

## **Rainin SP+** Pipette Controller



**METTLER TOLEDO**

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# 1. Safety and Regulatory Information

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The following safety information is important for the safe handling and use of the Rainin SP+ pipette controller. Please read it carefully.

## 1.1 Important Safety Information

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Read all safety warnings before using, charging or servicing the Rainin SP+.

Always use the Rainin SP+ in accordance with these operating instructions and keep these instructions for future reference.

Safety notes are marked with signal words and warning symbols. Ignoring the safety notes may lead to personal injury, damage to the Rainin SP+ including malfunction, as well as unreliable results.



Risk of fire and burn.

Do not short circuit.

Do not disassemble, crush, incinerate or expose to high temperature.

## 1.2 Intended Use

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The Rainin SP+ should only be used in laboratories and production environments by trained specialists who have read these operating instructions. Mettler-Toledo Rainin, LLC is not liable for any damage resulting from misuse, including but not limited to:

- Use not in accordance with these operating instructions.
- Use with accessories or consumables not recommended by Rainin.
- Maintenance or repair by unauthorized personnel.
- Unauthorized changes to the instrument.

### 1.3 Compatible Liquids

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Any liquid can be used with the Rainin SP+.

### 1.4 Regulatory Information

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#### **FCC Note**

This instrument complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This instrument may not cause harmful interference, and (2) this instrument must accept any interference received, including interference that may cause undesired operation.



Mettler-Toledo Rainin, LLC declares that this product complies with the essential requirements and other relevant provisions of Directives 2014/35/EU Low voltage (LVD) and 2014/30/EU Electromagnetic compatibility (EMC). A copy of the CE Declaration of Conformity is available on request.



#### **RoHS Regulation 2011/65/EU**

Rainin and METTLER TOLEDO fulfill requirements under RoHS Regulation 2011/65/EU. Accessories comply with the above mentioned RoHS regulation.



#### **UKCA**

Mettler-Toledo Rainin, LLC declares that this product complies with the essential requirements of the UKCA Electromagnetic Compatibility Regulations 2016.

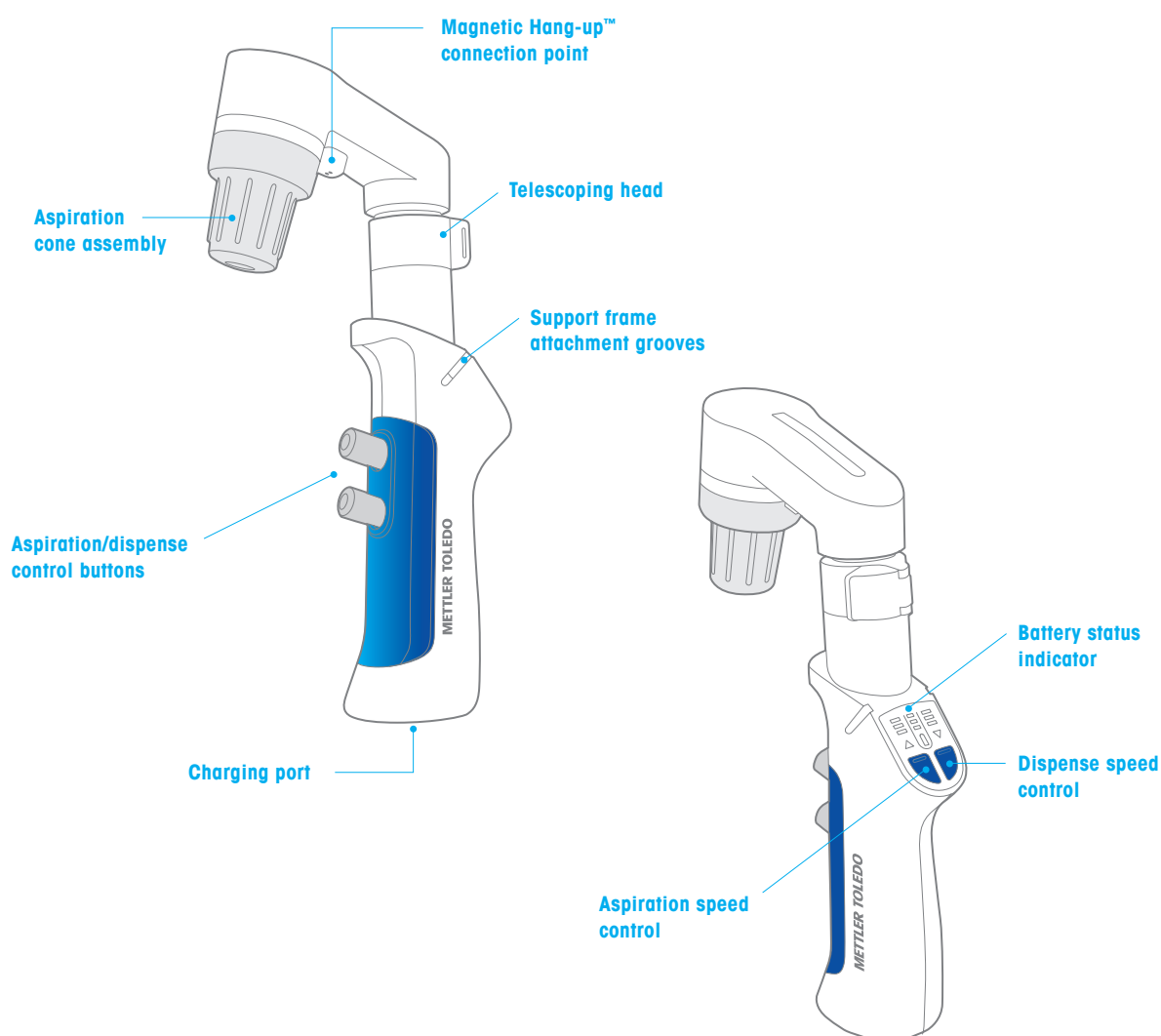
Electrical Equipment (Safety) Regulations 2016 Regulations. A copy of the UKCA Declaration of Conformity is available on request.

