



LLG-proMLP
Microliter Pipette



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1 - INTRODUCTION

The LLG-proMLP pipette has an air displacement mechanism and is used with disposable pipette tips.

This pipette line provides:

- Light and comfortable body, for both right and left handed users.
- Low pipetting forces ensuring ergonomics and users' well-being.
- Controlled volume setting.

Eight single channel models cover a volume range from 0.2 μ l to 10 ml.

2 - PARTS CHECK LIST

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

- LLG-proMLP Pipette
- User's Guide
- Certificate of conformity
- Calibration Key

3 - DESCRIPTION

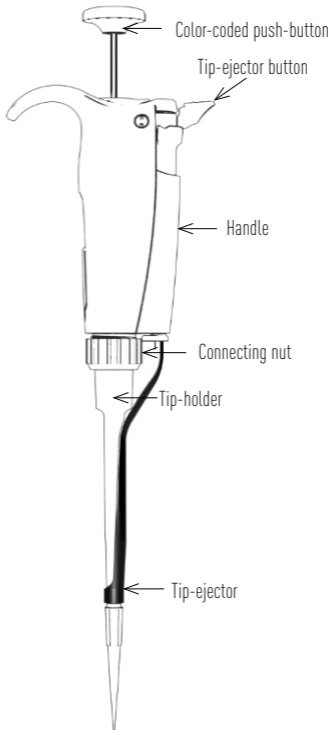


FIGURE 1

For LLG-proMLP 2 and LLG-proMLP 10 pipettes, a dual position adapter (plastic) is required to eject short or long collar tips. LLG-proMLP 2 and LLG-proMLP 10 models are delivered with the adapter in place, different tips for Olympus™ style tips.

If long collar tips are used, the adapter must be repositioned in the longer slot as follows:

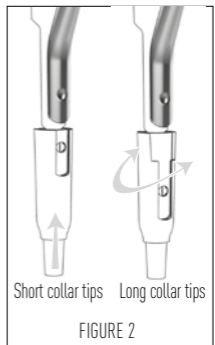


FIGURE 2

- ① Pull the adapter down from the metallic rod.
- ② Turn the adapter through 180°.
- ③ Refit the adapter so that the end of the metallic rod engages the longer slot of the adapter.

To fit this tip ejector extension, push the extension firmly onto the end of the clip ejector until it clicks into place. To remove it, gently twist and pull the extension. If a new adapter is required, you can order it (see chapter 15 - Spare parts).

4 - SETTING THE VOLUME

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

Single models LLG-proMLP

2	10	20	100
1 2 5	0 7 5	1 2 5	0 7 5
1.25 μ L	7.5 μ L	12.5 μ L	75 μ L
200	1000	5K	10K
1 2 5	0 7 5	1 2 5	0 7 5
125 μ L	0.75 mL	1.25 mL	7.5 mL



MODEL	Color of volumeter digits		Increment
	Black	Red	
LLG-proMLP 2	μ L	0.01 μ L	0.002 μ L
LLG-proMLP 10 to LLG-proMLP 20	μ L	0.1 μ L	0.02 μ L
LLG-proMLP100, LLG-proMLP 200	μ L	-	0.2 μ L
LLG-proMLP 1000	0.01mL	mL	0.002mL
LLG-proMLP 5K	0.01mL	mL	0.002mL
LLG-proMLP 10K	mL	0.1mL	0.02mL

The volume is set by turning the push-button (see figure 4). 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.

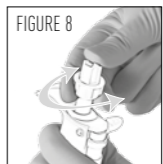
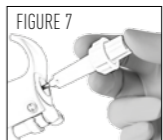
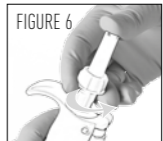
→ when **increasing** the volume setting, pass the required value by 1/3 of a turn and then slowly decrease to reach the volume, making sure not to overshoot the mark.

5 - USER ADJUSTMENT

The calibration of the LLG-proMLP 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. 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).
 - 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.
- 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 this 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).

- 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.

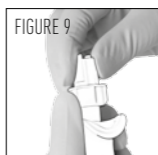


FIGURE 9

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)
LLG-proMLP 2	0.012 i.e: 1 full turn is 0.096
LLG-proMLP 10	0.047
LLG-proMLP 20	0.120
LLG-proMLP 100	0.48
LLG-proMLP 200	1.20
LLG-proMLP 1000	4.75
LLG-proMLP 5K	23.8
LLG-proMLP10K	48

6 - PIPETTING

Fitting the tips

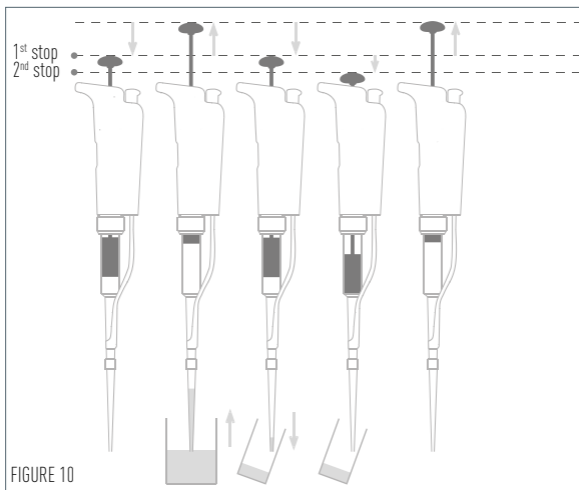
LLG-proMLP pipettes have been designed to fit various tips.

