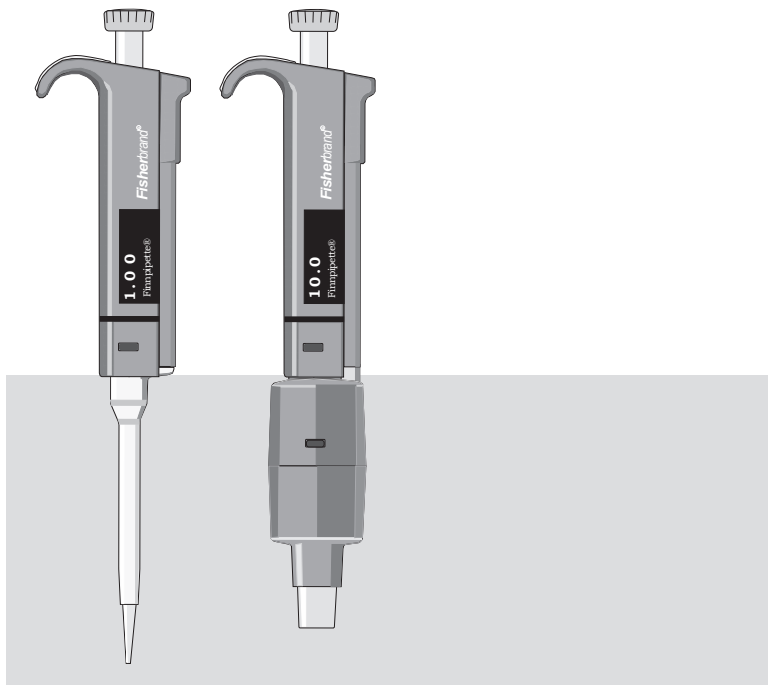


Fisherbrand[®] Finnpipette II

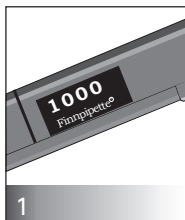
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INSTRUCTIONS FOR USE

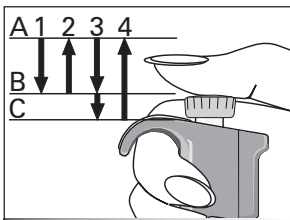


Fisher Scientific

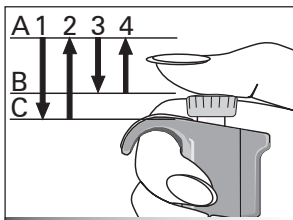
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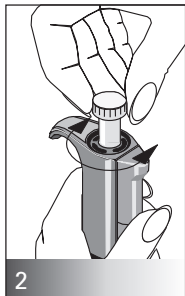
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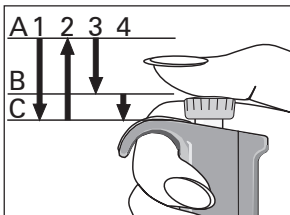
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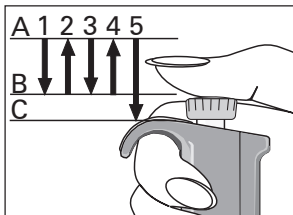
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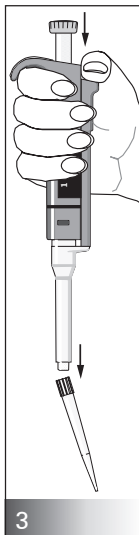
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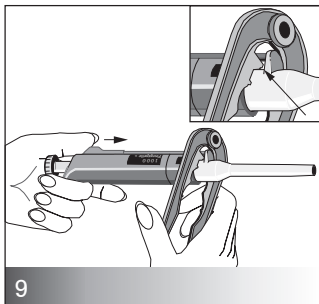
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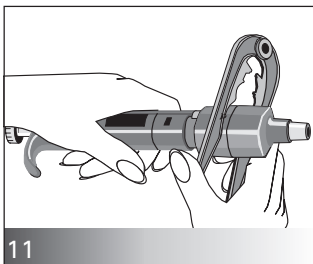
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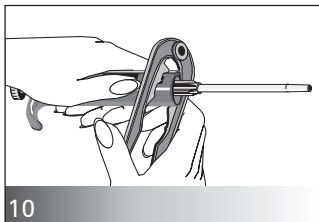
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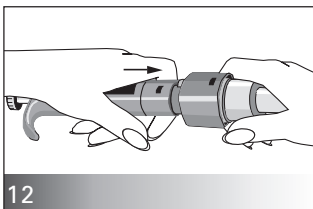
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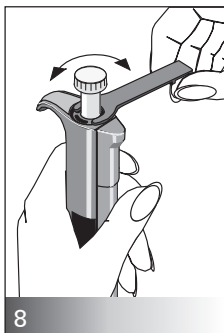
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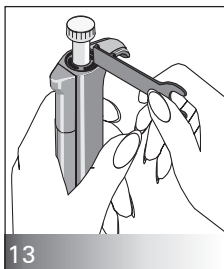
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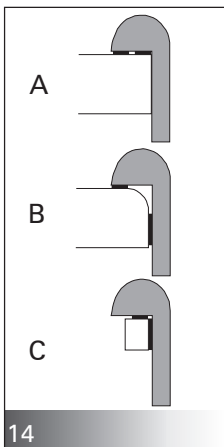
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14

