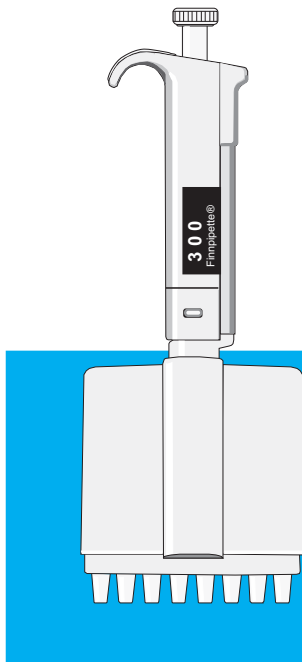


# Finnpipette®

## Digital Multichannel

Instructions for Use  
Bedienungsanleitung  
Guide d'utilisation et d'entretien  
Instrucciones de uso

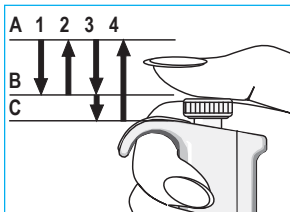


**Thermo**  
ELECTRON CORPORATION

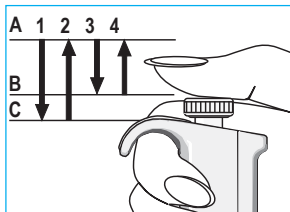
Thermo Electron Oy  
P.O.Box 100, Fin-01621 Vantaa, Finland  
Tel. +358-9-329 100, fax -358-9-3291 0414  
[www.thermo.com/finnpipette](http://www.thermo.com/finnpipette)



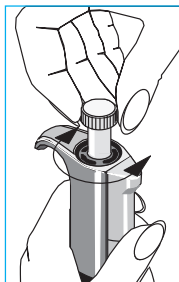
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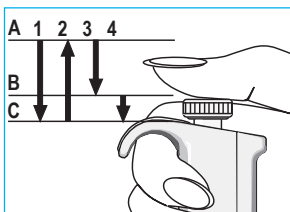
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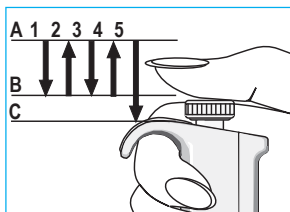
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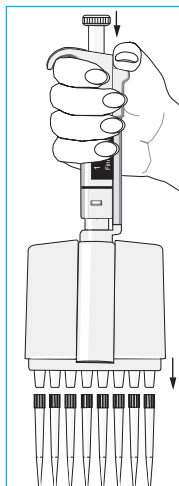
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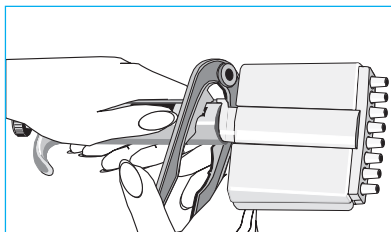
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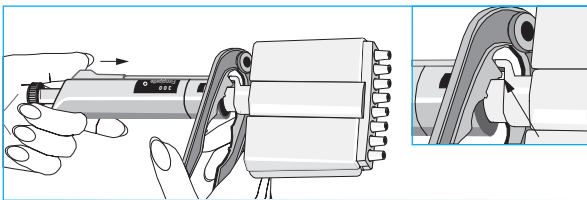
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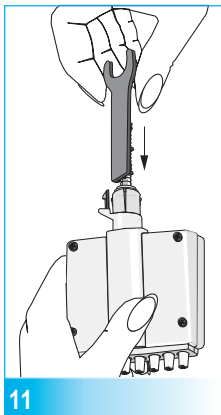
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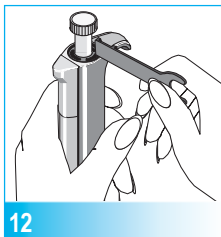
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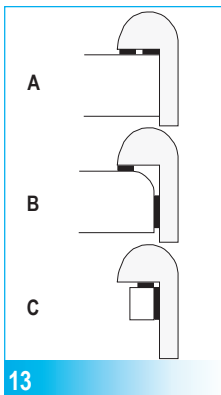
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## PRODUCT DESCRIPTION

The Finnpiquette Digital Multichannel is an autoclavable digital pipette. It operates on the air displacement principle (i.e. an air interface) and uses detachable, disposable tips.

