

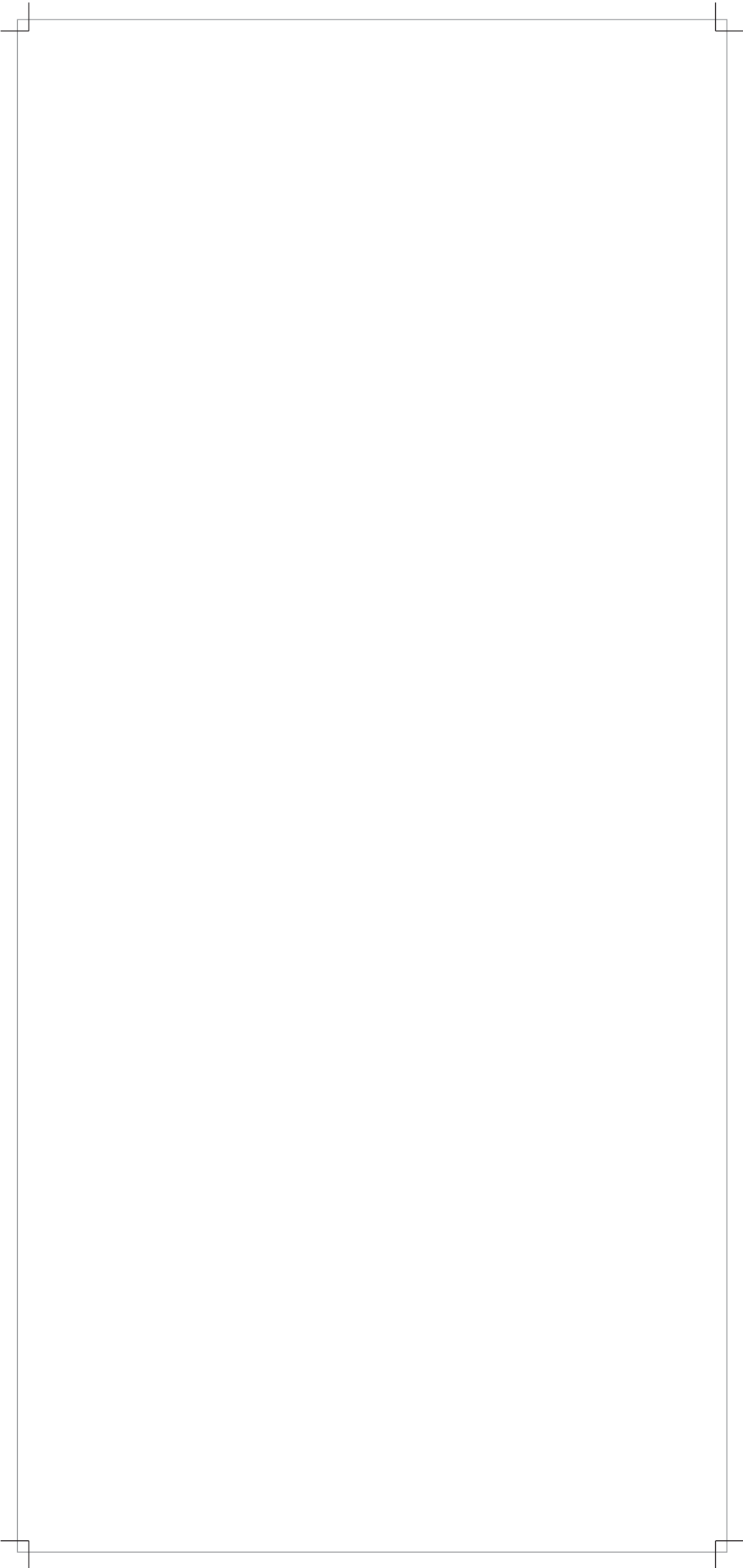
**OXFORD**  
BenchMate E

# Electronic Pipette

## User Manual



**OXFORD**  
LAB PRODUCTS



# Oxford Benchmate E Electronic Pipette User Guide

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## 1. Introduction

The Oxford BenchMate E electronic pipette offers you the best ergonomic design in the field of liquid handling devices. The ergonomic design of the electronic pipettes reduces the risk of repetitive strain injuries (RSI). The self explanatory functions of the pipette allow for easy access of each operation. The electronically operated piston movement reduces the manual error and provides high accuracy.

## 2. Volume Range

Number of Channel	Volume Range ( $\mu$ l)	Increment	Color
1 Channel	0.5-10	0.01	Grey
1 Channel	5-100	0.1	Orange
1 Channel	10-200	0.1	Yellow
1 Channel	50-1000	1	Dark Blue
1 Channel	250-5000	5	Green
8 Channel	0.5-10	0.01	Grey
8 Channel	2-20	0.01	Green
8 Channel	5-100	0.1	Orange
8 Channel	10-200	0.1	Yellow
8 Channel	15-300	0.1	Dark Blue
12 Channel	0.5-10	0.01	Grey
12 Channel	2-20	0.01	Green
12 Channel	5-100	0.1	Orange
12 Channel	10-200	0.1	Yellow
12 Channel	15-300	0.1	Dark Blue

## 3. Before You Start

Please verify your box includes the following

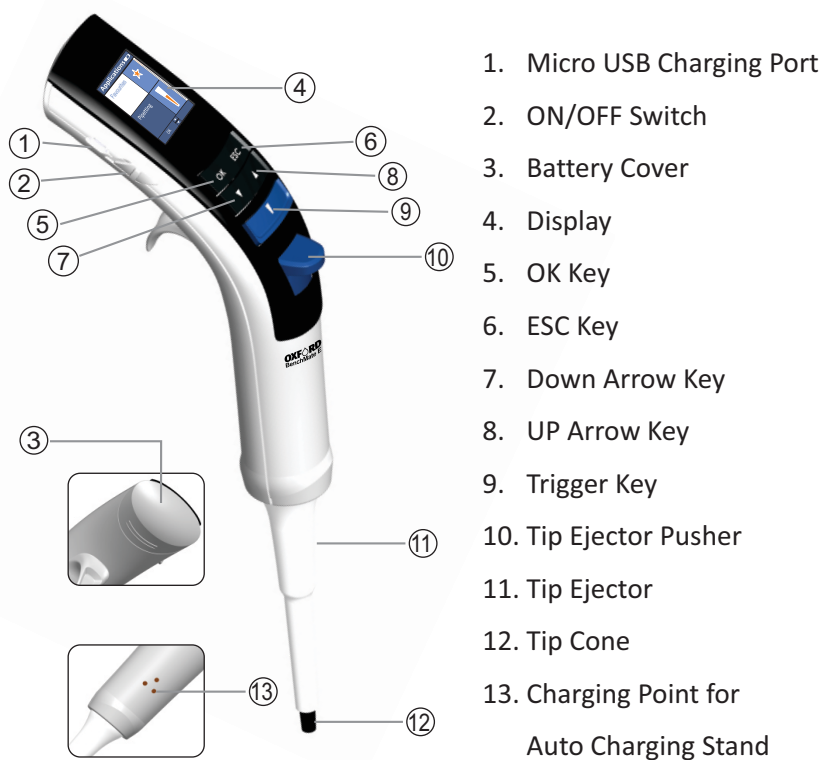
- Electronic Pipette
- Li-ion Battery
- Charger
- User Guide
- Calibration Report
- Toolkit
  - Grease Container
  - Tips

## 4. Getting Started

Please insert the Li-ion battery as shown in 8.1. Please charge the battery for 3 hours or unless the bar stops moving in the pipette display. Please follow charging instruction as shown in 8.2.

