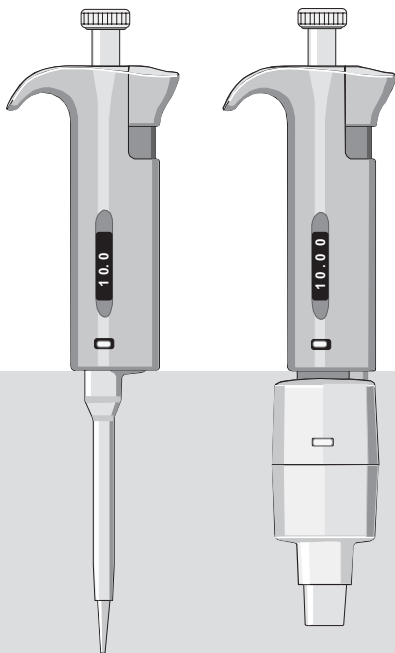


Fisherbrand[®] Finnpipette[®]

INSTRUCTIONS FOR USE



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CONTENTS

PRODUCT DESCRIPTION	3
PIPETTE OPERATION	4
PIPETTING TECHNIQUES	4, 5
CALIBRATION	6, 7, 8
TROUBLE SHOOTING	9
MAINTENANCE	10,11,12
SPARE PARTS LIST	13
FIGURE 1 PARTS DIAGRAM	14, 15
CONVERSION TABLE	16

PRODUCT DESCRIPTION

The Fisherbrand Finnpiquette Digital, Single-channel, Manual Pipetter operates on the air displacement principle and uses disposable polypropylene pipette tips. Six different models cover a volume range from 0.5 μ l to 10ml.

CONSTRUCTION

The tough polyamide and nylon pipetter handle stands up to volatile and aggressive liquids. Its low thermal conductivity means it won't absorb hand heat, which could compromise pipetter performance. The PVDF tip ejector shaft and PVDF/polypropylene tip cone provide extra corrosion resistance and are both autoclavable.

DESIGN

Designed for safe, one-hand operation even when dispensing infectious liquids. The ribbed finger rest ensures a secure grip and correct pipetting angle, minimizing hand strain. The tip ejector is separate from the operating piston, so there's no danger of accidentally discharging tips. The large digital display is easy to read—even while holding the pipetter.

A shelf hanger is included for storing the pipetter. Pipetter hangs firmly from grippy finger rest on the shelf hanger. Self-adhesive stickers attach the hanger securely to shelves, counters, cabinets, and even existing pipetter stands.

PACKAGE

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

- | | | |
|--|-----------------------|----------------------------|
| 1. The Fisherbrand ® 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 for hanger |

COMPATIBLE FINNTIP* PIPETTE TIPS

Finntip	Volume Range	Order No.
10	0.2 to 2 μ l	14-386-70
10	0.5 to 10 μ l	14-386-71
250 Universal, 300, 200 Ext	5 to 50 μ l	14-386-72
250 Universal, 300, 200 Ext	20 to 200 μ l	14-386-73
1000	100 to 1000 μ l	14-386-74

OTHER COMPATIBLE TIPS

Fisherbrand General-purpose Redi-Tip* Tips, Extended-length Tips, Stack-Rack Tips, and Environmental Reload Tips (101–1000 μ l).

Finntip Universal Tips (for volumes under 1 μ l)

Fisherbrand Standardization Tips (0–200 μ l)

Fisherbrand Redi-Tip Reference Tips (0–300 μ l)

Fisherbrand Redi-Tip Reference Tips (101–1000 μ l)

Fisherbrand Standardization Tips (200–1300 μ l)

Finntip 62 Tips and Finntip 63 Tips.

Fisherbrand Aerosol-barrier and Low-retention Tips

PIPETTER OPERATION

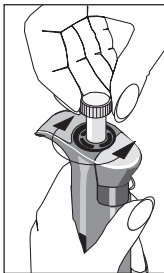
SETTING THE DELIVERY VOLUME

To set the delivery volume, turn the thumb knob counterclockwise to increase volume and clockwise to decrease volume.

Make sure the thumb knob clicks into place for the desired volume and the digits are completely visible in the display window.

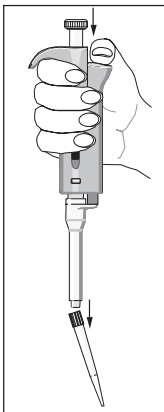
Note: Do not set volumes outside the pipetter's specified volume range.

