

# Positive-Displacement Pipette

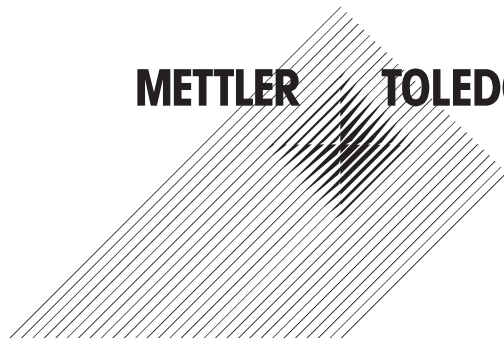


**Continuously-adjustable**

**6 models with  
volume ranges from  
0.5 to 1000  $\mu$ L**

Pos-D 250  $\mu$ L shown

**METTLER TOLEDO**



# Pos-D™

## Positive-Displacement Pipette

### Intent of Use

Pos-D positive-displacement pipettes are intended for dispensing liquids with high densities, viscosities or vapor pressure in the volume ranges from 0.5 µL to 1000 µL in various in-vitro liquid handling applications.

### Table of Contents

Introduction .....	3
Description .....	4
Note on Calibration and Operation .....	4
Capillary/Piston Assembly .....	4
Attaching the Capillary/Piston Assembly .....	5
Volume Ranges .....	6
Setting the Volume .....	6
Pre-Rinsing .....	6
Pipetting .....	7
GLP (Good Laboratory Practices) .....	7
Troubleshooting .....	8
Cleaning your pipette .....	8
Storage .....	9
Service, Calibration, and Repair .....	9
Specifications .....	10
Replacement Parts .....	11
Limited Warranty .....	Back Cover

### Figures

Figure 1	Pos-D 250 µL .....	3
Figure 2	Capillary/Piston .....	4
Figure 3	Attaching Capillary/Piston .....	5
Figure 4	Volume Display .....	6
Figure 5	1st and 2nd Stops .....	7
Figure 6	Replacement parts .....	11

### Contents of Pos-D box

Pos-D pipette as ordered

ID tags

Rainin Test Report / Conformance Certificate

If any item is missing please call 800-472-4646 in the US, or contact your local MT office or distributor.

Made in the USA by Mettler-Toledo Rainin, LLC.

Rainin is a registered trademark and Pos-D and Hang-Ups are trademarks of Mettler-Toledo Rainin LLC.

## Introduction

Pos-D is a positive displacement pipette for demanding biological protocols and for use with liquids with non-aqueous properties: e.g. viscous, dense, volatile, or high-surface-tension liquids. Positive-displacement pipettes have certain advantages over air-displacement pipettes for these applications:

- Concerning DNA amplification protocols, the positive-displacement Pos-D absolutely prevents sample-to-sample contamination from aerosols. Disposable capillaries and pistons prevent contamination from carry-over from one sample or reagent to another. Each capillary and piston is used only once and ejected without hand contact.
- Concerning non-aqueous samples, because the piston is in direct contact with the sample (no partial vacuum), viscous, dense, volatile, or high-surface-tension liquids are measured accurately and reproducibly.

