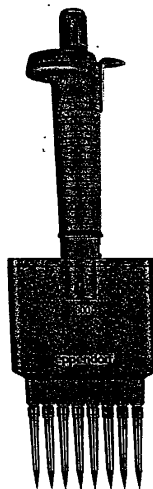
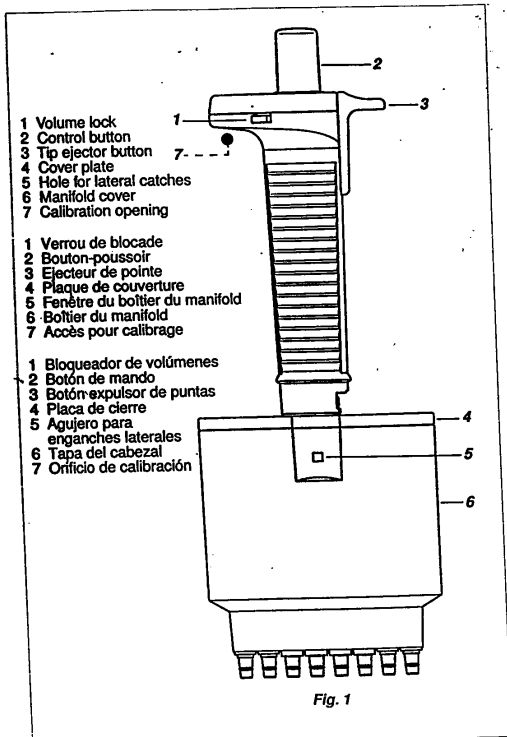


**Eppendorf Titermate
Instruction Manual
Mode d'emploi
Manual de Instrucciones**



eppendorf



1 Design principle

The Titermate multichannel pipette is a piston stroke pipette with variable volume setting. It functions according to the air-displacement principle.

The hand-grip holds exchangeable manifolds for 8- or 12-channel pipetting into 96-well microtiter plates.

Every piston has a separate guide to enable use with less than 8 or 12 tips.

In order to facilitate handling, the manifold of the pipette can be turned to the position most preferred by the user.

By pressing the control button to the first stop, the set volume can be aspirated and dispensed.

Any liquid remaining in the tip is fully dispensed by pressing to the second stop (blow-out).

Tip ejection is initiated with the separate, laterally attached tip ejector button which prevents unintentional ejection of the tips during pipetting.

The identification area on the cover below the volume display may be used to mark each pipette individually. Labels are supplied for this purpose.

Contents	
Design principle	3
Technical data	4
Operation	5
Special notes	6
Exchanging the manifolds	6
Troubleshooting table	7
Maintenance, Cleaning, Sterilization	8
1 Maintenance	8
2 Cleaning	8
3 Sterilization	8
Service / Exchanging the O-rings / Exchanging the piston seals	8
Adjustment / Calibration	10
3.1 Readjustment in the case of error	11
3.2 Recalibration for liquids with a density other than water	11
10 Operational limitations	12
11 Ordering information	13
Sommaire	
1 Définitions	15
2 Spécifications techniques	16
3 Mode opératoire	17
4 Observation particulières	18
5 Remplacement d'un manifold multicanaux	18
6 Tableau d'identification d'anomalies	19
7 Maintenance, Nettoyage, Stérilisation	20
7.1 Maintenance	20
7.2 Nettoyage	20
7.3 Stérilisation	20
8 Réparation / Remplacement des anneaux d'étanchéité / Remplacement des joints de piston	21
9 Réglages et calibrages	23
9.1 Réajustage en cas d'anomalie	24
9.2 Recalibrage avec un liquide dont la densité diffère de celle de l'eau ..	24
10 Limites fonctionnelles	25
11 Nomenclature de commande	26
Indice	
1 Principio de funcionamiento	28
2 Datos técnicos	29
3 Técnica de trabajo	30
4 Indicaciones especiales	31
5 Cambio de los cabezales	31
6 Búsqueda de errores	32
7 Mantenimiento, limpieza, Esterilización	33
7.1 Mantenimiento	33
7.2 Limpieza	33
7.3 Esterilización	33
8 Servicio técnico / Cambio de los anillos tóricos / Cambio de las juntas de los émbolos	34
9 Ajuste / Calibración	36
9.1 Reajuste en caso de error	37
9.2 Recalibración para líquidos con una densidad diferente a la del agua	37
10 Límites de aplicación	38
11 Información para pedidos	39