## 2. Introducing the Rainin SP+

Welcome to Rainin SP+ pipette controller! This instrument, which features an extendable head, works with all types of 1 mL to 100 mL serological pipettes and can transfer liquid from 0.1 mL to 100 mL.

Please read this manual in its entirety before using the instrument. It contains critical usage and technique information that will help you obtain accurate, reproducible results and ensure long-lasting operation.

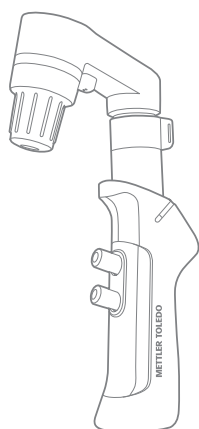
### 2.1 Overview



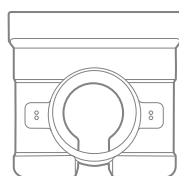
## 2.2 Box Contents

In the Rainin SP+ box you will find:

- 1 Instrument
- 1 Magnetic Hang-up™
- 1 Power adapter
- 1 Charging cable
- 1 Support frame
- 1 Filter
- 1 Quick Reference Guide



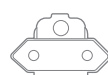
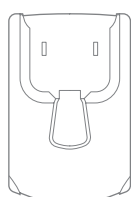
SP+



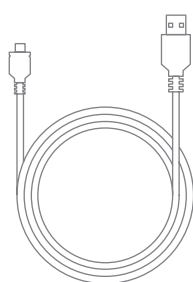
Magnetic Hang-up



Filter



Power adapter



Charging cable



Support frame

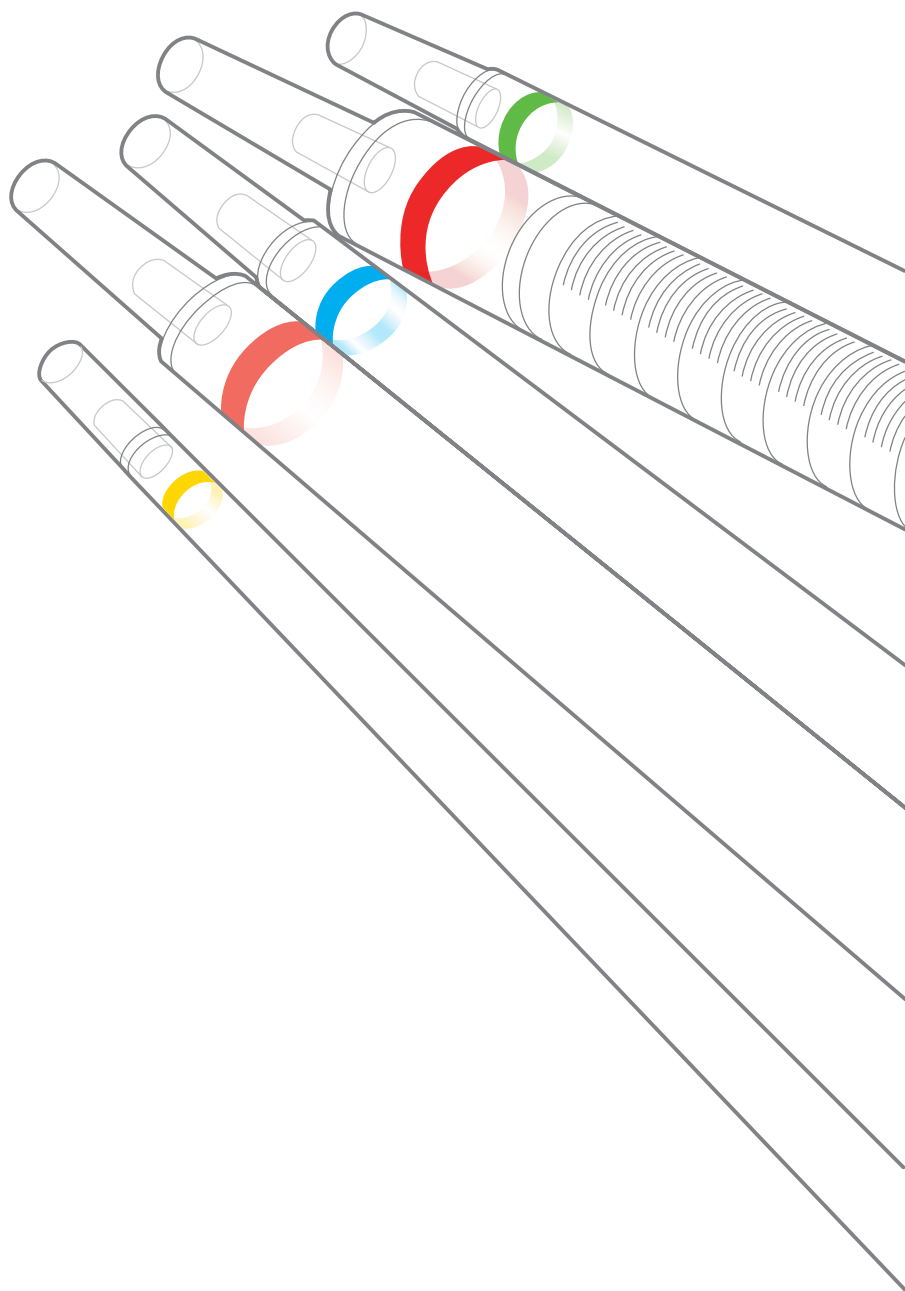


Quick Reference Guide

## 2.3 Rainin SP+ – Compatible Serological Pipettes

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The Rainin SP+ works with any type of standard serological pipette (1 mL, 2 mL, 5 mL, 10 mL, 15 mL, 25 mL, 50 mL and 100 mL).



## 3. Setup and Installation

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- Check to ensure box includes everything.
- Check instrument for accessories damage that might have occurred during shipping.
- Keep the box and inserts for storage and to return for service (e.g., battery replacement).

### 3.1 Overview

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- Plug the power supply into an electrical outlet using appropriate power plug adapter.
- Connect the power supply to the instrument until it locks in place.

### 3.2 Battery

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- The Rainin SP+ comes with a built-in rechargeable battery.  
The battery has a two-year life and can only be replaced by an authorized METTLER TOLEDO or Rainin service technician.
- After 10 seconds without use, the instrument will enter low-power mode.  
Pressing any button will reactivate it.
- If required, the battery will automatically begin charging when placed on the magnetic Hang-up or plugged directly into an AC power source.
- The battery status display shows the battery's current capacity.

### 3.2.1 Battery Status Indicator

|                                                                                     |                                                                                                        |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|    | The battery is fully charged.                                                                          |
