

Truepet™

Fixed Volume,
Precision Micropipette

INSTRUCTION MANUAL

CE

CONFORMS TO
ISO 8655 STANDARDS



fig. 11



fig. 12



fig. 8



fig. 9



fig. 10



fig. 1
Dis-assembling
the tip ejector



fig. 2
Dis-assembling
the tip cone



fig. 3
Dis-assembling
the piston



fig. 3 a
Dis-assembling
the piston



fig. 4
Service Tool



fig. 5
Dis-assembling
the O-ring seat



fig. 6
O-ring Seat
& Service tool



fig. 7
Piston & Spring

TROUBLE SHOOTING

The table below lists possible problem 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 tip
	Foreign particles between the piston, the o-ring and the cylinder	Clean and grease O-ring and Cylinder
Inaccurate dispensing	Insufficient amount of grease on cylinder and o-ring, O-ring Damaged	Grease accordingly Change the O-ring
	Incorrect operation Tip incorrectly attached calibration altered caused misuse, for example	Follow instruction carefully attach firmly recalibration according to instructions
Inaccurate dispensing with certain liquids	Unsuitable calibration High viscosity liquids may require recalibration	Recalibration with the liquids in question

PACKAGE

The pipette is shipped in a specially designed package containing the following items.

1. The Isolab Pipette
2. Service Tool
3. Multichannel service tool
4. Tip Sample
5. Tube Grease
6. Instruction manual
7. Calibration certificate
8. Shelf hanger
9. Two sticker

CAUTION

The pipette 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 sent it to us.

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

INACCURACY (SYSTEMATIC ERROR)

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

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

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

Inaccuracy can be expressed as a relative value $A\% = 100\% \times A/V_0$

Imprecision (random error)

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

$$s = \sqrt{\frac{\sum (V_i - \bar{V})^2}{n-1}}$$

S = standard deviation

\bar{V} = mean volume

n = number of measurements

Standard deviation can be expressed as a relative value (CV)
 $CV = 100\%$

Standard deviation can be expressed as a relative value (CV)
 $CV = 100\% \times S/\bar{V}$

Standard deviation can be expressed as a relative value (CV) $CV = 100\% \times S/V$

MAINTENANCE

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

Short-term service

The pipette should be checked at the beginning of each day for dust and dirt on the outside surface 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 service, single channel pipettes
 If the pipette is used daily it should be checked every three month.

The servicing procedure starts with the disassembly of the pipette.

1. Press the tip ejector button and pull the tip ejector out (fig.1).

2. Turn the tip cone counter clockwise to unscrew. (fig.2)

3. Fix the service tool on the O-ring seat and turn clockwise to open. pull out the O-ring seat and turn the tip cone upside down and tap to retrieve the O-ring.

4. Clean the piston, the piston spring and the O-ring with a dry napless cloth.

5. Check the tip cone for foreign particles.

6. Grease the cleaned parts with the lubricant preferably silicon grease.

REASSEMBLY PROCEDURE

Reassembly for capacity between 0.2 to 200 μ l

Place the O-ring in the tip cone and screw the O-ring seat with the help of service tool.

Place the spring on the piston and slide inside the tip cone.

Screw the assembled tip cone in the main housing.

Slide the tip ejector on to the tip cone.

Turn the tip ejector clockwise while forcing the ejector panel downwards.

DIS-ASSEMBLY PROCEDURE

Dis-assembly of capacity between 0.5 μ l to 10 ml. pull the lower position of the ejector to dis-engage from the upper portion. Unscrew the tipcone from the main housing. The tipcone is in two portion, the lower portion can be unscrewed from the upper portion to expose the piston. (fig.12)

STERILIZATION

The entire pipette can be sterilized by autoclaving it at 121°C (252°F) (2 ata) (minimum 20 minutes) No special preparation are needed for autoclaving. You can use steam sterilization bags if needed.

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The True Game Changer !



PRODUCT DESCRIPTION
 The pipettes are fixed volume general purpose micropipettes for sampling and dispensing accurate liquid volume.

It operates on Air displacement principle (i.e. an air interface is present between the piston and liquid) and uses detachable, disposable tips. Desired volume is determined by the following formula:
 $V = r^2h$

Where V= Desired Volume
 r= radius of piston
 h= vertical distance traveled by the plunger.

Any Volume between 0.2 μ l to 10 ml is available.

RAW MATERIAL
 The Pipettes are made of mechanically durable and autoclavable materials.

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.

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 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.

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 present 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 in to 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 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 step 3 and 4.

PIPETTING OF HETEROGENEOUS SAMPLES
 Deproteinization in blood glucose determination, for example

1. Use steps 1 and 2 of the forward technique to fill the tip with blood. Wipe the tip carefully with a dry clean tissue.
2. Immerse the tip into the reagent and depress the push button to the first stop, making sure the tip is well below the surface.
3. Release the push button slowly to the ready position. This will fill the tip. Keep the tip in the solution.
4. Depress the push button to the first stop and release slowly. Keep repeating this procedure until the interior wall of the tip is clear.
5. Finally, depress the push button all the way to completely empty the tip.