Forcing the thumb knob to turn outside the range may jam the mechanism and eventually damage the pipetter.



TIP EJECTION

To avoid accidental tip ejection, the ejector button is separate from the thumb knob. It is molded into the handle directly beside the operating piston for comfort and ease of use. To release the tip, point the pipetter at a suitable waste receptacle and press the tip ejector with your thumb.



PIPETTING TECHNIQUES

Make sure that the tips, pipetter and solution are at the same temperature.

Make sure that the tip is firmly attached to the tip cone. Check for foreign particles in the tip. Hold the pipetter in an upright position while aspirating liquid. The grippy should rest on your index finger.

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.

Before you begin your actual pipetting work, fill and empty the tip two to three times with the solution that you will be pipetting.

PIPETTING TECHNIQUES, Contd.

FORWARD TECHNIQUE

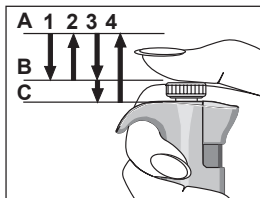
Fill a clean reagent reservoir with the liquid to be dispensed.

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 1cm 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 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.

A = Ready position

B = First stop

C = Second stop

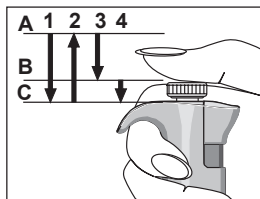


REVERSE TECHNIQUE

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 1cm, 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.

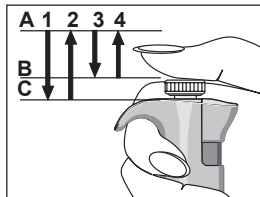


REPETITIVE TECHNIQUE

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 1cm, 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.

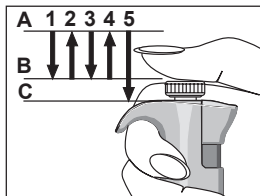
PIPETTING WHOLE BLOOD

This technique is effective for certain specialized applications, such as deproteinization in blood glucose determination.

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 when used with distilled or deionized water. Normally, the pipettors 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 to accurately weigh the test samples. The scale graduation value of the balance should be chosen according to the selected test volume of the pipetter:

Calibration Test Volume Range	Readable Scale Graduation
under 10 μ l	0.001mg
10–100 μ l	0.01mg
above 100 μ l	0.1mg

Test liquid: Distilled or deionized water, conforming to ISO 3696 requirements for “grade 3” water. Tests should be done in a draft-free room with the temperature of the water, pipetter, and air held constant between 20° and 25°C ($\pm 0.5^\circ\text{C}$).

The relative humidity must be above 55%. Especially with volumes under 50 μ l, the air humidity should be as high as possible to reduce the effect of evaporation loss. Special accessories, such as an evaporation trap, are recommended.

CHECKING THE CALIBRATION

The pipetter is checked with the maximum (nominal) volume and with the minimum volume (or 10% of maximum volume, whichever is higher). For example, the Finnpiquette 0.5–10 μ l is tested at 10 μ l and 1 μ l.

A new tip is first pre-wetted three to five times and a series of ten pipettings is done with each volume. Each of the pipettings is dispensed into a tared weighing vessel on the analytical balance. Weight of each sample is noted for calculating calibration results. If the calculated results are within the limits given on Table 1 on the following page, the calibration of the pipetter is correct. A pipetter is always adjusted for delivery of the selected volume. Measuring volumes taken from the balance is not an acceptable procedure for calibrating the Fisherbrand Finnpiquette.

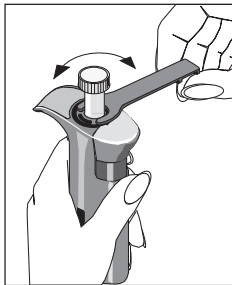
Procedure:

1. Do 10 pipettings with the min. volume.
2. Do 10 pipettings with the max. volume.
3. Calculate the accuracy (A) and precision (cv) of both series (see formulas below.)
4. Compare the results to the limits listed in Table 1. If the results are within the limits, then the calibration of the pipetter is correct. Otherwise, the pipetter must be adjusted and checked again.

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 counter clockwise to decrease 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 (μ l) e = evaporation loss (mg)
 w = weight (mg) Z = conversion factor for mg/ μ 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. Typical pipetting time might be 10 seconds with a mass loss of 2mg (10s x 0.2mg/s). If an evaporation trap or lid on the vessel is used the correction for 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 μ l/mg at 22°C and 95kPa. See the conversion table on page 16 of this manual for Z values at different temperatures and air pressures.