|    | Two thirds of the battery is left.                                                                     |
|    | One third of the battery is left.                                                                      |
|    | Solid red indicator light means battery is low and instrument need charging.                           |
|  | Flashing red indicator light means the battery has 15 minutes or less remaining and should be charged. |
|  | No indicator lights means the battery is dead and should be charged.                                   |

- When the instrument is picked up, the speed control indicator and battery status display will illuminate for 10 seconds.
- When the speed control button is pressed, the speed control indicator and the battery status display will illuminate for 10 seconds.
- When the aspirate or dispense buttons is pressed, the speed control indicator and battery status display will illuminate for 10 seconds.
- If the speed indicator is not on, press either the aspirate or dispense speed button and the indicator will display the previously set value.
- If the speed indicator light is on, press the speed control button to change the speed.

### 3.2.2 Charging

The battery will fully charge in about three hours and, once charged, will power the instrument for up to 15 hours. Note that after just 10 minutes of charging the battery will provide up to an hour of operation.

The battery can be charged by placing the instrument on the magnetic Hang-up if it is connected to a power source, or by plugging the power cord from the AC adapter directly into power outlet on the base of the instrument.

**Note:** The Rainin SP+ can be used while plugged into a power outlet. Disconnect the power cord from the charger and reconnect it directly into the instrument.

|                                                                                     |                                           |
|-------------------------------------------------------------------------------------|-------------------------------------------|
|   | Battery is charging.                      |
|  | Battery is approximately halfway charged. |
|  | Battery is almost fully charged.          |
|  | Battery is fully charged.                 |

## 4. Operation

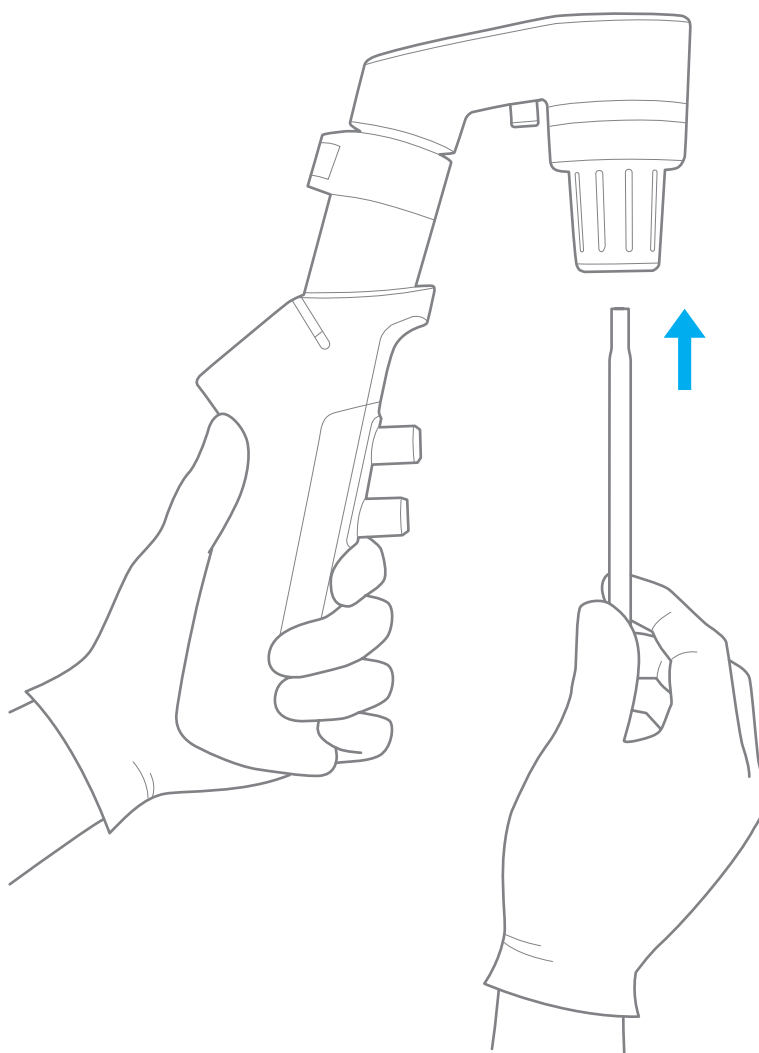
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The Rainin SP+ generates pressure to aspirate or dispense a liquid. It can also dispense using only atmospheric pressure. Aspiration and dispense speeds are controlled by the pressure applied to the respective buttons on the instrument.

