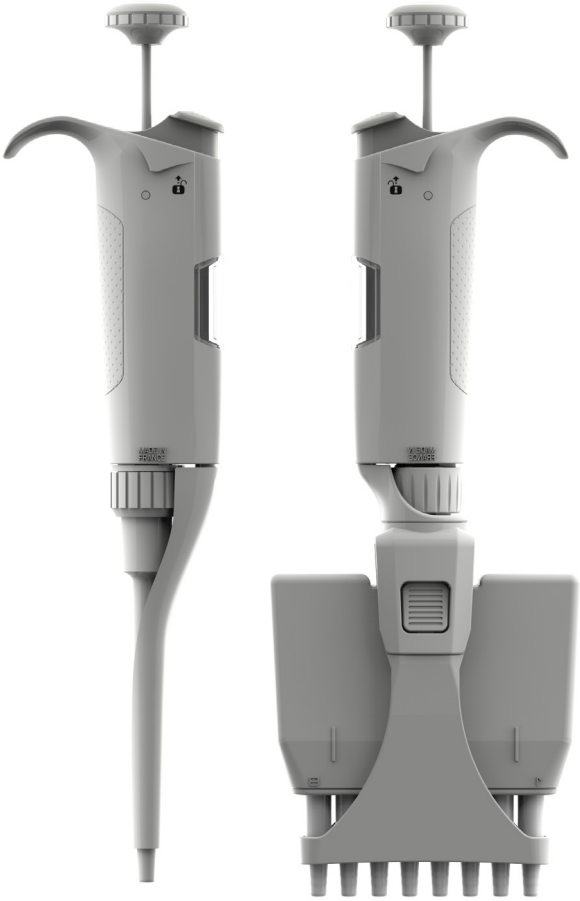
DKSH

USER'S GUIDE



LabPRO

MICROPIPETTE

DKSH

Contents Page

1 - INTRODUCTION

The LabPRO pipette is an air displacement mechanism and is used with disposable pipette tips.

This pipette line provides:

- Light and comfortable body
- Low pipetting forces ensuring ergonomics and users' well-being
- Unique patented Lock/Unlock mecanism for results you can trust

Eight single channel models cover a volume range from 0.2 µL to 10 mL.

Eight multichannel models (4 x 8-ch and 4 x 12-ch) cover a volume range from 0.5 µL to 300 µL.

2 - PARTS CHECK LIST

Just take a moment to verify that the following items are present:

Single models

- LabPRO Pipette,
- User's Guide,
- Certificate of conformity,
- Calibration Key.
- Tip-ejector extention for 10µl only

Multichannel models

- LabPRO Pipette,
- User's Guide,
- Ejector spacer for short collar tips (only for multi-channels models 10 µL),
- Certificate of conformity,
- Calibration key.

3 - DESCRIPTION

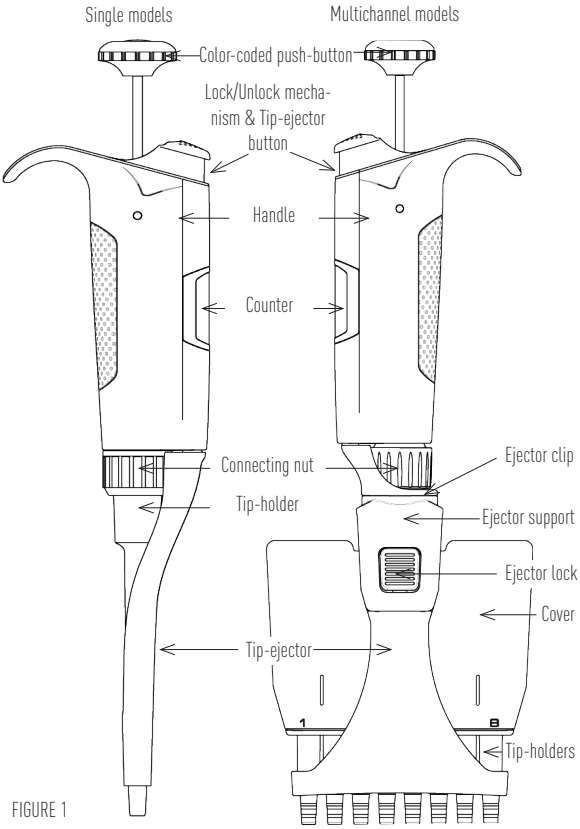


FIGURE 1

For 2µl and 10µl Single channel models, a tip-ejector extention is supplied to fit **with short tips models.**

To fit the tip-ejector extention:

1. Slide the extention over the tip-holder
2. Push the extention firmly onto the end of the tip-ejector until it clicks into place

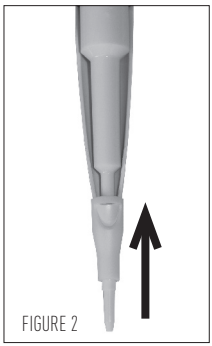


FIGURE 2

To remove the tip-ejector extention:

1. Gently twist the extention
2. Pull it away from the pipette

Ejector spacer for Multichannel models (X10µl only)

Multichannel models fit with long collar tips. If you use short collar tips, you might have to insert the ejector spacer especially indicated for that:

- Remove the tip-ejector, keep both ejector locks depressed; pull the tip-ejector down.
- Insert the broad ejector spacer and click it to the tip-ejector.
- To refit the tip-ejector, gently re-insert the tip-ejector vertically into the rails of the ejector support.