ACCURACY (systematic error)

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

$$A = \bar{V} - V_0 \quad A = \text{accuracy} \quad \bar{V} = \text{mean volume} \quad V_0 = \text{nominal volume}$$

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 = standard deviation \bar{V} = mean volume

n = number of measurements v = variance

cv is the relative value of standard deviation:

$$cv = 100\% \text{ of } s / v$$

TABLE 1
ACCEPTABLE CALIBRATION RESULTS

Test Volume Range	Maximum/Minimum Volumes (μ l)	Accuracy		Precision	
		μ l	%	Standard Deviation(μ l)	Coefficient of Variation (%)
0,2-2 μ l	2	± 0.05	± 2.5	0.04	2.0
	0,2	± 0.024	± 12.0	0.02	10.0
0,5-10 μ l	10	± 0.10	± 1.0	0.05	0.5
	1	± 0.025	± 2.5	0.02	2.0
0,5-10 μ l	10	± 0.10	± 1.0	0.08	0.8
	1	± 0.035	± 3.5	0.03	3.0
5-50 μ l	50	± 0.30	± 0.6	0.15	0.3
	5	± 0.15	± 3.0	0.13	2.5
20-200 μ l	200	± 1.2	± 0.6	0.4	0.2
	20	± 0.6	± 3.0	0.3	1.5
100-1000 μ l	1000	± 5.0	± 0.5	2.0	0.2
	100	± 1.5	± 1.5	0.6	0.6
1-5 ml	5000	± 25.0	± 0.5	10.0	0.2
	1000	± 15.0	± 1.5	5.0	0.5
2-10 ml	1000	± 50.0	± 0.5	20.0	0.2
	2000	± 20.0	± 1.0	6.0	0.3

CAUTION!

The Fisherbrand® Finnpiquette is designed to allow easy in-lab service. If you would prefer to have Fisher Scientific service your pipetter, make sure that it has been decontaminated before shipping.

Please note that the postal authorities in your country may prohibit or restrict the shipment of contaminated material by mail.

TROUBLESHOOTING

The table below lists possible problems and their solutions.

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

MAINTENANCE

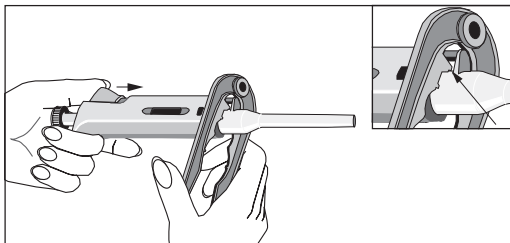
SHORT-TERM CHECKING

The pipetter should be checked at the beginning of each day for dust and dirt on the outside surfaces. Particular attention should be paid to the tip cone. No other solvents except 70 % ethanol should be used to clean the pipetter.

Note: When the **Fisherbrand**® Finnpiquette Digital is not in use, make sure it is stored in an upright position. We recommend a Finnpiquette stand for this purpose.

LONG-TERM MAINTENANCE

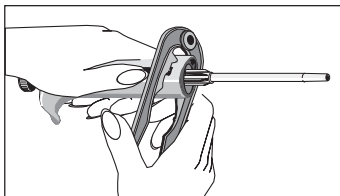
If the pipetter is used daily, it should be checked every three months. The servicing procedure starts with the disassembly of the pipetter.



DISASSEMBLING/ASSEMBLING PIPETTERS*

0.2-50 μ l PIPETTERS

1. Press the tip ejector.
2. Insert the maintenance pliers under the ejector bar to release the tip ejector.
3. Remove the tip cone by pressing with maintenance pliers.
4. Pull out the piston and spring.
5. Keep the tip cone vertical and use the piston to push out the rest of the piston assembly.



Then position the tip cone upside down and gently tap all parts from tip cone.

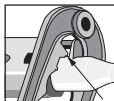
Remember to keep all parts in order on table for reassembly.

6. Clean the piston, the piston spring and the O-rings with a dry, napless cloth.
7. Check the tip cone for foreign particles. Clean if necessary.
8. Grease the cleaned parts with the lubricant that comes with the pipetter.
9. Reassembling the pipetter components:

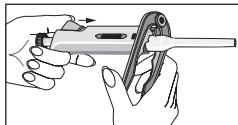
0.2-50 μ l: First, slide the spring (14), spring support (15) and tube (16) back on the piston. Compress the spring with fingers by pressing piston and spring support (15) against each other.