The adjusted delivery volume is displayed digitally on a readout window on the handle. The six different models of Finnpiquette Digital Multichannel pipettes cover a volume range from 0.5  $\mu\text{l}$  to 300  $\mu\text{l}$ .

Order No.	Channel	Volume Range	Finntip
4510000	8	0.5 $\mu\text{l}$ to 10 $\mu\text{l}$	10
4510010	12	0.5 $\mu\text{l}$ to 10 $\mu\text{l}$	10
4510020	8	5 $\mu\text{l}$ to 50 $\mu\text{l}$	250, 300, Band 4
4510030	8	50 $\mu\text{l}$ to 300 $\mu\text{l}$	250, 300, Band 4
4510040	12	5 $\mu\text{l}$ to 50 $\mu\text{l}$	250, 300, Band 4
4510050	12	50 $\mu\text{l}$ to 300 $\mu\text{l}$	250, 300, Band 4
4510070	16	5 $\mu\text{l}$ to 50 $\mu\text{l}$	Finntip 50

### 1 DIGITAL DISPLAY

The adjusted delivery volume is clearly indicated in the large digital display on the handle.

### RAW MATERIALS

The Finnpiquette Digital is made of mechanically durable and chemically resistant materials which allow repeated autoclaving of the complete pipette at 121°C.

### DESCRIPTION OF TIPS

Finntips are recommended for use with the Finnpiquette Digital Multichannel.

They are made of natural colour polypropylene, generally regarded as the only contamination free material suitable for tips. Finntips are also autoclavable (121°C).

## PIPETTE OPERATION

### SETTING THE DELIVERY VOLUME

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

Using excessive force to turn the push button outside the range may jam the mechanism and eventually damage the pipette.

### 3 TIP EJECTION

To help eliminate the risk of contamination, each pipette is fitted with a tip ejector system.

The tip ejector system consists of a soft-touch tip ejector and specially designed gearing mechanism. To release the tip, point the pipette at suitable waste receptacle and press the tip ejector with your thumb.

### SAFETY LABEL

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You can mark the pipette application your initials the calibration date, etc. on the safety label.

Remove the clear plastic window on the edge closest to the push button (use the service tool that comes with the pipette, or a screwdriver). Mark the adhesive label with a felt-tipped or other pen and snap the window back in place.

### SHELF HANGER

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You can attach the pipette shelf hanger on a counter, pipette stand or anywhere where you want to hang your pipette.

Clean the area where you plan to attach the shelf hanger. Apply two stickers to the underside of the shelf hanger. Press the shelf hanger firmly into place -- on a shelf, countertop or pipette stand. To use, hang the grippy finger rest on the shelf hanger.

## PIPETTING TECHNIQUES

Push and release the push button slowly at all times, particularly when working with high viscosity liquids. Never allow the push button to snap back.

Make sure that the tip is firmly attached to the tip cone. Check for foreign particles in the tip.

Before you begin your actual pipetting work, fill and empty the tip 2-3 times with the solution that you will be pipetting. Hold the pipette in an upright position while aspirating liquid. The grippy should rest on your index finger. Make sure that the tips, pipette and solution are at the same temperature.

#### Figures 4-7:

- A = Ready position**
- B = First stop**
- C = Second stop**

### FORWARD TECHNIQUE

4

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

1. Depress the push button to the first stop.
2. Dip the tip under the surface of the liquid in the reservoir to a depth of about 1 cm and slowly release the push button. Withdraw the tip from the liquid touching it against the edge of the reservoir to remove excess liquid.
3. Deliver the liquid by gently depressing the push button to the first stop. After a delay of about one second, continue to depress the push button all the way to the second stop. This action will empty the tip.
4. Release the push button to the ready position.

If necessary, change the tip and continue pipetting.

## 5 REVERSE TECHNIQUE

The reverse technique is suitable for dispensing liquids that have a high viscosity or a tendency to foam easily. The technique is also recommended for dispensing very small volumes.

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

1. Depress the push button all the way to the second stop.
2. Dip the tip under the surface of the liquid in the reservoir to a depth of about 1 cm, and slowly release the push button.  
This action will fill the tip. Withdraw the tip from the liquid touching it against the edge of the reservoir to remove excess liquid.
3. Deliver the preset volume by gently depressing the push button to the first stop. Hold the push button at the first stop. Some liquid will remain in the tip and this should not be included in the delivery.
4. The remaining liquid should either be discarded with the tip or pipetted back into the container.

