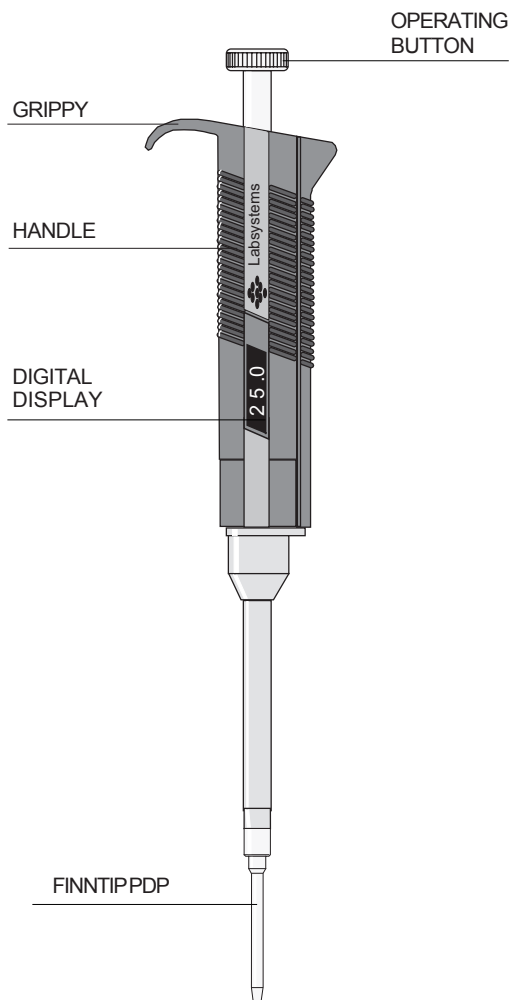


FINNPIPETTE PDP

INSTRUCTIONS FOR USE



Thermo
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PRODUCT DESCRIPTION

The FINNPIPETTE PDP is a continuously adjustable, positive displacement pipette specially designed for PCR (Polymerase Chain Reaction) [1] work.

It operates on the positive displacement principle (i.e. no air interface) and uses detachable, disposable tips with a pre-assembled plunger.

FINNPIPETTE PDP pipettes cover a volume range of 0.5 µl to 200 µl.

RAW MATERIALS

The FINNPIPETTE PDP is made of mechanically durable and chemically resistant materials:

Operating button	PA
Handle	polyamide
Tip ejector	polyamide
Tip cone	PVDF

THE DIGITAL DISPLAY (Fig.1)

The adjusted delivery volume is clearly indicated by the digital display on the pipette handle.

[1] The Polymerase Chain Reaction process PCR, is covered by US patents issued to the Cetus Corporation.

DESCRIPTION OF FINNTIP PDP (Fig.4)

FINNPIPETTE PDP tips are supplied in racks of 96 or bags of 960. The product code numbers are as follows:

Cat.No.	Volume	Qty
9403070	0.5-25µl	960/bag
9403080	20-200µl	960/bag

PIPETTE OPERATION

SETTING THE DELIVERY VOLUME (Fig.2)

- The delivery volume is set using the operating button on the top of the pipette. To increase the delivery volume turn the operating button counterclockwise. To decrease, turn it clockwise.
- Make sure that the desired delivery volume clicks into place and that the digits are completely visible on the handle display.
- Do not set volumes outside of the pipette's specified volume range!

ATTACHING A TIP (Fig.5)

Attach a Finntip PDP from a rack as follows:

- Push the pipette firmly onto the tip until the tip and cone snap.
- Without removing the tip from the tray press the operating button to the first stop to engage the plunger.
- The tip and plunger are now attached for pipetting.

TIP EJECTION (Fig.3)

1. To remove the tip and plunger from the pipette simply press the operating button all the way down.
2. Then release the operating button.
3. This action simultaneously ejects the tip and the plunger.

PIPETTING TECHNIQUE

Figure 6

A = Ready Position

B = Pipetting Stop

C = Tip Ejection

Ensure that clean tips are firmly pushed on to the tip cones of the pipette.