5-50 μ l: Slide bigger O-ring (17), smaller O-ring (18), 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).

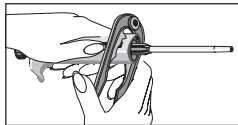


0.2-2 μ l: First slide O-ring tube (17) (larger hole first) and sealing combination (18) on the piston. Then slide small spring (19), spring support (20) (sharp edges against spring) and O-ring (21) on the sealing combination (18).



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

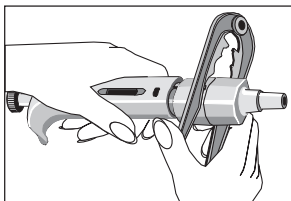
10. With the push button depressed all the way carefully attach the tip cone to the handle so that the adapter opening is on the tip ejector side. Do not bend the thin piston wire when assembling. Press in the snap joints.



11. Assemble the tip ejector and check the calibration according to the instructions.

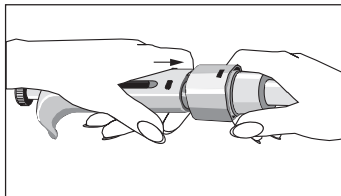
50-1000 μ l PIPETTERS

1. Press the tip ejector.
2. Insert the pliers under the ejector bar to release the tip ejector.
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 pipetter.
9. Reassemble by sliding parts over the piston in the opposite order of disassembly and 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.



1-10ml PIPETTERS

1. Press the tip ejector.
2. Insert the pliers under the ejector bar to release the tip ejector.
3. Remove the part 2 from part 1 of the tip ejector using the maintenance pliers to release the snap joint.
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. Do not apply grease inside the cylinder.
6. Reassemble 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 pipetter during assembly as this could cause damage to the snap joints or piston.
7. Check the calibration according to the instructions.



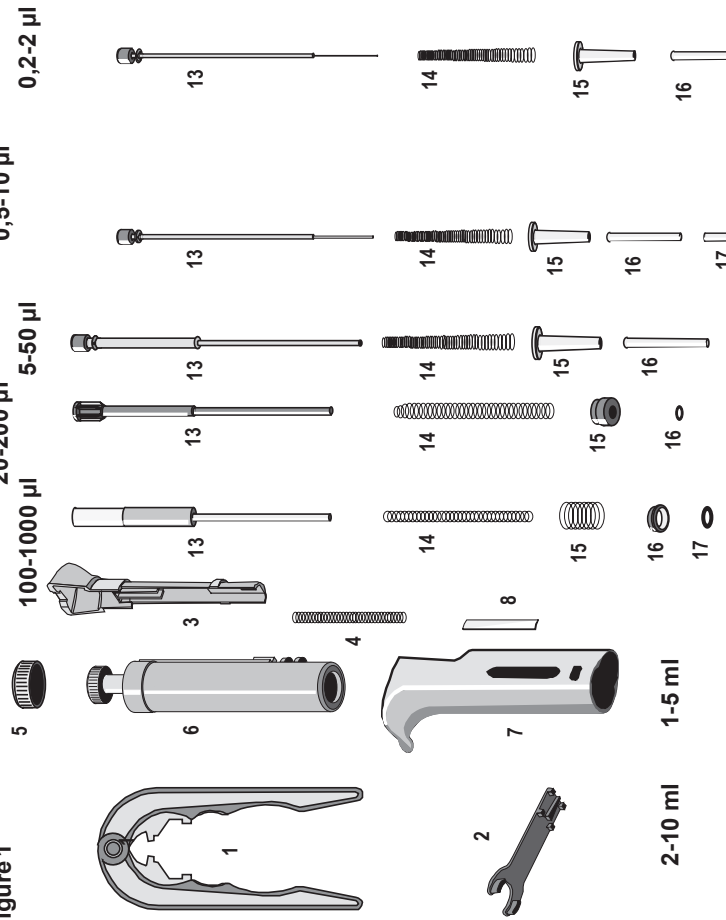
**See spare parts diagram on pages 10–12 for number references for disassembling/ assembling instructions.*