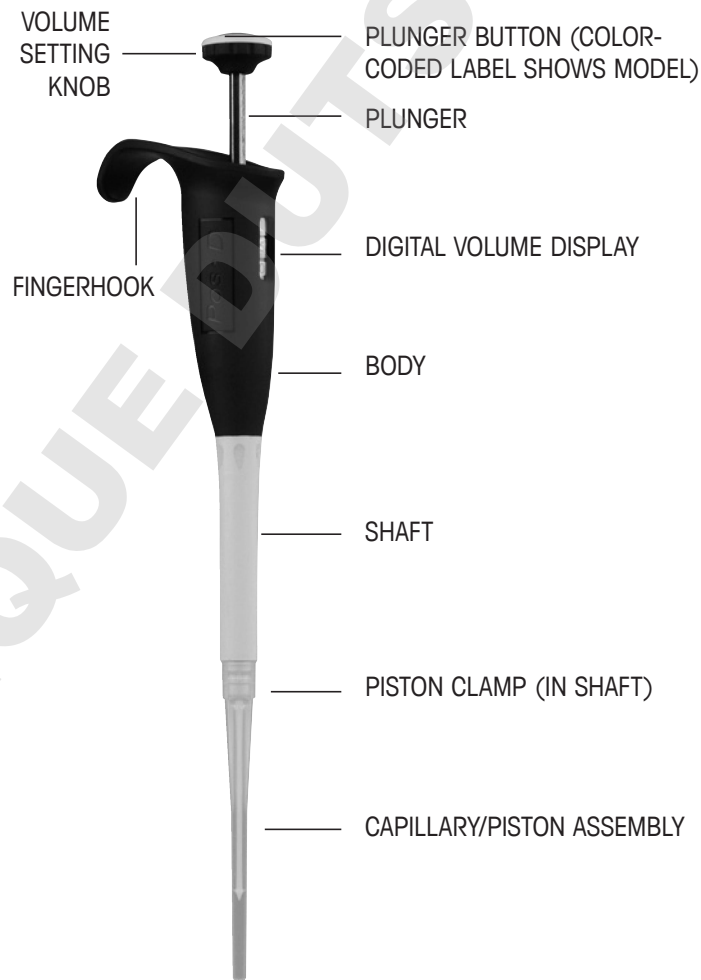


Figure 1: Pos-D, 250 µL

## Description – Additional Features

Permanent calibration.

The digital volume setting allows precise and continuous adjustment, and faces the user during the pipetting operation.

No lubrication or maintenance is required.

The fingerhook allows you to rest your hand and reduces pipetting static forces.

## Note on Calibration and Operation

Pos-D is calibrated at Rainin during manufacturing.

When the capillary/piston assembly is fitted correctly, the pipette will perform to the accuracy and precision specification as indicated in this manual.

## Capillary/Piston Assembly

Pos-D capillaries/pistons are supplied already assembled, pre-sterilized, in racks. The following illustration shows the parts assembled and as they would appear if unassembled. (250  $\mu$ L shown, other volumes are similar.)

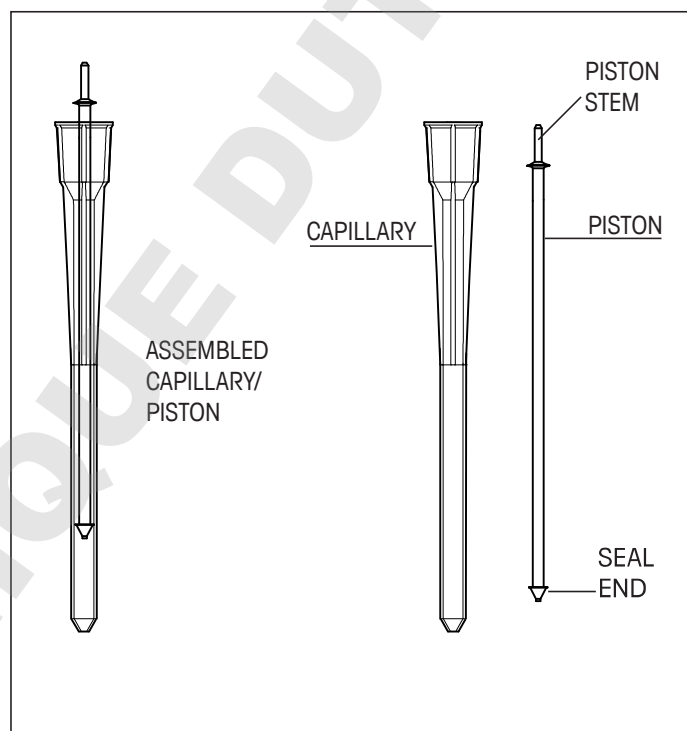


Figure 2: Attaching Capillary/Piston

## Attaching the Capillary/Piston Assembly

Pos-D capillaries/pistons are supplied already assembled and pre-sterilized.

- 1 Open the capillary/piston rack. Press the plunger button fully down to the 2<sup>ND</sup> STOP (see Fig 5.). The piston clamp will open, protruding from the end of the shaft. Figure 3A below.
- 2 Align the piston clamp into the capillary so that the piston clamp engages the piston stem. Figure 3B below.
- 3 Slowly release the plunger, while pushing Pos-D down until the capillary snaps into place on the shaft. See Figure 3C below, and note that there is a small gap between the end of the piston clamp and the "shoulder" on the piston.
- 4 To make sure the piston is properly seated and the pipette is in proper calibration, press lightly on the plunger button until you hear and feel a click as the gap shown in Figure 3C is adjusted.

