RHX-F03 Automatic Filling Machine User Manual

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REHEART

WENLY REHEART INDUSTRIAL LIMITED

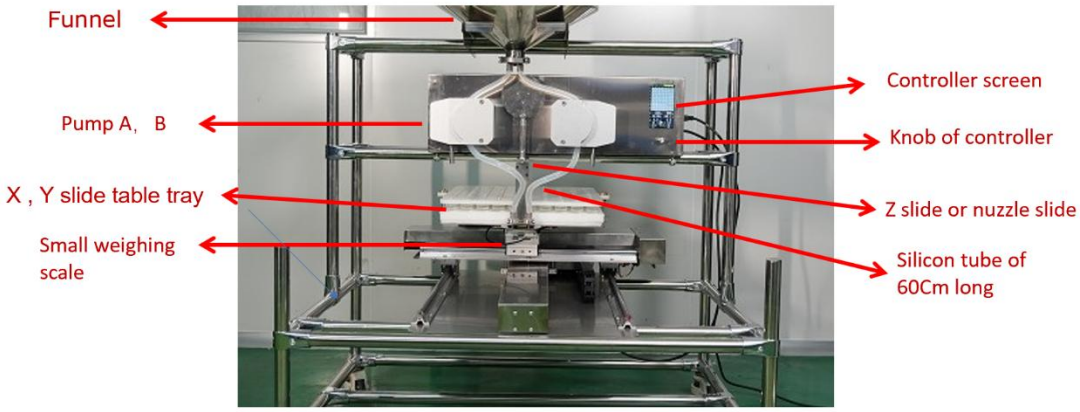
Contents

1 Product Introduction

1.1 Overview

The RHX-F03 Automatic Filling Machine is an advanced automated filling equipment, mainly consisting of the following parts:

- Main controller
- Three-axis motion control unit (X-axis, Y-axis, Z-axis)
- Dual peristaltic pump unit (Pump A, Pump B)
- Dual weighing scale unit
- Funnel and tubes



1.2 Description of Components

1.2.1 Main Controller

- 5-inch high-definition LCD screen
- 1 control knob, clickable and rotatable
- CAN bus-based distributed network architecture
- Includes 7 independent computer control units
- Simple system design for easy maintenance

1.3 Three-Axis Motion Control Unit

The equipment is fitted with X-axis, Y-axis, and Z-axis moving devices for precise three-dimensional positioning and movement control.

- X-axis: Controls left and right movement
- Y-axis: Controls forward and backward movement
- Z-axis: Controls up and down movement

1.4 Dual Peristaltic Pump Control Unit

- Both Pump A and Pump B are peristaltic pumps, used for precise control of filling amount.

- The pump's internal controller operates in gear pump mode, calculating the filling amount based on rotation angle.

1.5 Dual Weighing Scale System

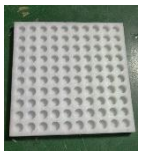
1.5.1 Large Scale

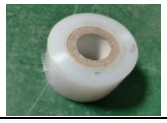
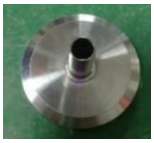
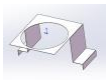
- Weighing range: 0-35 kilograms
- Accuracy: 1 gram
- Main use: Monitoring the overall filling process quality

1.5.2 Small Scale

- Weighing range: 0-3 kilograms
- Accuracy: 0.1 gram
- Main use: Precise measurement and calibration of filling amount

2 Packing Information

Item	Unit	Qty	Picture
Machine	pc	1	
Funnel cap	pc	1	
Funnel	pc	1	
Plastic board for 15mm bottle neck	pc	1	
Plastic board for 13mm bottle neck	pc	1	
Plastic board pin	set	4	
Foam tray of nail polish bottle	pc	100	
Alignment stick	pc	1	
Silicone pipe-Φ9X14mm	meter	25	
Nuzzle-4mm	pc	8	