## 6 REPETITIVE TECHNIQUE

The repetitive technique offers a rapid and simple procedure for repeated delivery of the same volume. Fill a clean reagent reservoir with the liquid to be dispensed.

1. Depress the push button all the way to the second stop.
2. Dip the tip under the surface of the liquid in the reservoir to a depth of about 1 cm, and slowly release the push button. This action will fill the tip. Withdraw the tip from the liquid touching against the edge of the reservoir to remove excess liquid.
3. Deliver the preset volume by gently depressing the push button to the first stop. Hold the push button at the first stop. Some liquid will remain in the tip and this should not be included in the delivery.
4. Continue pipetting by repeating steps 2 and 3.

## 7 PIPETTING WHOLE BLOOD

(deproteinization in blood glucose determination, for example)

Use steps 1 and 2 of the forward technique to fill the tip with blood.

Wipe the tip carefully with a dry clean tissue.

1. Immerse the tip into the reagent and depress the push button to the first stop, making sure the tip is well below the surface.
2. Release the push button slowly to the ready position. This will fill the tip. Keep the tip in the solution.
3. Depress the push button to the first stop and release slowly. Keep repeating this procedure until the interior wall of the tip is clear.
4. Finally, depress the push button all the way to the second stop to completely empty the tip.

## CALIBRATION

All Finnpiettes 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
under 10 $\mu$ l	0.001mg
10-100 $\mu$ l	0.01mg
above 100 $\mu$ l	0.1mg

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  $15^{\circ}\text{C}$  to  $30^{\circ}\text{C}$ . The relative humidity must be above 50%. Especially with volumes under 50 $\mu$ 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

The pipette is checked at the maximum volume (nominal volume) and the minimum volume or 10 % of the maximum volume, whichever is higher. E.g. Finnpiquette 0.5-10  $\mu$ l is tested at 10  $\mu$ l and 1  $\mu$ l. Both volumes are tested with the two end channels. 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.

Range	Channel	Volume $\mu$ l	Accuracy		Precision	
			$\mu$ l	%	s.d. $\mu$ l	cv%
0,5-10 $\mu$ l	8	10	$\pm 0.24$	$\pm 2.4$	0.16	1.6
		1	$\pm 0.12$	$\pm 12.0$	0.08	8.0
5-50 $\mu$ l	8	50	$\pm 0.75$	$\pm 1.5$	0.35	0.7
		5	$\pm 0.25$	$\pm 5.0$	0.10	2.0
50-300 $\mu$ l	8	300	$\pm 3.0$	$\pm 1.0$	0.9	0.3
		50	$\pm 2.3$	$\pm 4.6$	0.8	1.5
0,5-10 $\mu$ l	12	10	$\pm 0.24$	$\pm 2.4$	0.16	1.6
		1	$\pm 0.12$	$\pm 12.0$	0.08	8.0
5-50 $\mu$ l	12	50	$\pm 0.75$	$\pm 1.5$	0.35	0.7
		5	$\pm 0.25$	$\pm 5.0$	0.10	2.0
50-300 $\mu$ l	12	300	$\pm 3.0$	$\pm 1.0$	0.9	0.3
		50	$\pm 2.3$	$\pm 4.6$	0.8	1.5
5-50 $\mu$ l	16	50	$\pm 0.75$	$\pm 1.5$	0.35	0.7
		5	$\pm 0.25$	$\pm 5.0$	0.10	2.0

### Procedure:

1. Do 10 pipettings with the minimum 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.

## ADJUSTMENT:

Adjustment is done with the service tool.

1. The adjustment is done at the lower volume with one of the middle channels.
2. Place the service tool into the openings of the calibration nut at the top of the handle.
3. Turn the service tool clockwise to increase, or counterclockwise to decrease the volume.
4. 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 ( $\mu\text{l}$ )  
 $w$  = weight (mg)  
 $e$  = evaporation loss (mg)  
 $Z$  = conversion factor for mg/ $\mu\text{l}$  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. 6mg = 0.2mg/s). Compare this to the pipetting time from taring to reading. Typically pipetting time might be 10 seconds and the mass loss is 2mg (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 35.

