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# MICROLIT E-DISPENSER | Electronic Dispenser with Dual Dispensing and Titration Functionality



# EXPERIENCE PRECISION

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## 1. Intended Use of the Instrument

Microlit E-DISPENSER is a motor-operated bottle top dispenser with functionality of E-BURETTE as well with an intuitive design and user-friendly UI. The E-DISPENSER is intended to be used for dispensing a pre-defined volume. It offers two modes: serial and stepper dispensing.

## 2. Product Specifications

Sl. No.	Features	Microlit E-DISPENSER
1	Volume Ranges	50 ml, 25 ml, 10 ml
2	Increment, Accuracy, and CV	For 50 ml: Increment= 0.01ml, Accuracy= 0.05% and CV= 0.05% For 25 ml: Increment= 0.01 ml, Accuracy= 0.07% and CV= 0.05% For 10 ml: Increment= 0.005 ml, Accuracy= 0.10% and CV= 0.10%
3	Modes	Serial dispensing and Stepper dispensing
4	Unit Type	Microprocessor-controlled motorized piston lift system with recirculation valve
5	Material	ABS housing, borosilicate glass, FEP tubes, PTFE piston
6	Operating Temperature	+10 °C to +40 °C (from 50 °F to 104 °F)
7	Power Supply	18 V, 3 A
8	Battery	14.4 V Li-ion battery. One complete battery charge gives 3 hours (approx.) of continuous operation, (Battery capacity indicated on TFT display and charging time 6.5 hrs.)
9	Touchscreen	4" TFT screen; Stylus to assist touch screen operations
11	Extra window	Supplied with an extra UV protection window for sensitive media
12	Re-circulation Mode	Preventing the loss of reagent during purging
13	Flexinozzle	Adjustable delivery nozzle can move both horizontally and vertically
14	Time and Date	Real date and time integration
15	Brightness	Three levels: low, medium, and high
16	Calibration	Easy user calibration
17	Cleaning/Maintenance	Not Autoclavable
18	Memory	10 dedicated storage slots; each for serial and stepper dispensing
19	Languages	English, Spanish, and German

## 3. Safety Instructions

This instrument may sometimes be used for operations involving hazardous materials and equipment. 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 sole responsibility of the user to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations, prior to the usage of this instrument.

 Please read the following instructions carefully:

- Read and understand this Operation Manual thoroughly before using the instrument
- Follow general and safety instructions for hazard prevention. E.g., always wear protective clothing, protective gear for the eyes and hands.
- Carefully observe the specifications provided by reagent manufacturers.
- When dispensing inflammable fluids, avoid the built up of static charge. Make sure that you do not dispense into plastic vessels and do not wipe the instrument/equipment with a dry cloth.
- Use the instrument only for dispensing liquids, with strict regard to the defined limitations of use and operating constraints. (Refer to section 4)
- Do not leave the instrument mounted over the reagent, especially when not in use.
- Run the instrument on distilled water, especially after using with aggressive liquids. This helps to sustain the instrument's durability.
- Observe operating exclusions. When in doubt, contact the manufacturer or supplier.
- Always use the instrument in such a way that neither the user nor any other person is in danger. While dispensing, the discharge tube must always point away from you or any other person. Only dispense into appropriate vessels and avoid splashes.
- Do not press the piston when the discharge tube closure is attached.
- Do not remove the discharge tube while the dispensing cylinder is being filled.
- Reagents can accumulate in the cap of the discharge tube. Thus, clean it regularly.

- Do not carry the mounted instrument by the cylinder sleeve or the valve block. Breakage or loosening of the cylinder may lead to personal injury.
- Use only original accessories and spare parts.
- Do not attempt to make any technical alterations. Do not dismantle the instrument any further than is described in the Operation Manual.
- Always check the instrument for visual damage before use.
- If there is any sign of a potential malfunction (e.g. piston difficult to move, stuck valve or leakage), immediately stop dispensing. Consult the 'Troubleshooting' section of this Operation Manual and contact the manufacturer if needed. (Refer to section 18)

#### 4. Functions and Limitations of Use

The E-DISPENSER is designed to dispense a predefined volume required by the user from one reservoir to another. The E-DISPENSER has a motor-operated piston movement that regulates the aspiration and dispensing of the liquid with the help of inert valve system consisting of ball and seat.

This instrument is calibrated as per ISO 8655 standards. When the instrument is correctly used, the dispensed liquid comes into contact with only the following chemically resistant materials: PTFE, FEP, and Borosilicate glass.

##### A. CE Marking

This sign certifies that the product meets the requirements of the EC directive and has been tested according to the specified test methods.

##### B. Physical Limits

- Working temperature range for the instrument +10 °C to +40 °C (from 50 °F to 104 °F).
- Reagent vapor pressure up to 600 mbar (maximum). Aspirate slowly above 300 mbar in order to prevent the liquid from boiling
- Kinematic viscosity upto 500 mm<sup>2</sup>/s.  
(dynamic viscosity [mPas] = kinematic viscosity [mm<sup>2</sup> /s] x density [g/cm<sup>3</sup>])
- Use fluids with density upto 2.2 g/cm<sup>3</sup>

- Relative air humidity between 20% and 90%.
- Should be used with the battery provided by the manufacturer only

##### C. Operating Limitations

- Chlorinated and fluorinated hydrocarbons or chemical combinations which form deposits may make it difficult for the piston to move or jam it. If the piston becomes too difficult to move, immediately clean the instrument.
- While dispensing inflammable fluids, avoid the built up of static charge.
- Make sure that you do not dispense into plastic vessels and do not wipe instruments with a dry cloth.
- The instrument has been designed to comply with ISO 8655 standards in general laboratories applications. Please check the compatibility with the manufacturer for any specific application of the instrument.

#### 5. Operating Exclusions

E-DISPENSER should not be used with the following reagents:

- Liquids that attack FEP, PFA and PTFE (e.g. dissolved Sodium Azide)
- Liquids that attack borosilicate glass (e.g. Hydrofluoric acid).
- Hydrochloric acid > 40%. | Tetrahydrofuran or Oxolane | Trifluoroacetic acid.  
Explosive liquids (e.g. Carbon Disulfide).
- Suspensions (e.g. of charcoal) as the solid particles may clog or damage the instrument.  
Liquids that attack PP (cap).
- An aggressive atmosphere, e.g. HCl fumes\*.
- The permissible concentration of dissolved Sodium Azide is not more than 0.1%.



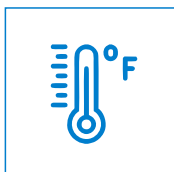
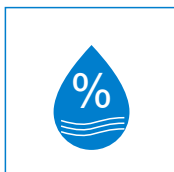
- Liquids that attack PP (cap).
- An aggressive atmosphere, e.g. HCl fumes.

\* The permissible concentration of dissolved Sodium Azide is not more than 0.1%.

## 6. Storage Conditions

### 1. Storage Conditions:

Store the instrument and accessories in a clean, cool and dry place. Storage temperature from -20 °C to +50 °C (from -4 °F to 122 °F) is advised with relative humidity between 5% and 95%.



## 7. List of Recommended Reagents

### 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 E-DISPENSER for dispensing and dosing also used for titration as an E-BURETTE. However, safety precautions and recommendations in operation manual must be followed carefully.