Nuzzle-8.5mm	pc	4	
Connector-12mm	pc	4	
Film	Roll	2	
Forceps, used to clamp the pipe	pc	2	
20g calibration weight	pc	1	
1 kg calibration weight	pc	1	
AC Power supply cord	pc	1	
Clamp collar for funnel	pc	4	
Silicone gasket	pc	10	
Pagoda Joint-Dual	pc	4	
Pagoda Joint-single	pc	4	
Funnel Frame	pc	1	
Container Frame	pc	1	
Phillips Screwdriver	pc	I	
Flat Screwdriver	pc	1	

Nut driver 5.5	pc	1	
Wrench-5.5mm/7mm	pc	1	
Wrench-8mm/10mm	pc	1	
Wrench-13mm/15mm	pc	1	
Socket wrench-16mm/18mm	pc	1	
Stainless Steel Ruler(60cm)	pc	1	
Hex key	set	1	

3 Quick Installation Guide

3.1 Installing the Hopper Support

This machine supports two types of hoppers supports:

- Funnel support (left image)
- Container support (right image)

Install the appropriate support according to the corresponding screw holes.

Note: The container support only works with a single pump head. Please select single pump head in the bottle configuration.

3.2 Installing the Silicone Tubes

- The left image shows the funnel silicone tube connection, the right image shows the container silicone tube connection.
- Choose the appropriate accessories and tools according to the illustrations.
- The standard specification for all silicone tubes is 9mm inner diameter, 14mm outer diameter, 60cm length.

3.3 Installing the Small Scale Bottle Holder Fixture

3.3.1 The three hole positions

- Plastic cup hole position
- 15mm bottle mouth diameter hole position
- 13mm bottle mouth diameter hole position

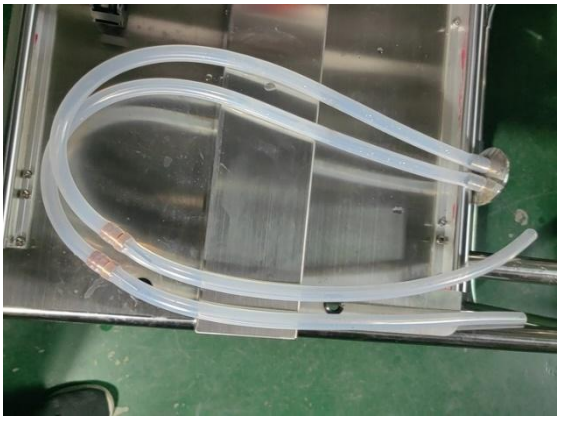
Choose the appropriate fixture hole position according to the bottle type.

3.3.2 Replacing the small scale bottle holder fixture

- Operate the controller to move the tray to the [Loading Bottles Position].
- Loosen the connector plug cover, unplug the connector, unscrew the two fixing screws, and replace the appropriate scale holder.
- After each scale holder replacement, perform scale calibration. Refer to “8.2 How to calibrate the large and small scales?”

3.4 Installing the Tube Washing Circuit

Take two additional sections of silicone tubing and extend the connection at the nozzle. Configure according to the right image, immerse the silicone tube ends in alcohol solvent. Operate the toolbox menu, press the [**FLUSH**] button twice, two pumps will start. After 30 to 60 seconds, tube washing is complete. Press the [**FLUSH**] button again to stop the pumps. The washed silicone tubes need to be left to air dry.

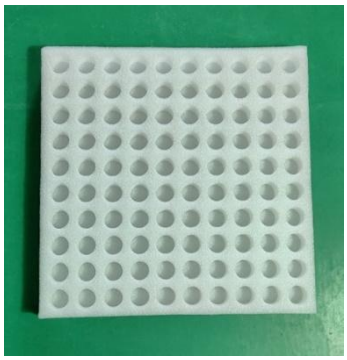


3.5 Installing a Full Tray of Bottles

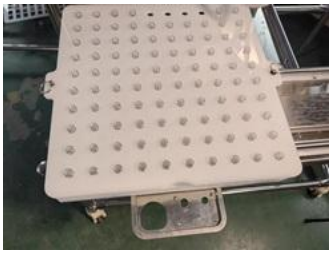
The filling machine's factory configuration is set to fill 100 nail polish glass bottles at once. Accessories include:

- a 100-hole foam tray bottle holder
- 15mm bottle mouth cover plate
- 13mm bottle mouth cover plate
- positioning pins

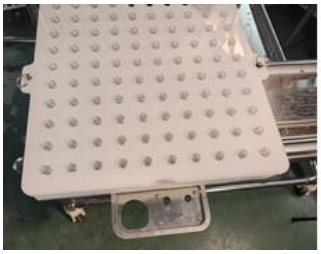
Choose the corresponding cover plate and pins according to the specific bottle type in production.



