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Ultimus

Bottle Top Dispenser

(Dual Inlet Technology)

Operation Manual

TABLE OF CONTENTS

		Page No.
1	Intended Use of The Instrument	1
2	Safety Instruction	1
3	Functions and Limitations of Use	2
4	Operating Exclusions	3
5	Storage Conditions	3
6	List of Recommended Reagents	3
7	First Steps	10
8	Assembly	10
9	Priming	11
10	Dispensing	12
11	Error Limits (Nominal Volume, Partial Volume)	13
12	User Calibration Procedure	14
13	Maintenance / Cleaning	15
14	Autoclaving	18
15	Re-Assembly	19
16	Troubleshooting	20

1. Intended Use Of The Instrument

The Bottle Top Dispenser is a general purpose laboratory instrument intended for use in laboratories for dispensing reagents and chemicals which are compatible with the instrument. (see page 4)

2. Safety Instructions

This instrument may sometimes be used with hazardous materials, operations and equipments. It is beyond the scope of this manual to address all of the potential risks associated with its use in such applications. It is the responsibility of the user of this instrument to consult and establish appropriate safety and health practice and determine the applicability of regulatory limitations prior to use.

⚠ Please read the following carefully!

1). Every user must read and understand this operating manual before operation.
2). Follow general instructions for hazard prevention and safety instructions e.g. wear protective clothing, eye protection and gloves.
3). Observe all specifications provided by reagent manufacturers.
4). When dispensing inflammable media, make sure to avoid the built up of static charge, e.g. do not dispense into plastic vessels do not wipe instruments with a dry cloth.
5). Use the instrument only for dispensing liquids, with strict regard to the defined limitations of use and operating limitations. (see page 2) Observe operating exclusions. If in doubt, contact the manufacturer or supplier.
6). Always use the instrument in such a way that neither the user nor any other person is endangered. When dispensing, the discharge tube must always point away from you or any other person. Avoid splashes. Only dispense into suitable vessels.
7). Never press down the piston when the discharge tube closure is attached.
8). Never remove the discharge tube while the dispensing cylinder is filled.
9). Reagents can accumulate in the cap of the discharge tube. Thus, it should be cleaned regularly.
10). Never carry the mounted instrument by the cylinder sleeve or the valve block. Breakage or loosening of the cylinder may also lead to personal injury from chemicals.
11). Never use force on the instrument. Use smooth gentle movements to operate the piston upwards and downwards. Use only original manufacturer's accessories and spare parts.
12). Do not attempt to make any technical alterations. Do not dismantle the instrument any further than is described in the operating manual.
13). Always check the instrument for visual damage before use.
14). If there is a sign of a potential malfunction (e.g. piston difficult to move, sticking valve or leakage). immediately stop dispensing. Consult the 'Troubleshooting' section of this manual and contact the manufacturer if needed. (see page 20)

4. Functions and Limitations of Use

The bottle top dispenser is designed for dispensing liquids directly from the reservoir bottle. The instrument is calibrated according to the requirements of the DIN EN ISO 8655 – 5. When the instrument is correctly used, the dispensed liquid comes into contact with only the following chemically resistant materials:
PTFE, FEP and Borosilicate glass.

Limitations of use :

- This instrument is designed for dispensing liquids, observing the following physical limits:
- Use temperature from +15°C to +40°C (from 59°F to 104°F) of instrument and reagent
- Vapor pressure up to max. 600 mbar. Aspirate slowly above 300 mbar, in order to prevent the liquid from boiling.
- Kinematic viscosity 500 mm^2
  (dynamic viscosity [mPas] = kinematic viscosity [mm^2 /s] x density [g/cm^3])
- Density: up to 2.2 g/cm^3

Operating Limitations :

Liquids, which form deposits may make the piston difficult to move or may cause jamming (e.g., crystallizing solutions or concentrated alkaline solutions). If the piston becomes difficult to move, the instrument should be cleaned immediately. (see page 15)
When dispensing inflammable media, make sure to avoid buildup of static charge, e.g. do not dispense into plastic vessels, do not wipe instrument with a dry cloth.
The Dispenser is designed for general laboratory applications and complies with the relevant standards, e.g. DIN EN ISO 8655. Compatibility of the instrument for a specific application (e.g. trace material analysis, food sector etc.) must be checked by the user. Approvals for specific applications, e.g. for production and administration of food, pharmaceuticals and cosmetics are not available.

4. Operating Exclusions

Never use with:

Liquids attacking FEP, PFA and PTFE (e.g. dissolved sodium azide*)

Liquids attacking borosilicate glass (e.g. hydrofluoric acid)

Hydrochloric acid > 40% and nitric acid >70% | Tetrahydrofuran | Trifluoroacetic acid

Explosive liquids (e.g. carbon disulfide)

Suspensions (e.g. of charcoal) as solid particles may clog or damage the instrument

Liquids attacking PP (cap)**

* Dissolved sodium azide permitted up to a concentration of max. 0.1%.

** Liquids attacking PP (cap)

5. Storage Conditions

Store the instrument and accessories only in clean conditions in a cool and dry place. Storage temperature: from – 20°C to +50°C (from – 4°F to 122°F)

6. Chemical Resistance

Chemicals from A to Z

The following list includes most frequently used chemicals. It provides useful information for the safe and adequate use of the Dispenser. However, safety precautions and recommendations in operating instructions must be followed carefully.

Code explanations

A = Good resistance B = Acceptable with limitations C = Not recommended

1 = Possible crystallisation - blockage or possible coating peeling

2 = Swelling of plunger, possible peeling.

