

# User Manual

## Vitae Mini-Lids Automated Mini-capping System



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## 1. Instrument Overview

Automated Mini-capping System is a small automated capping device capable of intelligently capping various swab sampling tubes and general centrifuge tubes. It uses sensors to automatically trigger the cap opening and closing commands. Experimental personnel can quickly position and cap the tubes with one hand.

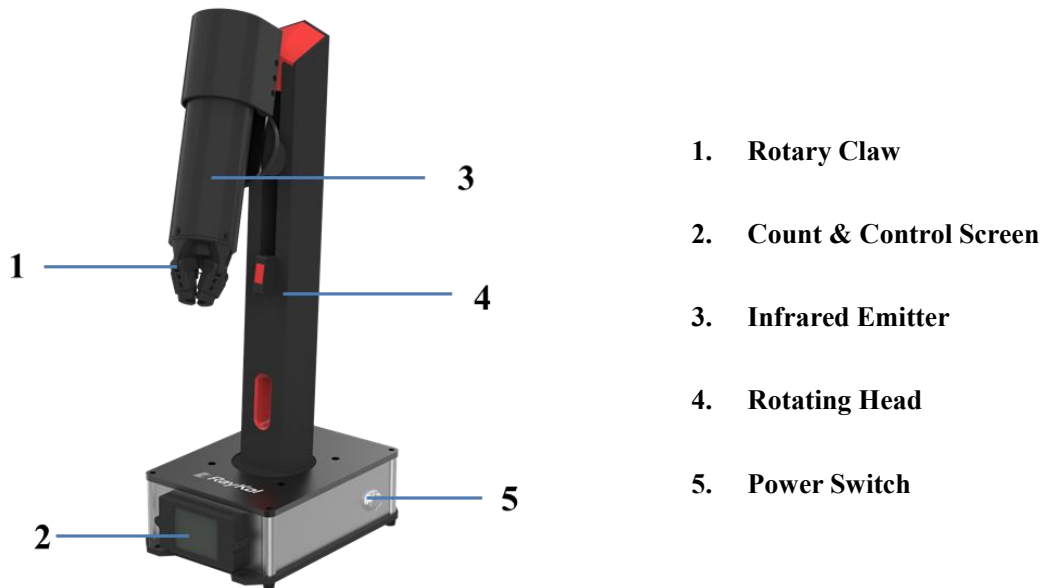


Fig.1 Vitae Mini-Lids

## 2. Workbench

Instrument placement space needs to meet the requirement of being 40 cm long and 30 cm wide. The placement surface should be flat and able to withstand a weight of 8 kg.

Instrument	Instrument size	weight
Vitae Mini-Lids	24cm long x 16cm wide x49cm high	8 kg

Attention:

If the instrument is placed inside a biosafety cabinet, the internal operating height must be greater than 55 cm.

## 3. Power Voltage

- Voltage: AC 200~240V
- Voltage Frequency: 50~60Hz

## 4. Configuration List

- (1) Automatic Sensing Capping Device Main Unit: 1 set
- (2) Power Cord: 1 set

## 5. Operating Procedures

### 5.1 Basic Operation

- (1) Power On: Connect the power cord to the instrument and turn on the power.
- (2) Turn On: Press the power switch on the right side of the instrument when in use.

### 5.2 Testing

- (1) Adjust the position of the rotating head to a comfortable angle for operation (refer to 5.5).
- (2) Select the method for the corresponding tube size through the control screen (built-in methods: ① 10 mL sampling tube, ② 15 mL centrifuge tube, ③ 50 mL centrifuge tube). Then, with one hand, place the tube cap in the rotary claw, and the sensor will automatically trigger the cap opening and closing command. The screen will display "Waiting to open" or "Waiting to close" (as shown in Figure 2), with an average of 4 seconds per sample. This indicates normal operation, and the test is completed.



Fig.2

### 5.3 Functions of Control Screen

You can directly select the methods for standard tubes (parameters are pre-set), or you can adjust the cap rotation speed, the number of rotations, and the claw spacing as needed. The setting interface is shown in Figure 3.