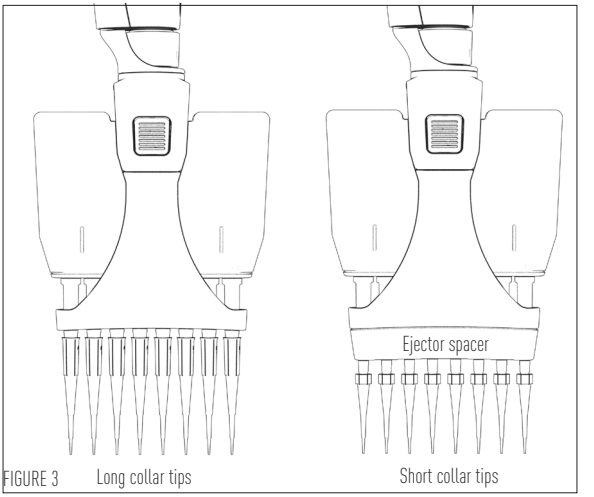
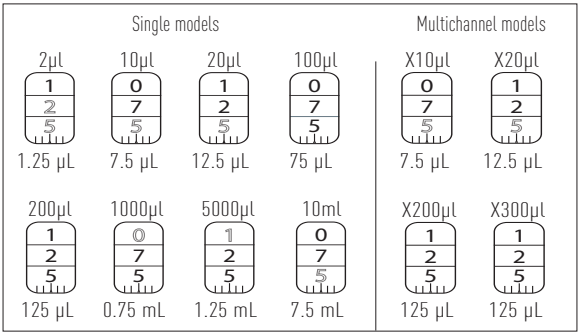


FIGURE 3

4 - SETTING THE VOLUME

The volume of liquid to be aspirated is set using the volumeter. The digits are colored either black or green to indicate the position of the decimal point, depending on the model (see examples below).



MODEL	Color of volumeter digits		
	Black	Green	Increment
2µl	µL	0.01 µL	0.002 µL
10µl to 20µl	µL	0.1 µL	0.02 µL
8X-10µl, 8X-20µl 12X-10µl, 12X-20µl	µL	0.1 µL	0.02 µL
100µl, 200µl, 8X-200µl, 12X-200µl	µL	-	0.2 µL
8X-300µl, 12X-300µl	µL	-	0.2 µL
1000µl	0.01 mL	mL	0.002 mL
5000µl	0.01 mL	mL	0.002 mL
10 mL	mL	0.1 mL	0.02 mL

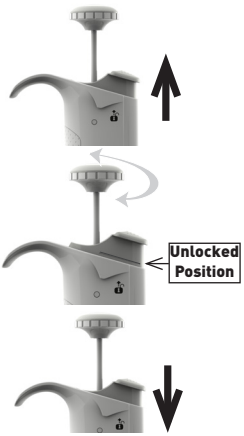
Lock system:

For trusted results, the volume selection is lockable.

❶ First step, unlock the tip-ejector button by pushing it up

❷ Second step, the volume is set by turning the push button

❸ Third step, push down the tip-ejector button.
The selected volume is locked.



To obtain maximum accuracy when setting the volume, proceed as follows:

→ when **decreasing** the volume setting, slowly reach the required setting, making sure not to overshoot the mark.

→ when **increasing** the volume setting, pass the required value by 1/3 of a turn and then slowly decrease to reach the volume, making sure not to overshoot the mark.
→ To adjust perfectly the last digit, it is even more precise to do so on the Lock position.

5 - USER ADJUSTMENT

The calibration of the LabPRO Pipettes has been performed with distilled water and very high precision volumetric instruments. Adjusting the pipette can be necessary for different solutions due to their density, viscosity, surface tension and/or vapor pressure etc. Calibration is sometimes recommended when it is used in high altitudes or with special tips. It can also be recalibrated when long pipette tips are used. Performance testing should take place in a draught-free room at 15-30°C, constant to ± 0.5°C and humidity above 50%.

To adjust the volume setting:

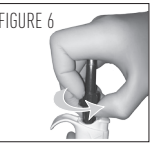
1. Remove the push button.
2. Use the calibration key to take off the block cover.

a. Insert the metal rod into the calibration tool on the hexagonal side.
b. Engage the two rectangular hooks of part 2 into the two holes of the block cover. You should feel them clipped on firmly in the hidden part of the pipette (see figure 5).

FIGURE 5

c. Make sure to hold the part 1 at the top cap, along the part 2.
d. Turn the part 2 counterclockwise slowly to remove the block cover (see figure 6).
Put the block cover apart.

FIGURE 6



3. Use the calibration key to adjust the pipette
   a. Insert the metal rod into the calibration key on the circle tip side (see figure 7). Lock it into place. You should feel the internal part of the calibration key clamped and clipped on firmly. If it is not the case, turn it counterclockwise slowly. Then, turn the plastic connecting nut of the part 1 slowly until it's locked in place (see figure 8).
   b. Hold the connecting nut of the part 1 with one hand and turn the part 2 with the other one according to the correction needed (see figure 9).

FIGURE 7

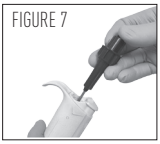


FIGURE 8

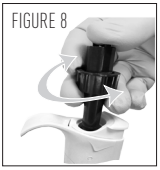
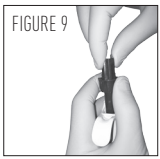


FIGURE 9



4. Once the desired volume is set, remove the calibration key and put back the block cover using the hexagonal side. Turn it clockwise to lock the block cover. Put back the push button.