2 Technical data			
Titerate	Volume	Inaccuracy	Imprecision
0.5 – 10 μ L	1 μ L	$\pm 8.0\%$	$\leq 5.0\%$
	5 μ L	$\pm 4.0\%$	$\leq 2.0\%$
	10 μ L	$\pm 2.0\%$	$\leq 1.0\%$
5 – 50 μ L	5 μ L	$\pm 4.0\%$	$\leq 2.0\%$
	10 μ L	$\pm 2.0\%$	$\leq 1.0\%$
	50 μ L	$\pm 0.8\%$	$\leq 0.4\%$
30 – 300 μ L	50 μ L	$\pm 1.5\%$	$\leq 0.8\%$
	150 μ L	$\pm 1.0\%$	$\leq 0.5\%$
	300 μ L	$\pm 0.6\%$	$\leq 0.2\%$
Liquid:		bidist. water	
Reference temperature:		20 – 25 °C, constant to ± 0.5 °C	
No. of measurements:		12/channel in accordance with DIN12 650 using Original Eppendorf Pipette Tips	
Technical specifications subject to change!			

3 Operation

Assembly

Before inserting the manifold, set the volume display to the highest position possible.

Insert the manifold into the hand grip until it locks.

Volume setting

The volume setting is carried out: for 0.5 – 10 μL , in 0.01 μL increments, for 5 – 50 μL , in 0.05 μL increments, for 30 – 300 μL , in 0.2 μL increments.

- Turn the manifold of the pipette to the most suitable working position.
- Press volume lock (Fig. 1-1) and hold down.
- Set volume by turning the control button (Fig. 1-2).
- Release volume lock.
- The volume set is now secured against inadvertent adjustment.

Filling

When new pipette tips are used, we recommend that liquid be aspirated and dispensed two or three times before pipetting (see Sec. 4).

- Fill reagent reservoir with the required amount of liquid.
- Attach tips.
- Press control button (Fig. 1-2) down to first stop.

- Immerse tips into the liquid.
- Let control button glide back slowly.
- Slide tips out of the liquid along the inside of the reagent reservoir.

Note:
Never lay the pipette down with filled tips!

A pipette carousel stand is available. An adapter for the stand is supplied with each complete Titertate unit.

Dispensing

- Hold tips at an angle against the inner walls of the microtiter plate wells.
- Press control button down to first stop.
- Press button down to second stop to empty tips completely.

Tip ejection

- Press the tip ejector button (Fig. 1-3).

4 Special notes

For utmost precision and accuracy, we recommend that liquid be aspirated and dispensed two or three times (pre-rinse) when new pipette tips are used.

Physical reasons:

- Pressure compensation of the system.
- Vapor pressure adaptation.
- Compensation for slight differences in temperature (Sec. 9).
- Compensation for liquid properties.

Wetting liquids (serum, detergent) form a thin film on the inside of the pipette tip. Without pre-rinsing, the first volume dispensed would be too small due to this retained liquid.

When pipetting serum or solutions with a high viscosity, wait a few seconds after aspiration to allow entire volume to enter the tips before sliding the tips out of the liquid.

5 Exchanging the manifolds

The manifolds of pipettes of the same size are interchangeable. It is therefore possible to change from an 8-channel to a 12-channel manifold (or vice-versa).

Note:
Before removing the manifold, set the volume display to the highest position possible!

Place thumb onto the pipette hand grip and pull the manifold out toward the front through the slit. Assemble the manifold in reverse order and push in until it locks.