### Code explanations

A = Good resistance

B = Acceptable with limitations

C = Not recommended

1 = Aggressive liquid vapours (better resistance with lower concentration) may cause corrosion of electronic motor.

Do not leave the E-DISPENSER on the bottle. Run the E-DISPENSER with distilled water after usage.

2 = Risk of damage, softening or discoloration of external parts through vapours.

Do not leave the E-DISPENSER on the bottle. Run the E-DISPENSER with distilled water after usage.

3 = Chemical deposition on the barrel surface which may restrict the movement of piston.

Do not leave the E-DISPENSER on the bottle. Run the E-DISPENSER with distilled water after usage.

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

## List of Reagents

Chemicals A - Z	
A	
Acetaldehyde (Ethanal)	A
Acetic acid 96%	B/1/2
Acetic acid 100% (glacial)	B/1/2
Acetic anhydride	B/1/2
Acetone (Propanone)	B/2
Acetonitrile (MECN)	A
Acetophenone	B/2
Acetyl Chloride	B/2
Acetylacetone	B/1
Acrylic acid	B/1
Acrylonitrile	B/1/2
Adipic acid	A
Allyl alcohol	A
Aluminum chloride	B/1
Amino acids	A
Ammonia 20%	B/1/2
Ammonia 20-30%	B/1/2
Ammonium chloride	B/1
Ammonium fluoride	B/1
Ammonium molybdate	B/1
Ammonium sulfate	B/1
Amyl alcohol (Pentanol)	A
Amyl chloride (Chloropentane)	B/1/2
Aniline	A
Ascorbic acid	A
n-Amyl acetate	B/2
B	
Barium chloride	A
Benzaldehyde	A
Benzene	B/2
Benzine	A
Benzoyl chloride	B/2
Benzyl alcohol	A
Benzyl chloride	B/2
Bis(2-ethylhexyl) phthalate	B/2
Boric acid 10%	A
Bromine	C/1/2
Bromobenzene	B/2
Bromonaphthalene	A
Butanediol	A
Butanol	A
Butyl acetate	B/2
Butyl methyl ether	B/2
Butylamine	B/2
Butyric acid	B/2
C	
Calcium carbonate	B/3
Calcium chloride	B/3
Calcium hydroxide	B/3
Calcium hypochlorite	B/3

## List of Reagents

Chemicals A - Z	
Carbon disulfide	B/2
Carbon tetrachloride	B/2
Chlorine dioxide	B/2
Chlorine water	B/2
Chloro naphthalene	B/2
Chloroacetaldehyde 45%	A
Chloroacetic acid	B/2
Chloroacetone	B/2
Chlorobenzene	B/2
Chlorobutane	B/2
Chloroethanol	B/2
Chloroform (Trichloromethane)	B/1/2
Nitro-hydrochloric acid (Aqua regia)	B/1/2
Chlorosulfonic acid	B/1/2
Chlorosulfuric acid 100%	B/1/2
Chromic acid 100%	B/1/2
Chromosulfuric acid 100%	C/1/2
Citric acid	A
Copper fluoride	A
Copper sulfate	A
Covi-Ox-T70/ Mixed Tocopherol	A
Cresol	A
Cumene (Isopropylbenzene)	B/2
Cyanoacrylate	A
Cyclohexane	B/2
Cyclohexanone	B/2
Cyclopentane	B/2
D	
1,2-Diethylbenzene	B/2
1,4-Dioxane (Diethylene dioxide)	B/2
1-Decanol	A
Decane	A
Di-(2-ethylhexyl) peroxydicarbonate	B/2
Dibenzyl ether	B/2
Dichloroacetic acid	B/2
Dichlorobenzene	B/1
Dichloroethane	A
Dichloroethylene	B/2
Diesel oil (Heating oil)	A
Diethanolamine	A
Diethylamine	B/2
Diethylene glycol	A
Diethylether	B/2
Dimethylacetamide	A
Dimethyl sulfoxide (DMSO)	B/1/2
Dimethylaniline	A
Dimethylformamide (DMF)	B/1/2

## List of Reagents

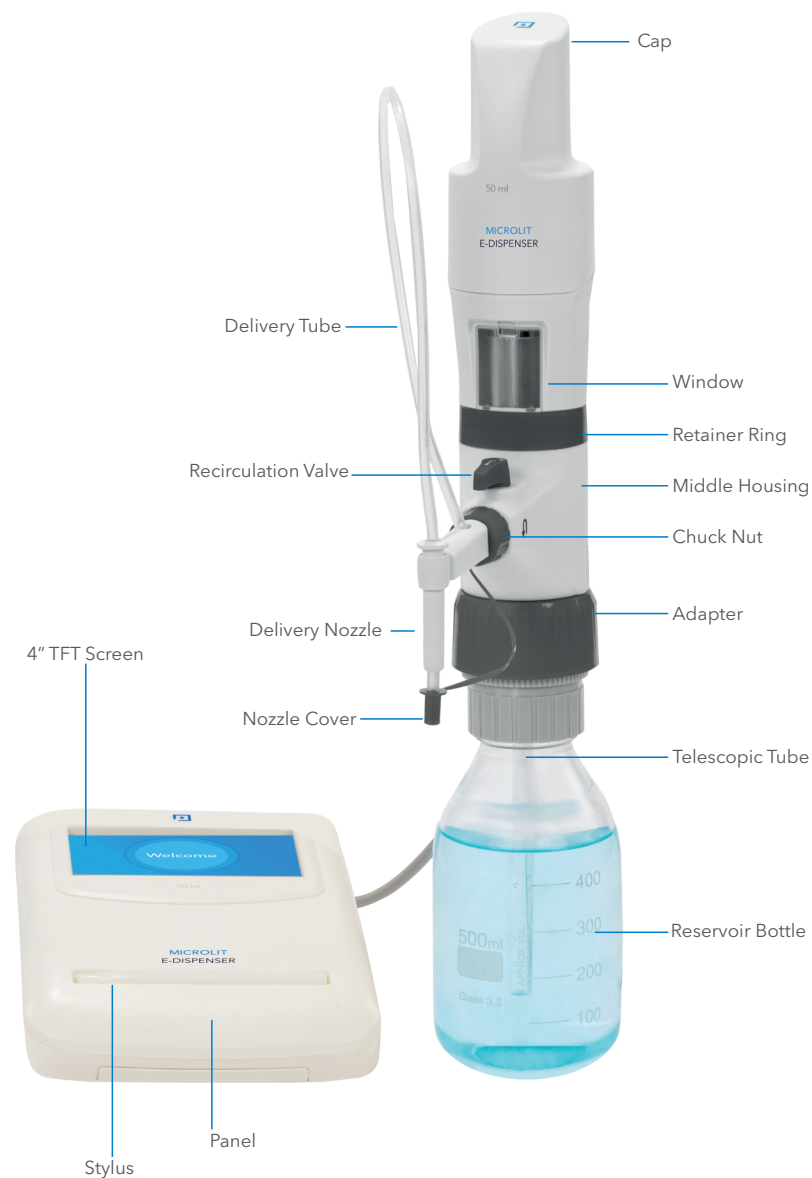
Chemicals A - Z	
E	
Ethanol	A
Ethanolamine	B/2
Ether	B/2
Ethyl acetate	B/2
Ethylbenzene	B/2
Ethylene chloride	B/2
Ethylene diamine	A
Ethylene glycol	A
F	
Fluoroacetic acid	B/1/2
Formaldehyde (Formalin)	A
Formamide	A
Formic acid	B/1/2
G	
Gamma-butyrolactone	A
Gasoline	B/2
Glycerin <40%	A
Glycolic acid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