The operation of the pipette is controlled by the operating button. For the best possible accuracy:

Operate the button slowly and with steady speed at all times, particularly when working with liquids having high viscosity. Never let the operating button snap back. When working with serum or biological fluids prime the tips with the liquid before pipetting. This is done by filling and emptying the tips.

Hold the pipette vertically (10 degrees maximum from vertical) during the liquid intake. For maximum hand control, hold the pipette tightly in the hand with the "Grippy" resting on the index finger.

Fill a clean reagent reservoir with the liquid to be dispensed.

1. Depress the operating button to the pipetting stop.
2. Dip the tip just under the surface of the liquid in the reservoir (2-3 mm) and slowly release the operating button. Withdraw the tip from the liquid touching them against the edge the reservoir to remove excess liquid.
3. Deliver the liquid by gently depressing the operating button to the pipetting stop.
4. Release the operating button to the ready position.

If necessary, change the tips and continue with the pipetting.

MAINTENANCE

When the FINNPIPETTE PDP is not in use make sure it is safely stored in a vertical position, preferably on a Finnpiquette Stand.

SHORT TERM CHECKING

The pipette should be checked at the beginning of each day for dust and dirt on outside surfaces of the pipette. Particular attention should be paid to the tip cones. Solvents should not be used for cleaning the pipette.

LONG TERM MAINTENANCE

If the pipette is used daily it should be checked at least twice a year. The servicing procedure starts with disassembly of the pipette.

1. To remove tip cone cover:
Insert the tooth of the service tool into the opening at the base of the tip cone cover.
2. Pull away the tip cone cover
3. Remove the tip cone by turning it counterclockwise with the service tool.
4. Pull out the piston.
5. Clean the piston and the piston spring with a dry napless cloth.
6. Grease the cleaned parts with lubricant provided in the package.
7. Reassemble the parts.

CALIBRATION

All Finnpiquettes are factory calibrated and adjusted to give the volumes as specified with distilled or deionized water. Normally, the pipettes do not need adjustment, but they are constructed to permit recalibration and adjustment for liquids of different temperature and viscosity.

DEVICE REQUIREMENTS AND TEST CONDITIONS

An analytical balance must be used. The scale graduation value of the balance should be chosen according to the selected test volume of the pipette:

Volume	range	readable	graduation
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under 10	μl	0.001	mg
10-100	μl	0.01	mg
above 100	μl	0.1	mg

Test liquid: Water, distilled or deionized, “grade 3” water conforming ISO 3696. Tests are done in a draft-free room at a constant ($\pm 0.5^{\circ}\text{C}$) temperature of water, pipette and air between 20°C to 25°C . The relative humidity must be above 55%. Especially with volumes under $50\ \mu\text{l}$ the air humidity should be as high as possible to reduce the effect of evaporation loss. Special accessories, such as the evaporation trap, are recommended.

CHECKING THE CALIBRATION

A new tip is first pre-wetted 3-5 times and a series of ten pipettings are done with both volumes.

A pipette is always adjusted for delivery (Ex) of the selected volume. Measuring volumes taken from balance is not allowed. If the calculated results are in the limits, the calibration of the pipette is correct.

Procedure:

1. Do 10 pipettings with the lower volume.
2. Do 10 pipettings with the maximum volume.
3. Calculate the accuracy (A) and precision (cv) of both series.
4. Compare the results to the limits in the Table 1.

If the results are in the limits of Table 1, then the calibration of the pipette is correct. Otherwise the pipette must be adjusted and checked again.

Range	Volume μl	Accuracy		Precision	
		μl	%	s.d. μl	cv%**
0,5-25 μl	25 μl	± 0.625	± 2.5	0.250	1.0
	5 μl	± 0.250	± 5.0	0.125	2.5
	0.5 μl	*	*	*	*
20-200 μl	200 μl	± 3.0	± 1.5	0.40	0.2
	50 μl	± 2.0	± 4.0	0.25	0.5
	20 μl	*	*	*	*

*User dependent **s.d. = Standard Deviation, CV = Coefficient of Variation

ADJUSTMENT (Fig.7)

Adjustment is done with the service tool.