With reference water, one revolution (1/8 turn of the calibration tool) of the volume setting corresponds to:

Volume range	Vol. per 1/8 turn (equivalence in µL)
2µl	0.012 i.e: 1 full turn is 0.096
10µl	0.047
20µl	0.120
100µl	0.48
200µl	1.20
1000µl	4.75
5000µl	23.8
10ML	48
8X-10µl 12X-10µl	0.058
8X-20µl 12X-20µl	0.120
8X-200µl 12X-200µl	1.20
8X-300µl 12X-300µl	1.90

6 - PIPETTING

Fitting the tips

LabPRO pipettes have been designed to fit universal tips.

Pre-rinse the tips

Some liquids (e.g.protein-containing solutions and organic solvents) can leave a film of liquid on the inside wall of the tip; pre-rinse the tip to minimize any errors that may be related to this phenomenon.

Pre-rinsing consists of aspirating the first volume of liquid and then dispensing it to waste. Tips will not fall off nor will they have to be manually positioned.
Make sure first that the pipette is calibrated with the tips that you are using. Then, subsequent volumes that you pipette will have levels of accuracy and precision within specifications. Using other tips may require a validation of the pipetting system.

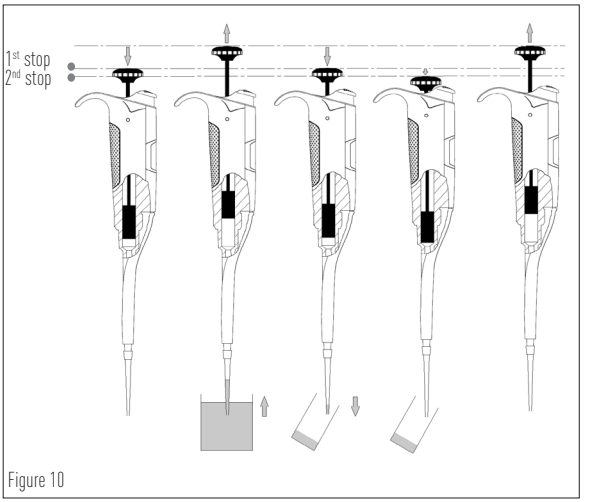


Figure 10

Aspirate

1. Press the push-button to the **first stop** (this corresponds to the set volume of liquid).

2. Hold the pipette vertically and immerse the tip in the liquid (see immersion depth table, page 10).
   Release the push-button slowly and smoothly (to top position) to aspirate the set volume of liquid. Wait one second (time depends on model, see table page 10); then withdraw the pipette tip from the liquid.

You may wipe any drop lets away from the outside of the tip using a medical wipe, however if you do so take care to avoid touching the tip's orifice.

✏ *For the multichannel models, use a reagent reservoir.*

Dispense

1. Place the end of the tip against the inside wall of the recipient vessel (at an angle of 10° to 40°).
2. Press the push-button slowly and smoothly to the **first stop**.
3. Wait for at least a second, then press the push-button to the **second stop** to expel any residual liquid from the tip.

   Keep the push-button pressed fully down and (while removing the pipette) draw the tip along the inside surface of the vessel.
4. Release the push-button, smoothly. Eject the tip by pressing firmly on the tip-ejector button.

✏ *For the multichannel models, use a reagent reservoir.*

7 - GENERAL GUIDELINES FOR GOOD PIPETTING

1. Make sure that you operate the push-button slowly and smoothly.
2. When aspirating, keep the tip at a constant depth below the surface of the liquid (refer to the table).
3. Change the tip before aspirating a different liquid, sample, or reagent.
4. Change the tip if a droplet remains at the end of the tip from the previous pipetting operation.

Table Immersion Depth and Wait Time

Model	Immersion Depth (mm)	Wait Time (seconds)
2µl	1	1
10µl	1	1
20µl	2-3	1
100µl	2-4	1
200µl	2-4	1
1000µl	2-4	2-3
5000µl	3-6	4-5
10mL	5-7	4-5
8X-10µl, 12X-10µl	1	1
8X-20µl, 12X-20µl	2-3	1
8X-200µl, 12X-200µl	2-3	1
8X-300µl, 12X-300µl	2-4	1

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

6. Liquid should **never** enter the tip-holder; 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.

7. If you use the same tip with a higher volume, pre-rinse the tip.

8. For volatile solvents you should saturate the air-cushion of your pipette by aspirating and dispensing the solvent repeatedly before aspirating the sample.

9. When the pipetted liquid is not at room temperature, pre-rinse the tip several times before use.

10. You may remove the tip-ejector (see chapter 12 - Maintenance) to aspirate from very narrow tubes.

11. After pipetting acids or other corrosive liquids that emit vapors, remove the tip-ejector, the tip-holder, rinse, dry and lubricate the piston (see chapter 12 - Maintenance).

12. Do not pipette liquids having temperatures above 70°C or below 4°C. The pipette can be used between +4°C and +40°C but the specifications may vary according to the temperature (refer to the ISO8655-2 standard for conditions of use).

✏ *Pipettes should be held in the vertical position.*

8 - ACCESSORIES

To avoid the possibility of liquid running back into the pipette, store the pipette vertically.

To identify or personalize your pipette, identification clips are available:

Identification clips (mixed colors set of 10)	FE07060
Identification clips (red, set of 10)	FE07061
Identification clips (yellow, set of 10)	FE07062
Identification clips (green, set of 10)	FE07063
Identification clips (blue, set of 10)	FE07064
Identification clips (white, set of 10)	FE07065

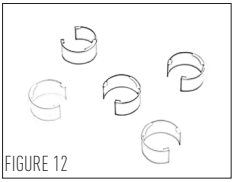


FIGURE 12

9 - GLP FEATURES

The Serial Number is engraved on the body of the pipette. It provides a unique identification of the pipette and the manufacturing date. Example: 15A1425

To know the specific details about your pipette, see the table.

The Bar Code on the box and the certificate of conformity provide traceability of your pipette.