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PRODUCT DESCRIPTION

The **Fisherbrand**[®] Finn timer pipette II is a manual 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 eleven different models of **Fisherbrand**[®] Finn timer pipette II pipettes cover a volume range from 0.2 μ l to 10 ml.

Fisher Catalog Number	Volume Range	Tip Size
21377814	0.2 μ l - 2 μ l, micro	10
21377815	0.5 μ l - 10 μ l, micro	10
21377816	0.5 μ l - 10 μ l	250 Universal, 200 Ext
21377817	2 μ l - 20 μ l	250 Universal, 300, 200 Ext
21377818	5 μ l - 50 μ l	250 Universal, 300, 200 Ext
21377819	10 μ l - 100 μ l	250 Universal, 300, 200 Ext
21377820	20 μ l - 200 μ l	250 Universal, 300, 200 Ext
21377821	100 μ l - 1000 μ l	1000, 1000 Ext
21377822	200 μ l - 1000 μ l	1000
21377823	1 ml - 5 ml	5 ml
21377824	2 ml - 10 ml	10 ml

1 DIGITAL DISPLAY

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

RAWMATERIALS

The **Fisherbrand**[®] Finn timer pipette II is made of mechanically durable and chemically resistant materials.

PIPETTE OPERATION

SETTING THE DELIVERY VOLUME

1. 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.
2. Make sure that the desired delivery volume clicks into place and that the digits are completely visible in the display window.
3. 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.

TIP EJECTION

3

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

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

13

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

14

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. The pipettes are constructed to permit re-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 μl	0.00 1 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 15°C to 30°C . The relative humidity must be above 50%. Especially with volumes under 50 μl 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.

PROCEDURE TO CHECK CALIBRATION

The pipette is checked with the maximum volume (nominal volume) and with the minimum volume. A new tip is first pre-wetted 3-5 times and a series of ten pipettings is done with both volumes. A pipette is always adjusted for delivery (Ex) of the selected volume.

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 calculated results are within the selected limits, the adjustment of the pipette is correct.

TABLE 1: Maximum permissible errors according ISO8655

8 ADJUSTMENT

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 increase, or counterclockwise to decrease the volume.
3. After adjustment check the calibration according to the instructions above.

Range	Volume μl	Accuracy		Precision	
		μl	%	s.d. μl	cv%
0,2-2 μl	2	± 0.080	± 4	0.040	2.0
	0.2	± 0.080	± 40	0.020	20.0
0,5-10 μl	10	± 0.120	± 1.2	0.080	0.8
	1	± 0.120	± 12	0.080	8.0
2-20 μl	20	± 0.20	± 1.0	0.10	0.5
	2	± 0.20	± 10.0	0.10	5.0
5-50 μl	50	± 0.50	± 1.0	0.20	0.4
	5	± 0.50	± 10	0.20	4.0
10-100 μl	100	± 0.80	± 0.8	0.30	0.3
	10	± 0.80	± 8.0	0.30	3.0
20-200 μl	200	± 1.60	± 0.8	0.60	0.3
	20	± 1.60	± 8.0	0.60	3.0
200-1000 μl	1000	± 8.0	± 0.8	3.0	0.3
	200	± 8.0	± 4.0	3.0	1.5
100-1000 μl	1000	± 8.0	± 0.8	3.0	0.3
	100	± 8.0	± 8.0	3.0	3.0
1-5 ml	5000	± 40.0	± 0.8	15.0	0.3
	1000	± 40.0	± 4.0	15.0	1.5
2-10 ml	10000	± 60.0	± 0.6	30.0	0.3
	2000	± 60.0	± 3.0	30.0	1.5