Please switch on the instrument by pressing the ON / OFF switch. Here you can start working in any modes of the pipette.

## 5. Overview



## 6. Modes

There are various modes available on the application menu. You can use them according to requirement.

### Special Note :

**Press “OK” button for selection.**

**Press “ESC” button to come out from the mode any time.**

### 6.1 Favorites

#### Steps :

1. Select Favorites from applications.
2. Select Prog1 / Prog2 / Prog3.
3. Select the mode.
4. Select volume by using up / down arrow key.
5. Select Aspiration Speed by using up / down arrow key.
6. Select Dispensing Speed by using up / down arrow key.
7. Select one of the 3 options.  
(a. Save & Run. b. Save & Exit. c. Do Not Save).
  - a) Save & Run  
This will save the program and it will be ready for pipetting.
  - b) Save & Exit  
This will save the program and will exit from menu.
  - c) Do Not Save  
No program will be saved. You can use ESC key as well if you do not want to save this program.

### 6.1.1 Edit

This program allows you to edit your saved favorite program. Also you can change the sequence of saved programs.

#### Edit Program

This program allows you to edit the mode, aspiration speed, dispensing speed and volume. Also you can delete the program from this function.

#### Steps :

1. Select Favorites.
2. Select Edit.
3. Select Edit Prog.
4. Select any of the following options
  - a) Mode : This will allow you to change the mode.
  - b) Volume : This will allow you the change the volume.
  - c) Speed : This will allow you to change the aspiration and dispensing speed.
  - d) Save & Exit : Come out of the mode after saving the program.
  - e) Do not save : It will not change anything.
  - f) Delete Prog : This will delete the existing program.

#### Edit Sequence

This will allow the user to edit the sequence of the saved program. You can change the position of your program from 1st to 2nd or 3rd or vice versa.

#### Steps :

1. Select Favorites.
2. Select Edit.
3. Select Edit Seq.
4. Select program position which you want to swap.
5. Press OK button.
6. Select the position with which you want to swap your program by using up / down arrow key.
7. Press OK button.  
You will be directed to the favorite mode where you can see the changes.

### 6.2 Pipetting

This will allow you to aspirate and dispense the selected volume.

#### Steps :

1. Select Pipetting from the applications.
2. Select volume by pressing up / down arrow key.
3. Press OK to finalize the volume.
4. Press trigger key to aspirate the volume.
5. Press trigger key to dispense the volume.
6. Press trigger key to repeat the process or Press ESC key to come out from the mode.

## 6.3 Reverse Pipetting

This mode is generally used for pipetting high viscous liquids accurately. It aspirates little excess liquid than the selected volume and it dispense the exact liquid of the selected volume. The rest of the liquid in the tip will need to be discarded.

### Steps :

1. Select Reverse Pipetting from the applications.
2. Select volume by pressing up / down arrow key.
3. Press OK to finalize the volume.
4. Press trigger key to aspirate the volume.
5. Press trigger key to dispense the volume.  
**The excess liquid will remain in the tip.**
6. Press trigger key to discard the excess liquid.
7. Press trigger key to repeat the process or press ESC key to come out from the mode.

## 6.4 Multi Dispense

### 6.4.1 Repeat Dispense

The repeat dispense mode repeatedly dispenses the volume in selected increments. For better accuracy, it will aspirate the excess volume which will need to be discarded at the end.

### Steps :

1. Select Multi Dispense from the applications.
2. Select Repeat Dispense from the Multi Dispense menu.
3. Select volume.
4. Select Dispensing Steps, the pipette will calculate the maximum number of steps once you select the volume.
5. Use up/down arrow key to modify the dispensing steps and press OK button.
6. Press trigger key to aspirate the liquid.
7. Press trigger key to dispense the liquid.  
**The excess liquid will remain in the tip.**
8. Press trigger key to discard the excess liquid.
9. Press trigger key to repeat the process or press ESC key to come out from the mode.

### 6.4.2 Auto Dispense

Auto Dispense has a same function of Repeat Dispense but with an automatic timer setting.

## Steps :

1. Select Multi Dispense from the applications.
2. Select Auto Dispense from the Multi Dispense menu.
3. Select volume.
4. Select Dispensing Steps. The pipette will calculate the maximum number of steps automatically once you select the volume.
5. Use up/down arrow key to modify the Dispensing Steps and press OK button.
6. Select Time Gap between 1 to 3 sec. and press OK button.
7. Press trigger key to aspirate the liquid.
8. Press trigger key to dispense the liquid.  
**The excess liquid will remain in the tip.**
9. Press trigger key to discard the excess liquid.
10. Press trigger key to repeat the process or press ESC key to come out of the mode.

## 6.4.3 Sequence Dispense

This mode is used to dispense the liquid in different sequences.

### Steps :

1. Select Multi Dispense from applications.
2. Select Sequence Dispense from Multi Dispense.
3. Select No. of Sequences by pressing up / down arrow key (max. 4 sequences can be selected).
4. Select 1st volume by using up / down arrow key.
5. Repeat this process for 2nd, 3rd and 4th sequence selected.
6. Aspirate the volume by using trigger key.
7. Dispense the 1st sequence of volume.
8. Repeat the process till all the volume.
9. Discard the excess liquid by using trigger key.

**Note :** (If you choose nominal volume in the 1st selection then you won't be allowed to select other sequences)

## 6.5 Diluting

This technique is used to mix two different liquids in one vessel.

### 6.5.1 Diluting

#### Steps :

1. Select Diluting from applications.
2. Select Diluting.
3. Select No. of Dilutants (Max. 2 dilutants can be selected).
4. Select 1st volume by using up / down arrow key.
5. Select 2nd volume by using up / down arrow key.
6. Aspirate 1st volume by pressing trigger key.
7. Aspirate Air by pressing trigger key.
8. Aspirate 2nd volume by pressing trigger key.
9. Dispense total volume in vessel by using trigger key.