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 your pipette will have levels of accuracy and precision within specifications. Using other tips may require a validation of the pipetting system.



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 droplets 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.

Dispense

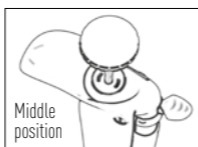
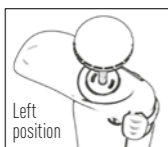
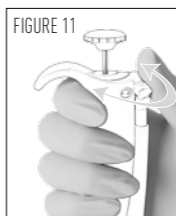
- ① Place the end of the tip against the inside wall of the recipient vessel (at an angle of 10° to 40°).

- 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.

Ejecting the tip

Before you start pipetting, you can adjust the tip-ejector button according to your preferences.

- 1 Position the tip-ejector button. Simply rotate the tip-ejector button to the most comfortable position: left, right or middle.



- 2 Activate the tip-ejector. You can either push the tip-ejector button with the tip of the thumb as usual, or with the base of your thumb for more comfort. Please note the LLG-proMLP 5K and LLG-proMLP 10K are not equipped with a tip-ejector.

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.
- 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 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.
- 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

Table Immersion Depth and Wait Time

Model	Immersion Depth (mm)	Wait Time (seconds)
LLG-proMLP 2	1	1
LLG-proMLP 10	1	1
LLG-proMLP 20	2-3	1
LLG-proMLP 100	2-4	1
LLG-proMLP 200	2-4	1
LLG-proMLP 1000	2-4	2-3
LLG-proMLP 5K	3-6	4-5
LLG-proMLP 10K	5-7	4-5

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 - 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

9 - STERILIZATION

Sterilization

The entire autoclavable range of pipettes can be sterilized by steam autoclaving at 121 °C (252 °F), 1 atm for 20 minutes. The LLG-proMLP 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.

10 - SPECIFICATIONS

LLG-proMLP pipettes are high quality pipettes. These pipettes are compatible with different tips.

Each pipette is inspected and validated by qualified technicians. LLG-proMLP 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 which are based on the ISO8655).

Single models						
Model	Volume range (µL)	Volume (µL)	SPECIFICATIONS - Error limits			
			Systematic error (µL)	Systematic error (%)	Random error (µL)	Random error (%)
LLG-proMLP 2	0.2 - 2	0.2	± 0.026	± 13.2	≤ 0.013	≤ 6.6
		2	± 0.033	± 1.7	≤ 0.015	≤ 0.8
LLG-proMLP 10	1 - 10	1	± 0.035	± 3.5	≤ 0.013	≤ 1.3
		10	± 0.110	± 1.1	≤ 0.044	≤ 0.4
LLG-proMLP 20	2 - 20	2	± 0.11	± 5.5	≤ 0.033	≤ 1.7
		20	± 0.20	± 1.0	≤ 0.066	≤ 0.3
LLG-proMLP 100	10 - 100	10	± 0.39	± 3.9	≤ 0.11	≤ 1.1
		100	± 0.80	± 0.8	≤ 0.17	≤ 0.2
LLG-proMLP 200	20 - 200	20	± 0.55	± 2.8	≤ 0.22	≤ 1.1
		200	± 1.60	± 0.8	≤ 0.33	≤ 0.2
LLG-proMLP 1000	100 - 1 000	100	± 3.3	± 3.3	≤ 0.7	≤ 0.7
		1000	± 8.0	± 0.8	≤ 1.7	≤ 0.2
LLG-proMLP 5K	500 - 5 000	500	± 13	± 2.6	≤ 3.3	≤ 0.7
		5000	± 33	± 0.7	≤ 8.8	≤ 0.2
LLG-proMLP 10K	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 tips standard length series pipette tips.



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 LLG-proMLP 2 model may be used to aspirate volumes as low as 0.1 µl and the LLG-proMLP 10 model as low as 0.5 µl.

MAINTENANCE & CALIBRATION

Pipette calibration and maintenance is recommended at least once annually by an authorized service provider. Please contact your local LLG Labware supplier.

WARRANTY

LLG warrants this pipette against defects in material under normal use and service for a period of 36 months from the date of purchase.

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 not authorized by LLG. 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.

THE FOREGOING WARRANTY IS EXCLUSIVE AND LLG HEREBY DISCLAIMS ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING ANY WARRANTIES OF MERCHANTABILITY AND ANY WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE, UNDER NO CIRCUMSTANCES SHALL LLG BE LIABLE FOR ANY CONSEQUENTIAL, PUNITIVE, INDIRECT OR INCIDENTAL DAMAGES ARISING OUT OF ANY BREACH OF ANY EXPRESS OR IMPLIED WARRANTY.



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