## List of Reagents

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

## List of Reagents

Chemicals A - Z	
Propylene oxide	A
Picric acid (Trinitrophenol)	B/2
Pyridine	B/2
Pyruvic acid	A
R	
Resorcin	A
S	
Salicylaldehyde	A
Scintillation fluid	A
Silver acetate	B/1/2
Silver nitrate	B/1/2
Sodium acetate	B/1/2
Sodium chloride (kitchen salt)	B/3
Sodium dichromate	B/1/2
Sodium fluoride	B/1/2
Sodium hydroxide 30%	B/3
Sodium hypochlorite	B/3
Sodium thiosulfate	B/3
Sulfonitric acid 100%	B/1/2
Sulfur dioxide	B/1/2
Sulfuric acid 100%	B/1/2
Sulfuric acid <10%	B/1
Sulfuric acid (10-75%)	B/1
Sulfuric acid (Cold conc.)	B/1/2
Sulfuric acid (Hot conc.)	B/1/2
T	
1,1,2-Trichlorotrifluoroethane	B/2
Tartaric acid	B/1
Tetrachlorethylene	B/2
Tetrahydrofuran (THF)	B/2
Tetramethylammonium hydroxide	B/3
Toluene	B/2
Trichlorethylene	B/2
Trichloroacetic acid	B/2
Trichlorobenzene	B/2
Trichloroethane	B/2
Triethanolamine	B/2
Triethylamine	B/2
Triethylene glycol	A
Trifluoroacetic anhydride (TFAA)	B/1/2
Trifluoromethane (Fluoroform)	B/1/2
U	
Urea	A
X	
Xylene	B/2
Z	
Zinc chloride 10%	B/3
Zinc sulfate 10%	B/3



Product Description

## 8. First Steps

First and foremost – check whether everything is there in the package.

**Verify that the package includes:**

1.

Fig. 8.1



Operation Manual  
(Fig. 8.1)

2.

Fig. 8.2



10ml, 25ml or 50 ml Dispensing Unit  
(Fig. 8.2)

3.

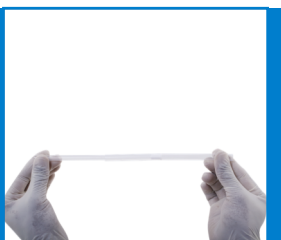
Fig. 8.3



Control Panel  
(Fig. 8.3)

4.

Fig. 8.4



Telescopic Tube  
(Fig. 8.4)

5.

Fig. 8.5



Bottle Adapters (28, 32, 38, 40, 45 mm)  
(Fig. 8.5)

6.

Fig. 8.6



Charging AC Adaptor  
(Fig. 8.6)

7.

Fig. 8.7



Control Panel Stylus  
(Fig. 8.7)

8.

Fig. 8.8



USB Drive for software & driver  
(Use it for titration)  
(Fig. 8.8)

9.

Fig. 8.9



Mini USB Cable to transfer the readings of titration  
(Fig. 8.9)

10.

Fig. 8.10



Portable Printer  
(Applicable With Only Titration Functions)  
(Fig. 8.10)

11.

Fig. 8.11



RS232 Printer Cable  
(Applicable With Only Titration Functions)  
(Fig. 8.11)

12.

Fig. 8.12



Extra Amber Coloured Windows  
(Fig. 8.12)

13.

Fig. 8.13



Calibration Certificate  
(Fig. 8.13)

14.

Fig. 8.14



14.4 V, 2000 mAh Li-ion Rechargeable Batteries  
(Fig. 8.14)

## 9. Initializing

### Connecting the batteries

1.

Fig. 9.1



Open the battery panel at the back of the control panel.  
(Fig. 9.1)

2.

Fig. 9.2



Connect the batteries to the panel wire by inserting the battery connector into the panel connector firmly. It locks with a 'click' sound.  
(Fig. 9.2)

3.

Fig. 9.3



Close the panel.  
(Fig. 9.3)

4.

Fig. 9.4



Press the ON/OFF button at the side of the panel.  
(Fig. 9.4)

5.

Fig. 9.5



The screen will display 'Welcome'.  
(Fig. 9.5)

#### NOTE:

In order to replace the batteries, press the lock button to disengage the battery lock and remove the old batteries.

## 10. Setting Up

### 10. A. Dispensing Unit Setup

### 10. B. Portable Printer Setup

#### 10. A. Dispensing Unit

A1.

Fig. 10.A1



Adjust the length of the Telescopic tube (FEP tube) to fit your particular reservoir.  
If you require a longer tube, it is provided on request.  
(Fig. 10.A1)

A2.

Fig. 10.A2



Fix the Telescopic tube as shown. The tube's ends have different diameters - fix it from the wider end.  
(Fig. 10.A2)

A3.

Fig. 10.A3



Choose the correct adapter for the bottle.  
The threaded platform base of Dispensing Unit has a 30 mm screw thread. Five adapters are supplied to suit containers with a 28, 32, 38, 40, 45 mm and 30 mm (inbuilt adapter) screw neck.  
(Fig. 10.A3)

A4.

Fig. 10.A4



Fix the adapter on the reservoir bottle by screwing it in clockwise direction.  
(Fig. 10.A4)

A5.

Fig. 10.A5



Mount the instrument. Screw it to the reservoir by applying gentle hand torque applied to the threaded platform base only. In case of removal, apply the same technique to the base, in the opposite direction.  
(Fig. 10.A5)

A6.

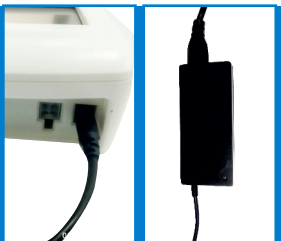
Fig. 10.A6



Connect the cable from the instrument housing to the port at the back of the control panel with a firm push, as shown. Check for the cable position.  
The flat surface of the connector with an arrow mark will face down.  
(Fig. 10.A6)

A7.

Fig. 10.A7



If charging is required, insert the charging pin at the back of the control panel and connect the power cord with the AC adaptor firmly and then plug the two pin power cord to the 220 V power supply.  
(Fig. 10.A7)

A8.

Fig. 10.A8



The battery indicator will show the charging symbol.  
(Fig. 10.A8)



A9.

Fig. 10.A9



The instrument is now ready to be switched on. Press the ON button (of the ON/OFF button) at the side of the control panel to switch on the control panel.  
(Fig. 10.A9)

## A10. Transporting the instrument

Fig. 10.A10



When mounted to a reagent bottle, always carry the instrument as shown and always store it in the upright position.  
(Fig. 10.A10)

## 10.B. Portable Printer Setup

Fig. 10.B1



(Applicable With Only Titration Functions)  
To setup the Portable printer, insert the slip roll inside the printer.

1. Now, connect the printer cable to the back of the instrument panel via RS32 cable provided. (Fig.10.B1)
2. Switch ON the printer via power cable to the main socket.