3 = Acid vapours (better resistance with lower concentration).
Rinse the instrument in the rinse mode otherwise do not leave instrument on bottle.

4 = Risk of damage, softening or discoloration of external parts through vapours.
Rinse the instrument in the rinse mode otherwise do not leave instrument on bottle.

5 = Chemical degradation of glass parts (plunger/barrel).

List of Reagents

Chemicals A - Z	
A	
Acetaldehyde (Ethanal)	A
Acetic acid 96%	A
Acetic acid 100% (glacial)	B/4
Acetic anhydride	B/4
Acetone (Propanone)	B/4
Acetonitrile (MECN)	B/4
Acetophenone	B/4
Acetyl Chloride	B/4
Acetylacetone	A
Acrylic acid	A
Acrylonitrile	B/4
Adipic acid	C/1
Allyl alcohol	A
Aluminum chloride	C/1
Amino acids	C/1
Ammonia 20%	B/4
Ammonia 20-30%	B/4
Ammonium chloride	C/1
Ammonium fluoride	C/1
Ammonium molybdate	C/1
Ammonium sulfate	C/1
Amyl alcohol (Pentanol)	A
Amyl chloride (Chloropentane)	B/4
Aniline	A
Ascorbic acid	C/1
n-Amyl acetate	B/4
B	
Barium chloride	C/1
Benzaldehyde	A
Benzene	B/4
Benzine	A
Benzoyl chloride	B/4
Benzyl alcohol	A
Benzyl chloride	B/4
Bis(2-ethylhexyl) phthalate	B/4
Boric acid 10%	B/1
Bromine	C/4
Bromobenzene	B/4
Bromonaphtalene	A
Butanediol	B/1
Butanol	A
Butanone (MEK)	B/4
Butyl acetate	B/4
Butyl methyl ether	B/4
Butylamine	B/4
Butyric acid	B/4

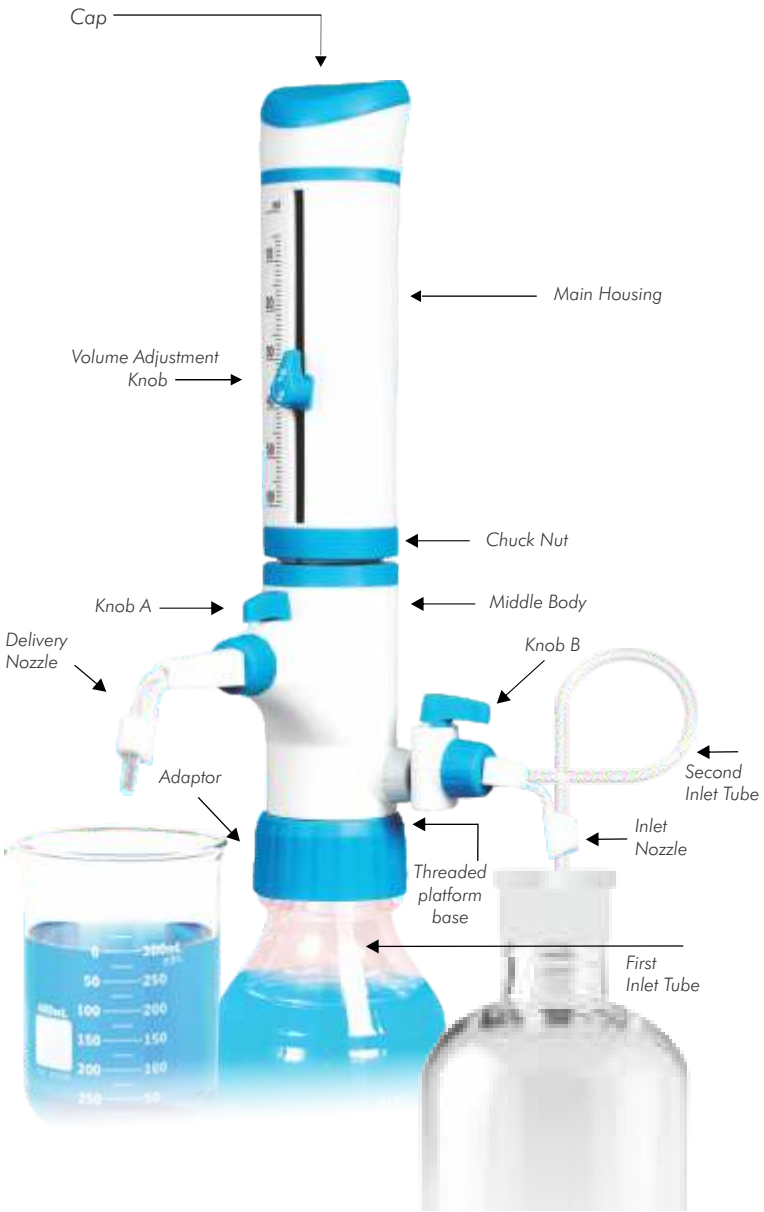
Chemicals A - Z	
C	
Calcium carbonate	C/1
Calcium chloride	C/1
Calcium hydroxide	C/1
Calcium hypochlorite	C/1
Carbon disulfide	B/4
Carbon tetrachloride	B/4
Chlorine dioxide	B/4
Chlorine water	B/4
Chloro naphthalene	B/4
Chloroacetaldehyde 45%	B/1
Chloroacetic acid	B/1
Chloroacetone	B/4
Chlorobenzene	B/4
Chlorobutane	B/4
Chloroethanol	B/4
Chloroform	B/4
Nitro-hydrochloric acid (Aqua regia)	B/4
Chlorosulfonic acid	B/4
Chlorosulfuric acid 100%	B/3/4
Chromic acid 100%	B/3/4
Chromosulfuric acid 100%	C/1/3/4
Citric acid	B/1
Copper fluoride	C/1
Copper sulfate	C/1
Cresol	B/1
Cumene (Isopropylbenzene)	B/4
Cyanoacrylate	C/1
Cyclohexane	B/4
Cyclohexanone	B/4
Cyclopentane	B/4
D	
1,2-Diethylbenzene	B/4
1,4-Dioxane (Diethylene dioxide)	B/4
1-Decanol	A
Decane	A
Di-(2-ethylhexyl) peroxydicarbonate	B/4
Dibenzyl ether	B/4
Dichloroacetic acid	A
Dichlorobenzene	A
Dichloroethane	A
Dichloroethylene	B/4
Diesel oil (Heating oil)	A
Diethanolamine	A
Diethylamine	B/4
Diethylene glycol	A
Diethylether	B/4
Dimethyl sulfoxide (DMSO)	B/1/4
Dimethylaniline	A
Dimethylformamide (DMF)	B/4