Year /CODE	Month/CODE	NUMBER (example)
2015/15	January/A	0001
2016/16	February/B	0325
2017/17	March/C	0500
2018/18	April/D	0750
2019/19	May/E	1000
2020/20	June/G	1300
2021/21	July/H	1600
2022/22	August/J	2000
2023/23	September/K	2400
2024/24	October/L	2600
2025/25	November/M	2800
2026/26	December/N	3000

10 - TROUBLESHOOTING

A quick inspection of the pipette may help you to detect a problem.

The following tables may help you to identify and correct the problem you might encounter.

For any other symptom or if you can't solve the problem, please contact your supplier.

For single models

Symptom	Possible Cause	Action
Pipette is leaking sample	Damaged tip-holder	Replace the tip-holder
	Worn O-ring or seal	Replace both parts and lubricate
Pipette won't aspirate	Worn O-ring	Replace both parts and lubricate
	Damaged tip-holder	Replace the tip-holder
	Connecting nut is loose	Tighten connecting nut
	Damaged or corroded piston	Return pipette to supplier
	Improper repair or assembly	See Chapter 12 - Maintenance
Pipette is inaccurate	Improper repair or assembly	See Chapter 12 - Maintenance
	Unscrewed tip-holder	Tighten connecting nut
	Connecting nut is loose	Tighten connecting nut
Pipette is not precise	Tip-holder is loose	Tighten connecting nut
	Connecting nut is loose	Tighten connecting nut
	Incorrect operator technique	Operator training
	Damaged or corroded piston(s)	Return pipette to supplier
	Damaged tip-holder(s)	Replace the tip-holder
	Worn O-ring or seal	Replace both parts and lubricate
Tips fall off or do not fit correctly	Low quality tips	Use good quality tips to have optimum results of the pipetting system
	Dirty tip-holder	Clean the tip-holder with isopropanol or ethanol
	Damaged tip-holder(s)	Replace the tip-holder
	Damaged tip-ejector	Replace tip-ejector
	The tip-ejector is loose	Assemble the tip-ejector properly
	The ejector lock is misaligned	Align the ejector lock
Pipetting seize up	Piston need lubricant	Lubricate piston assembly

For Multichannel models

Symptom	Possible Cause	Action
Tips fall off or do not fit correctly	Low quality tips	Use good quality tips to have optimum results of the pipetting system
	Tip-ejector damaged	Replace tip-ejector
	Ejector spacer damaged	Replace ejector spacer
	Dirty tip-holder	Clean them with ethanol or isopropanol
	Damaged tip-holder	Contact your local supplier
Pipette won't aspirate	Connecting nut is loose	Tighten connecting nut
Pipette is inaccurate	Connecting nut is loose	Tighten connecting nut
Pipette is not precise	Connecting nut is loose	Tighten connecting nut
	Incorrect operator technique	Operator training

11 - LEAK TEST

This test may be performed at any time to check that the pipette does not leak, especially after performing a maintenance or sterilization procedure. If a pipette fails this test, replace the O-ring and seal. After making sure that the pipette is correctly reassembled, repeat this test.

For the 2µl to 200µl Single channel models:

1. Fit Pipette Tips.
2. Set the pipette to the maximum volume given in the specifications, and pre-rinse.
3. Aspirate the set volume from a beaker of distilled water.
4. Maintain the pipette in the vertical position and wait for 20 seconds.
5. If a water droplet appears at the end of the tip there is a leak.
6. If you see no droplet, re-immerse the tip below the surface of water.
7. The water level inside the tip should remain constant; if the level goes down there is a leak.

For the 1000µl, 5000µl and 10mL Single channel models:

1. Fit Pipette Tips.
2. Set the pipette to the maximum volume given in the specifications.
3. Aspirate the set volume from a beaker of distilled water.
4. Maintain the pipette in the vertical position and wait for 20 seconds.
5. If a water droplet appears at the end of the tip, there is a leak.

For the Multichannel models (8X - 12X):

1. Fit Pipette tips.
2. Set the pipette to the maximum volume given in the specifications, and pre-rinse.
3. Aspirate the set volume from a reagent reservoir of distilled water.
4. Maintain the pipette in the vertical position and wait for 20 seconds; fluid level in tips should remain constant.
5. If a water droplet appears at the end of the tip, there is a leak.
6. If you see no droplet, for volumes below 200 µL, re-immerse the tip below the surface of water.
7. The water level inside the tip should remain constant; if the level goes down there is a leak.

12A - MAINTENANCE FOR THE SINGLE CHANNEL MODELS ONLY

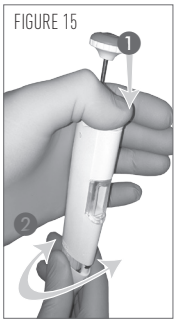
Routine maintenance will help to keep your pipette in good condition, ensuring a continued high level of performance.

Maintenance is limited to:

- Cleaning or sterilization (see Chapter 13 - Cleaning and Sterilization).
- Replacing spare parts.
- Greasing the piston assembly.
  Lubricant tube 1 g is available under the reference FE07066

2µl and 10µl Single channel models should not be disassembled, so you may only replace the push-button, tip-ejector and its adapter.
With these pipettes if the tip-holder is damaged, the piston may also be damaged.

Changing the tip-ejector



To remove

1. Push the ejection button.
2. Push laterally (to the left) the tip-ejector.
3. Slide and remove the tip-ejector.

To refit

1. Push the ejection button.
2. Slide the tip-ejector along the tip-holder.
3. Clip and push laterally (to the right) the tip-ejector on the body of the pipette.