## 11. Computer Connectivity

### 11. A. Installing the Driver

### 11. B. Installing the titration software

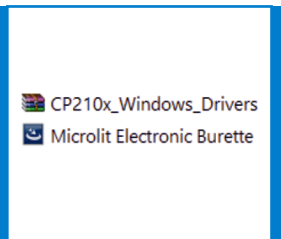
(Applicable With Only Titration Functions)  
Insert the pen drive provided with the package in your PC/Laptop for driver files and software. Please note that there are two set up files in the pen drive.

- CP210x\_Windows\_Drivers
- Titration Setup Files

### 11. A. Installing the Driver

A1.

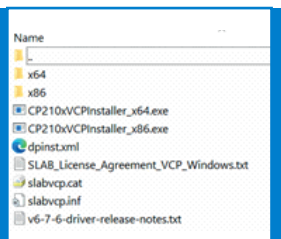
Fig. 11.A1



Double click the CP210x\_Windows\_Drivers setup icon.  
(Fig. 11.A1)

A2.

Fig. 11.A2

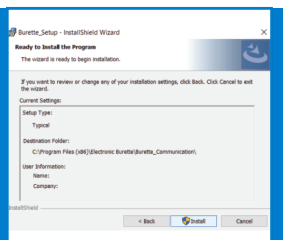


Download the setup files by double-clicking the Installer  
For Windows 7 or less, download CP210xVCPInstaller\_x86.exe.  
For Windows 8 or above, download CP210xVCPInstaller\_x64.exe.  
(Fig. 11.A2)



A3.

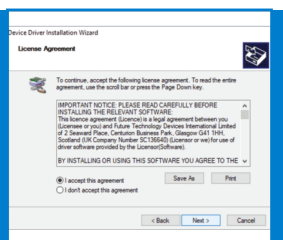
Fig. 11.A3



Click the Next button for installing the device driver.  
(Fig. 11.A3)

A4.

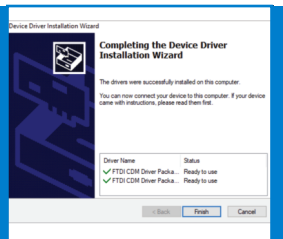
Fig. 11.A4



Click to accept the licence agreement.  
(Fig. 11.A4)

A5.

Fig. 11.A5

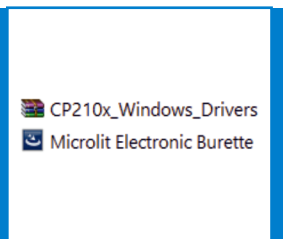


Then, click the Finish button on the  
device driver installation wizard.  
(Fig. 11.A5)

## 11.B. Installing the instrument software

B1.

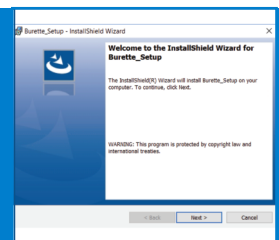
Fig. 11.B1



Double click the MICROLIT ELECTRONIC BURETTE  
setup icon.  
(Fig. 11.B1)

B2.

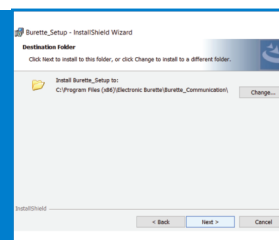
Fig. 11.B2



Click Next to start the Install Shield Wizard for  
MICROLIT Communication window.  
(Fig. 11.B2)

B3.

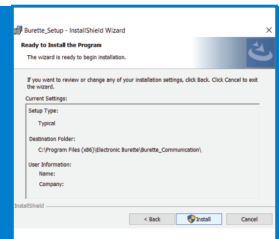
Fig. 11.B3



Click Next to choose the destination folder of the  
software files.  
(Fig. 11.B3)

B4.

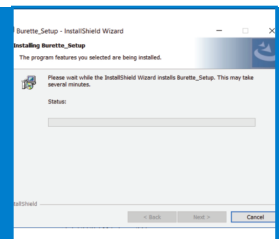
Fig. 11.B4



Click Install for the ready to install program window.  
(Fig. 11.B4)

B5.

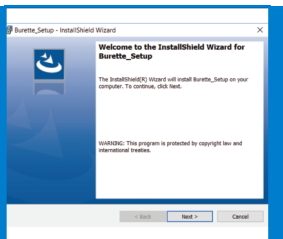
Fig. 11.B5



Click Next for the user account control window.  
(Fig. 11.B5)

B6.

Fig. 11.B6



Click Finish for the Install Shield Wizard completion window.  
(Fig. 11.B6)

B7.

Fig. 11.B7



MICROLIT Communication icon will then appear on the desktop.  
(Fig. 11.B7)

## 12. Operating the instrument

### 12. A. Switch on the Control Panel

### 12. B. Purging

### 12. C. Titration

### 12. D. Dispensing

### 12. E. Sensitive Media

### 12. A. Switch on the Control Panel

A1.

Fig. 12.A1



Switch on the instrument using the ON/OFF switch at the back of the control panel.  
(Fig. 12.A1)

A2.

Fig. 12.A2



When it boots, the instrument will warn the user to switch the knob to recirculation mode.  
(Fig. 12.A2)

A3.

Fig. 12.A3



Turn the knob to re-circulation mode and click the tick mark (✓) on the control panel screen when ready.  
(Fig. 12.A3)

A4. The instrument will reset automatically. It is now ready to use.

### 12. B. Purging

⚠ This step is recommended before using the instrument to ensure bubble free dispensing.

B1.

Fig. 12.B1



Click on the purging mode from the Home Screen on the control panel. (Fig. 12.B1)

B2.

Fig. 12.B2



The screen on the control panel will warn the user to turn the knob to re-circulation mode. (Fig. 12.B2)

B3.

Fig. 12.B3



Turn the knob to Recirculation mode and click the tick mark (✓) on the control panel screen when ready. (Fig. 12.B3)

B4. The instrument will purge automatically. If the device is still not properly purged, go to Step-1 and repeat the procedure till no large air bubble is visible below the piston.

⚠ A few air bubbles up to 1 mm in size are permissible.

## 12. C. Titration

⚠ Wear protective clothing, protective gear for the eyes and hands. Liquid may accumulate in the cap. Follow all safety instructions and observe limitations of use and operating constraints. (Refer to section 4 and 5)

C1.

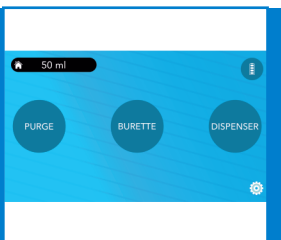
Fig. 12.C1



Remove cap from the discharge tube. (Fig. 12.C1)

C2.

Fig. 12.C2



Click on the Titration mode on the home screen. (Fig. 12.C2)

C3. The screen on the control panel will warn the user to turn the knob to titration mode.

C4.

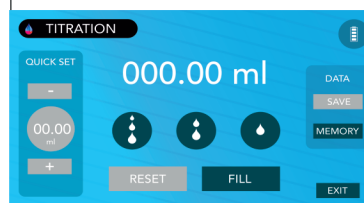
Fig. 12.C4



Turn the knob clockwise to set at titration mode and click the tick (✓) mark on the screen of the control panel when ready. (Fig. 12.C4)

C5. Place the discharge tube orifice against the inner wall of a suitable receiving vessel.

C6.