Chemicals A - Z	
E	
Ethanol	A
Ethanolamine	B/4
Ether	B/4
Ethyl acetate	B/4
Ethylbenzene	B/4
Ethylene chloride	B/4
Ethylene diamine	A
Ethylene glycol	A
F	
Fluoroacetic acid	B/1/4
Formaldehyde (Formalin)	A
Formamide	A
Formic acid	A
G	
Gamma-butyrolactone	A
Gasoline	B/4
Glycerin <40%	A
Glycolic acid 50%	B/1
H	
Heating oil (Diesel oil)	A
Heptane	A
Hexane	A
Hexanoic acid	B/1
Hexanol	A
Hydriodic acid	B/4
Hydrobromic acid	A
Hydrochloric acid 20% (HCl)	A
Hydrochloric acid 37% (HCl)	B/3
Hydrofluoric acid (HF)	C/5
Hydrogen peroxide	A
I	
Iodine	C/1
Iodine bromide	C/4
Iodine chloride	C/4
Isoamyl alcohol	A
Isobutanol	A
Isooctane	A
Isopropanol	A
Isopropyl ether	B/4
Iso-propylamine	B/4
L	
Lactic acid	C/1
M	
2-Methoxyethanol	A
Methanol	A
Methoxybenzene (Anisol)	B/4
Methyl benzoate	B/1/4
Methyl chloride (Chloromethane)	B/4
Methyl formate	A

Methyl iodide (Iodomethane)	B/4
Chemicals A - Z	

M	
Methyl methacrylate (MMA)	B/4
Methyl propyl ketone (2-Pentanone)	A
Methyl tert-butyl ether	B/4
Methylene chloride (Dichloromethane) (DCM)	B/4
Methylpentanone	A
Mineral oil (engine oil)	A
Monochloroacetic acid	B/1
N	
N-Butylamine	B/4
Nitric acid 100%	C/3/4
Nitric acid 30-70%	B/4
Nitric acid dil. <30%	B/4
Nitrobenzene	B/4
Nitromethane	B/4
N-methyl-2-pyrrolidone (NMP)	A
O	
Octane	A
Octanol	A
Oil (vegetable, animal)	B/4
Oil of turpentine	B/4
Oleic acid	B/1
Oxalic acid	C/1
P	
Pentane	B/4
Peracetic acid	A
Perchloric acid 100%	B/4
Perchloric acid diluted	A
Perchloroethylene	B/4
Petroleum	B/4
Petroleum ether / spirit	B/4
Phenol	A
Phenylethanol	B/4
Phenylhydrazine	B/1/4
Phosphoric acid 100%	A
Phosphoric acid 85%	A
Piperidine	B/4
Potassium chloride	C/1
Potassium dichromate	C/1
Potassium hydroxide	C/1
Potassium iodide	C/1
Potassium permanganate	C/1
Potassium peroxydisulfate (persulfate)	C/1
Potassium sulfate	C/1
Propionic acid (Propanoic acid)	A
Propylene glycol (Propane-1,2-diol)	A
Propylene oxide	A
Pyric acid (Trinitrophenol)	B/4
Pyridine	B/4

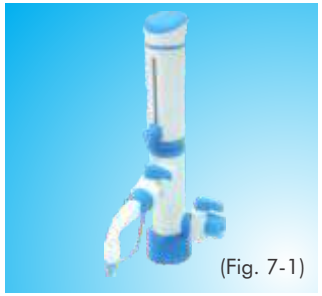
Chemicals A - Z	
P	
Pyruvic acid	B/1
R	
Resorcin	C/1
S	
Salicylaldehyde	A
Scintilation fluid	A
Silver acetate	C/1
Silver nitrate	C/1
Sodium acetate	C/1
Sodium chloride (kitchen salt)	C/1
Sodium dichromate	C/1
Sodium fluoride	C/1
Sodium hydroxide 30%	C/1
Sodium hypochlorite	C/1
Sodium thiosulfate	C/1
Sulfonitric acid 100%	B/3/4
Sulfur dioxide	B/4
Sulfuric acid 100%	B/4
T	
1,1,2-Trichlortrifluoroethane	B/4
Tartaric acid	C/1
Tetrachlorethylene	B/4
Tetrahydrofuran (THF)	B/4
Tetramethylammonium hydroxide	C/1/4
Toluene	B/4
Trichlorethylene	B/4
Trichloroacetic acid	B/1/4
Trichlorobenzene	B/4
Trichloroethane	B/4
Trichloromethane (Chloroform)	B/4
Triethanolamine	A
Triethylene glycol	A
Trifluoroacetic anhydride (TFAA)	B/4
Trifluoromethane (Fluoroform)	B/4
U	
Urea	C/1
X	
Xylene	B/4
Z	
Zinc chloride 10%	C/1
Zinc sulfate 10%	C/1