## 6.5.2 Diluting + Mixing

### Steps :

1. Select Diluting from applications.
2. Select Diluting + Mixing.
3. Select No. of Dilutants (Max. 2 dilutants can be selected).
4. Select 1st volume by using up / down arrow key.
5. Select 2nd volume by using up / down arrow key.
6. Select Mixing Cycle by using up / down arrow key. Max. 10 cycles can be selected.
7. Aspirate 1st volume by pressing trigger key.
8. Aspirate Air by pressing trigger key.
9. Aspirate 2nd volume by pressing trigger key.
10. Dispense total volume in vessel by using trigger key.
11. Mixing will automatically start once you dispense the liquid into the vessel.
12. You can stop mixing if require by using the ESC key.
13. Press trigger to start the mixing again / Press the ESC key to completely stop the mixing in between the process. It will discard the excess liquid remaining in the tip.

## 6.6 Mixing

You can mix the liquids using this mode. There are three modes under mixing.

a) Mixing. b) Pipetting + Mixing. c) Diluting + Mixing.

### 6.6.1 Mixing

#### Steps :

1. Select Mixing from the applications.
2. Select volume by using the up/down arrow key.
3. Select Mixing Cycles by using up/down arrow key. Max. 10 cycles can be selected.
4. Aspirate the volume.
5. Mixing will automatically start .
6. You can stop mixing by using the ESC key.
7. Press trigger to start the mixing again / Press the ESC key to completely stop the mixing in between the process. It will discard the excess liquid remaining in the tip.

## 6.6.2 Pipetting + Mixing

### Steps :

1. Select Pipetting + Mixing from the applications.
2. Select volume by using up/down arrow key.
3. Select Mixing Cycles by using up/down arrow key Max. 10 cycles can be selected.
4. Aspirate the selected volume by using trigger key.
5. Dispense the selected volume by using trigger key.
6. Mixing will automatically start .
7. You can stop mixing by using ESC key.
8. Press trigger key to start the mixing again / Press the ESC key to completely stop mixing in between the process. It will discard the excess liquid remaining in the tip.

## 6.6.3 Diluting + Mixing

### Steps :

1. Select Diluting from applications.
3. Select Diluting + Mixing.
4. Select No. of Dilutants. Max. 2 dilutants can be selected.
5. Select 1st volume by using up / down arrow key.
6. Select 2nd volume by using up / down arrow key.
7. Select Mixing Cycle by using up / down arrow key. Max. 10 cycles can be selected.
8. Aspirate 1st volume by pressing trigger key.
9. Aspirate Air by pressing trigger key.
10. Aspirate 2nd volume by pressing trigger key.
11. Dispense total volume in vessel by using trigger key.
12. Mixing will automatically start once you dispense the liquid into the vessel.
13. You can stop mixing by using the ESC key.
14. Press trigger to start the mixing again / Press the ESC key to completely stop mixing in between the process. It will discard the excess liquid remaining in the tip.

## 6.7 Settings

This is a control menu where you can define Speed, Sound, User ID and Product ID of the pipette.

### 6.7.1 : Speed

#### Steps :

1. Select Settings from the applications.
2. Select Speed.
3. Change the Aspiration Speed by using up/down arrow key and press OK.
4. Change the Dispense Speed by using up/down arrow key and press OK.
5. You will find new aspiration and dispense speed on the display.
6. If you do not want to change any speed, press ESC key.

## 6.7.2 Sound

### Steps :

1. Select Settings from the applications.
2. Select Sound.
3. Change the sound level by using the up/down arrow key and press OK.
4. You will find the new selected sound on the display.
5. If you do not want to change sound, press the ESC key.

## 6.7.3 User ID

### Steps :

1. Select Settings from applications.
2. Select User ID.
3. Select 1st character by using up / down arrow key and press OK. You can select letters from alphabets, 1-9 number and few symbols.
4. After pressing OK button, 2nd character will be highlighted. Follow the same process till maximum character.
5. Once you will select the last character, display will show the setting menu with all changes.

## 6.7.4 Product ID

### Steps :

1. Select settings from applications.
2. Select Product ID.
3. Select 1st character by using up / down arrow key and press OK button once you select 1st character. You can select letters from the alphabet numbers 1-9 and few symbols.
4. After pressing the OK button, the 2nd character will be highlighted. Follow the same process until maximum character limit is reached.
5. Once you will select the last character, the display will show the setting menu with all changes.

## 6.8 Calibration

The Oxford Benchmate E pipette offers you 3 types of calibration settings depending on the user's requirement.

a.) 3 Point Calibration   b.) 2 Point Calibration   c.) 1 Point Calibration

By default 3 Point Calibration has been adjusted on the pipette for supreme accuracy at each volume.

### 6.8.1 3 Point Calibration

#### Steps :

1. Select Calibration from the applications.
2. Select Enter Password from the sub menu by default, press "0000" if you have not set your own password.
3. Select 3 Point Cal. from the sub menu.
4. Select Expected Volume 1. By default, 10% of the nominal volume will be on the display, you can change this volume according to your requirement by using up / down arrow key.
5. Enter Delivered Volume 1.
6. Select Expected Volume 2. By default middle volume will be on the display, you can change this volume according to your requirement by using up / down arrow key.
7. Enter Delivered Volume 2.
8. Select Expected Volume 3. By default nominal volume will be on the display, you can change this volume according to your requirement by using up / down arrow key.
9. Enter Delivered Volume 3.
10. Select "Yes" to save the changes. It will show Calibration done on the display.  
Select "No" to exit.

### 6.8.2 2 Point Calibration

#### Steps :

1. Select Calibration from the applications.
2. Select Enter Password from the sub menu by default, press "0000" if you have not set your own password.
3. Select 2 Point Cal. from the sub menu.
4. Select Expected Volume1. By default, 10% of the nominal volume will be on the display, you can change this volume according to your requirement by using up / down arrow key.
5. Enter Delivered Volume 1.
6. Select Expected Volume 2. By default nominal volume will be on the display, you can change this volume according to your requirement by using up / down arrow key.
7. Enter Delivered Volume 2.
8. Select "Yes" to save the changes. It will show Calibration done on the display.
9. Select "No" to exit.

### 6.8.3 1 Point Calibration

#### Steps :

1. Select Calibration from the applications.
2. Select Enter Password from the sub menu by default, press "0000" if you have not set your own password.
3. Select 1 Point Cal. from the sub menu.
4. Select Expected Volume1. By default, 10% of the nominal volume will be on the display, you can change this volume according to your requirement by using up / down arrow key.
5. Enter Delivered Volume1.
6. Select "Yes" to save the changes. It will show Calibration done on the display.
7. Select "No" to exit.

### 6.8.4 Restore Factory Calibration

This feature will allow you to restore all the factory generated data of the product. So, all the user changes will be nullified and factory calibration will be restored.