Now, fill the barrel of the burette by clicking on the FILL button on the titration screen. (Fig. 12.C6)

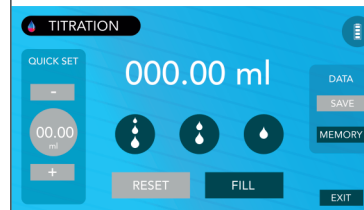
C7.



By pressing the STOP button, the filling volume can be stopped as and when you need to. (Fig. 12.C7)

\*The 'grey' color shows that the function is disabled

C8.



Once the burette is filled, the FILL button will be disabled, which means the burette cannot be filled further. (Fig. 12.C8)

C9. To dispense the liquid, three dispensing speeds are provided, including drop-wise dispensing, which allows the user to achieve the end point very accurately by dispensing one drop on a single click.

Note: The one-touch-one drop dispensing is enabled and applicable only for 50 ml and 25 ml E-BURETTE.

C10. Three dispensing speeds are provided for titration, including drop-wise dispensing, which allows the user to achieve the end point very accurately.



#### Fast mode

In this mode, the dispensing speeds are :

Model	Capacity	Dispensing Speed
ED-50	50 ml	3.8 ml/sec
ED-25	25 ml	2.1ml/sec
ED-10	10 ml	1.2 ml/sec



#### Medium mode

In this mode, the dispensing speeds are :

Model	Capacity	Dispensing Speed
ED-50	50 ml	1.3 ml/sec
ED-25	25 ml	0.7 ml/sec
ED-10	10 ml	0.2 ml/sec

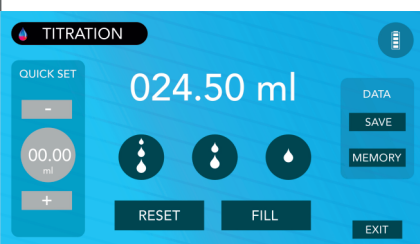


#### Dropwise mode

In this mode, the dispensing speeds are :

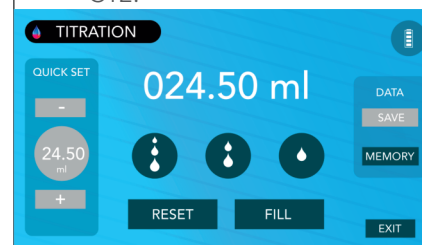
Model	Capacity	Dispensing Speed
ED-50	50 ml	10 µl/click
ED-25	25 ml	10 µl/click
ED-10	10 ml	5 µl/click

C.11



Once the dispensing is complete, the RESET and SAVE button will be enabled.  
(Fig. 12.C11)

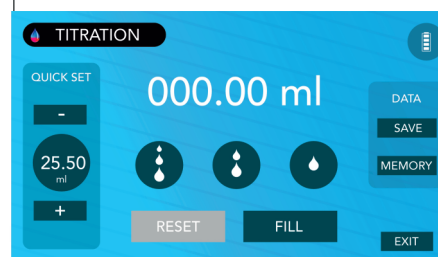
C12.



Now when you click on SAVE, the dispensed reading will be transferred to QUICK SET button. Now the SAVE button is disabled which signifies that the reading cannot be saved again. (Fig. 12.C12)

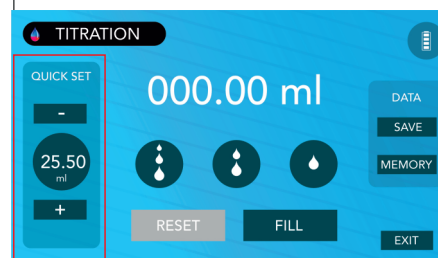
The reading saved into the memory will be transferred to the QUICK SET which will be considered as the last titration value.

C13.



To activate the QUICK SET button, reset the screen. RESET button simply tares the reading displayed on the screen. (Fig. 12.C13)

C14.



When you go to the QUICK SET feature, you can adjust the amount by 10 µl using + and - button. Quick Set button allows the user to dispense a certain amount of liquid in one go. (Fig. 12.C14)

Once the QUICK SET button dispenses the amount, the user can continue the titration process from the same point.

Note: If the titration value is more than the barrel's capacity, simply save the value to Quick Set. Now, the burette will fill and dispense until the saved value is achieved.

## 12. D. Dispensing

To dispense the desired volume of the liquid, the E-DISPENSER offers two dispensing modes: serial dispensing mode and stepper dispensing mode. Both modes allow the user to define the steps required to dispense the desired volume and set the delay between two consecutive dispensing. It is important to note that all parameters should be adjusted such that they should not exceed more than the capacity of the dispenser

### D1. Serial Mode

A predefined volume, configured once, can be consecutively dispensed automatically several times if required. The user can define the number of steps for the desired volume and can set the delay between two consecutive dispensing. The real-time display shows the volume dispensed by the dispenser along with the number of steps completed from 0 to 'n'

D1.1A



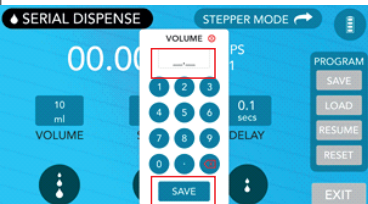
1.A SERIAL DISPENSING is the default selection, when DISPENSER from the main menu is selected. To switch between the two modes, user can click on the switch (↔) button at the top right (Fig. D1.1A)

D1. 2A



2. Setting the VOLUME:  
A. To configure, click on the VOLUME button.  
(Fig. D1. 2A)

D1. 2B & 2C



B. A keyboard will pop up.  
C. The user can enter the desired volume and SAVE.  
(Fig. D1. 2B & 2C)

Note: the set volume should not more than the capacity of the dispenser

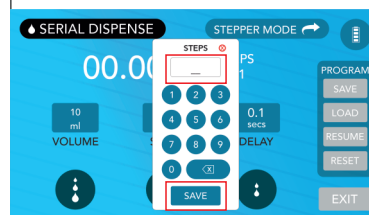
D1.3A



3. Setting the STEPS

A. To configure this, click on STEPS button  
(Fig. D1.3A)

D1.3B & 3C



B. A keyboard will pop up.

C. Enter the number of steps to define the number of times you want to dispense the desired volume.  
(Fig. D1.3B & 3C)

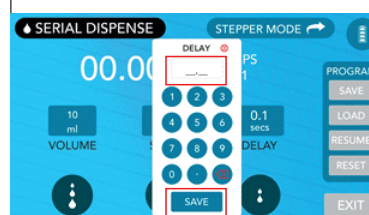
D1.4A



4. Setting the DELAY:

A. To configure this, click on DELAY button  
(Fig. D1.4A)

D1.4B & 4C



B. A keyboard will pop up

C. Set the delay in seconds. This describes the time interval between two consecutive dispensing and save  
(Fig. D1.4B & 4C)

- ◆ To activate the serial dispensing, the volume should not be more than the capacity of the dispenser and steps should always be more than 1 and delay more than 0.
- ◆ When parameters are defined, select the desired dispensing speeds: fast, medium or slow to dispense the volume.
- ◆ This mode can also be used as fixed volume dispensing. For this, set the desired volume, not more than the capacity of the dispenser. Set the steps to 1 and delay to 0.
- ◆ Serial dispensing also facilitates auto-dispensing. To use this, adjust the volume to more than the nominal volume, and define the step and delay to 1 and 0, respectively. In this, the dispenser will auto-fill and auto dispense the desired volume.