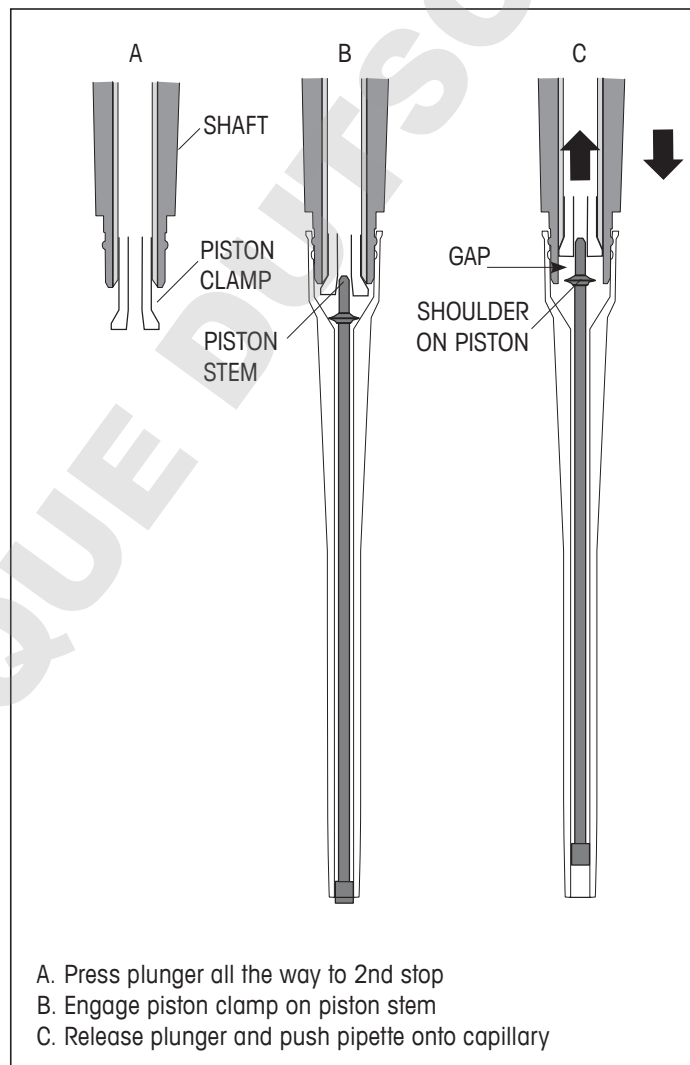


Figure 3: Attaching Capillary/Piston

## Volume Ranges

Pos-D Model	Capillary/Piston	Increment ( $\mu\text{L}$ )	Volume Range ( $\mu\text{L}$ )	# of Turns in Range
10 $\mu\text{L}$	C-10	0.02	0.5–10	10
25 $\mu\text{L}$	C-25	0.02	3–25	25
50 $\mu\text{L}$	C-50	0.05	20–50	25
100 $\mu\text{L}$	C-100	0.2	10–100	10
250 $\mu\text{L}$	C-250	0.2	50–250	25
1000 $\mu\text{L}$	C-1000	2	100–1000	10

## Setting Volumes

Volume setting is done by turning the volume setting knob slowly and reading the volume on the display. The display consists of three number wheels and is read from top to bottom. The digits are black and/or red, as follows:

Model Volume	Black Digits	Red Digits
10 $\mu\text{L}$ , 25 $\mu\text{L}$ , 50 $\mu\text{L}$	1 $\mu\text{L}$	0.1 $\mu\text{L}$
100 $\mu\text{L}$ , 250 $\mu\text{L}$	1 $\mu\text{L}$	--
1000 $\mu\text{L}$	0.1 and 0.01 mL	1 mL

### Pos-D Model

10 $\mu\text{L}$	25 $\mu\text{L}$	50 $\mu\text{L}$	100 $\mu\text{L}$	250 $\mu\text{L}$	1000 $\mu\text{L}$
0	1	2	0	2	0
7	2	5	7	2	7
5	5	0	5	5	5
7.5 $\mu\text{L}$	12.5 $\mu\text{L}$	25 $\mu\text{L}$	75 $\mu\text{L}$	225 $\mu\text{L}$	0.75 mL
<b>Volume Set</b>			<b>BLACK DIGITS</b> <b>RED DIGITS</b>		

Figure 4: Volume Display

To eliminate errors due to mechanical backlash: when setting a larger volume, first turn the knob 1/3 turn above the desired volume. Then turn the knob slowly clockwise until the desired volume is displayed. If setting a smaller volume, simply turn the volume setting knob slowly until the desired setting is reached.

**Always dial down to the desired volume.**

## Pre-Rinsing

Before pipetting, pre-rinse the capillary/piston twice. Press the plunger button to the FIRST STOP and insert the capillary about 2-3 mm into the sample. Slowly release the plunger to allow the sample to pre-rinse the capillary/piston.