### 4.1 Inserting a Serological Pipette

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To insert a pipette, hold the instrument by the head for support, then carefully insert the pipette into the aspiration cone until it is secure and tightly sealed.



## 4.2 Adjusting the Speed

The aspiration and dispense speeds can be adjusted by pressing the appropriate button.

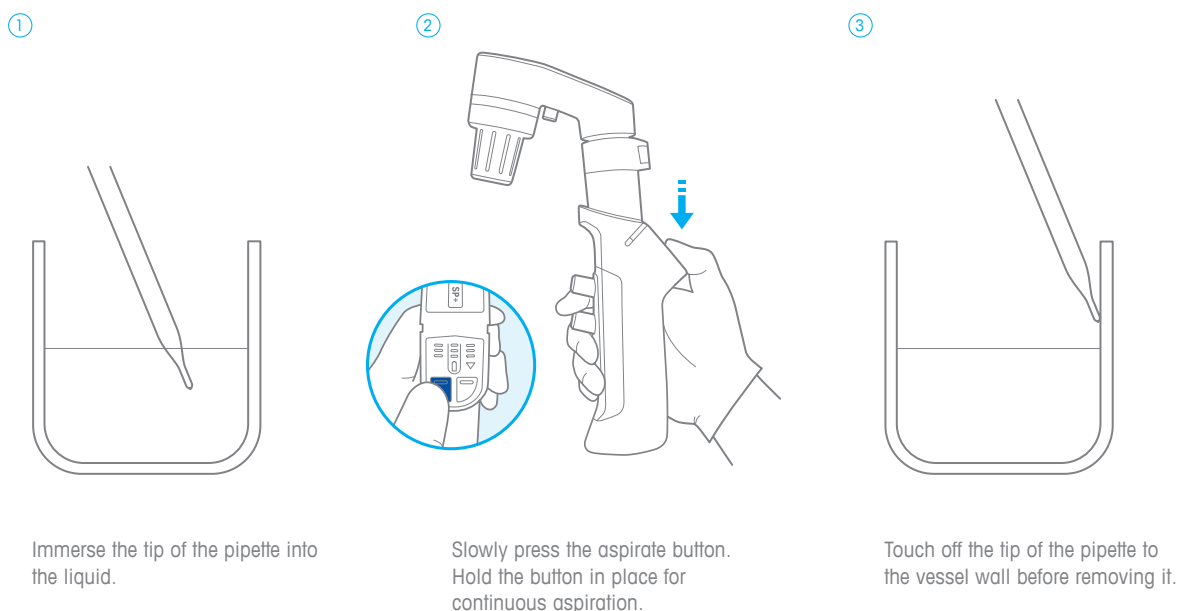


Pressing the button will cycle the speed from low/medium/high, then back to low.

|                                                                                     |              |
|-------------------------------------------------------------------------------------|--------------|
|  | High speed   |
|  | Medium speed |
|  | Low speed    |

To dispense without speed control (gravity), press the dispense speed button until no lights are illuminated.

### 4.3 Aspirating



### 4.4 Dispensing

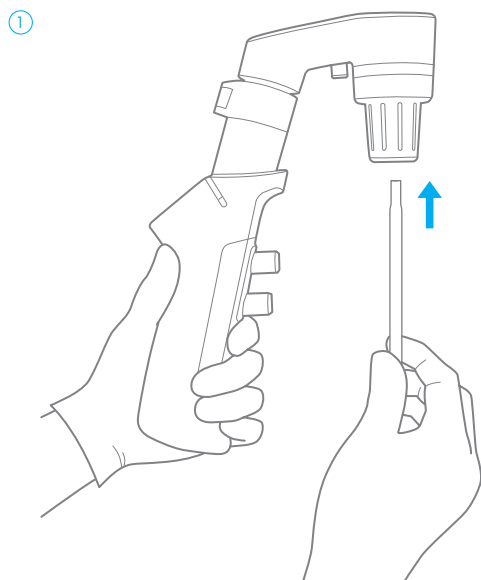
Liquids can be dispensed at a low speed (flow out) or a high speed (blow out).

### 4.5 Using the Extendable Head

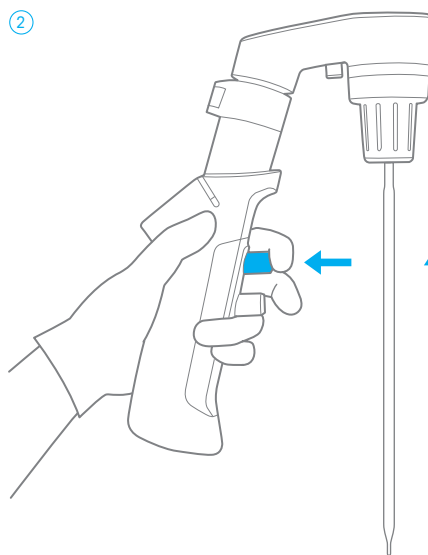
The head of the SP+ can be extended by releasing the latch at the top of the neck and moving the head up. Secure the head in this position by closing the latch. To return the head to its original position, open the latch, move the head down and close the latch.