Foam Tray Bottle Holder



Cover Plate-15mm



Cover Plate-13mm

Positioning Pins

100 bottles covered by the plate, locked in place

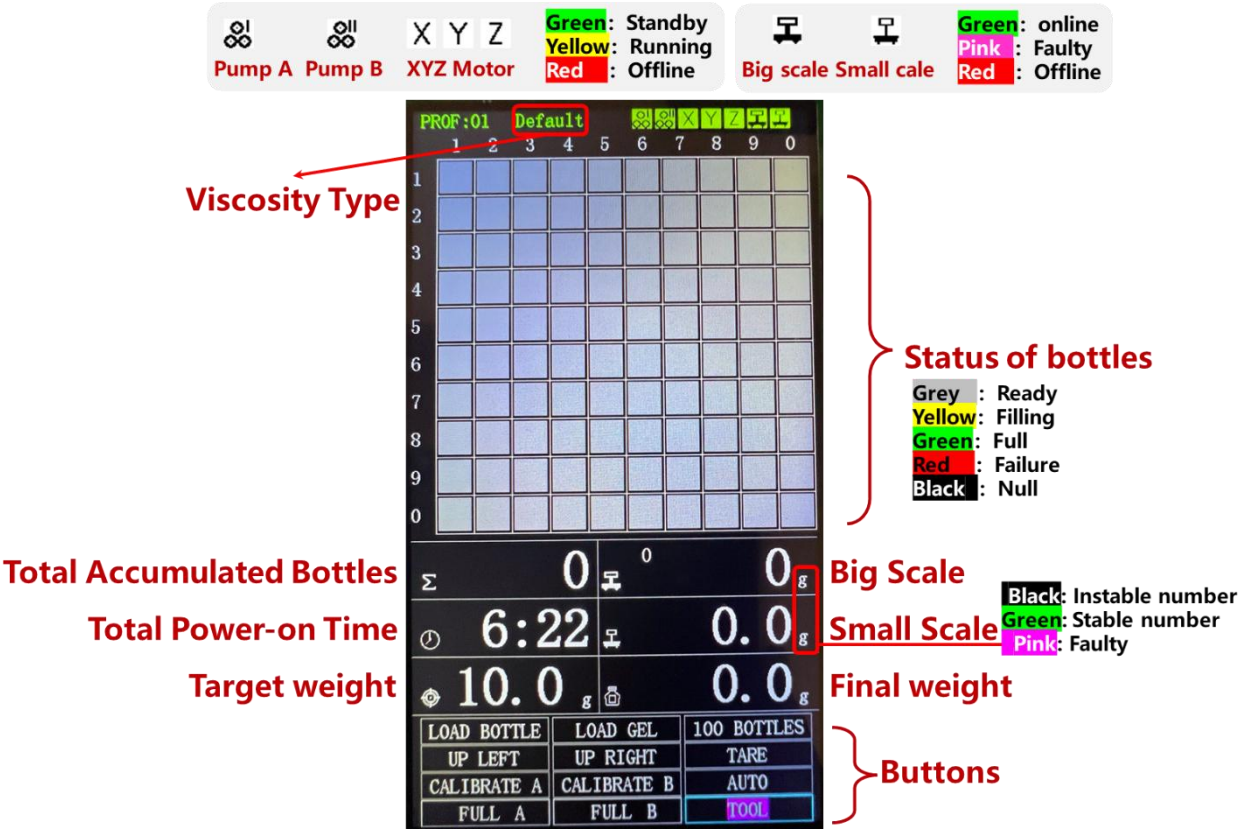
4 Controller Menu Introduction

4.1 Understanding the Control Knob

Below the screen, there's a round control knob. You can use it in these ways:

- Click: Press and release quickly (like a left mouse click)
- Long press: Press for 2 seconds before releasing
- Turn left: Rotate to the left (like moving a mouse up or left)
- Turn right: Rotate to the right (like moving a mouse down or right)

4.2 Home Screen

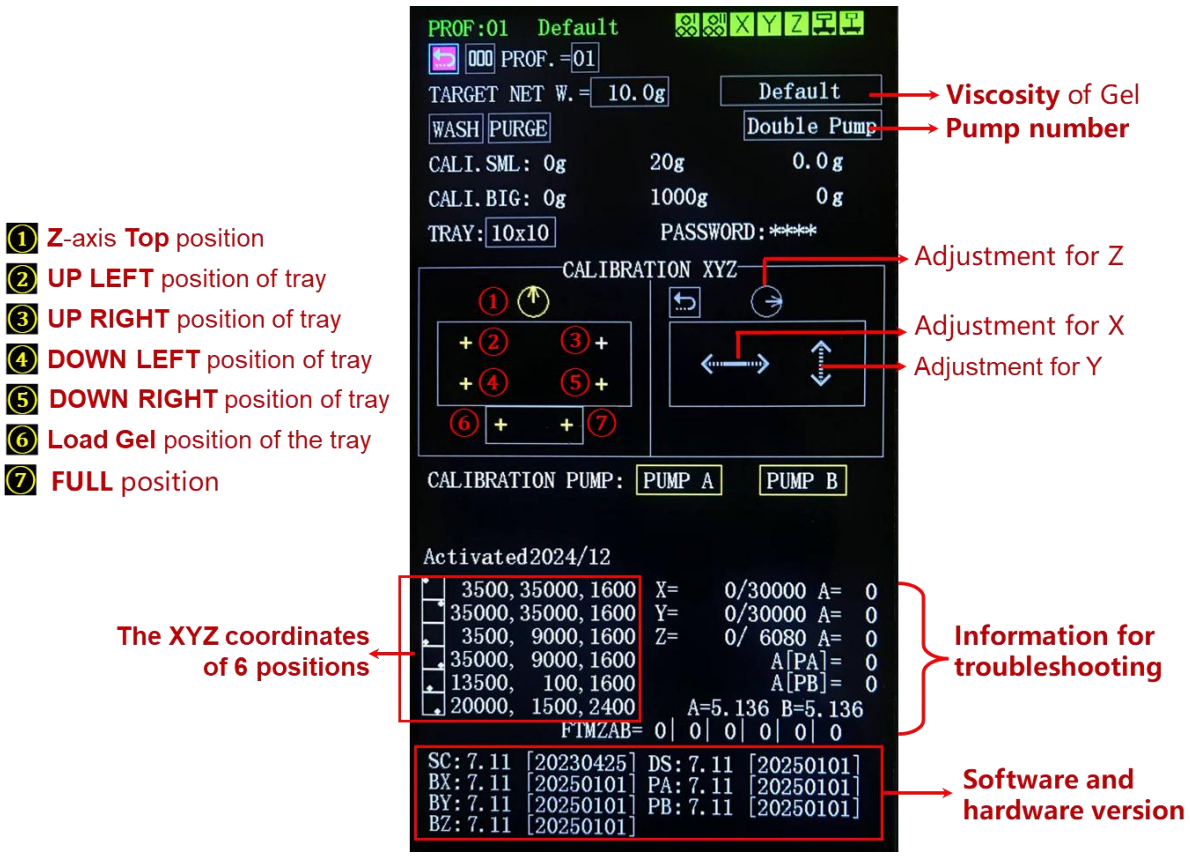


4.3 Home menu buttons

Button	What it does
LOAD BOTTLE	Click this to move the platform to the **Load Bottle** position. You can then put on or take off the tray of bottles.
LOAD GEL	Click this to move the platform to the **Load Gel** position, this position is convenient to load or unload gel, and is also the position for manual filling calibration.
XX BOTTLES	If you're not using a full tray, click this. The background turns yellow. Then turn the knob right or