Changing the tip-holder – no tools required

1. Remove the tip-ejector (see above).
2. Unscrew the connecting nut by turning it clockwise.
3. Carefully separate the lower and upper parts.
4. Remove the piston assembly and the seals.
5. Clean, sterilize, or replace the tip-holder.
6. If necessary, lubricate lightly the piston and its seals (see below).
7. Reassemble the pipette (refer to the figure 16).
8. Tighten the connecting nut (turn counterclockwise).
9. Refit the tip-ejector (see above).

Servicing the piston assembly

You may remove the piston assembly for cleaning purposes only. If the piston assembly is changed, the pipette must be adjusted and calibrated in the Supplier Service Center. **As the models 2µl and 10µl single channel models contain miniaturized parts, it is best not to disassemble these pipettes yourself**.

1. Remove the tip-ejector (see above).
2. Unscrew the connecting nut by turning it clockwise.
3. Carefully separate the lower and upper parts.
4. Remove the piston assembly, O-ring and seal.

5. Leave exposed the piston, clean it with isopropanol or ethanol and lubricate lightly.

   For 20µl, 100µl, 200µl Single channel models: lubricate only the useful part of the piston (20 ±5 mm length) and the O-ring.

   For 1000µl single channel model: lubricate the piston.

   For 5000µl, 10mL single channel model: disassemble the seals, lubricate their internal part and lubricate the piston. Do not lubricate the O-ring.
6. Reassemble the pipette (refer to the figure 16).
7. Tighten the connecting nut (turn counterclockwise).
8. Refit the tip-ejector (see above).

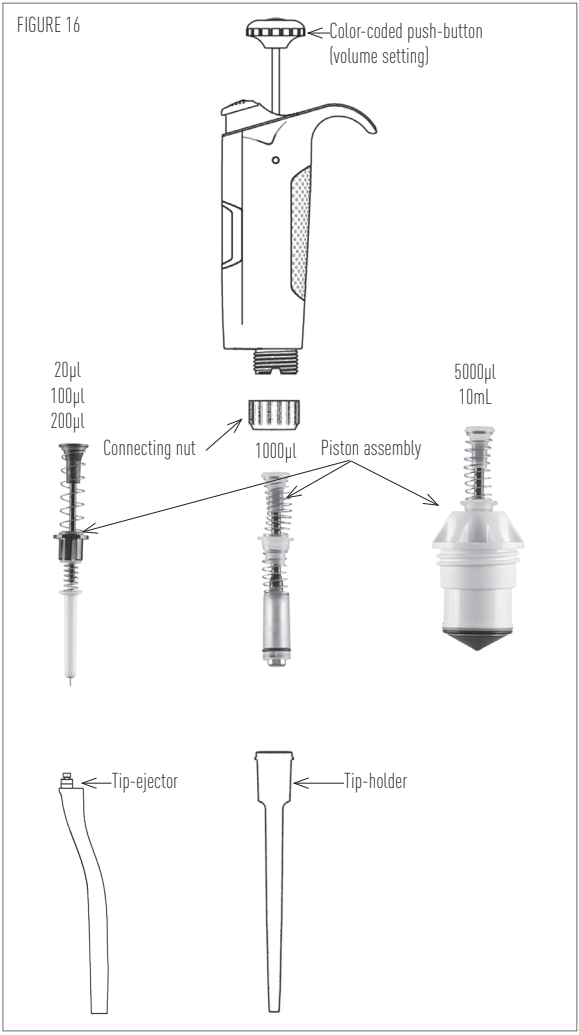
Changing the seals

The O-ring and seal are on the piston; if worn or damaged in any way (chemical or mechanical), they must be replaced. **As the models 2µl and 10µl single channel models contain miniaturized parts, it is best not to disassemble these pipettes yourself**, please contact your Supplier Service Center.

The dimensions of the O-ring vary depending on the model of pipette.

1. Remove the tip-ejector (see above).
2. Unscrew the connecting nut by turning it clockwise.
3. Carefully separate the lower and upper parts.
4. Remove the piston assembly, O-ring and seal.
5. If necessary clean the piston and replace the seal ; lubricate them lightly. Please place them in the correct order.
6. Reassemble the pipette (refer to the figure 16).
7. Tighten the connecting nut (turn counter clockwise).
8. Refit the tip-ejector (see above).

FIGURE 16


Color-coded push-button
(volume setting)
20µl
100µl
200µl
Connecting nut
1000µl
Piston assembly
5000µl
10mL
Tip-ejector
Tip-holder

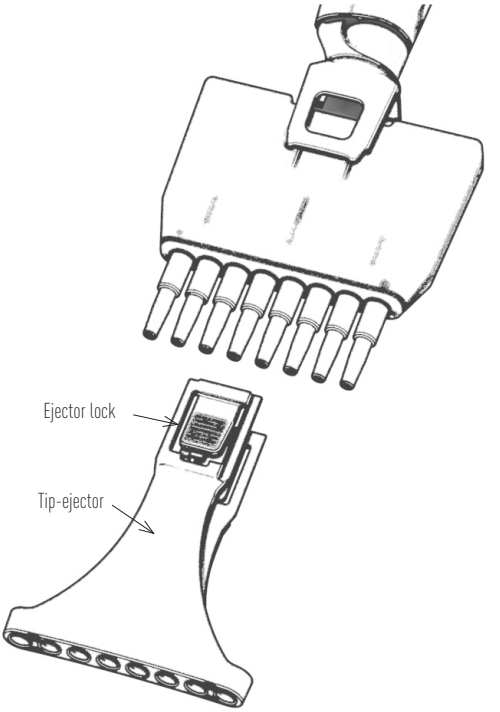
12B - MAINTENANCE FOR THE MULTI-CHANNEL MODELS ONLY

Routine maintenance will help keep your pipette in good condition, ensuring a continued high level of performance.