1. Place the service tool into the openings of the calibration nut at the top of the handle.
2. Turn the service tool clockwise to decrease, or counterclockwise to increase the volume.
3. After adjustment check the calibration according to the instructions above.

FORMULAS FOR CALCULATING RESULTS

Conversion of mass to volume

$$V = (w + e) \times Z$$

V = volume (μl)

w = weight (mg)

e = evaporation loss (mg)

Z = conversion factor for mg/ μl conversion

Evaporation loss can be significant with low volumes. To determine mass loss, dispense water to the weighing vessel, note the reading and start a stopwatch.

See how much the reading decreases during 30 seconds (e.g. 6 mg = 0.2 mg/s). Compare this to the pipetting time from taring to reading. Typically pipetting time might be 10 seconds and the mass loss is 2 mg (10s x 0.2mg/s) in this example. If an evaporation trap or lid on the vessel is used the correction of evaporation is usually unnecessary.

The factor Z is for converting the weight of the water to volume at test temperature and pressure. A typical value is 1.0032 $\mu\text{l}/\text{mg}$ at 22°C and 95 kPa. See the conversion table on page 8.

Accuracy (systematic error)

Accuracy is the difference between the dispensed volume and the selected volume of a pipette.

$$A = \bar{V} - V_0$$

A = accuracy
 \bar{V} = mean volume
 V_0 = nominal volume

Accuracy can be expressed as a relative value:

$$A\% = 100\% \times A / V_0$$

Precision (random error)

Precision refers to the repeatability of the pipettings. It is expressed as standard deviation (s) or coefficient of variation (cv)

$$S = \sqrt{\frac{\sum_{i=1}^n (V_i - \bar{V})^2}{n-1}}$$

s = standards deviation
 \bar{V} = mean volume
 n = number of measurements
 cv is the relative value of standard deviation.
 $cv = 100\% \times s / \bar{V}$

PACKAGE

The FINNPIPETTE PDP is shipped in a specially designed package containing the following items:

1. The pipette
2. Instruction manual
3. Service tool
4. Calibration certificate
5. Sample of Finntip PDP

TROUBLE SHOOTING

The following table is a guide to possible problems and their solutions.

Fault	Possible reason	Solution
Leakage	Tip incorrectly attached	Attach firmly
	Foreign bodies between tips and tip cones	Clean tip cones thoroughly and attach new tips
Inaccurate dispensing	Incorrect operation	Follow instructions carefully
	Tips incorrectly attached	Attach firmly
	Calibration altered: e.g. caused by misuse	Recalibrate according to instructions
Inaccurate dispensing with certain liquids	Unsuitable calibration. Many high viscosity liquids require recalibration	Recalibrate with the liquids in question

CAUTION!

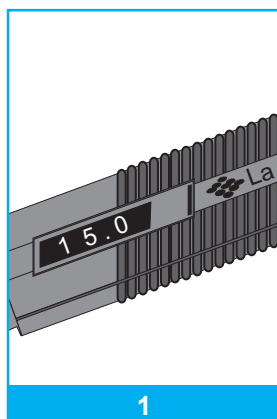
The Finnpiquette is designed to allow easy in-lab service. If you, however, want to send the pipette to us or to our local representative for service, please, enclose a list of any infectious, radioactive or otherwise hazardous materials that have been pipetted.

Also, please, note that the postal authorities in your country may limit the sending of contaminated material by mail.

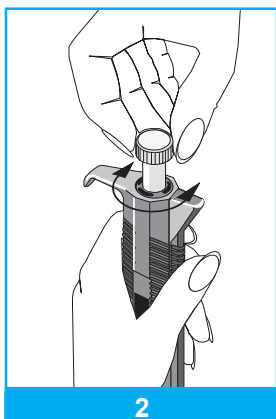
CONVERSION TABLE

Value of the conversion factor Z ($\mu\text{l}/\text{mg}$), as a function of temperature and pressure, for distilled water.