#### Steps :

1. Select Calibration from the applications.
2. Select Enter Password from the sub menu. By default, press "0000" if you have not set your own password.
3. Select Restore Fact. Cal.
4. Select Yes by pressing up / down arrow key to restore the factory calibration. "Factory Calibration Restored" screen will appear for few seconds and you will directed to the calibration menu.
5. Select No by pressing up / down key to keep the user settings.

Special Note : Whenever the user makes any changes in the calibration, the Applications will show "**Calibration User**". Once you restore the factory calibration, Applications will show "**Calibration Fact.**".

### 6.8.5 Last Calibration Date

Here you can keep a track of your last calibration date. Whenever you calibrate your pipette, you can enter the date of the calibration.

#### Steps :

1. Select Calibration from the applications.
2. Select Enter Password from the sub menu. By default, press "0000" if you have not set your own password.
3. Select Last Cal. Date by using up / down arrow key.
4. Enter the date in DD/MM/YY format and you will be directed to the calibration menu.

### 6.8.6 Due Calibration Date

Here you can save your due date for re-calibration of the product.

#### Steps :

1. Select Calibration Fact. From the applications.
2. Select Enter Password from the sub menu by default, press "0000" if you have not set your own password.
3. Select Due Cal. Date by using up / down arrow key.
4. Enter the date in DD/MM/YY format and you will be directed to the calibration menu.

### 6.8.7 Edit Password

This feature will help user to edit the password. So only authorized persons can modify the calibration.

#### Steps :

1. Select Calibration from the applications.
2. Select Edit Password.
3. "Enter Existing Password" by using up / down arrow key. The default password is "0000".
4. Enter New Password by using up / down arrow key.
5. Repeat the New Password.
6. If everything is ok then "Password Change Successful" window will appear.

### 6.8.8 Forgot password

**In case you forget the password, please contact your supplier. They will be able to reset your password.**

## 7. Warning / Safety Precautions

To prevent fire, electronic shock or any serious injury to persons, follow below safety instruction.

- Do not submerge the unit and its charger in any liquid.
- Do not operate the charger that has a damaged cord.
- Please use chargers that are compatible with the pipette.
- Do not handle the charger plug with moist hands.
- Do not burn, crush, damage the Lithium battery or expose it to excessive heat.
- Always use recommended battery.

## 8. Battery and Charging

### 8.1 Inserting a Battery

1. Please follow the image to open the battery cover.
2. Insert battery supplied along with the instrument in a way that the metal pins inside the pipette establish proper contact with the metal points on the battery.
3. Slide the battery cover down.



### 8.2 Charging - Power Adaptor

1. Insert the power cable in the pipette as shown in the image (A).
2. Connect the power plug of the power adaptor with the external power source.



### 8.3 Charging - Charging Pod

1. Insert the power cable in the auto charging pod as shown in the image (B).
2. Connect the power plug of the power adaptor with the external power source.
3. Place the pipette on the auto charging pod.



## 9. Technical Specification

### 9.1 Single Channel Pipette Technical Specification

Cat. No.	Color	Volume Range (μl)	Test Volume (μl)	Inaccuracy (±) %	Imprecision (±) %
OBE-10	●	0.5-10 μl	1	2.5	1.8
			5	2	1
			10	1	0.6
OBE-100	●	5-100 μl	10	3	1
			50	1	0.5
			100	0.8	0.2
OBE-200	●	10-200 μl	20	2.5	0.7
			100	0.7	0.3
			200	0.6	0.2
OBE-1000	●	50-1000 μl	100	3	0.6
			500	1	0.4
			1000	0.6	0.2
OBE-5000	●	250-5000 μl	500	2.4	0.6
			2500	1.2	0.25
			5000	0.6	0.15

### 9.2 Multi Channel (8-12) Pipette Technical Specification

Cat. No.	Color	Volume Range (μl)	Test Volume (μl)	Inaccuracy (±) %	Imprecision (±) %
OBE-8-10 OBE-12-10	●	0.5-10 μl	1	8	5
			5	4	2
			10	2	1
OBE-8-20 OBE-12-20	●	2-20 μl	2	7	3
			10	3	2
			20	2	1.6
OBE-8-100 OBE-12-100	●	5-100 μl	10	3	2
			50	1	0.8
			100	0.8	0.3
OBE-8-200 OBE-12-200	●	10-200 μl	20	5	1.4
			100	1	0.4
			200	0.7	0.25
OBE-8-300 OBE-12-300	●	15-300 μl	30	3	1
			150	1	0.5
			300	0.6	0.3



## 10. Maintenance

### 10.1 Single channel pipette maintenance

You should check the pipette at the beginning of each day for accumulation of dust and dirt on the outside surfaces. Attention should be paid to the tip cone. No other solvent except Iso-propanol should be used to clean the pipette. If the pipette is used daily, it should be inspected every three months.

The servicing procedure starts with the disassembly of the pipette. Please refer to the spare parts lists for better understanding of the components. After disassembling pipette as per mentioned procedure follow below

- routine maintenance steps:

Pull out the piston and other parts and follow general maintenance.

- Remember to keep all parts in order for reassembly.

- Clean piston, piston spring, Seal and O-ring with a isopropanol and lint free tissue. Allow them to dry.

Check the tip cone for foreign particles and remove, if any. Grease the cleaned parts with the approved lubricant provided with each pipette.

#### 10.1.1 Volume-wise Dis-assembly Procedure

Shown here are dis-assembly procedure for different volumes pipettes.