Maintenance is limited to:

- Cleaning or sterilization (see Chapter 13 - Cleaning and Sterilization)
- Replacing spare parts
- Greasing the piston assembly.

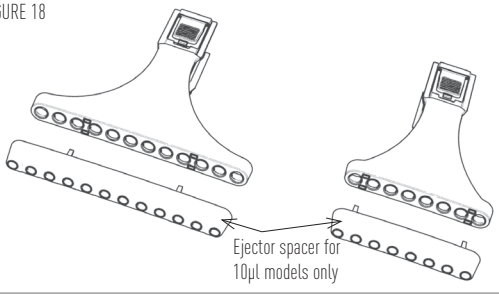
FIGURE 17



Changing the tip-ejector

To remove the tip-ejector, keep both ejector locks depressed. Pull the tip-ejector down. To refit the tip-ejector, gently re-insert the tip-ejector vertically into the rails of the ejector support. Pull lightly on the tip-ejector to check the position.

FIGURE 18



13 - CLEANING AND STERILIZATION

LabPRO Pipettes are designed so that the parts normally in contact with liquid contaminants, can easily be cleaned and decontaminated. However, **because the models 2µl and 10µl single channel models contain miniaturized parts, it is best not to disassemble these pipettes yourself**; please contact your Supplier Service Center.

Liquid must never enter the upper part (handle) of any-pipette.

Cleaning for the Single Models only

The pipette must be cleaned, as described below, before it is decontaminated. Soap solution is recommended for cleaning these models.

External cleaning

1. Remove the tip-ejector.
2. Wipe the tip-ejector with a soft-cloth or lint-free tissue impregnated with soap solution.

3. Wipe the entire pipette with a soft-cloth or lint-free tissue impregnated with soap solution, to remove all dirty marks. If the pipette is very dirty, a brush with soft plastic bristles may be used.
4. Wipe the entire pipette and the tip-ejector with a soft cloth or lint-free tissue soaked with distilled water.
5. Refit the tip-ejector and allow the pipette to dry.

Internal cleaning

The following components only can be immersed in a cleaning solution: connecting nut, tip-ejector, tip-holder, piston assembly, seal and O-ring.

1. Disassemble the pipette as described in the chapter 12A - Maintenance.
2. Set aside the upper part in a clean, dry place.
3. Clean the individual components of the lower part of the pipette using an ultrasonic bath (20 minutes at 50°C) or with a soft-cloth. Note that the piston assembly and seals must be degreased with isopropanol or ethanol before being immersed in another ultrasonic bath. Small round brushes with soft plastic bristles may be used to clean the interior of the tip-holder.
4. Rinse the individual components with distilled water.
5. Leave the parts to dry by evaporation or wipe them with a clean soft-cloth or lint-free tissue.
6. Reassemble the pipette as described in the chapter 12A - Maintenance.

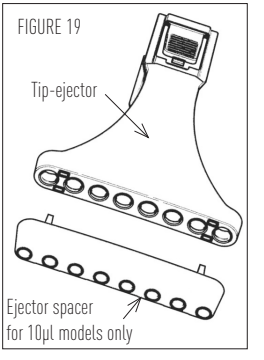
Cleaning for the Multichannel Models only

The pipette must be cleaned, as described below, before it is decontaminated. Soap solution is recommended for cleaning these models.

The following components **only** can be immersed in a cleaning solution: tip-ejector and ejector spacer.

1. Remove the tip-ejector and the ejector spacer.

FIGURE 19



2. Immerse the tip-ejector, and ejector spacer in the cleaning solution or wipe them with a soft cloth or lint-free tissue impregnated with the cleaning solution.
3. Rinse the components with distilled water.
4. Wipe the entire pipette with a soft cloth or lint-free tissue impregnated with the cleaning solution.
5. Wipe it with distilled water.
6. Leave the parts to dry by evaporation or wipe them with a clean soft-cloth or lint-free tissue.
7. Refit the tip-ejector as described in "Changing the tip-ejector".

Chemical Decontamination

You may choose to decontaminate your pipette chemically, in accordance with your own procedures. Whatever decontaminant you use, check with the supplier of the decontaminant that it is compatible with stainless steel and the plastics used in the construction of the pipette: PBT (Polybutylene Terephtalate), PC (Polycarbonate), PC/PBT (Polycarbonate/Polybutylene Terephtalate), PEEK (Polyetheretherkitone), PEI (Polyetherimide), POM (Polyoxymethylene), PPS (Polyphenylene Sulfide), PVDF (Polyvinylidene Fluoride), or PP (Polypropylene).

For the single models:

Upper Part (handle)

1. Wipe the upper part (handle) of the pipette with a soft cloth or lint-free tissue impregnated with the chosen decontaminant.
2. Wipe the upper part of the pipette with a soft cloth or lint-free tissue soaked with distilled water or sterile water.

Lower Part (Volumetric module)

The following components **only** can be immersed in a decontaminant solution: connecting nut, tip-ejector, tip-holder.

Piston assembly and seals must be degreased with methyl alcohol before being immersed in decontamination solution in separate vessel.

1. Disassemble the pipette as described in the chapter 12A.

2. Immerse tip-ejector, tip-holder and connecting nut in the cleaning solution.
3. Degrease the piston assembly, the seals and immerse them in another vessel.
4. Rinse each component with distilled water.
5. Leave the parts to dry by evaporation (or wipe with a soft cloth the tip-ejector, the tip-holder and connecting nut).
6. Lubricate the piston assembly and the seals.
7. Reassemble the piston assembly, the tip-holder and the tip-ejector.