### 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.  
 $cv = 100\% \times s / \bar{v}$

## MAINTENANCE

When the Finnpiptette Digital Multichannel is not in use, make sure it is stored in an upright position. We recommend a Finnpiptette stand for this purpose.

### SHORT-TERM CHECKING

The pipette should be checked at the beginning of each day for dust and dirt on the outside surfaces of the pipette.

Particular attention should be paid to the tip cone. No other solvents except 70 % ethanol should be used to clean the pipette.



## LONG-TERM MAINTENANCE

If the pipette is used daily it should be checked every three months. The servicing procedure starts with the disassembly of the pipette.

### DISASSEMBLING ASSEMBLING MULTICHANNEL PIPETTES

1. Press down the tip ejector. 9
  2. Insert the maintenance pliers under the tip ejector bar to release the tip ejector.
  3. Remove the tip cone module by pressing it with the maintenance pliers. 10
  4. Press the spring and remove the locking pieces from the groove. Remove the spring, spring support and o-ring.
  5. Place the maintenance key in the adapter groove and pull off the adapter. 11
  6. Pull out the tip ejector adapter. Lift the upper end of the tip ejector bar slightly and push it back. Lift out the module spring.
  7. Use a screwdriver to remove the four/six screws in the module cover and lift off the cover.
  8. Remove the piston bar and clean the pistons with a dry nap-free cloth.
  9. Clean the tip cones.
  10. If needed, replace the seal by carefully releasing the cover ring from its snap joint with the screwdriver. Remove all the parts from the tip cone. Clean all the parts. Reassemble the tip cone. 14
- 5–50 µl and 50–300 µl:** Take one piston. Slide cover ring 32 (larger hole), spring 33, support ring 35, (o-ring 37 bigger 5-50µl) and o-ring 36 (smaller) onto the piston. Grease the o-ring with the lubricant provided in the pipette package. Slide all the parts into the tip cone and close the snap joint of the cover ring.
- 0.5–10 µl:** Take one piston. Slide cover ring 32 (larger hole), support 35, o-ring 36 (bigger), o-ring 37 (smaller) and o-ring support 38 onto the piston. Then slide spring 39, spring support 40 (sharp edges first) and o-ring 41 onto the o-ring support 38. Grease the o-rings with the lubricant provided in the pipette package. Slide all the parts into the tip cone and close the snap joint of the cover ring.
11. Grease cleaned pistons with the lubricant provided in the pipette package.
  12. Install the piston bar with pistons and tip cones in the cover and close the cover with the four/six screws.
  13. Place the tip ejector and module spring on the neck of the module. Press the spring below the tip ejector. Close the tip ejector with the tip ejector adapter.
  14. Use the maintenance key to slide the adapter to wider groove in the module neck.
  15. Slide the o-ring, spring support and spring onto the piston bar and lock with the locking pieces.
  16. Attach the tip cone module to the handle and the tip ejector adapter to the tip ejector bar.

## STERILIZATION

The entire pipette can be sterilized by autoclaving it at 121°C (252°F) (minimum 20 minutes). No special preparations are needed for autoclaving. You can use steam sterilization bags if needed.

After autoclaving the pipette must be cooled to room temperature for at least two hours. Before pipetting, make sure that the pipette is dry. We recommend that you check the calibration of after every 25th sterilization cycle.

**CAUTION!**

*The Finnpiquette is designed to allow easy in-lab service. If you would prefer to have us or your local representative service your pipette, please make sure that the pipette has been decontaminated before you send it to us. Please note that the postal authorities in your country may prohibit or restrict the shipment of contaminated material by mail.*

**TROUBLE SHOOTING**

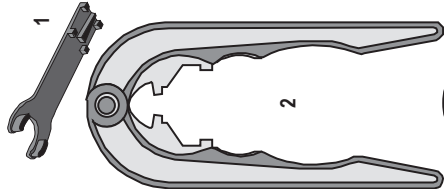
The table below lists possible problems and their solutions.