7. First Steps

Is everything in the package ? Confirm that package includes :

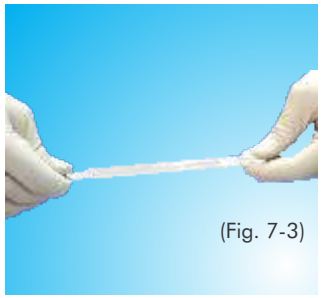
- Bottle Top Dispenser (Fig. 7-1)


(Fig. 7-1)

- Second inlet tube (Fig. 7-2)


(Fig. 7-2)

- Telescoping filling tube (Fig. 7-3)


(Fig. 7-3)

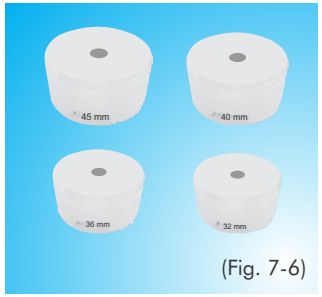
- Calibration tool (Fig. 7-4)


(Fig. 7-4)

- Bottle Adapters - 28, 32, 36, 40 & 45 mm. (Fig. 7-5)

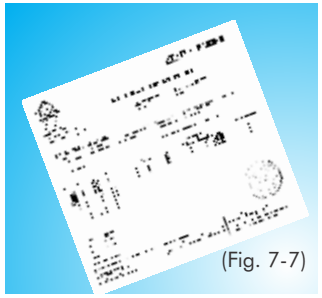
(Fig. 7-5)

- Bottle Adapters for the second bottle - 32, 36, 40 & 45 mm. (Fig. 7-6)

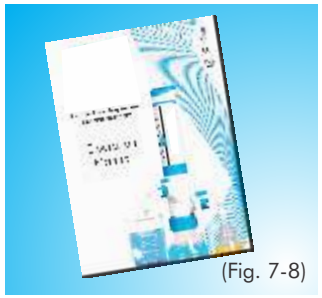


(Fig. 7-6)

- Calibration Certificate (Fig. 7-7)


(Fig. 7-7)

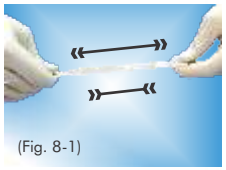
- Operation manual. (Fig. 7-8)


(Fig. 7-8)

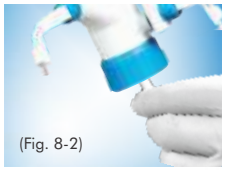
8. Assembly

⚠ Wear protective clothing, eye protection and gloves. Follow all Safety instruction and observe limitations of use and operating limitations. (see page 2)

1. Adjust length of telescoping inlet tube.
   The length of FEP inlet tubing provided should be adjusted to fit your particular reservoir. Longer length of inlet tube 1 are available on request. (Fig. 8-1)


(Fig. 8-1)

2. Fix the telescoping inlet tube 1. (Fig. 8-2)


(Fig. 8-2)

3. Choose the correct adapter for the bottle.
   The threaded platform base of dispenser has a 30 mm screw thread in 2.5, 5 & 10 ml dispenser and 45 mm screw thread in 30, 60 & 100 ml dispenser. In case of 30, 60 & 100 ml dispenser, a reducer is pre fitted to fix the extra adapters. If a GL 45 bottle neck is used then the reducer can be removed and dispenser can be mounted directly. Five adapters are supplied to suit containers with a 28, 32, 36, 40, 45 mm and 30 mm (inbuilt adapter) screw neck. (Fig. 8-3)


(Fig. 8-3)

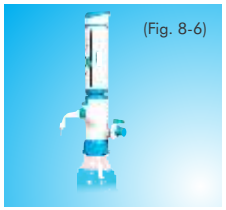
4. Fix the adapter. (Fig. 8-4)


(Fig. 8-4)

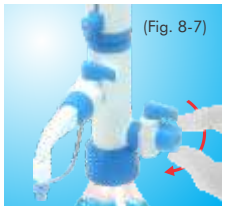
5. Mount the dispenser with first inlet tube attached :
   The assembled dispenser is screwed to the reservoir using gentle hand torque applied to the threaded platform base only. Removal should also be by means of hand torque applied to the same base. (Fig. 8-5)


(Fig. 8-5)

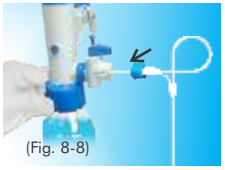
6. The dispenser with the first inlet will look as in (Fig. 8-6).