Press the button to the FIRST STOP again to return the sample to the reservoir.



Figure 5: 1st & 2nd Stops

## Pipetting

**To pick up sample:** Press the plunger button to the FIRST STOP

Insert the capillary into the sample for each volume:

**10-250  $\mu\text{L}$ : 2-3 mm      1000  $\mu\text{L}$ : 3 mm**

Slowly release the plunger to move the piston upward and draw the sample into the capillary to the desired volume.

When removing the capillary from the sample, touch it against the vessel wall to remove any sample from the outside of the capillary.

### To dispense sample

Touch the end of the capillary against the inside wall of the receiving vessel.

Press the plunger button slowly to the FIRST STOP.

Holding the plunger button down, move the capillary away from the vessel wall, then remove the pipette completely from the vessel and release the plunger button.

### To eject the capillary/piston

Over a suitable waste container, press the plunger button to the FIRST STOP, then through to the SECOND STOP: see figure 5. The capillary and piston will be ejected into the waste container.

## GLP (Good Laboratory Practice)

Pos-D allows easy maintenance of GLP records according to your SOPs (standard operating procedures):

- 1. Serialized pipettes:** Serial No. on pipette and Test Report.
- 2. Bar coding:** On the Rainin Test Report and pipette box label.
- 3. ID tag:** Useful to record the application or user.

Additionally, there is:

**No sample-to-sample contamination:** Capillary/piston is used once then discarded.

**No aerosol contamination:** Positive displacement eliminates aerosol contamination.

**No hand contact:** Capillaries and pistons are loaded and ejected without hand contact.

## Troubleshooting

**Leaking from the capillary:** Change the capillary/piston assembly and make sure it is seated properly; see page 5.

**Piston does not move when you release the plunger button:**

Piston is not attached correctly to the piston clamp. Attach as described on page 5.

**Difficult to fit capillary:** Clean the end of the shaft and piston clamp with isopropyl alcohol and a lint-free cotton swab.

**Inaccurate or non-reproducible results:** Change the capillary/ piston assembly and make sure it is seated properly; page 5.

**If the problem persists, or you encounter a problem not listed above:**

1. Go to [www.mt.com/rainin](http://www.mt.com/rainin)
2. Click the green "Contact Us" button in the upper right-hand corner
3. Call the Service number listed under Rainin Pipettes or click the green Contact Us button to send an email.

## Cleaning your pipette

The piston clamp should never be lubricated. If this area requires cleaning, use a lint-free cotton swab with isopropyl alcohol only.

**Cleaning:** Do not use any aggressive solvents which could attack the plastic parts when cleaning Pos-D. Only use a mild detergent. The external parts can easily be cleaned using a soft cloth or soft brush and soap solution. After cleaning, rinse well with distilled water and allow to dry thoroughly.

**Decontamination:** If it is necessary to decontaminate Pos-D, use hand, body, and eye protection, and exercise extreme care. Follow standard safety procedures of your institution.

Wipe the body with a soft cloth or lint-free tissue wetted with decontaminant.

Soak immersible parts (piston clamp, shaft, and shaft spring) in the decontaminant solution, or wipe them according to instructions given with the decontaminant.

Rinse well with distilled water and allow to dry thoroughly.



## Storage

After use, store the pipette in a clean safe place. The Pos-D pipette is a precision instrument and should be treated with the level of care appropriate for laboratory instrumentation.

Several hangers are available to hold your Pos-D conveniently and safely when not in use:



**HU-M3:** Set of 3 magnetic Hang-Ups™ for mounting on ferrous surfaces. Includes adhesive disks. (Part# 17003024)



**HU-S3:** 3 Hang-Ups attached to a clamp to mount on a shelf. (Part# 17004992)



**CR-7:** Free-standing carousel holds 7 Rainin pipettes. (Part# 17001255)

## Contacting Rainin

**Technical Support:** T: 800-543-4030 E: [tech.support@rainin.com](mailto:tech.support@rainin.com)

**Pipette Service:** T: 800-662-7027 E: [service@rainin.com](mailto:service@rainin.com)

**Direct Order Line:** T: 800-472-4646 E: [pipets@rainin.com](mailto:pipets@rainin.com)

**Rainin website:** [www.shoprainin.com](http://www.shoprainin.com) (for product ordering)

**Outside U.S.A.:** [www.mt.com/rainin](http://www.mt.com/rainin)

**Rainin Service website:** [www.RaininService.com](http://www.RaininService.com) (please select your country)

For pipettes under warranty, please note that the warranty will be voided if the pipette has been damaged as a result of physical or chemical abuse, or if the pipette has been repaired or recalibrated by any service facility which is not authorized by Rainin. Call Technical Support 800-543-4030 for further information.