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 (10 s x 0.2 mg/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 15.

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

Standard deviation can be expressed as a relative value (CV)

$$CV = 100\% \times S / \bar{V}$$

MAINTENANCE

When the *Fisherbrand*[®] Finnpiquette II is not in use, make sure it is stored in an upright position. We recommend a Finnpiquette 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 0.2-50 μ l PIPETTES

1. Press the tip ejector. 9
2. Insert the maintenance pliers under the ejector bar to release the tip ejector.
3. Remove the tip cone by pressing with maintenance pliers. 10
4. Pull out the piston and the spring.
5. Keep the tip cone vertically and push out with piston the rest of the piston assembly. Then keep the tip cone upside down and tap all parts from tip cone. Remember keep all parts in order on table for reassembly.
6. Clean the piston, the piston spring and the O-rings with a dry napless cloth.
7. Check the tip cone for foreign particles.
8. Grease the cleaned parts with the lubricant that comes with the pipette.
9. Reassemble the pipette components.

All 0.2-50 μ l: First, slide the spring 14, spring support 15 and tube 15 16 back on the piston. Compress the spring with fingers by pressing piston and spring support 15 against each other.

5-50 μ l: Slide bigger O-ring 17, smaller O-ring 18, (2-20 μ l bigger O-ring 18a, smaller O-ring 18b), spring support 19 (sharp edges against spring) and small spring 20 on the piston.

0.5-10 μ l: First slide O-ring tube 17 (larger hole first), bigger O-ring 18, smaller O-ring 19 and O-ring support 20 on the piston. Then slide small spring 21, spring support 22 (sharp edges against spring) and O-ring 22 on the O-ring support 20.

0.2-2 μ l: First slide O-ring tube 17 (larger hole first) and sealing combination 18 on the piston. Then slide small spring 19, spring support 20 (sharp edges against spring) and O-ring 21 on the sealing combination 18.

All 0.2-50 μ l: Carefully slide the entire assembly into the tip cone and release your fingers.

10. With the push button depressed all the way carefully attach the tip cone to the handle so that the adapter opening is on the tip ejector side. Do not bend the thin piston wire when assembling. Press in the snap joints.
11. Assemble the tip ejector and check the calibration according to the instructions.

DISASSEMBLING 50-1000 μ l PIPETTES

- 9 1. Press the tip ejector.
2. Insert the pliers under the ejector bar to release the tip ejector.
- 10 3. Remove the tip cone using the maintenance pliers.
4. Pull out the piston.
5. Remove the O-ring, O-ring support and spring from the tip cone.
6. Clean the piston, the piston spring and the O-ring with a dry napless cloth.
7. Check the cylinder for foreign particles.
8. Grease the cleaned parts with the lubricant that comes with the pipette.
9. Slide parts over the piston pressing down the large spring. Attach the tip cone to the handle so that the adapter opening is on the tip ejector side, and press in the snap joints.
10. Check the calibration according to the instructions.

DISASSEMBLING 1-10 ml PIPETTES

- 9 1. Press the tip ejector.
2. Insert the pliers under the ejector bar to release the tip ejector.
- 10 3. Remove the part 2 from part 1 of the tip ejector using the maintenance pliers to release the snap joint.
- 12 4. Remove the cylinder by pressing part 1 of the tip ejector firmly towards the cylinder. This action releases the snap joint so you can remove the cylinder.
5. Clean the O-ring and cylinder. Regrease the O-ring and the cylinder.
6. Assemble the parts in the opposite order of disassembly. All joints are snap fit and can be pushed together by hand. Be careful not to bend the pipette during assembly because this could damage the snap joints or the piston.
7. Check the calibration according to the instructions.