- (1) The number of rotations: The setting page of the number of rotations during cap opening and closing is shown in Figure 4.



Fig.3

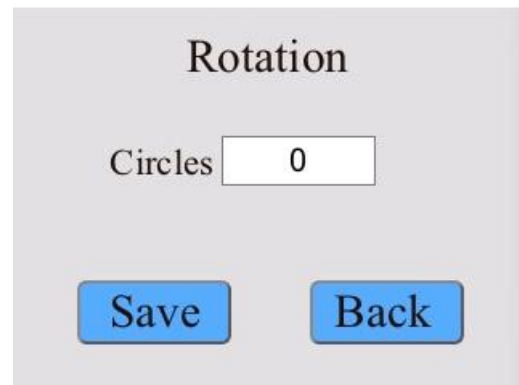


Fig.4

- (2) Claw Spacing: Three commonly used tube diameter modes are pre-set for 10 mL sampling tubes, 15 mL centrifuge tubes and 50 mL centrifuge tubes. When you need to switch, select the mode and save it. If the pre-set mode does not meet your actual needs, you can make adjustments (release steps are the distance when opening, grip steps are the distance when gripping the tube). After setting, click "Save," as shown in Figure 5.

- (3) Speed: The interface is shown in Figure 6. The shaft speed is the rotation speed (the faster, the lower the torque), and the claw speed is the speed when gripping the tube (the set value should be slightly smaller than the diameter of the tube cap).

Note: The acceleration is already set for optimized speed; please do not change it.

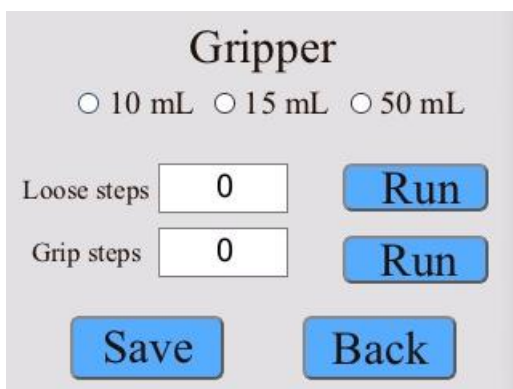


Fig.5

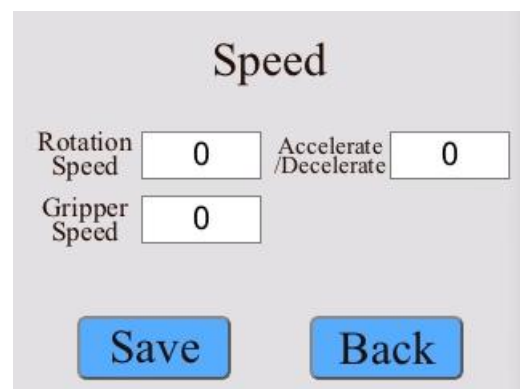


Fig.6

- (4) Claw Motor: The interface is shown in Figure 7.

- a. Maximum Stroke: The maximum range for locking the claw open; do not change it, as there is a risk of mechanical jamming beyond this range.

- b. Delay-Open: The action time for delay of the claw after the sensor detects the hand when opening the cap, default is 0.4 seconds (customers can set a faster speed as per their needs).
  - c. Delay-Close: The action time for delay of the claw after the sensor detects the hand when closing the cap, default is 0.5 seconds (customers can set a faster speed as per their needs).
- (5) Shaft Motor: Turning 1 rotation (STEP) corresponds to the "Rotations" option, and the purpose is to fine-tune the locking strength. If you still haven't locked the cap after 2 rotations, or if you've locked it too tightly after 3 rotations, you can increase the value of "Turn 1 rotation (STEP)" appropriately.