(Fig. 8-6)

7. For the Assembly of the second inlet B,
first remove the cap on the Inlet B. (Fig. 8-7)


(Fig. 8-7)

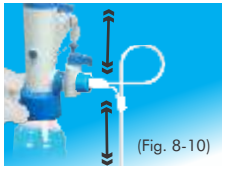
8. Insert the extension tube attachment into the hole of the
Inlet B. Push the tube to ensure the tight fitment. (Fig. 8-8)


(Fig. 8-8)

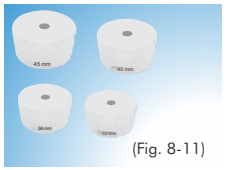
9. Screw the chuck nut on the extension tube to tightly
secure the inlet pipe. (Fig. 8-9)


(Fig. 8-9)

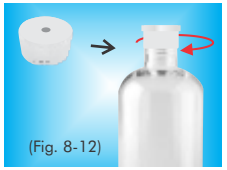
10. The Inlet Tube B can now be extended or
reduced depending on the depth of the Bottle.
(Fig. 8-10)


(Fig. 8-10)

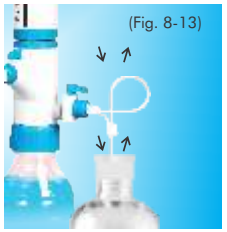
11. To use the second inlet B, there is an additional set of
adapters/caps to mount on the second bottle to avoid
any exposure to air and fumes. (Fig. 8-11)


(Fig. 8-11)

12. Mount the correct cap on the second bottle by
screwing it on. (Fig. 8-12)


(Fig. 8-12)

13. Now the extension tube can be passed through the
hole on the cap of the second bottle. (Fig. 8-13)


(Fig. 8-13)

14. The instrument is now ready for use. (Fig. 8-14)


(Fig. 8-14)

⚠ Do not operate the piston until the unit is safely and fully mounted on the reservoir bottle.

Always wear protective gloves when touching the instrument or the bottle, especially when ⚠ using dangerous liquids. When mounted to a reagent bottle, always carry the instrument as shown in the figure. (8-14)

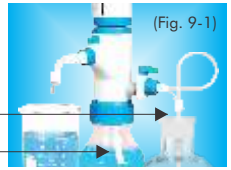
⚠ Never press down the piston when the cap is on. (Fig. 9-2)

The reagent can drip out from the discharge tube and cap.

⚠ Ensure that the receiving vessel is kept below the delivery nozzle before starting the operation.

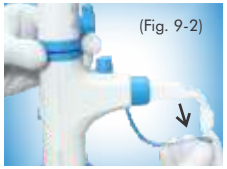
9. Priming

⚠ In this dispenser two inlet paths, A and B, have to be primed. (Fig.9-1)



- Open the cap of the dispensing tube. (Fig. 9-2)

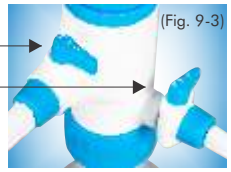
⚠ For safety hold the discharge tube orifice on the inner wall of a suitable receiving vessel.



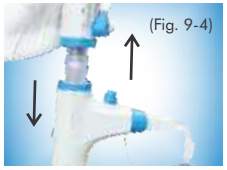
INLET A

POSITION - Knob A - Closed

Knob B - Closed. (Fig.9-3)



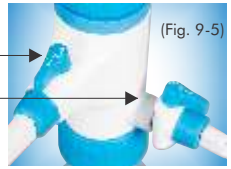
- For priming gently pull up the piston approx, 30mm and push it down rapidly until the lower stop.
- Repeat this procedure 5 times (Fig. 9-4).



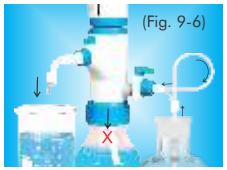
INLET B

POSITION - Knob A - Open

Knob B - Open (Fig. 9-5)

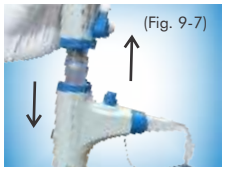


NOTE - Now the liquid will flow from the second bottle to the outside without any interaction with the liquid in the first bottle. (Fig. 9-6)



⚠ Ensure that the receiving vessel is kept below the delivery nozzle before starting the operation.

- Gently pull up the piston approx, 30mm and push it down rapidly until the lower stop.
- Repeat this procedure 5 times. (Fig. 9-7)



NOTE - In case the liquid in the second bottle is the same as the liquid in the first bottle then close the Knob A and open the Knob B. The liquid will flow from the second bottle into the first bottle for re-filling. After a few dispense cycles the second inlet will be primed as well and no liquid will be wasted.

⚠ To avoid splashes when priming hold the discharge tube on the inner wall of a suitable receiving vessel and dispense liquid to prime the discharge tube until it is bubble free, Wipe away any remaining drops from the discharge tube.

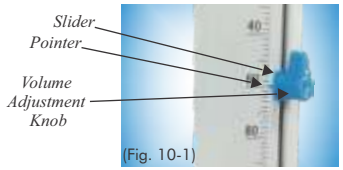
⚠ Before using the instrument for the first time, ensure it is rinsed carefully and discard the first few samples dispensed. Avoid splashing.

10. Dispensing

1. VOLUME SETTING :

Volume Adjustment Knob :

It is simple and easy to operate. There are two positions of the knob as shown in Fig. 10-1-A

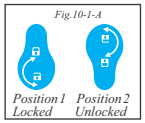


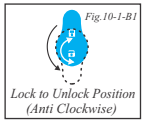
Position 1 : Locked Position | Position 2 : Unlocked Position

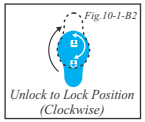
Setting the Volume :

Follow these simple steps :

- Turn the Knob from Position 1 to Position 2 by rotating it ANTICLOCKWISE as shown in Fig. 10-1-B1.
- The slider is now loose and can be moved up and down.
- Set your desired volume by aligning the pointer with the scale.
- To lock the set volume, turn the Knob from Position 2 to Position 1 by rotating it CLOCKWISE as shown in Fig. 10-1-B2 .