##### Volume 0.5-10 $\mu$ l



Step 1  
Unscrew the Tip Ejector  
as per shown direction



Step 2  
Unscrew the Tip Cone  
Cap as per shown direction



Step 3  
Pull out the Piston as  
per shown direction

**Volume 5-100 $\mu$ l & Volume 10-200 $\mu$ l**



Step 1  
Unscrew the Tip Ejector  
as per shown direction



Step 2  
Unscrew the Tip Cone  
Cap as per shown direction



Step 3  
Pull out the Piston as  
per shown direction

**Volume 50-1000 $\mu$ l**



Step 1  
Unscrew the Tip Ejector  
as per shown direction



Step 2  
Unscrew the Tip Cone  
as per shown direction



Step 3  
Pull out the Piston as  
per shown direction

Volume 250-5000 $\mu$ l



Step 1  
Unscrew the Tip Ejector  
as per shown direction



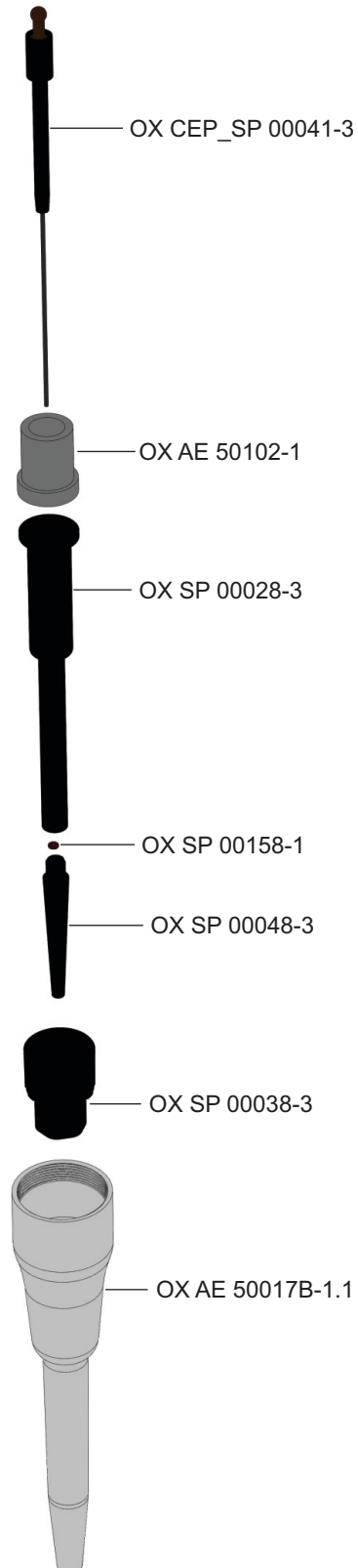
Step 2  
Unscrew the Tip Cone  
as per shown direction



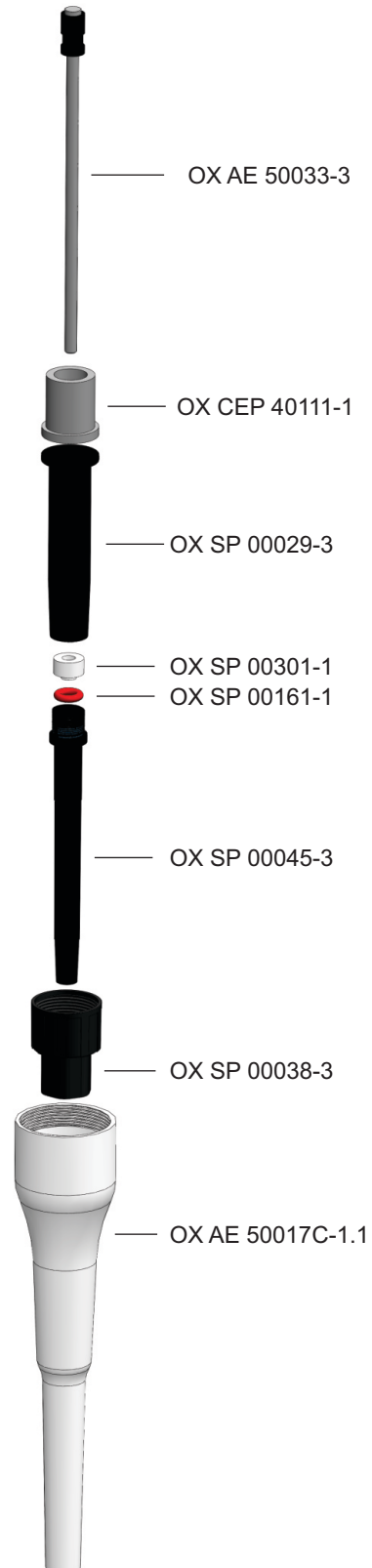
Step 3  
Unscrew the Tip Ejector  
Cap as per shown direction  
then pull out piston  
as per shown direction