5 Troubleshooting table

Error	Cause	Solution
One or more channels drip, pipetted volume incorrect.	<ul style="list-style-type: none"> - Tips are loose. - Wrong pipette tip. - O-ring of channel is damaged. - Piston of the channel is contaminated or seal damaged. 	<ul style="list-style-type: none"> - Attach tips tightly. - Use Original Eppendorf Tips. - Replace defective O-ring (Sec. 8). - Open manifold (Sec. 8). Clean piston and lubricate lightly. If necessary, replace seal. Otherwise, exchange manifold completely (Sec. 5).
Droplets on the inside of one tip.	<ul style="list-style-type: none"> - Nonuniform wetting of the plastic. 	<ul style="list-style-type: none"> - Attach a new pipette tip.
Erratic movement of the control button.	<ul style="list-style-type: none"> - Contamination of the pistons or swelling of the sealing rings caused by organic solvents or caustic liquids. - Manifold not properly locked in. 	<ul style="list-style-type: none"> - Open the manifold (Sec. 8). Clean piston and lubricate lightly. If necessary, replace seal. Otherwise, exchange manifold completely (Sec. 5). - Insert manifold until it locks in position.
Pipette manifold cannot be removed.	<ul style="list-style-type: none"> - Volume display not set to highest position. 	<ul style="list-style-type: none"> - Set volume display to highest position possible.

7

7 Maintenance, Cleaning, Sterilization

7.1 Maintenance

If the Titermate is used correctly, no maintenance is required.

7.2 Cleaning

All parts of the pipette can be cleaned with soap solution or 60 % isopropanol. After cleaning, rinse with distilled water and dry. After cleaning with isopropanol, the O-rings on the nose cones should be lubricated lightly and then wiped with a lint-free tissue. Defective O-rings can be replaced if necessary (Sec. 8).

Disassembly of the manifold may be required to clean contaminated nose cones (Sec. 8).

7.3 Sterilization

Only the manifold of the Titermate can be autoclaved (121 °C, 20 min, 15 psi).

After autoclaving, the manifold may have to be dried at room temperature.

The pipette should only be assembled and used after it has completely cooled down.

Do not autoclave the upper part. The hand grip may only be cleaned with lab cleansing agents (Sec. 7.2).

The special plastic housing enables storage of the pipette under UV light.

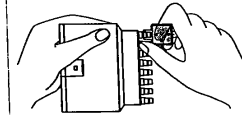
8 Service / Exchanging the O-rings / Exchanging the piston seals

Exchanging the O-rings

A tool for changing the O-rings is included with the device.

- Turn the digital indicator of the pipette to the highest position possible and pull the manifold out of the hand grip.

- Press the opening (A) over the nose cone so that the sharp edge in the opening of the tool is resting on the O-ring (see diagram).



- Using the index finger, press the tool from behind against the nose cone and apply pressure in the other direction using the thumb.

- The O-ring is then severed and can be removed from the nose cone.

Fitting a new O-ring

- Attach the mounting aid enclosed (shortened pipette tip) to the nose cone.

- Push the new O-ring over the tip and onto the nose cone.

8

Exchanging the piston seals

(Please open out front and back cover of this manual so that the diagrams are visible.)

- Turn digital volume indicator of the pipette to the highest position possible and pull the manifold out of the hand grip.
- Place pipette manifold upright onto a bench and press down a little.
- Push the Phillips head screwdriver into the opening (Fig. 1-5) in the manifold cover (Fig. 1-6).
- Caution:** A volume lock is pressed down and the cover plate (Fig. 1-4) springs up.
- Pull the manifold cover off the cover plate.
- Hold manifold so that your fingers wrap around the nose cone holder (held with spring, Fig. 2).
- Loosen both screws with the Phillips head screwdriver and pull off the nose cone holder (Fig. 3). Be careful not to lose the brass nuts that are seated in slots in the top half of the manifold (Fig. 2).
- To clean the piston, pull off springs (uneven placement of the piston springs is intentional). Wipe all pistons (you may use 60% Isopropanol) and lubricate lightly.

- Reattach springs and turn slightly.

Allocation of the springs
8-channel: Piston 3, 4, 5, 6
12-channel: Piston 4, 5, 6, 7, 8 or 5, 6, 7, 8, 9.

