, 100μL, 200μL	53.0mm	1000
00-BMT2-LG	1000μL	81.9mm	1000
00-BMT2-X	5000μL	132.0mm	200
00-BMT2-ZS	10000μL	171.2mm	200

● Premium Tip (Racked tip, Autoclavable)

Code	Applicable models	Q'ty
00-BMT2-UTWR2	2μL, 10μL	960 (96pcs x 10 cases)
00-BMT2-SGR2	20μL, 100μL, 200μL	960 (96pcs x 10 cases)
00-BMT2-LGR2	1000μL	960 (96pcs x 10 cases)
00-BMT2-XR	5000μL	100 (50pcs x 2 cases)
00-BMT2-ZSR	10000μL	80 (40pcs x 2 cases)

8.2 Spare parts list

Code	Replaced parts name	Remarks	Volume
00-NX3-DK2	First spring set	First spring, First spring retainer	2μL
00-NX3-ABC2	Nozzle cylinder set	O-ring and O-ring retainer included	2μL
00-NX3-E2	Ejector pipe	————————	2μL
00-NX3-DK10	First spring set	First spring, First spring retainer	10μL
00-NX3-ABC10	Nozzle cylinder set	O-ring and O-ring retainer included	10μL
00-NX3-E10	Ejector pipe	————————	10μL
00-NX3-D20	First spring	————————	20μL
00-NX3-A20	Nozzle cylinder	————————	20μL
00-NX3-BC20	O-ring set	O-ring, O-ring retainer	20μL
00-NX3-E20	Ejector pipe	————————	20μL
00-NX3-D100	First spring	————————	100μL
00-NX3-A100	Nozzle cylinder	————————	100μL
00-NX3-BC100	O-ring set	O-ring, O-ring retainer	100μL
00-NX3-E100	Ejector pipe	————————	100μL
00-NX3-DK200	First spring set	First spring, First spring retainer	200μL
00-NX3-A200	Nozzle cylinder	————————	200μL
00-NX3-BCG200	O-ring set	O-ring, O-ring retainer, Seal spring	200μL
00-NX3-E200	Ejector pipe	————————	200μL
00-NX3-DK1000	First spring set	First spring, First spring retainer	1000μL
00-NX3-A1000	Nozzle cylinder	————————	1000μL
00-NX3-BCG1000	O-ring set	O-ring, O-ring retainer, Seal spring	1000μL
00-NX3-E1000	Ejector pipe	————————	1000μL
00-NX3-F1000	Nozzle filter	10 pcs	1000μL
00-NX3-A5000	Nozzle cylinder set	————————	5000μL
00-NX3-E5000	Ejector pipe	————————	5000μL
00-NX3-A10000	Nozzle cylinder set	————————	10000μL
00-NX3-E10000	Ejector pipe	————————	10000μL

Code	Replaced parts name	Remarks	Volume
00-NX3-F15000	Nozzle filter	10 pcs	5000μL、10000μL
00-NX3-GRS	Grease	———————	All
00-NX3-AT	Volume adjustment tool	———————	All

Please note that the specifications of the accessories may be changed without notice.
Always check our website for the latest specifications and information.

Inspection and Calibration Statement

The enclosed pipette was tested and calibrated under closely controlled environmental conditions to ensure that it meets published calibration specifications. The precision and accuracy results obtained for this pipette are provided on the enclosed calibration certificate. Because temperature and humidity conditions affect the calibration results of liquid measurement devices, your pipette should be calibrated under conditions of use. The calibration results obtained in your laboratory may vary from our results, due to differences in the environmental testing conditions.

Information on repair or servicing, when contacting your local distributor.

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EC REP

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