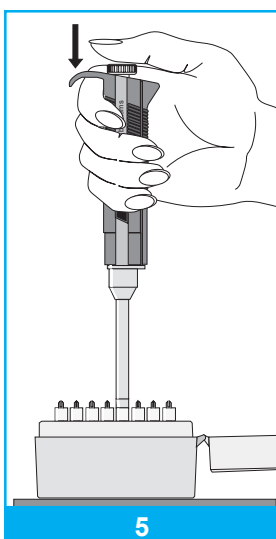
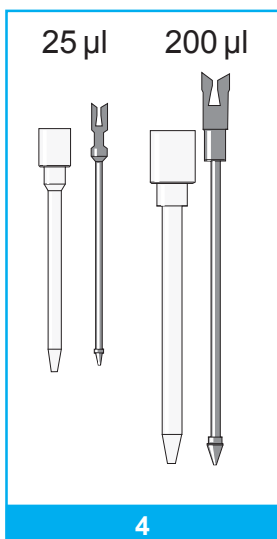
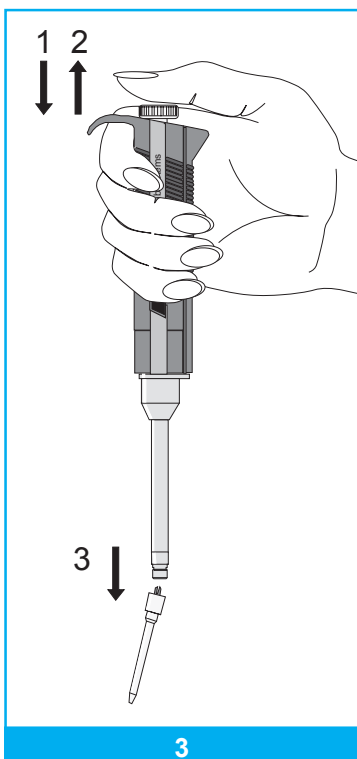
Temperature °C	Air pressure hPA (mbar)					
	800	853	907	960	1013	1067
15	1.0018	1.0018	1.0019	1.0019	1.0020	1.0020
15.5	1.0018	1.0018	1.0019	1.0020	1.0020	1.0021
16	1.0019	1.0020	1.0020	1.0021	1.0021	1.0022
16.5	1.0020	1.0020	1.0021	1.0022	1.0022	1.0023
17	1.0021	1.0021	1.0022	1.0022	1.0023	1.0023
17.5	1.0022	1.0022	1.0023	1.0023	1.0024	1.0024
18	1.0022	1.0023	1.0024	1.0024	1.0025	1.0025
18.5	1.0023	1.0024	1.0025	1.0025	1.0026	1.0026
19	1.0024	1.0025	1.0025	1.0026	1.0027	1.0027
19.5	1.0025	1.0026	1.0026	1.0027	1.0028	1.0028
20	1.0026	1.0027	1.0027	1.0028	1.0029	1.0029
20.5	1.0027	1.0028	1.0028	1.0029	1.0030	1.0030
21	1.0028	1.0029	1.0030	1.0030	1.0031	1.0031
21.5	1.0030	1.0030	1.0031	1.0031	1.0032	1.0032
22	1.0031	1.0031	1.0032	1.0032	1.0033	1.0033
22.5	1.0032	1.0032	1.0033	1.0033	1.0034	1.0035
23	1.0033	1.0033	1.0034	1.0035	1.0035	1.0036
23.5	1.0034	1.0035	1.0035	1.0036	1.0036	1.0037
24	1.0035	1.0036	1.0036	1.0037	1.0038	1.0038
24.5	1.0037	1.0037	1.0038	1.0038	1.0039	1.0039
25	1.0038	1.0038	1.0039	1.0039	1.0040	1.0041
25.5	1.0039	1.0040	1.0040	1.0041	1.0041	1.0042
26	1.0040	1.0041	1.0042	1.0042	1.0043	1.0043
26.5	1.0042	1.0042	1.0043	1.0043	1.0044	1.0045
27	1.0043	1.0044	1.0044	1.0045	1.0045	1.0046
27.5	1.0044	1.0045	1.0046	1.0046	1.0047	1.0047
28	1.0046	1.0046	1.0047	1.0048	1.0048	1.0049
28.5	1.0047	1.0048	1.0048	1.0049	1.0050	1.0050
29	1.0049	1.0049	1.0050	1.0050	1.0051	1.0052
29.5	1.0050	1.0051	1.0051	1.0052	1.0052	1.0053
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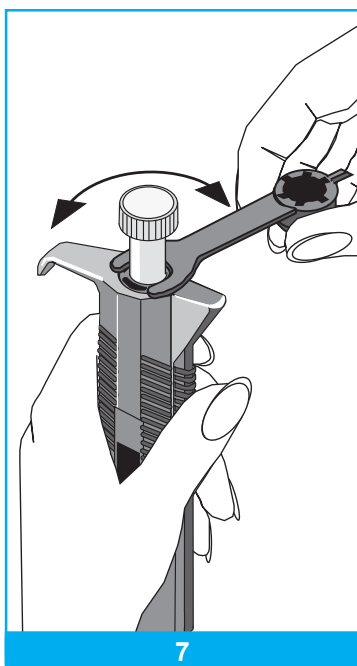
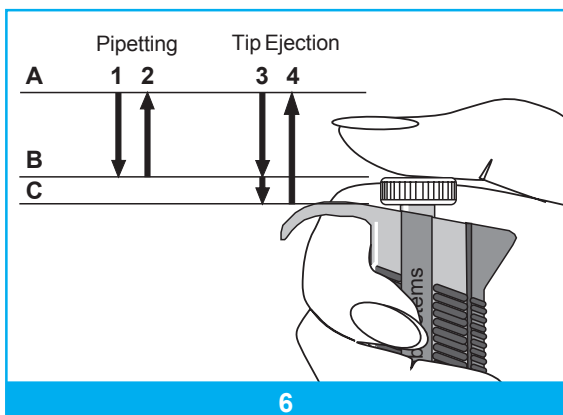