## 4.6 Checking the Adapter Seal

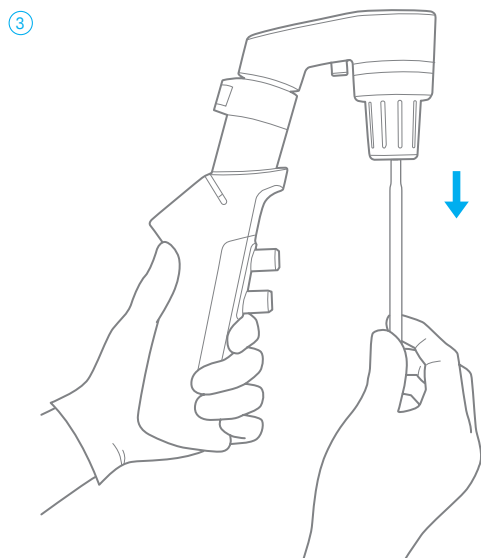
Liquids can be dispensed at a low speed (flow out) or a high speed (blow out).



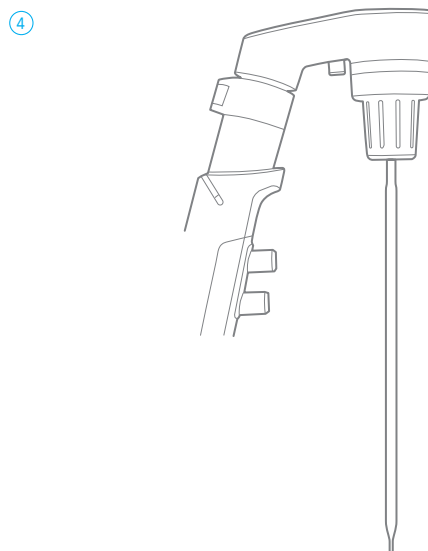
Insert the pipette into the aspiration cone.



Aspirate the maximum volume.

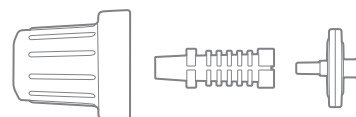


Hold the instrument so that the pipette is vertical.



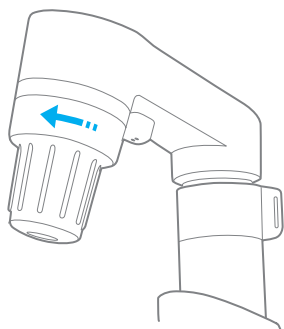
Without touching the pipette or pressing the control buttons, observe the tip of the pipette for approximately 30 seconds.

If water leaks from the tube, remove the pipette and carefully disassemble/reassemble the aspiration cone assembly (aspiration cone/pipette adapter/filter module) and check the seal again. If it continues to leak, replace the pipette adapter.



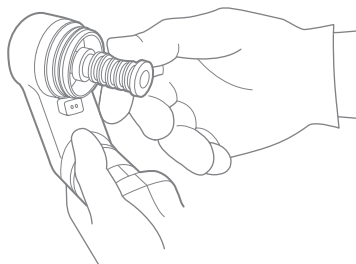
## 4.7 Replacing the Adapter

①



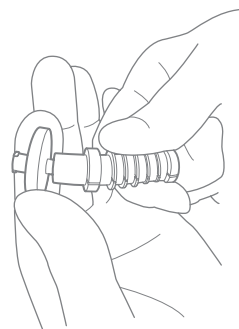
Remove the aspiration cone by twisting counter clockwise.

②



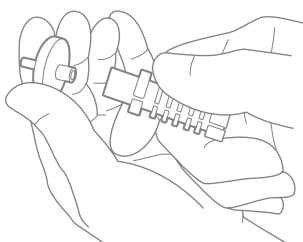
Unplug the filter module pipette adapter assembly from the head of the SP+.

③



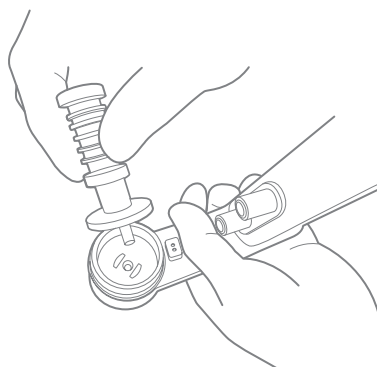
Unplug the filter module from the adapter and discard.

④



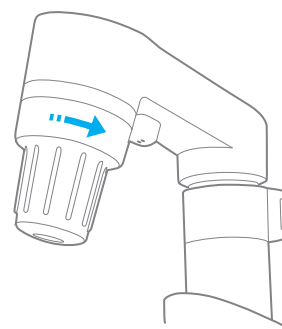
Insert the filter module into a new pipette adapter.

⑤



Reinsert the filter module adapter assembly into the head.