For the multichannel models:

The following components only can be immersed in a decontamination solution: tip-ejector and ejector spacer (for 10µl models only).

1. Remove the tip-ejector and the ejector spacer.
2. Immerse the tip-ejector and ejector spacer in the decontamination solution or wipe them with a soft cloth or lint-free tissue impregnated with the decontamination solution.
3. Rinse the components with distilled water.
4. Wipe the entire pipette with a soft cloth or lint-free tissue impregnated with the decontamination solution.
5. Wipe it with distilled water.
6. Leave the parts to dry by evaporation or wipe them with a clean soft-cloth or lint-free tissue.
7. Refit the tip-ejector as described in "Changing the tip-ejector".

Sterilization

The entire autoclavable range of pipettes can be sterilized by steam autoclaving at 121°C (252°F), 1 atm for 20 minutes. The single and multichannel pipettes can be autoclaved without special precautions. Use of a bag is not recommended in order to improve the drying of the pipette.

After autoclaving, check the connecting nut is fully tightened and screw it if it is not the case. The pipette needs to dry completely and cool down to room temperature. (1/2 day if your autoclave has a dry cycle or otherwise overnight before use). The piston does not

need to be lubricated after autoclaving, except if grease was removed during cleaning. Gravimetric checking is recommended after every 5 autoclave cycles for single pipettes and after 1 cycle for multichannel pipettes.

14 - SPECIFICATIONS

LabPRO pipettes are high quality. These pipettes are compatible with universal tips.

Checking and recalibrating your pipette with the tips that you use may be needed.

Each pipette is inspected and validated by qualified technicians in accordance with DKSH Quality System. DKSH declares that its manufactured pipettes comply with the requirements of the ISO8655 standard, by type testing.

The adjustment is carried out under strictly defined and monitored conditions (described in the internal manufacturer procedure wich are based on the ISO8655).

Single models

			SPECIFICATIONS - Error limits			
Model	Volume range (µL)	Volume (µL)	Systematic error (µL)	(%)	Random error (µL)	(%)
2µl	0.2 - 2	0.2	± 0.026	± 13.2	≤ 0.013	≤ 6.6
		2	± 0.033	± 1.7	≤ 0.015	≤ 0.8
10µl	1 - 10	1	± 0.035	± 3.5	≤ 0.013	≤ 1.3
		10	± 0.110	± 1.1	≤ 0.044	≤ 0.4
20µl	2 - 20	2	± 0.11	± 5.5	≤ 0.033	≤ 1.7
		20	± 0.20	± 1.0	≤ 0.066	≤ 0.3
100µl	10 - 100	10	± 0.39	± 3.9	≤ 0.11	≤ 1.1
		100	± 0.80	± 0.8	≤ 0.17	≤ 0.2
200µl	20 - 200	20	± 0.55	± 2.8	≤ 0.22	≤ 1.1
		200	± 1.60	± 0.8	≤ 0.33	≤ 0.2
1000µl	100 - 1 000	100	± 3.3	± 3.3	≤ 0.7	≤ 0.7
		1000	± 8.0	± 0.8	≤ 1.7	≤ 0.2
5000µl	500 - 5 000	500	± 13	± 2.6	≤ 3.3	≤ 0.7
		5000	± 33	± 0.7	≤ 8.8	≤ 0.2
10mL	1000 - 10000	1000	± 33	± 3.3	≤ 6.6	≤ 0.7
		10000	± 60	± 0.6	≤ 17.6	≤ 0.2

The data given in the tables are achieved with Gilson standard length series pipette tips. If you are using other 10 µL extended length series pipette tips, you will need to recalibrate your pipette to comply with specifications.

Multichannel models

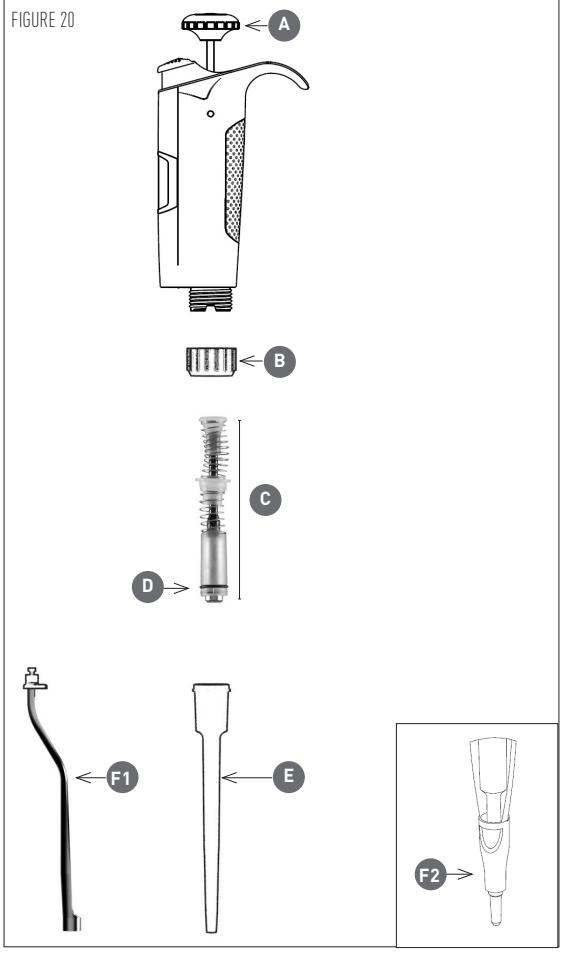
Model	Volume range (µL)	Volume (µL)	SPECIFICATIONS - Error limits Systematic error (µL)	Systematic error (%)	Random error (µL)	Random error (%)
8X-10µl	0.5-10	0.5	± 0.09	± 17.6	≤ 0.04	≤ 8.8
12X-10µl		10	± 0.22	± 2.2	≤ 0.11	≤ 1.1
8X-20µl	2-20	2	± 0.11	± 5.5	≤ 0.09	≤ 4.4
12X-20µl		20	± 0.40	± 2.0	≤ 0.17	≤ 0.8
8X-200µl	20-200	20	± 0.55	± 2.8	≤ 0.28	≤ 1.4
12X-200µl		200	± 2.20	± 1.1	≤ 0.55	≤ 0.3
8X-300µl	20-300	20	± 1.10	± 5.5	≤ 0.39	≤ 1.9
12X-300µl		300	± 3.30	± 1.1	≤ 1.10	≤ 0.4