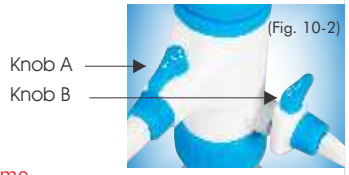


2. DISPENSING :

⚠ Wear protective clothing, eye protection and gloves. Liquid may accumulate in the cap. To avoid splashes dispense slowly. Follow all safety instructions and observe limitations of use and operating limitations.

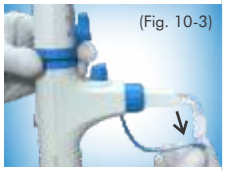
1. STANDARD DISPENSING

POSITION - Knob A - Open
Knob B - Closed (Fig 10-2)



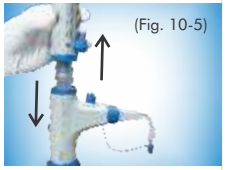
⚠ Before starting dispensing make sure that the dead volume is removed. Refer to article 11 of this manual.

- Remove cap from the discharge tube. (Fig. 10-3)



- Hold the discharge tube orifice on the inner wall of a suitable receiving vessel. (Fig. 10-4)

- Gently lift the piston until the upper stop and then depress piston slowly and steadily with minimal force until the lower stop. (Fig. 10-5)

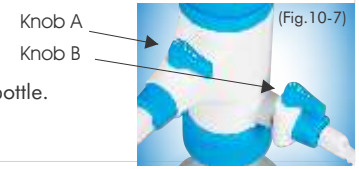


- Wipe off the discharge tube against the inner wall of the receiving vessel.
- Reattach cap to discharge tube. (Fig.10-6)

2. BOTTLE RE-FILLING

NOTE - This feature is designed to re-fill the main bottle without dismounting the dispenser.

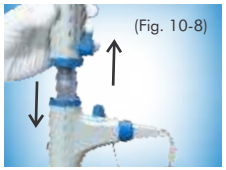
POSITION - Knob A - Closed
Knob B - Open (Fig.10-7)



⚠ Second bottle should have the same liquid as the first bottle.

⚠ Volume may be set to the maximum for quick refill.

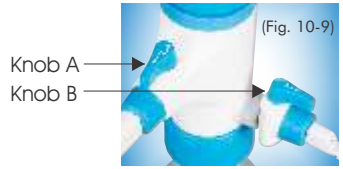
- Gently lift the piston until the upper stop and then depress piston slowly and steadily with minimal force until the lower stop. (Fig. 10-8)
- Bottle will be refilled with the liquid from the second bottle.



3. RINSING :

NOTE - This feature is designed to rinse the dispenser with distilled water without dismounting the dispenser.

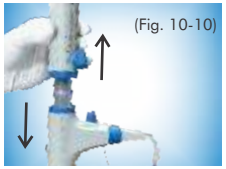
POSITION - Knob A - Open
Knob B - Open (Fig.10-9)



⚠ Make sure the second liquid is Distilled Water.

⚠ Make sure a suitable receiving vessel is placed below the outlet tube.

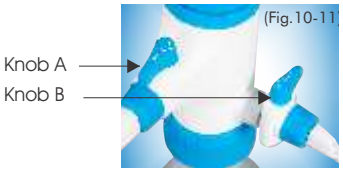
- Set the volume adjustment knob to maximum volume.
- Remove cap from the discharge tube. (Fig. 10-3)
- Hold the discharge tube orifice on the inner wall of a suitable receiving vessel. (Fig. 10-4)
- Gently lift the piston until the upper stop and then depress piston slowly and steadily with minimal force until the lower stop. (Fig. 10-10)



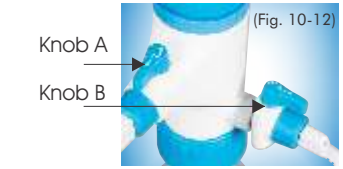
- Run the rinse cycle at least twice.
- Wipe off the discharge tube against the inner wall of the receiving vessel.

4. DUAL REAGENT DISPENSING :

POSITION 1 - Knob A - Open
Knob B - Closed (Fig. 10-11)



POSITION 2 - Knob A - Open
Knob B - Open (Fig. 10-12)



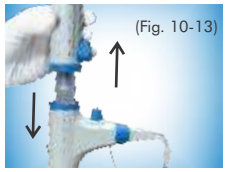
POSITION 2 dispenses the liquid from the second bottle to the outside.

NOTE - This feature enables the user to use two reagents with one dispenser without dismounting the dispenser.

⚠ Make sure a suitable receiving vessel is placed below the outlet tube.

⚠ Before switching to liquid 1 or 2 make sure that the dead volume is removed. Refer to article 11 of this manual.

- Remove cap from the discharge tube. (Fig. 10-3)
- Hold the discharge tube orifice on the inner wall of a suitable receiving vessel. (Fig. 10-4)
- Gently lift the piston until the upper stop and then depress piston slowly and steadily with minimal force until the lower stop. (Fig. 10-13)


(Fig. 10-13)

- Wipe off the discharge tube against the inner wall of the receiving vessel.

11. Removal of dead volume

⚠ IMPORTANT

When switching from Position 1 to 2 or from Position 2 to 1, to dispense the First/Second reagent, please note that there will be dead volume of the first reagent in the delivery tube.