	left to increase or decrease the number of bottles. Click again to confirm.
UP LEFT	Click to move the platform to the **UP LEFT** position.
UP RIGHT	Click to move the platform to the **UP RIGHT** position.
TARE	Click to reset the scale to zero
CALIBRATE A	Click to start the calibration filling of pump A (left side); calibration filling function can only be used when the tray is in the **Load Gel** position; after continuously calibrating and filling 3~5 bottles, the A letter background of this button turns green. The purpose of calibration is to test and record the filling weight of one pump rotation.
CALIBRATE B	Click to start the calibration filling of pump B (right side); calibration filling function can only be used when the tray is in the **Load Gel** position; after continuously calibrating and filling 3~5 bottles, the A letter background of this button turns green. The purpose of calibration is to test and record the filling weight of one pump rotation.
AUTO	When the cursor moves to this button, the background is pink. After clicking, the background turns yellow. Click again to start automatic filling. When automatic filling officially starts, this button position changes to a 'STOP' button.
STOP	When auto-filling starts, the "Auto" button becomes "Stop". Click to stop filling
FULL A FULL B	The FULL (Top-up) function can perform manual filling for empty bottles, or manual top-up filling for half-filled bottles. The small scale bottle holder fixture has a 15mm hole position and a 13mm hole position. [**FULL A**] will start pump A to fill bottles in the 15mm hole position; [**FULL B**] will start pump B to fill bottles in the 13mm hole position. Choose the appropriate hole position according to the bottle type, first place an empty bottle in the bottle holder hole position, click "**TARE**", confirm the small scale displays "0g", click the corresponding "**FULL**" button, the background turns yellow, continue rotating the knob to exit, or click again to start filling to the target weight. Afterwards, you can continuously give corresponding bottles, automatically executing continuous top-up filling function.
TOOL	Click and the background turns yellow. Enter a 4-digit password (by turning and clicking) to access the toolbox. The default passcode is 0000.

4.4 Understanding the Toolbox



4.5 Toolbox Menu

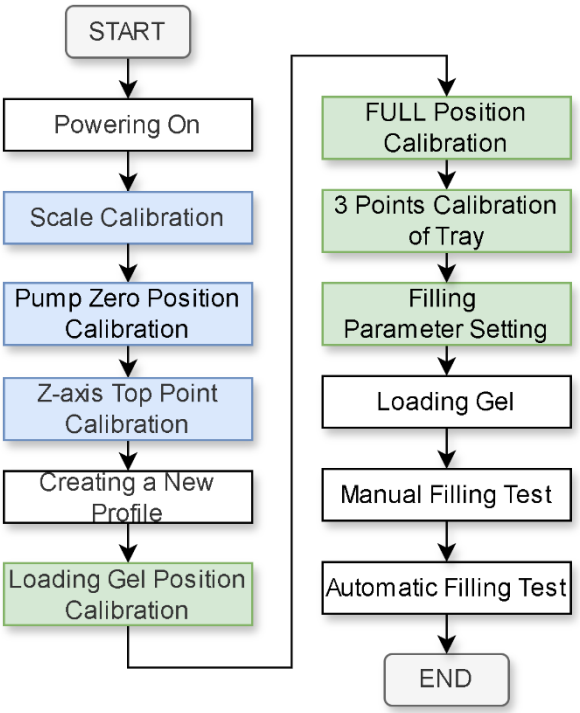
Button	What it does
⮌	**Return** Click to go back to the home screen
000	**Reset Counter** Click: The background turns yellow. Turn the knob: Exit without resetting. Click again: Reset the counter. This sets both the power-on time and total bottle count to zero.
PROF.	**Bottle Profile (**1-50) Click: The background turns yellow. Turn the knob: Switch between bottle profile. Click again: Confirm and exit. You can set up to 50 different bottle profiles for different sizes of bottles.
TARGET NET W.	**Single Bottle Target Net Weight** After clicking, the background turns yellow. Continue rotating the knob to change the net weight, click again to confirm and exit
Viscosity Type	After clicking, the background turns yellow. Continue rotating the knob to change the viscosity type, click