⑥



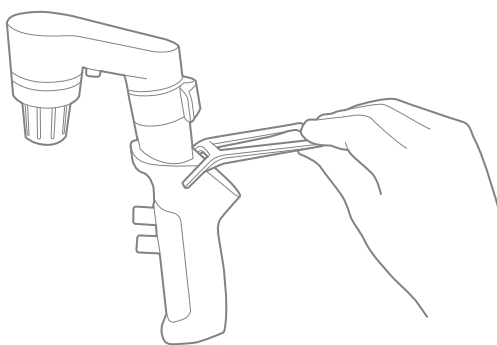
Replace the aspiration cone by twisting just until snug (do not overtighten).

## 4.8 Magnetic Hang-Up

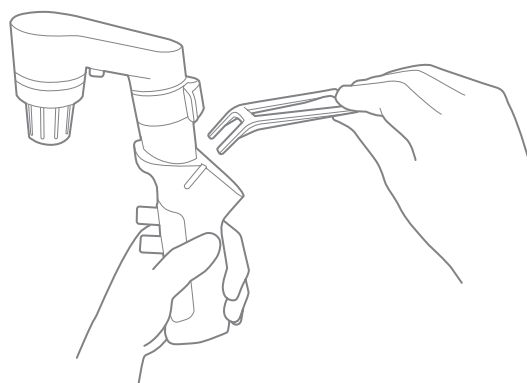
The Rainin SP+ can be stored using the provided magnetic Hang-up. When attached to the power cord, the Hang-up will automatically detect and charge the instrument.

- Strong magnets in the base of the Hang-up will hold the hook and SP+ securely to any ferromagnetic surface (e.g., the steel side wall of a Laminar flow hood).
- Place the Hang-up on the metal wall directly where you want it. When removing or repositioning the Hang-up, pull it directly away from the wall to avoid scratching the wall (e.g., avoid sliding the base of the hook along the wall).
- Warning: The Magnetic Hang-up has a strong magnetic field. Handle with care.

## 4.9 Attaching the Support Frame



The SP+ support frame attaches easily. Simply slide the arms of the frame over the grooves one each side of the handle.



To remove, gently slide the support frame out of the grooves.

## 5. Warnings

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Because this instrument may be used to handle hazardous liquids, these operating instructions do not claim to address all of the safety issues associated with its use. It is the user's responsibility to establish appropriate safety and health practices, and determine the applicability of regulatory limitations prior to use.

- Every user must read and understand the operating instructions in this manual.
- Follow the general instructions for hazard prevention and safety regulations (e.g., wear protective clothing, eye protection and gloves).
- Observe all specifications provided by reagent manufacturers.
- Never use the instrument in an area where there is danger of explosion.
- Do not use this instrument to pipette flammable liquids.
- Only use this instrument to pipette liquids, with strict regard to the defined limitations of use. If in doubt, contact your METTLER TOLEDO or Rainin sales representative, Rainin Technical Support or the supplier.
- Avoid splashes (e.g., over-aspirating).
- Only dispense into suitable vessels.
- Never use force on the instrument.
- Use only original Rainin accessories and spare parts.
- Do not alter the instrument or dismantle it any further than as described in these operating instructions.
- Always check the instrument for visible damage prior to use. If there is a sign of a potential malfunction, immediately stop using the instrument and consult Section 13, Troubleshooting. Consult Section 13, Troubleshooting. If necessary, contact Rainin Technical Support.
- To charge the lithium battery, you must use the power adapter supplied with the instrument or a replacement adaptor (if original is lost) specified by Rainin.
- Protect the power adapter from moisture and do not use it for any other purpose than recharging the battery in this instrument.
- Only METTLER TOLEDO or Rainin service personnel are authorized to repair or service the instrument.

## 6. Battery Replacement

The Rainin SP+ comes with a built-in rechargeable battery. It has a two-year life-span and can only be replaced by sending it in for service.

## 7. Specifications

Below are the technical specifications for the Rainin SP+.

|                                                |                                                                   |
|------------------------------------------------|-------------------------------------------------------------------|
| <b>Aspiration speed (test with 50 mL tube)</b> | Low: 5 mL/s<br>Mid: 7 mL/s<br>High: 10 mL/s                       |
| <b>Dispense speed (test with 50 mL tube)</b>   | Gravity dispensing<br>Low: 6 mL/s<br>Mid: 8 mL/s<br>High: 11 mL/s |
| <b>Power adapter input</b>                     | 110-240 VAC, 50/60Hz, 0.3A                                        |
| <b>Power adapter outlet</b>                    | 5V DC, 1A                                                         |
| <b>Battery</b>                                 | 1100 mA lithium ion battery                                       |
| <b>Light</b>                                   | LED                                                               |
| <b>Weight</b>                                  | 215g                                                              |
| <b>Shipping weight</b>                         | 650g                                                              |
| <b>Dimensions (L*W*H)</b>                      | 310*225*75 mm                                                     |
| <b>Charging time</b>                           | 3 hours                                                           |
| <b>Operation time</b>                          | 15 hours                                                          |
| <b>Operating range (°C)</b>                    | 0 to 40 °C, Max. 85% RH                                           |
| <b>Storage range (°C)</b>                      | -20 to 40 °C, Max. 85% RH                                         |
| <b>Power supply (manufacturer)</b>             | Model: PSA 105R-050QL6<br>MFR: Phihong                            |

## 7.1 Operating and Storage Environment

|                  |                     |                 |
|------------------|---------------------|-----------------|
| <b>Operating</b> | Ambient temperature | 0° C - 40° C    |
|                  | Relative humidity   | ≤ 85%           |
| <b>Storage</b>   | Ambient temperature | - 20° C - 40° C |
|                  | Relative humidity   | ≤ 85%           |

- The instrument should not be stored with a pipette attached.
- Do not expose the instrument to volatile gases over an extended period.