To remove the dead volume follow this method:

a. Switch to Position 1/2 (depending on mode needed).

b. Take a new receiving vessel to take out the dead volume/waste reagent out.

c. Set the volume to 3ml for 2.5ml, 5ml and 10ml dispensers.
Set the volume to 5ml for 30ml, 60ml and 100ml dispensers.

d. Execute one cycle of dispensing. (Two cycles are advised to be completely sure that the complete dead volume is removed.)

e. Remove the second vessel (waste collection vessel).

f. Dispenser is ready to dispense the second reagent.

12. Error Limits

Error Limits related to the nominal capacity (= maximum volume) indicated on the instrument, are obtained when instrument and distilled water are equilibrated at ambient temperature (20°C/68°F). Testing takes place according to DIN EN ISO 8655-6 with a completely assembled instrument and with uniform and smooth dispensing.

Error Limits for First & Second Liquid		Specifications ISO 8655			
Vol. Range	Increment	Accuracy ±%	Accuracy ± ml	CV ±%	CV ± ml
0.25-2.5 ml	0.05 ml	0.6	0.015	0.2	0.005
0.5-5 ml	0.1 ml	0.6	0.030	0.2	0.010
1-10 ml	0.2 ml	0.6	0.060	0.2	0.020
2.5-30 ml	0.5 ml	0.6	0.180	0.2	0.060
5-60 ml	1.0 ml	0.6	0.360	0.2	0.120
10-100 ml	2.0 ml	0.6	0.600	0.2	0.200

13. User Calibration Procedure

Dispenser has been laboratory calibrated at its nominal volume. However, due to changes in environmental conditions and the viscosity of the media which you dispense, we recommend gravimetric testing every 3-12 months. Gravimetric volume testing according to DIN EN ISO 8655-6 (for measurement conditions, see 'Error Limits', page 13) is performed as follows:

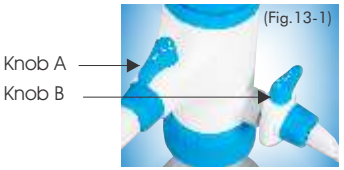
Re-Calibrate :

⚠ Make sure that the instrument is primed.

⚠ Make sure a suitable receiving vessel is placed below the outlet tube.

1. Set the dispenser to STANDARD DISPENSING mode.

POSITION - Knob A - Open
Knob B - Closed (Fig. 13-1)



(Fig.13-1)

2. Set the Dispenser to the nominal volume or any other volume which is most commonly used by you. (Fig. 13-2) Follow the common rules for calibration used in statistical quality control (ISO 8655/2).


(Fig. 13-2)

3. Set the volume and dispense five full volumes of distilled water at 20°C on Electronic Balance to establish the actual mean volume of liquid dispensed. If the gravitational average result varies from the volume displayed, you should re-calibrate the Dispenser.

4. For re-calibration pull the cap outwards to expose the Calibration nut. (Fig. 13-3)

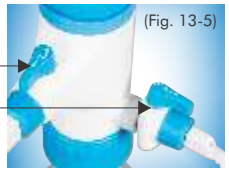

(Fig. 13-3)

5. Using the calibration tool, turn the calibration nut clockwise to reduce the volume and anticlockwise to increase the volume. Repeat this procedure till the desired volume is achieved on the electronic balance. (Fig. 13-4)


(Fig. 13-4)

NOTE - After the calibration is finished, also check the reading for the second inlet B. Set the dispenser to RINSE mode.

POSITION - Knob A - Open
Knob B - Open (Fig. 13-5)



(Fig. 13-5)

Check the readings at the desired volume on the electronic balance.

After calibrating the first liquid, the second liquid should be automatically calibrated.

13. Maintenance / Cleaning

The Dispenser should be cleaned in the following situations :

- Immediatley when the piston is difficult to move.
- Before changing the reagent.
- Prior to long term storage.
- Prior to dismantling the instrument.
- Prior to autoclaving.
- Regularly when using liquids which form deposits (e.g. crystallizing liquids).
- Regularly when liquids accumulate in the cap.

⚠ All maintenance should be carried out wearing suitable eye protection and protective clothing. If in doubt, consult your safety officer.

1. Make sure that the Dispenser is completely empty.
2. Place the instrument into an empty sink together with its reservoir.
3. Unscrew the threaded platform base from the reservoir and lift the dispenser's intake tube carefully out of the reservoir, whilst tapping it against the reservoir's aperture to shake off any droplets from the intake tube.
4. Hold the dispense nozzle over the aperture of the reservoir and apply gentle piston strokes in order to return any contents into the reservoir.
5. Empty the instrument completely and flush thoroughly with distilled water.
6. If the piston barrel is still not completely clean, you need to dis-assemble the dispenser. Refer Dis-assembling procedure given below.