## 10.1.2 List of Spares:

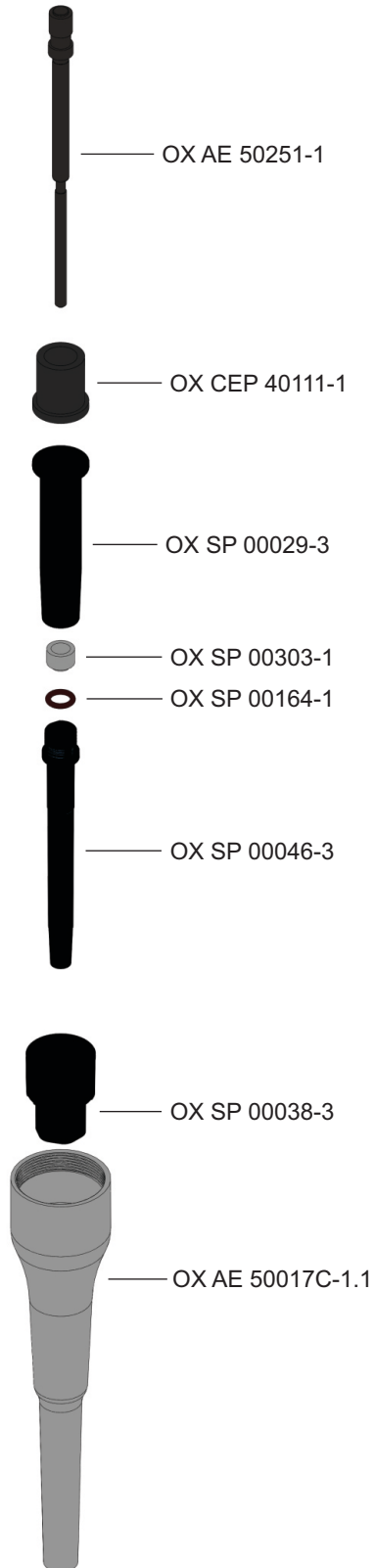
### Volume 0.5-10 $\mu$ l



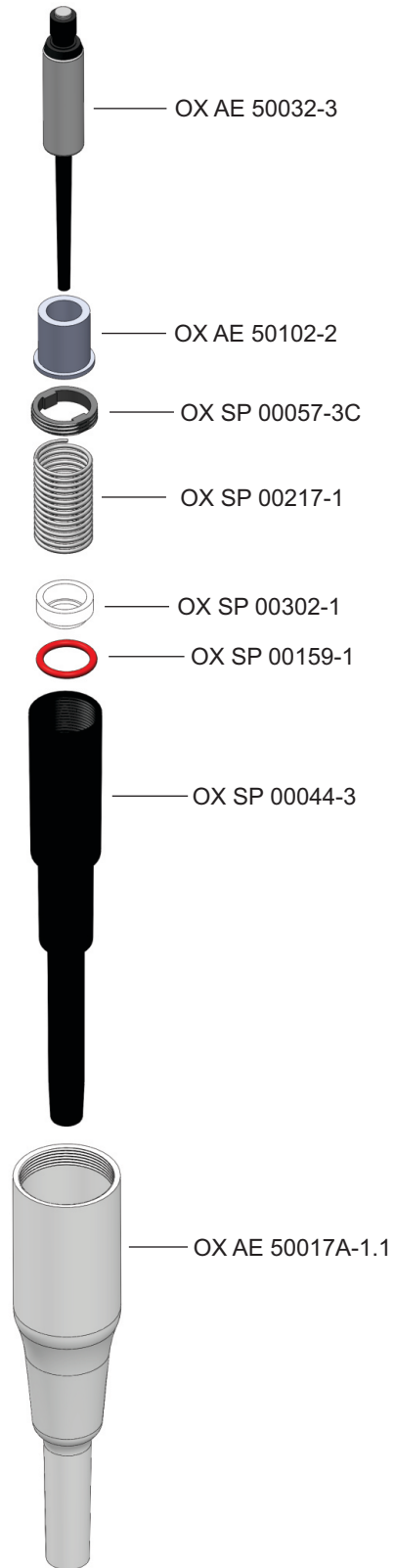
### Volume 5-100 $\mu$ l



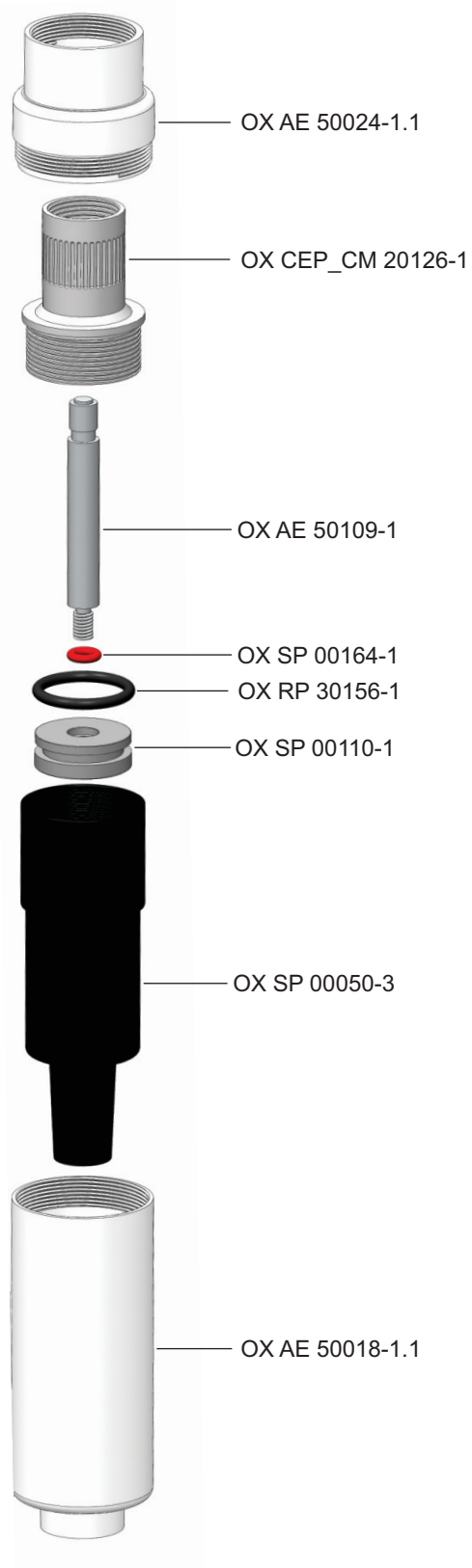
**Volume 10-200µl**



**Volume 50-1000µl**



**Volume 250-5000µl**

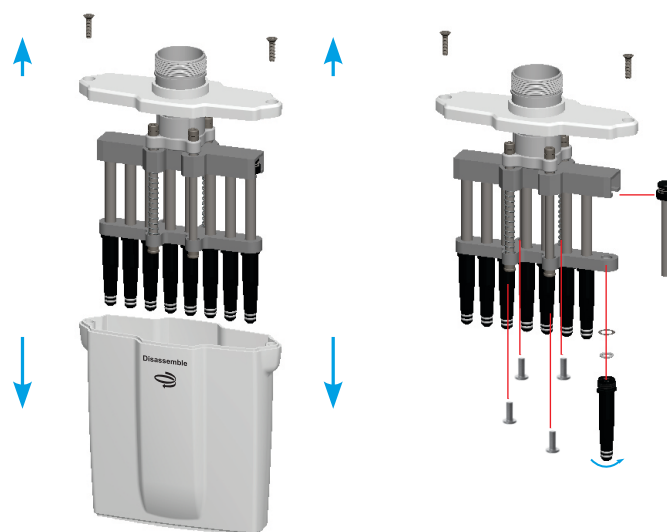


## 10.2 Multichannel pipette maintenance

The servicing procedure starts with the disassembly of the pipette. Please refer to the spare parts lists for better understanding of the components. Shown here is an example of dis-assembly and assembly procedure of 2-20 $\mu$ l 8 channel pipette. The basic procedure is the same to be followed for all other volumes in 8 channel as well in all 12 channel pipettes.



- Rotate the Multi channel manifold in the direction indicated until it is detached.
- Unscrew the manifold by taking out two screws from the top.
- Move upwards tip ejector ring lock (black part) to remove from bottom assembly. At the time of pipette assembly match two legs of tip ejector ring lock in pipette top half assembly.