## 8. Accessories

| Accessory                                 | Material Number |
|-------------------------------------------|-----------------|
| <b>Filter (1 pc)</b>                      | 30621244        |
| <b>Magnetic Hang-up</b>                   | 30671310        |
| <b>Support frame</b>                      | 30621248        |
| <b>Power adapter</b>                      | 30671311        |
| <b>Aspiration cone</b>                    | 30621241        |
| <b>Sterilized filter (1 pc) ROW</b>       | 30695285        |
| <b>Sterilized filter (1 pc) (US only)</b> | 17011745        |
| <b>Serological pipette adapter</b>        | 30621247        |

## 9. Ordering Information

| Product                              | Material Number |
|--------------------------------------|-----------------|
| <b>Rainin SP+ Pipette Controller</b> | 30671415        |

## 10. Care and Maintenance

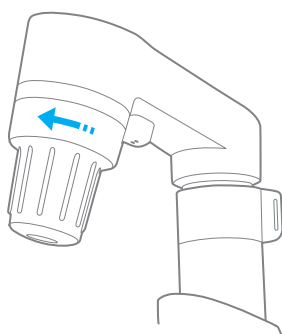
Clean the Rainin SP+ by wiping the housing with a damp cloth. The housing can also be disinfected using alcohol (ethanol, propanol) or alcohol-based disinfectants.

The SP+ may also be sterilized by applying 30 minutes of ultraviolet irradiation after each experiment. After 600 hours under a 30W UV light the color change should be less than 2.0.

Liquid entering the serological pipette adapter/filter module assembly can decrease the instrument's aspiration capacity. If liquid gets in the adapter, you will need to remove and disassemble the aspiration cone assembly. Once the parts have been cleaned and dried, reassemble. If the filter is wet it will need to be replaced.

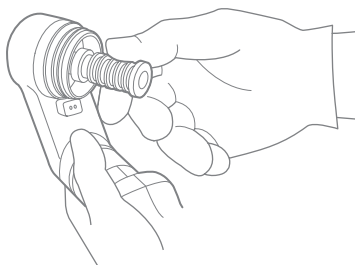
### To disassemble:

①



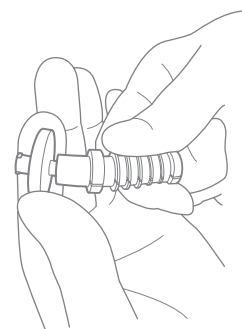
Turn the aspiration cone counterclockwise to remove it.

②



Remove the pipette adapter and filter assembly.

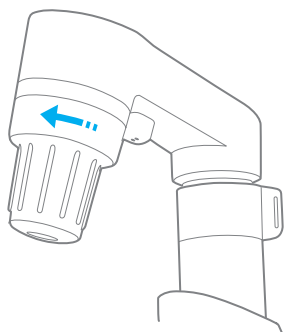
③



Remove the filter from the adapter.

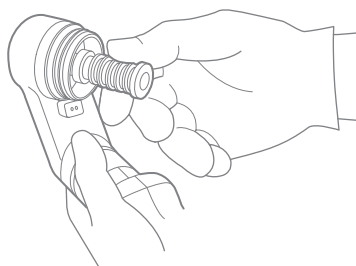
## To clean and dry the pipette adapter/filter assembly:

①



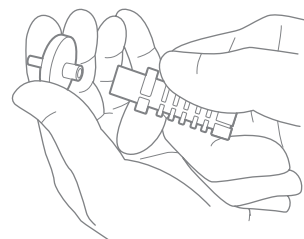
Twist the aspiration cone counterclockwise to remove it.

②



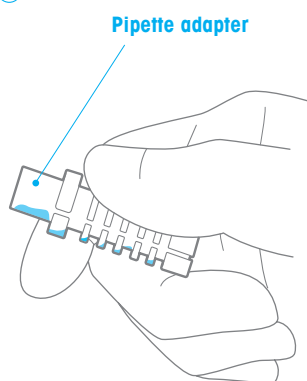
Unplug the pipette adapter/filter module from the head of the SP+.

③



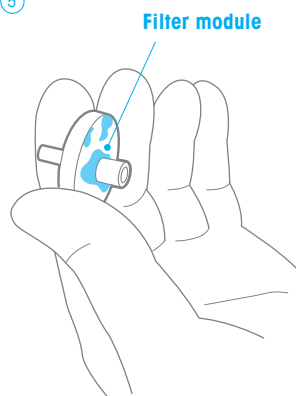
Unplug the filter module from the pipette adapter.

④



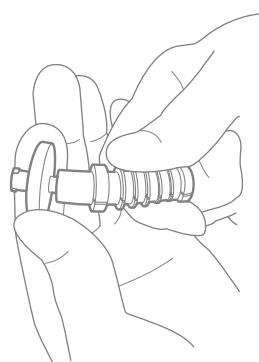
Clean and dry the pipette adapter.