15. Dis-assembling the dispenser for cleaning and servicing :

1. Procedure to dis-assemble the piston:

- Pull the cap outwards to expose the Calibration Nut. (Fig. 15-1)


(Fig. 15-1)

- Unscrew the Calibration Nut with the help of calibration tool to dis-assemble the Piston and shaft out of the main housing. (Fig. 15-2)


(Fig. 15-2)

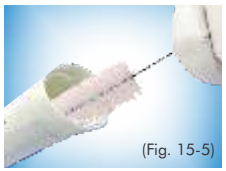
- After unscrewing pull out the shaft. (Fig. 15-3)


(Fig. 15-3)

- Rinse the piston and shaft with deionized water. (Fig. 15-4)


(Fig. 15-4)

- Clean the cylinder with a bottle-brush. If necessary carefully remove deposits at the edge of the glass cylinder. (Fig. 15-5)


(Fig. 15-5)

- Then flush all the parts of the instrument with deionized water. (Fig. 15-6)


(Fig. 15-6)

- Insert the piston completely into the cylinder and then reassemble the instrument using the calibration tool by screwing back the piston. (Fig. 15-7)

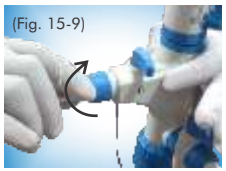

(Fig. 15-7)

- Snap back the cap to complete the assembly. (Fig. 15-8)


(Fig. 15-8)

2. (a) Procedure to dis-assemble the DELIVERY PIPE A

- Unscrew the chuck nut and pull out the delivery pipe. (Fig. 15-9) & (Fig. 15-10)

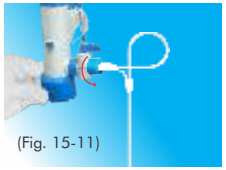

(Fig. 15-9)


(Fig. 15-10)

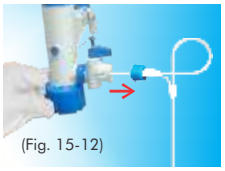
- Clean the pipe with deionized water.

2. (b) Procedure to dis-assemble the INLET PIPE B

- Unscrew the chuck nut and pull out the inlet pipe. (Fig. 15-11) & (Fig. 15-12)


(Fig. 15-11)

- Clean the pipe with deionized water.


(Fig. 15-12)

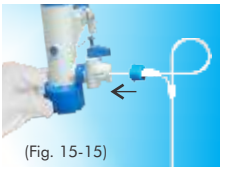
3. (a) Procedure to re-assemble the DELIVERY PIPE A

- First push the delivery pipe into the lower housing till it stops going in further. (Fig. 15-13)

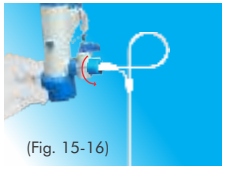
- Screw the chuck nut to complete the assembly. (Fig. 15-14)

3. (b) Procedure to re-assemble the INLET PIPE B

- Insert the extension tube attachment into the hole of the Inlet B. Push the tube to ensure the tight fitment. (Fig.15-15)


(Fig. 15-15)

- Screw the chuck nut on the extension tube to tightly secure the inlet pipe. (Fig. 15-16)


(Fig. 15-16)

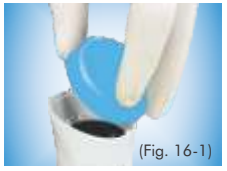
16. Autoclaving

This instrument is autoclavable at 121° C) (250° F) 1 bar absolute (15 psi) with a holding time of at least 15 minutes.

NOTE - Only the piston needs to be removed for autoclaving the instrument. Piston is also autoclavable.

Dis-assembling for Autoclaving :

- Pull the cap outwards to expose the Calibration Nut. (Fig. 16-1)


(Fig. 16-1)

- Unscrew the Calibration Nut with the help of calibration tool to dis-assemble the Piston and shaft out of the main housing. (Fig. 16-2)


(Fig. 16-2)

- After unscrewing pull out the shaft. (Fig. 16-3)


(Fig. 16-3)

- This is the piston-shaft sub-assembly. (Fig. 16-4)


(Fig. 16-4)

- Autoclave the two sub-assemblies at 121°C and 15 psi pressure for 10-15 mins. (Fig. 16-5)


(Fig. 16-5)

Re-assembling after Autoclaving :

- Insert the piston completely into the cylinder and then reassemble the instrument use in the calibration tool by screwing back the piston. (Fig. 16-6)


(Fig. 16-6)

- Snap back the cap to complete the assembly. (Fig. 16-7)


(Fig. 16-7)

- Dispenser is now ready for use.
  Re-calibation is required after autoclaving.
  (Fig. 16-8)


(Fig. 16-8

17. Troubleshooting

Trouble	Possible Cause	Solution
Piston Difficult to move	Formation of crystals, dirty	Stop dispensing immediately. Loosen piston with circular motion, but do not disassemble. Follow all cleaning instructions. (see page 21)
Air bubbles appear in the Instrument	Reagent with high vapor pressure has been drawn in too quickly	Slowly draw in reagent.
	The instrument has not been primed	Prime the instrument. (see page 15)
	Filling tube is loose or damaged	Push the filling tube on firmly. if necessary cut off approx. 1 cm of the tube at the upper end and then re-connect it or replace filling tube.
	Liquid reservoir is empty	Refill reservoir and prime unit.
	Too fast filling action	Fill and dispense slowly.
	Leaking Piston	Clean Piston. (see page 21) If problem persist replace piston.
	Leaking discharge valve	Clean by flushing throughly with distilled water. (see page 21)
Dispensing not possible	Blocked Dispense nozzle	Disassemble the dispense nozzle and flush through with distilled water.
	Discharge valve stuck	Clean Unit by immersing valve assembly in distilled water. (see page 21)
Wrong Dispenser Volume	Instrument not calibrated	Follow steps of user calibration. (see page 14)
Barrel does not fill with liquid	Inlet tube not fitted firmly	Connect inlet tube correctly. (see page 12, Fig. 2)
Filling Not Possible	Volume adjustment to Minimum setting	Set to required volume. (see page 16)