The nose cone holder contains the following for each channel: press piece, spring, spring plate and piston seal underneath (Fig. 4).

- To remove the seals, place index finger on the opening of the channel in which the defective seal is located.

0.5 - 10 μ L and 5 - 50 μ L

- Press the pin (B) of the tool into the openings of the nose cone holder and push the press piece slightly upwards. This loosens the press piece and it can be removed (Fig. 5).

Caution: the press piece is under spring tension.

30 - 300 μ L

- Proceed as with all other sizes. The press piece is discarded.
- Remove the spring, spring plates and seal using C (Fig. 6a) and replace the defective seal.

Assembly

0.5 - 10 μ L and 5 - 50 μ L

- Press the tool with the press piece, spring, spring plate and seal into the nose cone again (Fig. 6b). Ensure that the press piece is positioned correctly.

30 - 300 μ L

- Attach a new press piece onto the tool and proceed as with all other sizes.
- The press piece locks into the opening of the nose cone holder.
- Push the nose cone completely over the piston. Hold as shown in Fig. 2.
- Place the brass nuts into the appropriate slot in the top of the manifold and tighten the screws.
- Push on housing, press lateral catches together slightly and press down cover plate until housing snaps into place.

Caution:

After exchanging parts or other maintenance, always check that the pipette functions correctly.

If a problem cannot be solved with the aid of the recommendations above, return the pipette to your Eppendorf distributor.

9 Adjustment / Calibration

The Titermate multichannel pipette is calibrated with water by the manufacturer under the measuring conditions stated in Sec. 2.

If the precision of the pipetting volume is questionable, consider all other possibilities before readjusting the pipette.

Insufficient volume is usually due to leaks or pipette contamination (see Troubleshooting, Sec. 6).

If the volume decreases or increases and the pipette does not leak, all measuring conditions should be tested and, where appropriate, taken into consideration mathematically:

- Sample temperature?
- Pipette temperature?
- Air temperature?
- Conversion from mg into μ L?
- Does the sample have the same density as water?
- Pipetting speed too fast?

If all these conditions are fulfilled, it is probable that the calibration of the pipette has been changed by an unknown influence (e.g. exchange of several essential parts).

9.1 Readjustment in the case of error

Technically a zero point shift, (Sec. 9.2).

- a) Pipette, tips and water must be equilibrated to the same temperature (20–25 °C, constant to ± 0.5 °C).
- b) Adjust the Titermate to the desired maximum volume.
- c) To determine the actual volume the pipette is delivering, attach a tip to a chosen channel. Weigh eight dispensings of water. Convert the mean value of these weights to µL by dividing by the density of water at the testing temperature. Compare this value to the volume setting on the pipette.
- d) To adjust the calibration, insert the Phillips head screwdriver into the calibration opening (Fig. 1-7) on the top of the pipette and connect carefully with the inner adjustment bushing.
- e) Turn the screwdriver to adjust the volume display to match the actual volume delivered by the pipette (measurement under c).
- f) Remove the Phillips head screwdriver.
- g) Adjust the Titermate to the desired maximum volume in the usual way.

- h) Repeat c). Each of the measured channels must be within the tolerances given in the technical data.

If the maximum volume does not correspond with the result of the measurements, repeat a) – h).

9.2 Recalibration for liquids with a density other than water

It is possible to recalibrate the Titermate multichannel pipette to a certain volume of a liquid with a density other than water.

This is technically a zero point shift. The setting of the pipette is changed by a defined amount over the entire measuring range. For example: If for a 5 to 50 µL pipette, there is a compensation of 1 µL at 50 µL or 2 %; the compensation at 5 µL is also 1 µL or 20 %!

- a) Pipette, tips and water must be equilibrated to the same temperature (20–25 °C, constant to ± 0.5 °C).
- b) Adjust the Titermate to the desired maximum volume.

- c) Attach a tip to a chosen channel and pipette and weigh this volume eight times.