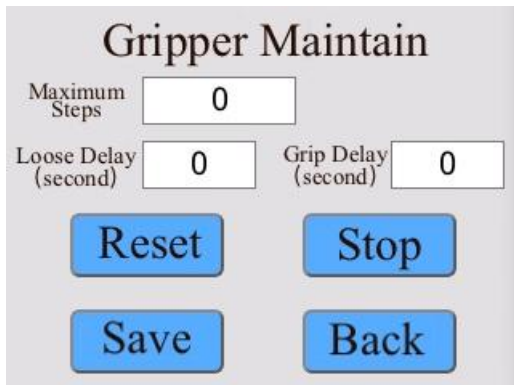


Fig.7

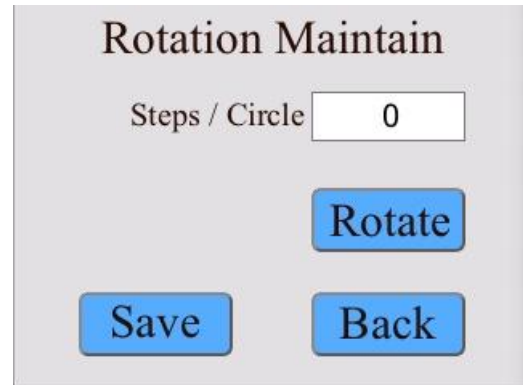


Fig.8

## 5.4 Parameter Settings When Tube Material and Pre-set Method Do Not Match

- (1) As shown in Figure 9, click the "Settings" button on the instrument's control screen to enter the debugging interface.
- (2) In the debugging interface, select "Claw Spacing," as shown in Figure 10.



Fig.9

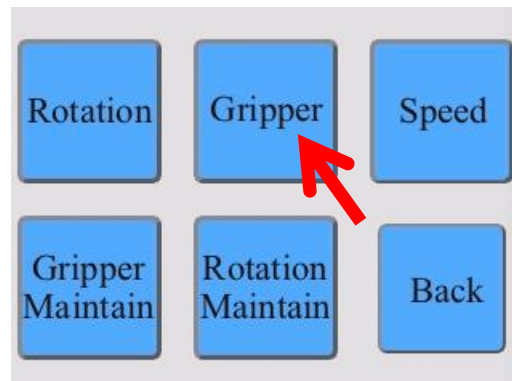


Fig.10

(3) Choose the corresponding tube type and adjust the spacing size (as shown in the setting interface in Figure 11):

- ✧ If the actual size is not significantly different from the default built-in size, it is recommended to adjust with a span of 100 steps.
- ✧ If the actual size differs significantly from the default built-in size, you can adjust with a span of 200 to 300 steps or more.

Note:

Release steps refer to the opening size when the claw is not gripping the tube, and grip steps refer to the size when the claw is gripping the tube.

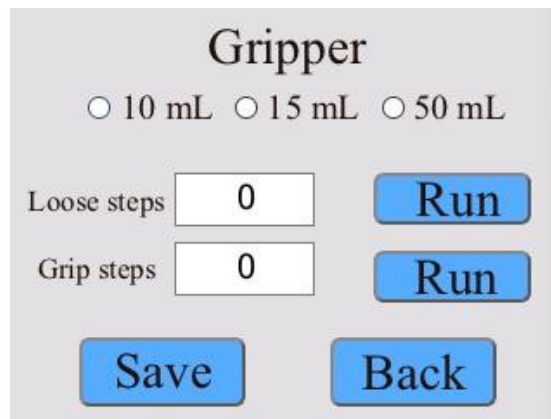


Fig.11

(4) Rotation Count Adjustment:

If the default rotation count does not meet the requirements, you can increase or decrease the number of rotations, as shown in Figure 13 (default is 3 rotations). It is recommended to use 3 rotations for 10 mL and 15 mL tubes and 2 rotations for 50 mL tubes.