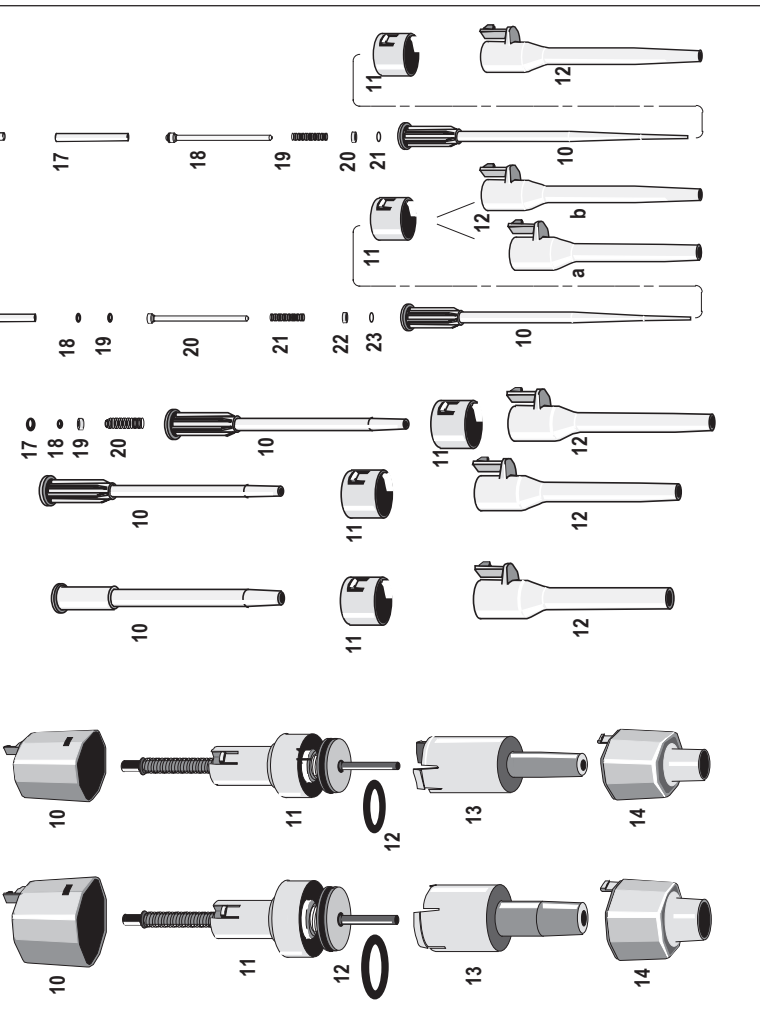
SPARE PARTS

See figure 1 for spare part reference numbers

All	100-1000 μ l	5-50 μ l	0,5-10 μ l
1. 2900580	5. 1057510	5. 1057490	5. 1057480
2. 10593720	6. 2207150	6. 2207160	6. 2206650
3. 10594540	7. 10594524F	7. 10594527	7. 10594521
4. 1131820	8. 1054014	8. 1054015	8. 1054015
	10. 10593410	10. 10593430	10. 10593090
2-10 ml	11. 10593630	11. 10593630	11. 10593630
5. 1058260	12. 10593100	12. 10593110	12.a 10593110
6. 2206690	13. 10589450	13. 2206430	12.b 10593120
7. 10594526	14. 1130560	14. 1131810	13. 2205710
8. 1054015	15. 1130550	15. 10593340	14. 1131810
10. 10593660	16. 1054260	16. 10593330	15. 10593340
11. 2206730	17. 1030020	17. 1030500	16. 10593330
12. 1033050		18. 1033060	17. 10593310
13. 10593440	20-200μl	19. 10593500	18. 1030170
14. 10593670	5. 1057500	20. 1132000	19. 1030060
	6. 2206670		20. 10593290
1-5 ml	7. 10594523F	0,2-2 μl	21. 1131800
5. 1057520	8. 1054014	5. 10589810	22. 10593360
6. 2206690	10. 10593420	6. 2207170	23. 1030170
7. 10594525	11. 10593630	7. 10594521F	
8. 1054016	12. 10593110	8. 1054016	
10. 10593680	13. 1053840	10. 10593090	
11. 2206720	14. 1130510	11. 10593630	
12. 1030230	15. 1053860	12. 10593120	
13. 10593130	16. 1030160	13. 2205700	
14. 10593690		14. 1131810	
		15. 10593340	
		16. 10593330	
		17. 10593300	
		18. 2205730	
		19. 1131800	
		20. 10593360	
		21. 1030170	
Shelf hanger			
2206740			

Figure 1





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
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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