Defect	Possible reason	Solution
Leakage	Tip incorrectly attached	Attach firmly
	Foreign particles between tip and tip cone	Clean tip cones attach new tips
	Foreign particles between the piston, the O-ring and the cylinder	Clean and grease O-ring and cylinder.
	Insufficient amount of grease on cylinder and O-ring	Grease accordingly
	O-ring damaged	Change the O-ring
Inaccurate dispensing	Incorrect operation	Follow instructions carefully
	Tip incorrectly attached	Attach firmly
	Calibration altered: caused by misuse, for example	Recalibrate according to instructions
Inaccurate dispensing with certain liquids	Unsuitable calibration. High viscosity liquids may require recalibration.	Recalibrate with the liquids in question.

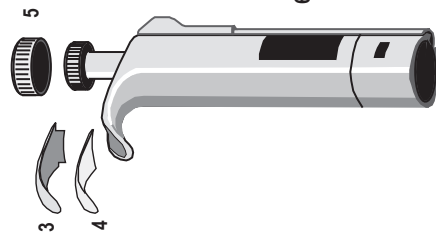
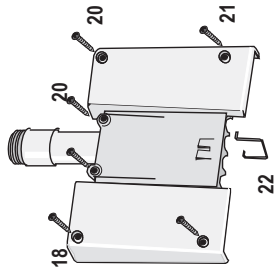
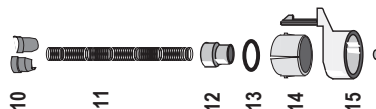
**PACKAGE**

The Finnpiquette Digital is shipped in a specially designed package containing the following items:

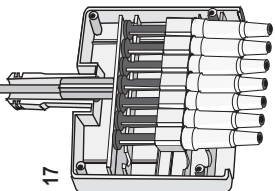
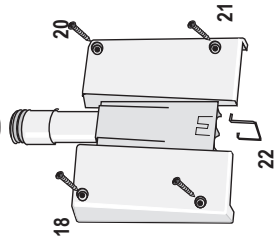
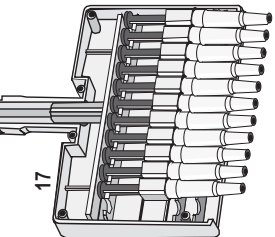
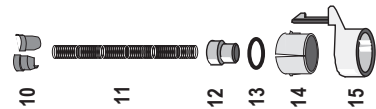
- |                       |                       |                            |
|-----------------------|-----------------------|----------------------------|
| 1. The Finnpiquette   | 4. Finntip sample     | 7. Calibration certificate |
| 2. Service tool       | 5. Tube of grease     | 8. Shelf hanger            |
| 3. Maintenance pliers | 6. Instruction manual | 9. Two stickers            |

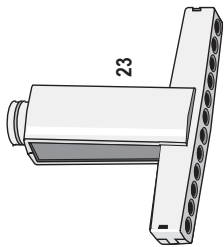


**12-channel**

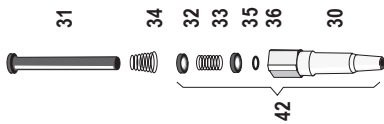


**8-channel**

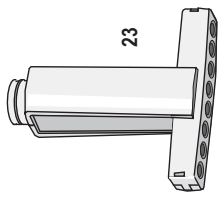
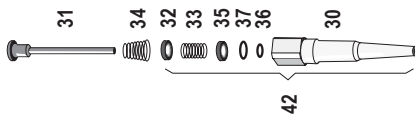




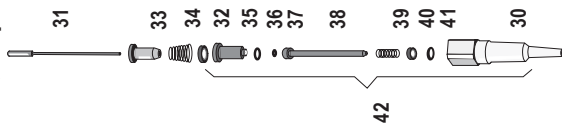
50-300  $\mu$ l



5-50  $\mu$ l



0,5-10  $\mu$ l



## Module

### 16-ch 5-50 µl 2207020

- 10. 1058180
- 11. 1131890
- 12. 10593260
- 13. 1030590
- 14. 10593220
- 15. 10593210
- 16. 2205970
- 17. 10589270
- 18. 10589260
- 19. 1131430
- 20. 0202040
- 21. 0202020
- 22. 1131930
- 23. 10589285
- 24. 10593800
- 30. 10593810
- 31. 11071320
- 32. 10593840
- 33. 1132130
- 34. 1131790
- 35. 10593500
- 36. 1030170
- 37. 10593870
- 42. 2207050 1 pcs
- 42. 2207950 16 pcs