TIP EJECTION
 Each pipette is fitted with a tip ejector. This helps to eliminate the risk of contamination. To eject the tip, point the pipette at suitable waste receptacle and press the ejector with your thumb.

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	0.001 mg
under 10 μ l	0.01 mg
10 - 100 μ l	0.1 mg
above 100 μ l	

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 μ 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.

PROCEDURE TO CHECK CALIBRATION

1. Keep a container on the electronics balance and take the readings.
2. A new Tip is fitted on the tipcone and fore-wetted 3-4 times.
3. A series of 10 readings is taken by filling the tip and dispensing in the container kept on the electronics balance.
4. Calculate the inaccuracy (A) and imprecision (cv).
5. Compare the results to the limits in the Table 1 If the calculated results within the selected limits, the adjustment of pipette is correct.

Fixed Volume	Inaccuracy		Imprecision	
	μ l	%	s.d. μ l	cv%
1	± 0.050	± 5.00	0.050	5.00
5	± 0.125	± 2.50	0.075	1.50
10	± 0.120	± 1.20	0.080	0.80
20	± 0.20	± 1.00	0.10	0.50
25	± 0.50	± 2.00	0.20	0.80
50	± 0.50	± 1.00	0.20	0.40
100	± 0.80	± 0.80	0.30	0.30
200	± 1.60	± 0.80	0.60	0.30
250	± 4.00	± 1.60	1.50	0.60
500	± 4.00	± 0.80	1.50	0.30
1000	± 8.00	± 0.80	3.00	0.30
2000	± 16.00	± 0.80	6.00	0.30
3000	± 40.00	± 1.33	15.00	0.50
5000	± 40.00	± 0.80	15.00	0.30
10000	± 60.00	± 0.60	30.00	0.30

CALIBRATION AND ADJUSTMENT

The pipettes are factory calibrated and adjusted to give the volume as specified with distilled or deionized water using the forward pipetting technique. It should be noted that the use of other pipetting techniques may affect the calibration results. The pipettes are constructed to permit re-adjustment for other pipetting techniques or liquids of different temperature and viscosity.

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.

Formulas for calculating results

Conversion of mass to volume
 $V = (w+e) \times Z$

v=volume (μ l)

w=weight (mg)

e=evaporation loss (mg)

Z=conversion factor for μ l/mg

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 (i.e. 6mg = 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 μ l/mg at 22°C and 95 kPa.

See the conversion table below.

Temperature °C	Air Pressure kPa					
	80	85	90	95	100	101.3 105
15.0	1.0017	1.0018	1.0019	1.0019	1.0020	1.0020
15.5	1.0018	1.0019	1.0019	1.0020	1.0020	1.0021
16.0	1.0019	1.0020	1.0020	1.0021	1.0021	1.0022
16.5	1.0020	1.0020	1.0021	1.0021	1.0022	1.0022
17.0	1.0021	1.0022	1.0022	1.0022	1.0023	1.0023
17.5	1.0022	1.0022	1.0023	1.0023	1.0024	1.0024
18.0	1.0022	1.0023	1.0023	1.0024	1.0025	1.0025
18.5	1.0023	1.0024	1.0024	1.0025	1.0025	1.0026
19.0	1.0024	1.0025	1.0025	1.0026	1.0026	1.0027
19.5	1.0025	1.0026	1.0026	1.0027	1.0027	1.0028
20.0	1.0026	1.0027	1.0027	1.0028	1.0028	1.0029
20.5	1.0027	1.0028	1.0028	1.0029	1.0029	1.0030
21.0	1.0028	1.0029	1.0029	1.0030	1.0031	1.0031
21.5	1.0030	1.0031	1.0031	1.0031	1.0032	1.0032
22.0	1.0031	1.0032	1.0032	1.0032	1.0033	1.0033
22.5	1.0032	1.0033	1.0033	1.0033	1.0034	1.0034
23.0	1.0033	1.0034	1.0034	1.0034	1.0035	1.0036
23.5	1.0034	1.0035	1.0035	1.0036	1.0036	1.0037
24.0	1.0035	1.0036	1.0036	1.0037	1.0037	1.0038
24.5	1.0037	1.0038	1.0038	1.0039	1.0039	1.0039
25.0	1.0038	1.0039	1.0039	1.0039	1.0040	1.0040
25.5	1.0039	1.0040	1.0040	1.0041	1.0041	1.0042
26.0	1.0040	1.0041	1.0041	1.0042	1.0042	1.0043
26.5	1.0042	1.0043	1.0043	1.0043	1.0044	1.0044
27.0	1.0043	1.0044	1.0044	1.0045	1.0045	1.0046
27.5	1.0045	1.0046	1.0046	1.0046	1.0047	1.0047
28.0	1.0046	1.0047	1.0047	1.0047	1.0048	1.0048
28.5	1.0048	1.0048	1.0048	1.0049	1.0049	1.0050
29.0	1.0049	1.0050	1.0050	1.0050	1.0051	1.0051
29.5	1.0051	1.0051	1.0051	1.0052	1.0052	1.0052
30.0	1.0052	1.0053	1.0053	1.0053	1.0054	1.0054

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 after every sterilization cycle to achieve the best possible accuracy.