⑤

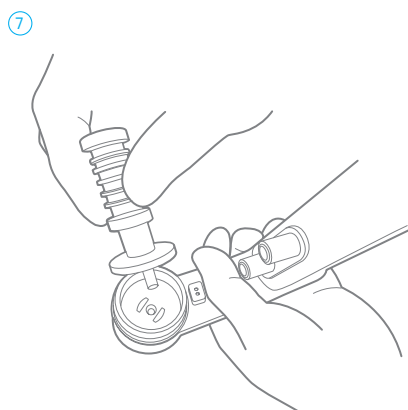


If there is liquid in the filter module, replace it.

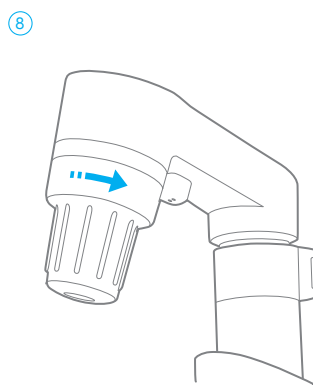
⑥



Plug the filter module into the pipette adapter.



Plug the filter/pipette adapter assembly into the head of the SP+.



Twist the aspiration cone clockwise (do not overtighten).

The pipette adapter assembly can be replaced, cleaned or autoclaved as described below (121 °C, 1 bar overpressure for 20 min.)

|                        |                                                                                                                                                                                                                            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Aspiration cone</b> | <ul style="list-style-type: none"><li>• Wipe using a damp cloth</li><li>• Disinfect with alcohol (ethanol, propanol) or alcohol-based disinfectants</li><li>• Can be autoclaved repeatedly</li><li>• Replaceable</li></ul> |
| <b>Pipette adapter</b> | <ul style="list-style-type: none"><li>• Rinse with demineralized water</li><li>• Can be autoclaved repeatedly</li><li>• Replaceable</li></ul>                                                                              |
| <b>Filter</b>          | <ul style="list-style-type: none"><li>• Dispose of if contaminated</li><li>• Cannot be cleaned</li><li>• Can be autoclaved once</li><li>• Replaceable</li></ul>                                                            |

## 11. Service

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Any authorized METTLER TOLEDO or Rainin service professional can service the Rainin SP+. We cannot accept instruments that are not appropriately cleaned and decontaminated. The Rainin SP+ may be repaired, but it cannot be calibrated.

**Go to [www.mt.com/contacts](http://www.mt.com/contacts)** to find your local METTLER TOLEDO or Rainin service center.

## 12. Troubleshooting

| Problem                                                         | Cause                                                                                                                             | Solution                                                                                                                                      |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Reduced aspiration capacity</b>                              | Wet filter                                                                                                                        | Replace the filter                                                                                                                            |
| <b>Pipette doesn't fit snugly</b>                               | Pipette adapter damaged                                                                                                           | Replace pipette adapter                                                                                                                       |
| <b>Battery will not charge</b>                                  | The battery is already charged to capacity                                                                                        | <ul style="list-style-type: none"> <li>• Disconnect the power</li> <li>• Only charge the battery if the status display is blinking</li> </ul> |
| <b>Battery is fully charged but instrument will not turn on</b> | Instrument can't work normally                                                                                                    | Reset instrument by pressing "Aspiration speed control" and "Dispense speed control" at the same time                                         |
| <b>Battery requires frequent recharging</b>                     | <ul style="list-style-type: none"> <li>• The battery capacity is reduced</li> <li>• Battery is more than two years old</li> </ul> | Request battery replacement service                                                                                                           |
| <b>Liquid drips out of the pipette tip</b>                      | Pipette adapter and/or filter are incorrectly assembled                                                                           | Remove the pipette adapter and filter and reassemble                                                                                          |
|                                                                 | Pipette not inserted far enough                                                                                                   | Continue to carefully insert the pipette (do not force)                                                                                       |
|                                                                 | Pipette adapter damaged                                                                                                           | Replace pipette adapter                                                                                                                       |
|                                                                 | Pipette damaged                                                                                                                   | Replace pipette                                                                                                                               |
| <b>Bubbles form in the pipette during aspiration</b>            | Aspiration speed is too slow                                                                                                      | Apply more pressure to aspirating button                                                                                                      |
| <b>Buttons do not respond</b>                                   | Unexpected error or battery is fully discharged                                                                                   | Charge the battery for three hours, then press aspiration speed control and dispense speed control at the same time to reset the instrument.  |

### Technical Support Contact Information

#### China

Phone: 4008 878 989  
Email: [mtservice@mt.com](mailto:mtservice@mt.com)

#### North America

Phone: 800 662 7027  
Email: [tech.support@rainin.com](mailto:tech.support@rainin.com)

#### RoW

[www.mt.com/contacts](http://www.mt.com/contacts)

## 13. Warranty Information

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For warranty claims, please contact Rainin Technical Service at **[ts@rainin.com](mailto:ts@rainin.com)**. The warranty is void if the instrument housing has been opened or there is evidence of abuse/misuse. The battery and other parts subject to normal wear and tear (e.g., pipette adapter/filter) are not covered by warranty.

## 14. Disposal

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The following guidelines should be followed to ensure the proper disposal of the Rainin SP+.

- Decontaminate the instrument before disposal by following local, regional and national guidelines for biohazardous or radioactive waste disposal.
- The lithium ion battery is regulated waste and must be disposed of according to local, regional and national guidelines.
- Dispose of the instrument according to local, regional and national guidelines concerning take-back of electronic equipment and waste.
- Recycle original packaging with your local recycling agent.

Contact your local METTLER TOLEDO or Rainin representative for more information.



**[www.mt.com/rainin](http://www.mt.com/rainin)**

For more information

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