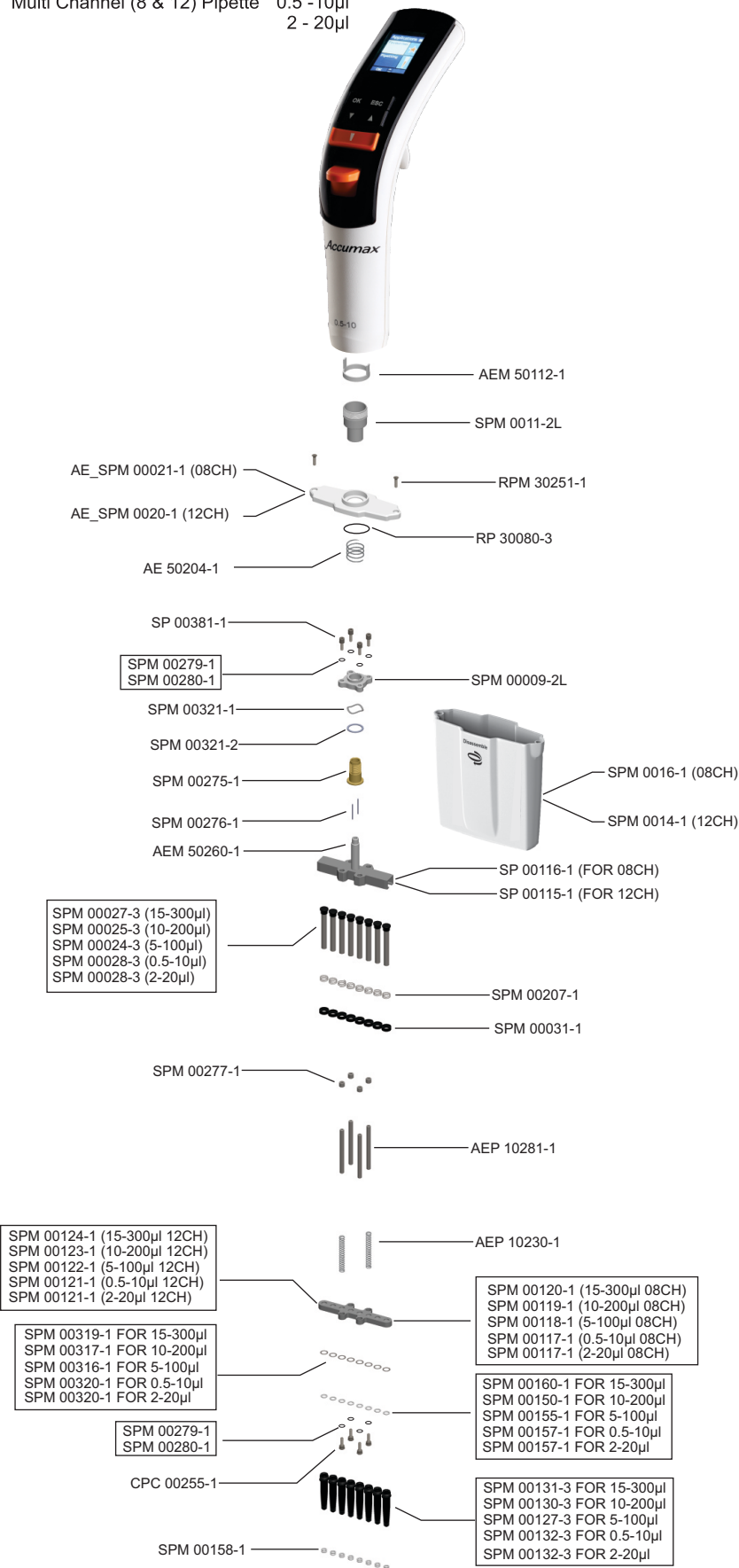


- Take other four screws to disassemble piston housing.
- Pull out the piston and other parts including the Seal and O-ring by unscrewing the tip cone. Remember to keep all parts in order for reassembly.
- Perform this procedure for each tipcone & piston.
- Clean the piston, piston spring, Seal and the O-Ring with iso-propanol and lint free tissue. Allow them to dry.
- Check the tip cone for foreign particles and remove, if any.
- Grease the cleaned parts with the approved lubricant provided with each pipette.