⚠ **The data given in the tables conform to the ISO8655-2 Standard. With a precise pipetting technique (see Chapter 7 - General guidelines for good pipetting) the 2µl single channel model may be used to aspirate volumes as low as 0.1 µL and the 10µl single channel model as low as 0.5 µL.**

15A- SPARE PARTS FOR SINGLE MODELS

	Description	Quantity	2µl
A	Push button	5	FE07004
B	Connecting nut	5	FE07001
C	Piston assembly	1	FE07040
D	Seal + O-ring	5	FE07050
E	Tip holder	5	FE07013
F1 F2	Tip-ejector assembly	5	FE07059
F2	Ejector adapter	1	FE07034

FIGURE 20



10µl

	Description	Quantity	10µl
A	Push button	5	FE07005
B	Connecting nut	5	FE07001
C	Piston assembly	1	FE07041
D	Seal Guide + O-ring	5	FE07051
E	Tip holder	5	FE07015
F1 F2	Tip-ejector assembly	5	FE07059
F2	Ejector adapter	1	FE07034

20µl and 100µl

	Description	Quantity	20µl	100µl
A	Push button	5	FE07006	FE07007
B	Connecting nut	5	FE07001	FE07001
C	Piston assembly	1	FE07042	FE07043
D	Seal Guide + O-ring	5	FE07052	FE07053
E	Tip holder	5	FE07017	FE07019
F1	Tip-ejector assembly	5	FE07030	FE07031

200µl and 1000µl

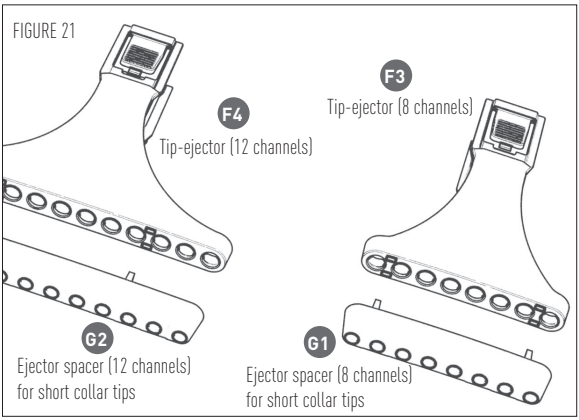
	Description	Quantity	200µl	1000µl
A	Push button	5	FE07008	FE07009
B	Connecting nut	5	FE07001	FE07001
C	Piston assembly	1	FE07044	FE07045
D	Seal Guide + O-ring	5	FE07054	FE07055
E	Tip holder	5	FE07021	FE07023
F1	Tip-ejector assembly	5	FE07032	FE07033

5000µl and 10ml

	Description	Quantity	5000µl	10ml
A	Push button	5	FE07010	FE07011
C	Piston assembly	1	FE07047	FE07049
D	O-ring	5	FE07056	FE07057
E	Tip holder	5	FE07025	FE07027
	Filter for 5000µl/ 10ml*	10	FE07058	FE07058

** Not shown.*

15B - SPARE PARTS FOR MULTICHANNEL MODELS



8x10µl and 12x10µl

	Description	Quantity	8x10µl	12x10µl
A	Push button	5	FE07005	FE07005
F3 F4	Tip-ejector	1	FE07038	FE07039
G1 G2	Ejector spacer for short collar tips	1	FE07036	FE07037

8x20µl and 12x20µl

	Description	Quantity	8x20µl	12x20µl
A	Push button	5	FE07006	FE07006
F3 F4	Tip-ejector	1	FE07038	FE07039

8x200µl and 12x200µl

	Description	Quantity	8x200µl	12x200µl
A	Push button	5	FE07008	FE07008
F3 F4	Tip-ejector	1	FE07038	FE07039

8x300µl and 12x300µl

	Description	Quantity	8x300µl	12x300µl
A	Push button	5	FE07012	FE07012
F3 F4	Tip-ejector	1	FE07038	FE07039

MAINTENANCE & CALIBRATION

DKSH recommends pipette calibration and maintenance at least once annually by an authorized service provider. Please contact DKSH directly. Please refer to the last page detailling local DKSH offices list.

WARRANTY

DKSH warrants this pipette against defects in material under normal use and service for a period of 36 months from the date of purchase. An extended warranty is possible on request. It extends the standard warranty coverage for a maximum of 2 years on selected components.

This warranty shall not apply to pipettes which are subject to abnormal use, and/or improper or inadequate maintenance (contrary to the recommendations given in the User's guide), including, but not limited to pipettes which have been subjected to physical damage, improper handling, spillage or exposure to any corrosive environment. This warranty shall also be void in the event pipettes are altered or modified by any party other than DKSH.The company's sole liability under this warranty shall be limited to repair or replace any defective components of pipettes or refund of the purchase price paid for such pipettes.

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