## Specifications

These manufacturer's specifications should be used as guidelines when establishing your own performance specification.

Pos-D Model	Volume $\mu\text{L}$	Accuracy		Precision	
		%	$\mu\text{L} (\pm)$	%	$\mu\text{L} (\leq)$
10 $\mu\text{L}$	1	9.0	0.09	3.0	0.03
	5	2.0	0.10	0.6	0.03
	10	1.5	0.15	0.6	0.06
25 $\mu\text{L}$	3	8.3	0.25	2.7	0.08
	10	2.7	0.27	0.8	0.08
	25	1.2	0.30	0.4	0.10
50 $\mu\text{L}$	20	1.7	0.34	1.0	0.20
	50	1.4	0.70	0.6	0.30
100 $\mu\text{L}$	10	5.0	0.50	2.0	0.20
	50	1.5	0.75	0.6	0.30
	100	1.0	1.00	0.4	0.40
250 $\mu\text{L}$	50	3.0	1.50	0.6	0.30
	100	1.7	1.70	0.3	0.30
	250	1.0	2.50	0.2	0.50
1000 $\mu\text{L}$	100	3.0	3.00	1.6	1.60
	500	1.0	5.00	0.5	2.50
	1000	0.8	8.00	0.4	4.00

Specifications by gravimetric method using distilled water at  $21.5^\circ\text{C} \pm 1.0^\circ\text{C}$ .

Specifications are guaranteed when using Rainin capillaries/pistons.

## Replacement Parts

The commonly-replaced parts are shown here for each volume range of Pos-D pipettes.  
Call 800 472 4646 to order replacement parts.

Part	Model and Product Part Number					
	MR-10	MR-25	MR-50	MR-100	MR-250	MR-1000
<b>Plunger Button</b>	17008279	17008280	17008281	17008282	17008230	17008283
<b>Shaft</b>	17008179	17008180	17008180	17008179	17008180	17008180
<b>Shaft Spring</b>	17008203	17008203	17008203	17008203	17008203	17008203
<b>Piston Clamp</b>	17008799	17008799	17008799	17008799	17008799	17008800

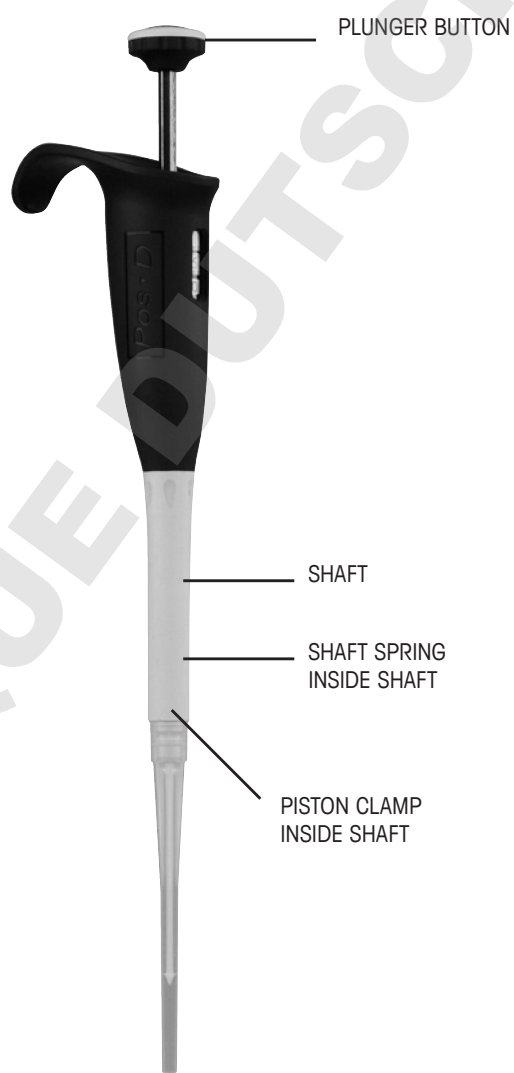


Figure 6: Replacement Parts

DOMINIQUE DUTSCHER SAS

**Mettler-Toledo Rainin, LLC**

7500 Edgewater Drive  
Oakland, CA 94621

Subject to technical changes

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For more information