## 10.2.1 List of Spare Parts

Group -1

Multi Channel (8 & 12) Pipette 0.5 -10µl  
2 - 20µl



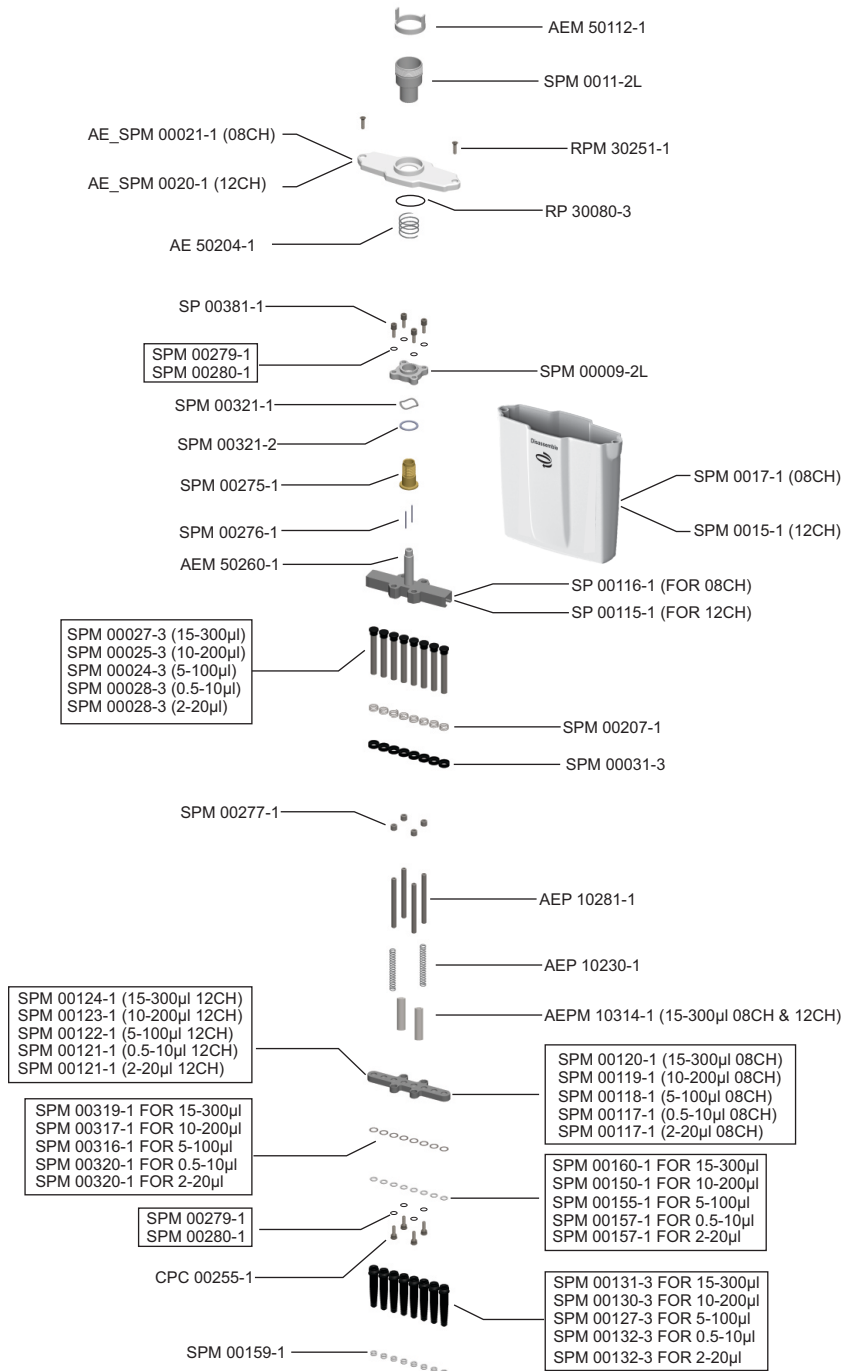


## 10.2.2 List of Spare Parts

Group -2

Multi Channel (8 & 12) Pipette

5-100µl  
10-200µl  
15-300µl



## 11. Autoclavability

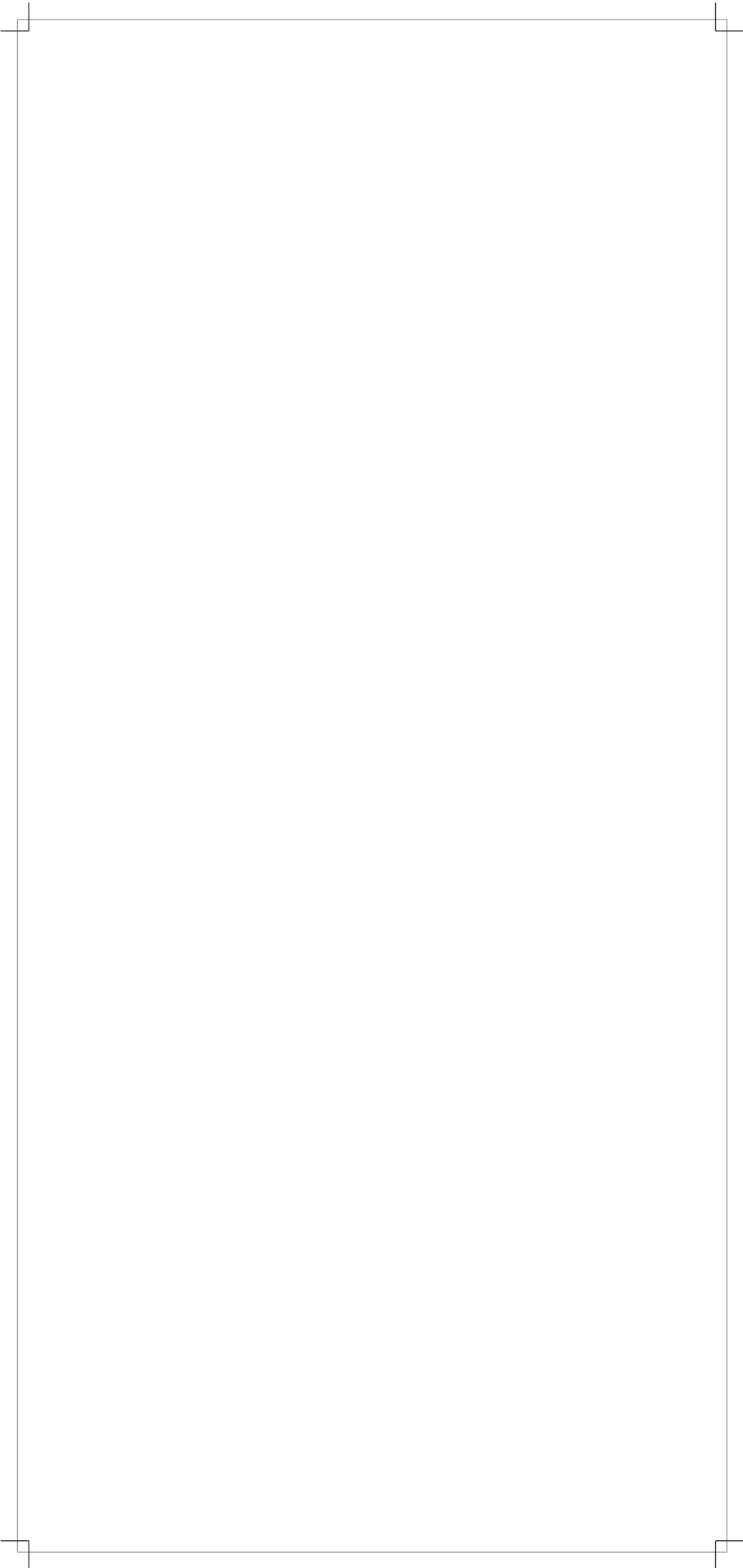
The lower part of the pipette, Tip cone, ejector collar, piston and oring are autoclavable parts. Please autoclave under below condition.

<b>Temperature</b>	<b>:</b>	<b>121°C / 250° Fahrenheit</b>
<b>Pressure</b>	<b>:</b>	<b>1 bar / 15 psi (Pounds)</b>
<b>Time</b>	<b>:</b>	<b>25 minutes or less</b>

After autoclave, allow parts to cool down for 8 hours in normal condition before reassembling it.

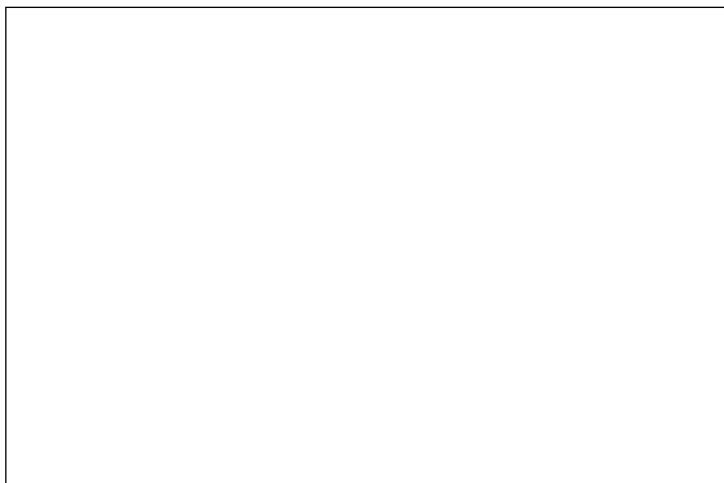
## 12. Trouble shooting

Trouble shooting		
Issue	Probable Cause	Recommendation
Low battery symbol	Battery is low	Charge the battery
Blank Display	Low battery / Instrument in Standby mode / No battery / Battery damage / battery connection issue	Charge the battery / Press any key come out from Standby mode / Insert the battery / insert new battery / Remove and Insert the battery again.
High vibration of motor	Motor speed is set to the lower speed	Set the motor speed at highest level
Aspiration / Dispense time is slow / different	Aspiration / Dispense Motor speed is set to the lower speed or different speed	Set the motor speed at highest level
Wrong pipetting volume	User change calibration / Tip issue	Restore Factory calibration. See section 6.8.4 to restore factory calibration / Use recommended standard tips
Unable to ENTER into Calibration menu	password issue	Contact authorized distributor.
Leakage	Not maintained regularly	Open bottom assembly and perform routine maintenance
Hard plunger movement	Excessive usage of pipette	open bottom assembly and perform routine maintenance
Tip fitment issue	wrong tips attached to the Tip cone	Use high quality standard tips



**OXFORD**  
BenchMate E  
Electronic Pipette

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