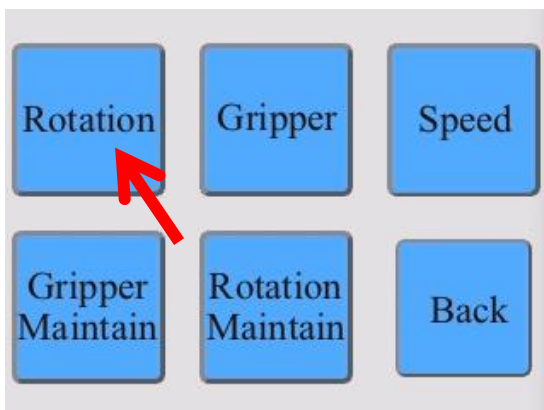


Fig.12

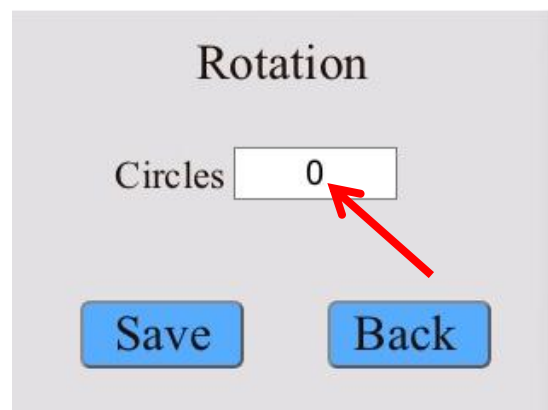


Fig.13

(5) Rotational Steps per Rotation:

If adjusting the rotation count still does not meet the rotational requirements for opening or closing the cap, you can adjust the number of steps per rotation. Increasing the steps will increase the angle of cap rotation, while decreasing the steps will decrease the angle. It is recommended to adjust in units of 200 steps, with the default value being 1280.



Fig.14

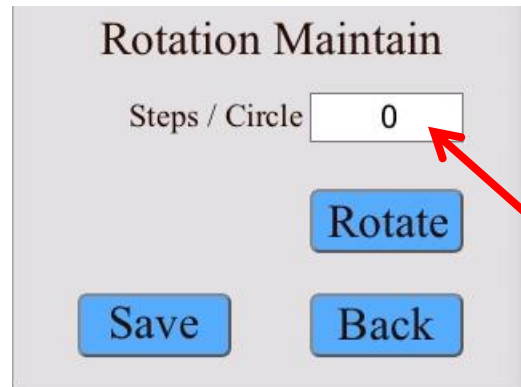


Fig.15

(6) Rotation Speed:

To open large-sized tubes or tightly sealed tubes, you should set the rotation speed to low. This allows the rotary claw to obtain greater torque. For 50 mL tubes, it is recommended to set the speed to 1200, and for 10 mL or 15 mL tubes, it is recommended to set the speed to 2500.

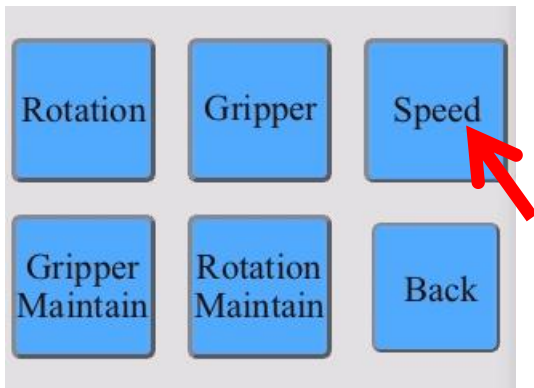


Fig.16

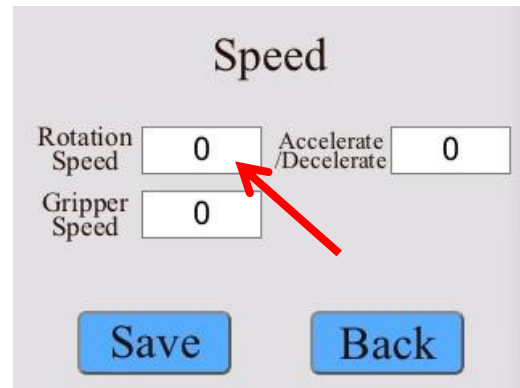


Fig.17

(7) Sensing Time Adjustment:

If you feel that the cap opening or closing response is too fast or too slow, you can adjust the response speed. The default is 700, but it is recommended not to set it lower than 450 (0.45 seconds).