D2. Stepper Mode

Stepper mode allows the dispensing of partial volumes with a defined number of steps, facilitating equal and unequal dispensing. User can define 'n' number steps but the sum of steps should not be more than the capacity of the dispenser. It allows the user to set the delay between two dispensing. The real-time display shows the number of volume dispensed and steps completed from 0 to n, along with the volume of set steps. The user can EDIT the set step volumes and the display also shows the number of steps configured.

To select the Stepper mode, click on switch (↕) button at the top right.

D2.1



Setting the VOLUME:

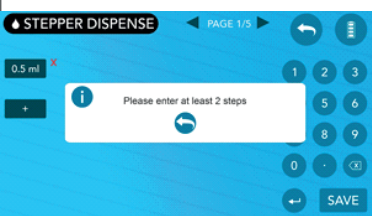
- 1. Click on EDIT STEP VOLUMES to define the volume steps. (Fig. D2.1)

D2.2



- 2. The stepper volume window will be opened. Click on the '+' icon to add volume from the side keyboard and press enter. (Fig. D2.2)

D2.3



- 3. It is important to note that at least two steps should be added to use the stepper dispensing. (Fig. D2.3)

D2.4



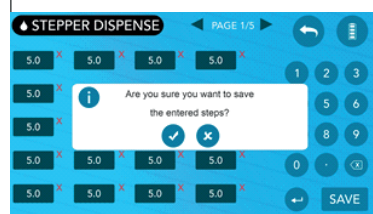
- 4. One can set 'n' number of steps but the sum of the set volume steps should not be more than the capacity of the dispenser. (Fig. D2.4)

D2.5



- 5. Once completed, click on SAVE to proceed further for dispensing. (Fig. D2.5)

D2.6



- 6. If the user does not want to SAVE the steps, click on 'back' button to discard the set volumes. (Fig. D2.6)

- 7. One can also make EDIT to existing volume by clicking on EDIT STEP VOLUME

Setting the DELAY:

It is important to set the DELAY to more than 0 to use it for stepper dispensing.

If the Delay is set to 0 and volume steps are defined as 2, the dispenser will autofill and dispense the volume.

D3 . Dispensing Speeds

The E-DISPENSER has three dispensing modes. The user can select either of the speeds to aspirate and dispense.

Capacity	Mode	Speed
50 ml	Fast	3.8ml/sec
	Medium	1.3ml/sec
	Slow	0.47ml/sec
25 ml	Fast	2.1ml/sec
	Medium	0.7ml/sec
	Slow	0.47ml/sec
10 ml	Fast	1.2ml/sec
	Medium	0.2ml/sec
	Slow	0.47ml/sec

## D4. Program

D4.1A



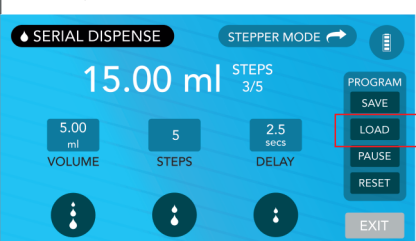
D4.1B



D4.2A



D4.2B



### 1. SAVE:

A. E-DISPENSER allows you to SAVE the program and recall it when required from the memory.

To save a program of SERIAL or STEPPER, when the selection has been made, click on SAVE button on the right under PROGRAM.

(Fig. D4.1A)

B. Enter the program name and click on SAVE.

(Fig. D4.1B)

### 2. LOAD

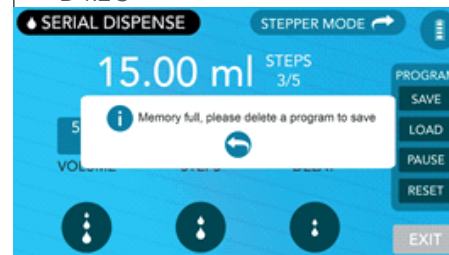
A. E-DISPENSER allows to storage of 10 programs in each mode, Serial, and Stepper with real date and time.

LOAD helps to recall a SAVED program from memory. (Fig. D4.1B)

B. To recall an existing program from the memory, click on the LOAD and select the program to recall.

(Fig. D4. 2B)

D4.2C



D4.2D



D4.3



D4.4



C. If the memory is exhausted, the display will show a pop-up of memory full and will not allow to store another program unless an existing program is deleted (Fig. D4. 2C)

D. To delete a program, click on 'x' button on right of the saved program (Fig. D4. 2D)

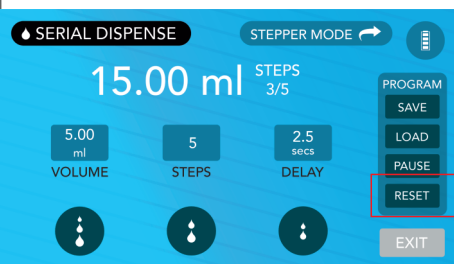
### 3. PAUSE

Pause button allows you to pause the dispensing during operation. (Fig. D4.3)

### 4. RESUME

To resume the dispensing, click on RESUME button. (Fig. D4.4)

D4.5



#### 5. RESET

RESET button allows to discontinue the current program, allowing the user to go back to the original data or exit the program. (Fig. D4.5)

D4.6



#### 6. EXIT

To end working with the E-DISPENSER, press the Exit button. The panel will warn the user to turn the knob in the re-circulation mode.

Click on the tick (✓) button to proceed. The piston will empty the barrel and go to the home position. (Fig. D4.6)

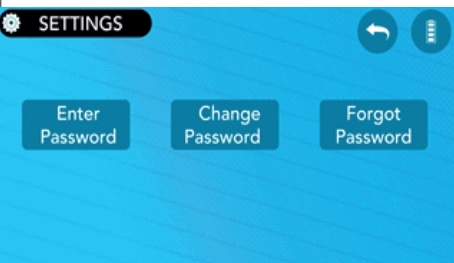
Press the ON/OFF button to switch OFF the control panel.

### D5. PIN protection

The instrument comes with a PIN protection feature to restrict the user access to the settings menu. This allows only the authorized user to modify the settings.

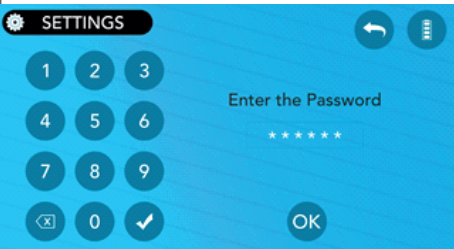
#### Activation of PIN:

D5.1



1.To activate the PIN, click on settings and select 'Enter Password'. (Fig. D5.1)

D5.2



2. Enter the '6-digit' password of your choice and click OK. (Fig. D5.2)

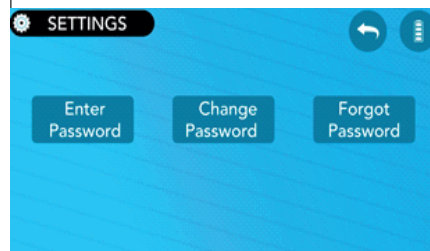
3. After entering the password, the page will redirect to Settings page.

4. When instrument is supplied, the PIN is already activated and a user password of '6-digits' is printed on the panel box.