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

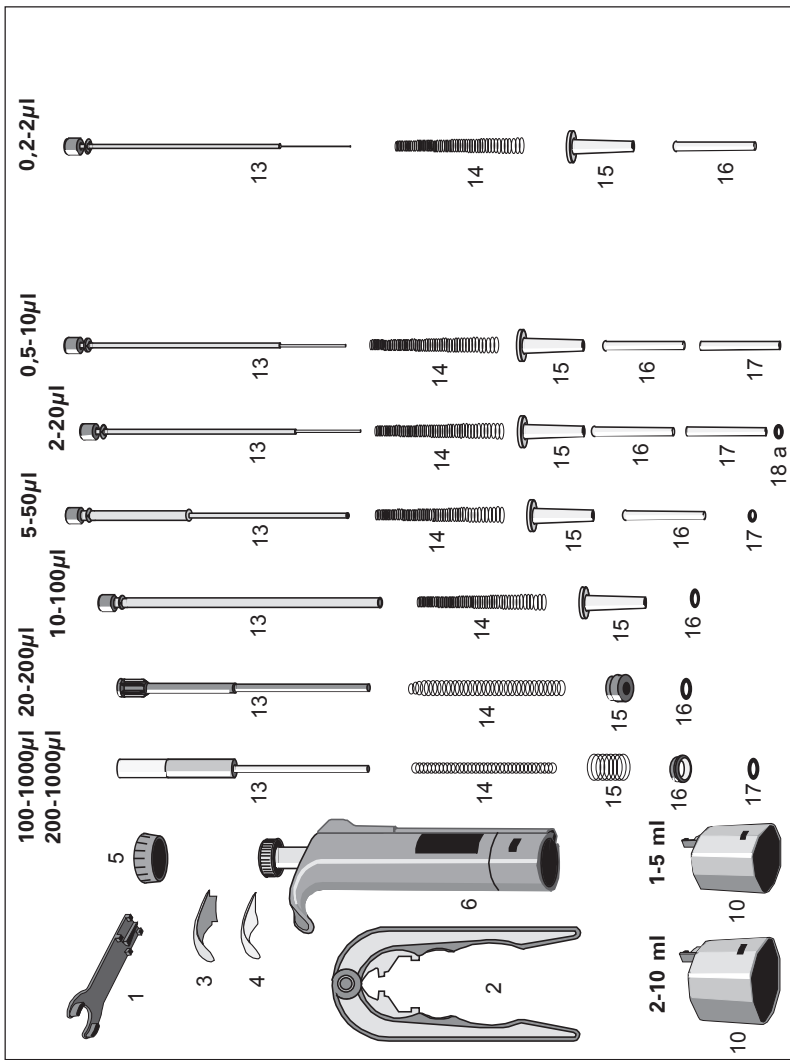
The **Fisherbrand**[®] Finnpiquette II is shipped in a specially designed package containing the following items:

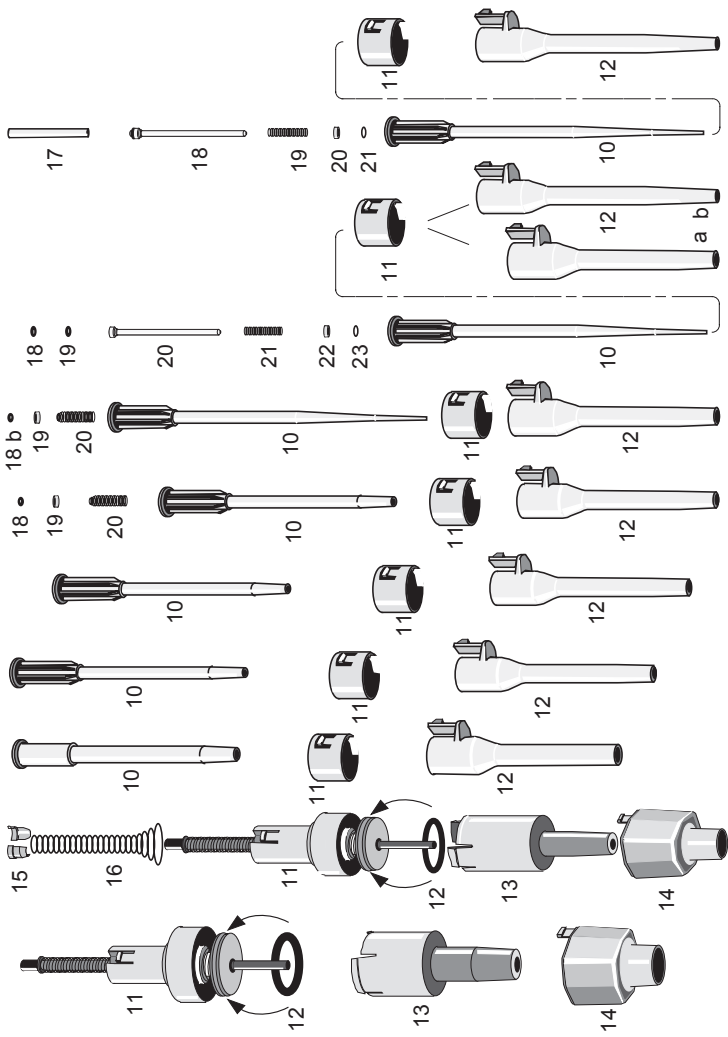
- | | | |
|-----------------------|----------------------------|-----------------|
| 1. The Finnpiquette | 4. Tube of grease | 7. Shelf hanger |
| 2. Service tool | 5. Instruction manual | 8. Two stickers |
| 3. Maintenance pliers | 6. Calibration certificate | |

CAUTION!

*The **Fisherbrand**[®] Finnpiquette II 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.





SPARE PARTS

15 Figure 15 lists spare parts and reorder numbers

All	20-200μl	2-20μl	0,2-2μl
1. 10593720	5. 10592520	5. 10592510	5. 10592560
2. 2900580	6. 2207410	6. 2207380	6. 2207360
3. 10593050	10. 10593420	10. 10593090	10. 10593090
4. 1527200	11. 10593630	11. 10593630	11. 10593630
	12. 10593110	12. 10593110	12. 10593120
2-10ml	13. 1053840	13. 2206440	13. 2205700
5. 10592550	14. 1130510	14. 1131810	14. 1131810
6. 2207450	15. 1053860	15. 10593340	15. 10593340
10. 10593660	16. 1030160	16. 10593330	16. 10593330
11. 2206730		17. 10593320	17. 10593300
12. 1033050	10-100μl	18. a 1030380	18. 2205730
13. 10593440	5. 10592520	18. b 1033110	19. 1131800
14. 10593670	6. 2207400	19. 10593360	20. 10593360
	10. 10593620	20. 1132120	21. 1030170
1-5ml	11. 10593630		
5. 10592540	12. 10593110	0,5-10μl	
6. 2207440	13. 2206600	5. 10592500	
10. 10593680	14. 1131810	6. 2207370	
11. 2206720	15. 10593340	10. 10593090	
12. 1030230	16. 1030510	11. 10593630	
13. 10593130		12. a 10593110	
14. 10593690	5-50μl	12. b 10593120	
15. 1058180	5. 10592510	13. 2205710	
16. 1131940	6. 2207390	14. 1131810	
	10. 10593430	15. 10593340	
100-1000μl /	11. 10593630	16. 10593330	
200-1000μl	12. 10593110	17. 10593310	
5. 10592530	13. 2206430	18. 1030170	
6. 2207420 / 100 μ l	14. 1131810	19. 1030060	
6. 2207430 / 200 μ l	15. 10593340	20. 10593290	
10. 10593410	16. 10593330	21. 1131800	
11. 10593630	17. 1030500	22. 10593360	
12. 10593100	18. 1033060	23. 1030170	
13. 10589450	19. 10593500		
14. 1130560	20. 1132000		
15. 1130550			
16. 1054260			
17. 1030020			
		Shelf hanger	
		2206740	

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
30	1.0052	1.0052	1.0053	1.0053	1.0054	1.0055



For customer service, call 1-800-766-7000.

To fax an order, use 1-800-926-1166.

To order online: www.fishersci.com

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