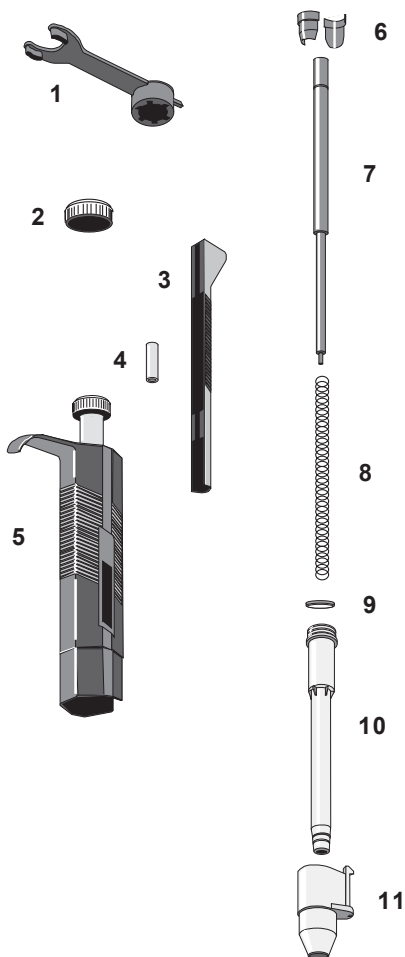
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No. Item

Product Codes

		25 µl	200 µl
1.	Service Tool	10589070	10589070
2.	Cap	1057490	1057500
3.	Handle Back	10588030	10588030
4.	Limiter	1092990	1092990
5.	Handle	2204030	2204040
6.	Locking Pieces	1058180	1058180
7.	Plunger	1106230	1106300
8.	Oper. Spring	1130720	1130720
9.	Ring		1006500
10.	Tip Cone	1058790	10588000
11.	Tip Cone Cover	10588011	10588011

SPARE PARTS

Product specifications are subject to change without prior notice. Finpipette® and Finntip® are registered trademarks of Thermo Electron Oy.

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