### D6. Modifying the Existing PIN:

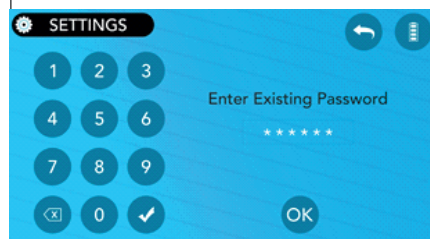
The user can modify the existing password and can set the password of their own by clicking on the Change Password button.

D6.1



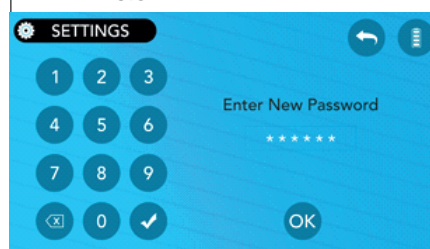
1.Enter the existing user password printed on the panel box and click on OK. (Fig. D6.1)

D6.2



2. Enter the new password and click on OK. (Fig. D6. 2)

D6.3



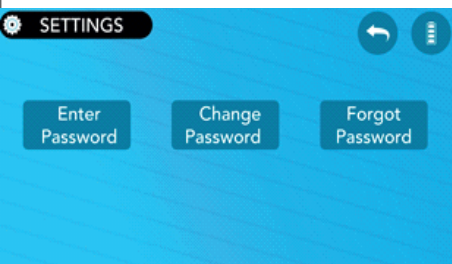
3. The new password has been set and access to settings will be granted. (Fig. D6. 3)

### D7. Retrieving by Forgetting PIN:

In case the user forgets the PIN, a default password is provided along with the user password, printed on the panel box. To set the password, click on Forgot Password button

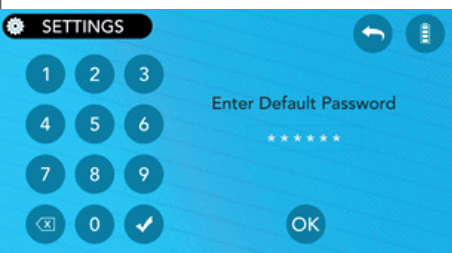


D7.1



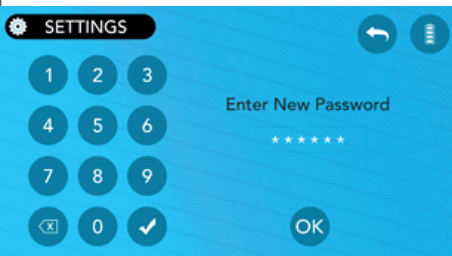
1. Enter the default password and click OK.  
(Fig. D7.1)

D7.2



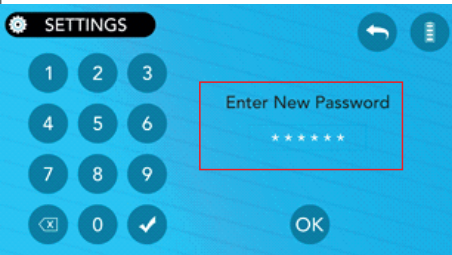
2. Enter the new password and click OK.  
(Fig. D7.2)

D7.3



3. The new password has been set and access to settings will be granted  
(Fig. D7.3)

D7.4



4. The new password has been set and access to settings will be granted  
(Fig. D7.4)

## 12.E. Sensitive Media

For light-sensitive media (e.g., Iodine, Potassium Permanganate and Silver Nitrate solutions), we recommend the use of 'Amber Coloured Windows' or the inspection windows provided in the box.

E1.

Fig. 12.E1



To replace the inspection window, unclip the default inspection window by pressing it from its top and then removing it.  
(Fig. 12.E1)

E2.

Fig. 12.E2



Place the Amber Coloured Window in the slot provided at the bottom of the housing and press it down until you hear a click sound.  
(Fig. 12.E2)

### 13. Error Limits

The error limits (Accuracy and Coefficient of Variation) mentioned in Product Specifications (Page 1) are in accordance with the nominal capacity (or maximum volume) indicated on the instrument. These are obtained by using the instrument with distilled water at equilibrium, ambient temperature of 20 °C, while operating the device smoothly and steadily.

The error limits are well within the limits of DIN EN ISO 8655.

Capacity (ml)	Increment	Accuracy ±%      ±ml		CV ±%      ±ml	
10	5 µl	0.10	0.01	0.1	0.01
25	10 µl	0.07	0.0175	0.05	0.0125
50	10 µl	0.05	0.025	0.05	0.025

### 14. Calibration

#### 14. A. User Calibration Procedure

#### 14. B. Factory Reset

#### 14. A. User Calibration Procedure

The E-DISPENSER has been laboratory calibrated at its nominal volume. However, due to changes in environmental conditions and the viscosity of the media which is dispensed, we recommend gravimetric testing every 3-12 months. Gravimetric volume testing according to DIN EN ISO 8655-6 is performed as follows:

A1.

Fig. 14.A1



Click the settings icon on the bottom right of the Home Screen. (Fig. 14.A1)

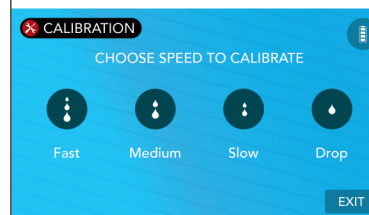
A2.

Fig. 14.A2



From the settings menu, choose Calibration. (Fig. 14.A2)

A3.



If the user is experiencing the calibration issue at any dispensing speed, they can select the speed they want to calibrate. (Fig. 14.A3)

A4.



Fill the nominal volume of double distilled de-ionized water by clicking the FILL button on the calibration screen of the operating panel. (Fig. 14.A4)

A5.



Dispense the filled liquid by clicking on the DISPENSE button on the calibration screen of the control panel. (Fig. 14.A5)

A6.



Measure the dispensed liquid on a digital or electronic balance and enter the value in g using the provided electronic keyboard in the DISPENSER panel. (Fig. 14.A6)

Note: This procedure is the same for calibrating the DISPENSER at fast, medium, or slow speed for all volumes. The slow speed is strictly used for E-DISPENSER

A7.



### Dropwise Speed Calibration

While calibrating the instrument at dropwise speed, a small amount is filled and while dispensing approx 20 drops are dispensed. Now the user needs to enter the dispensed amount displayed on the balance.

Click the tick mark (✓) to proceed. (Fig. 14.A7)]

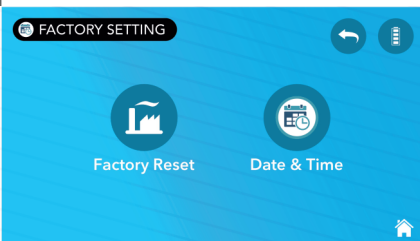
\* This speed calibration is only applicable for E-BURETTE

Note: CAL label will start appearing on top of all screens depicting that calibration has been performed.

A8. Repeat this procedure until the nominal volume is achieved on the electronic balance.

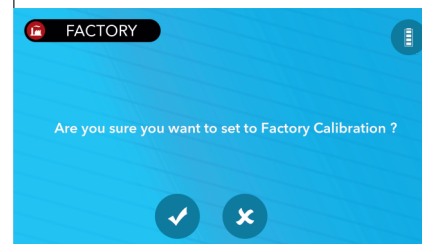
## 14. B. Factory Reset

B1.