- ① Delay-Open: This refers to the time delay for the cap to open after sensing the tube. For example, inputting 400 means a delay of 0.4 seconds.



② Delay-Close: This refers to the time delay for the cap to close after sensing the tube. For example, inputting 400 means a delay of 0.4 seconds.

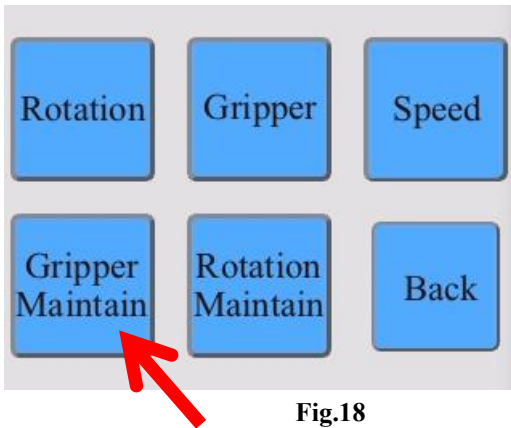


Fig.18

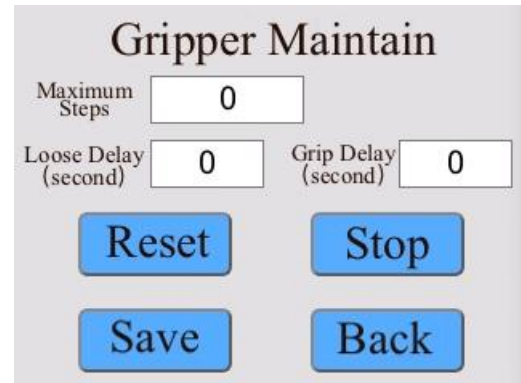


Fig.19

## 5.5 Adjustment of the Rotating Head's Position

(1) Adjust the position of the rotating head until it is comfortable and convenient for the operator.

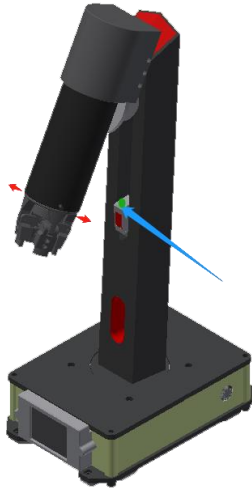
⚠ Note: As shown in Figure 20, when adjusting, grasp the upper part of the rotating head and the connection to the column. Do not force the lower part of the rotating head.



Fig.20

(2) Adjustment of Infrared Emitter Angle and Sensitivity:

As shown in Figure 22, the infrared emitter will display a green light when it is not in working status and an orange light when it is in normal working status. If the orange light is on in non-working status, you need to adjust the angle of the emitter or the orientation of the rotating head, as shown in Figure 23. If there is no orange light when in normal working status, you need to adjust the angle and sensitivity of the emitter.



**Fig.21**



**Fig.22 Non-working status**



**Fig.23 Normal working status**

(3) Angle Adjustment: The goal is to ensure that the emitter cannot sense any obstructions when the cap is not opening or closing. The emitter should be directed towards where the operator grips the centrifuge tube, not towards the location of the rotating claw. As shown by the red arrows in Figure 25, loosen two screws to adjust the angle.

(4) Sensitivity Adjustment: Turning clockwise increases sensitivity, while turning counterclockwise decreases it. As shown by the red arrows in Figure 25, there is a knob switch for adjusting the sensing distance. Customers can make adjustments if the set distance is too far or too close.

**!** Note: The instrument is factory-calibrated, and normal operation should not require further adjustments unless there are special requirements.



**Fig.24 Angle Adjustment**



**Fig.25 Sensitivity Adjustment**



RayKol Group (XiaMen) Corp., Ltd.

Address: Unit 5-6F, NO.176, Xinfeng Road, Huizhi Zone, Torch High-tech Zone, Xiamen, China