The mean value of these weighings is converted to microliters using the formula:

$$\text{Volume} = \frac{\text{Weight}}{\text{Density}}$$

The resulting value is the actual value to which the volume display has to be reset.

- d) Insert the Phillips head screwdriver into the calibration opening on the top of the pipette (Fig. 1-7) connect carefully with the inner adjustment bushing.
- e) Turn the screwdriver to adjust the volume display of the pipette to the actual volume (measurement under c).
- f) Remove the Phillips head screwdriver.
- g) As a control, repeat a) – f).

Caution:

A pipette set in this way provides a dispensing value corresponding with the display only for the liquid used and for the tested volume! Always label the recalibrated Titermate as a fixed volume pipette for "Solution Y".

10 Operational limitations

- Temperature differences between the pipette and the liquid to be pipetted may produce volume errors.
- In addition, volume errors may occur when pipetting liquids with a high vapor pressure or liquids with densities or viscosities clearly different than that of water.

ii Ordering information**Titermate 4908, 8-channel**

0.5 - 10 µL, compl. 22 45 100-6
 5 - 50 µL, compl. 22 45 110-3
 30 - 300 µL, compl. 22 45 120-1

Titermate 4908, 12-channel

0.5 - 10 µL, compl. 22 45 140-5
 5 - 50 µL, compl. 22 45 150-2
 30 - 300 µL, compl. 22 45 160-0

Titermate Manifold, 8-channel

0.5 - 10 µL 22 45 400-5
 5 - 50 µL 22 45 405-6
 30 - 300 µL 22 45 410-2

Titermate Manifold, 12-channel

0.5 - 10 µL 22 45 415-3
 5 - 50 µL 22 45 420-0
 30 - 300 µL 22 45 425-1

Tool

for 0.5 - 10 µL 22 45 650-4
 for 5 - 50 µL 22 45 655-5
 for 30 - 300 µL 22 45 660-1

O-rings for nose cone

(12 pieces); incl. mounting aid
 50 and 300 µL 22 45 633-4

Piston seals for Titermate

(1 press piece, 12 piston seals,
 1 spring, 1 spring plate)
 for 0.5 - 10 µL 22 45 617-2
 for 5 - 50 µL 22 45 619-9
 (12 press pieces, 12 piston seals,
 1 spring, 1 spring plate)
 for 30 - 300 µL 22 45 621-1

Pipette

carousel stand 22 44 500-6

**Titermate adapter
 for carousel stand** 22 45 530-3

Reagent reservoir 22 26 580-6

**Phillips head
 screwdriver** 22 45 648-2

Silicone grease 22 45 850-7

Pipette tips

(The packaging units stated
 represent the minimum ordering
 quantity).

Enviroset

(1 Envirobox plus 672 Envirotips)
 10 µL 22 49 050-8
 100 µL 22 49 055-9
 300 µL 22 49 057-5

Envirotips in racks

(1 set = 960 tips)
 10 µL 22 49 040-1
 100 µL 22 49 042-7
 300 µL 22 49 043-5

Enviroboxes

(1 Envirobox plus 96 Envirotips)
 10 µL 22 49 080-0
 100 µL 22 49 085-1
 300 µL 22 49 087-7

Eppendorf Biorpur pipette tips

sterile, pyrogen-free, DNA-free,
 RNase-free, ATP-free
 (in boxes, 5 x 96 = 480 tips)
 10 µL 22 49 000-1
 100 µL 22 49 022-8
 300 µL 22 49 003-6

Eppendorf Biorpur pipette tips

individually wrapped
 (1 set = 100 tips)
 100 µL 22 49 004-4

Filtertips

(presterile racks, 1 set = 480 tips)

Titermate
 for 0.5 - 10 µL 22 49 030-3
 for 5 - 50 µL 22 49 032-0
 for 30 - 300 µL 22 49 035-4
 (up to 250 µL)

Important note:

Please only use the accessories
 recommended by Eppendorf.
 Using spare parts or disposables
 which we have not recommended
 can reduce the precision, accuracy
 and life of the pipette. We do not
 honor any warranty or accept any
 responsibility for damage resulting
 from such action.