To reset the default factory calibration settings, the user needs to go to the factory reset under factory settings. (Fig. 14.B1)

B2.



Click the tick mark (✓) to reset the calibration to the original factory and CAL will disappear from all the screens. (Fig. 14.B2)

## 15 Other Settings

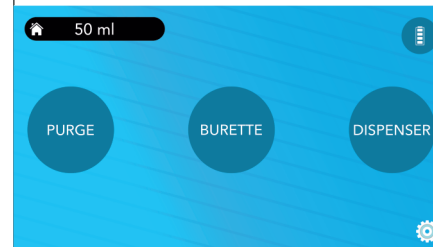
### 15. A. Control Panel & Brightness Setting

### 15. B. Language Setting

### 15. C. Date And Time Settings

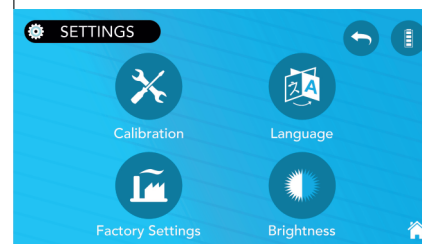
### 15. A. Control Panel & Brightness Setting

A1.



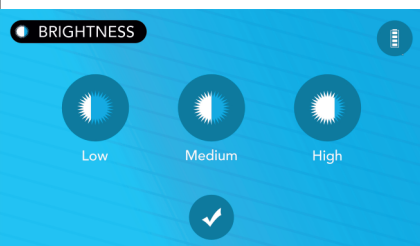
Click on the settings icon from the home screen. (Fig. 15.A1)

A2.



In the setting windows. click the BRIGHTNESS icon. (Fig. 15.A2)

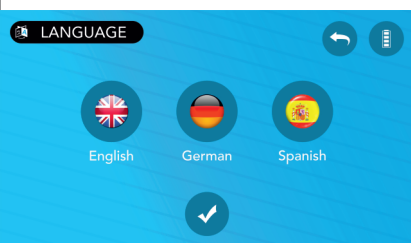
A3.



From the BRIGHTNESS window, select the level of brightness and tick mark to save it. (Fig. 15.A3)

## 15. B. Language Setting

B1.



User can select the preferred language from the language settings. (Fig. 15.B1)

Select the preferred language from the tab by clicking on it and tick mark (✓) to save it.

The instrument supports three languages - English, German, Spanish.

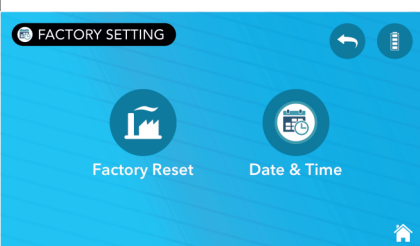
## 15. C. Date And Time Settings

C1.



In the settings window, click the factory settings icon. (Fig. 15.C1)

C2.



In the factory settings, select the Date & Time (Fig. 15.C2)

C3.



Now the user can set and change the date and time settings using the provided electronic keyboard. (Fig. 15.C3)

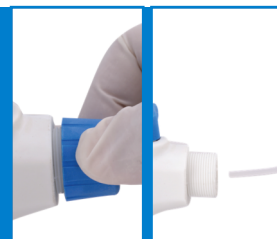
## 16. Cleaning and Product Maintenance

Whenever cleaning is required, run the instrument under distilled water.

Fill the barrel completely with distilled water and press the fast dispense button to dispense the water completely.

### Procedure to Disassemble the Delivery Pipe:

Fig. 16.1

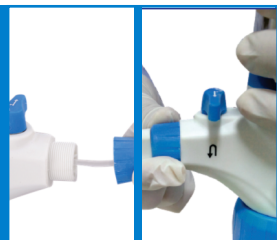


Unscrew the chuck nut by rotating it in anticlockwise direction and pull out the delivery pipe. (Fig. 16.1)

Clean the delivery pipe with de-ionized water.

### Procedure to Assemble the Delivery Pipe:

Fig. 16.2




First push the delivery pipe into the lower housing till it stops going in further. (Fig. 16.2)

Screw the chuck nut to complete the assembly by turning it in clockwise direction. (Fig. 16.2)

Note: Use rubbing alcohol on a cloth or cotton to clean the external body.

## 17. Troubleshooting

Problem	Possible cause	Solution
Piston difficult to move	Formation of crystals or deposition of dirt	Perform a cleaning cycle.
Filling not possible	Filling valve stuck	Clean the filling valve. If the valve ball is stuck, use a 200 µl plastic tip to loosen it. (Fig. 17.1)
		 Fig. 17.1
Air bubbles in the instrument	Purging not complete	Purge the instrument again.
	Filling tube loose or damaged	Fasten the telescopic filling tube firmly. If necessary, cut the tube off by approx. 1 cm from the top or replace it.
	Filling tube does not dip into the liquid	Fill up the bottle, or correctly adjust the length of the telescopic filling tube.
The volume delivered is smaller than that indicated	The instrument has not been completely primed	Prime the instrument again.
The instrument doesn't indicate any function	Internal error	Perform a restart.
One touch one drop dispensing not working (for titration)	Instrument not purged	Ensure no air bubble in the delivery tube or barrel, purge correctly.
	Using dropwise dispensing button directly after filling the instrument	After each fill, use either fast or medium button to dispense a small amount then use dropwise dispensing
Reading is not being transferred from instrument panel to the software	Driver is missing	Install the driver provided with the setup file

	Cable is not connected or damaged	Check for the connection and if cable is damaged, request your nearest dealer/manufacturer
Unable to print the record (for titration)	Check for printer connection or damaged printer cable/connection	Ensure that printer cable is connected to the panel. If the connection is correct, check with your nearest dealer/manufacturer.

## 18. Return for Repairs

1. Clean and decontaminate the instrument carefully.
2. Always mention the exact description of the type of malfunction and the media used. Please note that if information regarding media used is missing, the instrument cannot be repaired.
3. Shipment is at the risk and the cost of the sender.

## 19. Calibration Guidelines

ISO 9001 and GLP-guidelines require regular examinations of your volumetric instruments. We recommend checking the volume every 3-12 months. The interval depends on the specific requirements of the instrument. For instruments frequently used or in use with aggressive media, the interval should be shorter.

## 20. Warranty

MICROLIT shall not be liable for the consequences of improper handling, use, servicing, operation or unauthorized repairs of the instrument or the consequences of normal wear and tear, especially of wearing parts such as pistons, seals, valves and the breakage of glass as well as the failure to follow the instructions of the operating manual.

We are not liable for damage resulting from any actions not described in the operating manual or non-original spare parts or components being used.



The adjoining symbol means that storage batteries and electronic devices must be disposed of separately from household trash (mixed municipal waste) at the end of their service life.

- According to the Directive 2002/96/EC of the European Parliament and of the Council on Waste Electrical and Electronic Equipment (WEEE) published on 27 January 2003, electronic equipment requires disposal according to the relevant national disposal regulations.
- Batteries contain substances that can have harmful effects on the environment and human health. Therefore, according to the Directive 2006/66/EC of the European Parliament and the Council on Waste Batteries of 6 September, 2006, batteries require disposal according to the relevant national disposal regulations. Dispose the batteries only when they are completely discharged. Do not short-circuit the battery to discharge it. Subject to technical modifications without notice. Errors accepted.