	again to confirm and exit. Viscosity has the following 6 options: 1. Default 2. Base&top Coat 3. Solid Color 4. Glitter Color 5. Builder Gel 6. Color Cap
WASH	**Tube Washing** After clicking, the background turns yellow. Continue rotating the knob to exit, or click to start the tube washing operation. When tube washing starts, the pumps will repeatedly execute 5 forward rotations followed by 5 reverse rotations. If you want to stop tube washing, please click this button again.
PURGE	**Purge Material from Hopper** Click once to enable (button background turns yellow), then click again to start purging. When purging begins, both pumps will rotate at the same time. To stop purging, click this button again.
Number of Pumps	Only dual pump models have this button. When using a Funnel, please select [Single pump] When using a Container, please select [Double pump]
CALI. SML	**Small Scale Calibration** To calibrate, press and hold the knob for 2 seconds on either the [0g] or [20g] option.
CALI. BIG	**Large Scale Calibration** To calibrate, press and hold the knob for 2 seconds on either the [0g] or [1000g] option.
TRAY	**Choose tray type** (4x4 to 10x10). Click: The background turns yellow. Turn the knob: Switch between tray types. Click again: Confirm and exit.
PASSWORD	Press and hold the knob for 2 seconds, then release to change the toolbox password digit by digit
	**Z-axis Top Calibration** Press and hold: Z-axis moves to the top automatically. Turn left/right: Raise Z-axis to the highest point Click again: Exit calibration mode.
	**Tray [UP LEFT] Calibration** Click: Move tray to UP-LEFT position. Press and hold: If already in UP-LEFT, enter calibration mode. If not, move to UP-LEFT first.
	Click: Move tray to UP-RIGHT position

	**Tray [DOWN LEFT] Calibration** Click: Move tray to DOWN-LEFT position. Press and hold: If already in DOWN-LEFT, enter calibration mode. If not, move to DOWN-LEFT first.
	**Tray [DOWN RIGHT] Calibration** Click: Move tray to DOWN-RIGHT position. Press and hold: If already in DOWN-RIGHT, enter calibration mode. If not, move to DOWN-RIGHT first.
	These are the two positions on the small scale bottle holder fixture: 1. The left corresponds to the water cup hole position, which is the **Load Gel** position, also the position for buttons '**CALIBRATE A**' and '**CALIBRATE B**'. 2. The right corresponds to the 15mm and 13mm bottle clamp hole positions, which is the **FULL** position, the position for buttons **'FULL A'** and '**FULL B**'. Click: Tray moves to the corresponding position Long press: If the tray is already in that position, enter position calibration mode for that position; if not, the tray moves to that position and enters position calibration mode.
	**Z-axis Up/Down or Calibration** Click: Move Z-axis up or down. Press and hold: If nozzle is at lowest point, enter Z-axis calibration mode. If not, move Z-axis down.
	**X-axis Calibration** Click: Background turns yellow. Turn knob: Tray moves **left** or **right**. The faster the knob is turned, the faster the tray Click again: Exit fine adjustment mode.
	**Y-axis Calibration** Click: Background turns yellow. Turn knob: Tray moves **up** or **down**. The faster the knob is turned, the faster the tray Click again: Exit fine adjustment mode.
PUMP A	**Pump A zero position calibration** After clicking, the background turns yellow and the pump enters calibration mode, rotate the knob and the pump will move slightly; click again to exit calibration mode
PUMP B	**Pump B zero position calibration** After clicking, the background turns yellow and the pump enters calibration mode, rotate the knob and the pump will move slightly; click again to exit calibration mode

5 Commissioning Guide

5.1 Commissioning Flowchart



Note: After switching to a new bottle profile, large and small scale calibration, pump zero point calibration, and Z-axis top point calibration can be optionally performed.

5.2 Powering On

Turn on the equipment's power switch. The system first notifies the nozzle (Z-axis) to rise to the highest point, then notifies the X and Y axes to initialize simultaneously and find the zero point, and finally notifies the tray to go to the Load-Gel position. When the tray reaches the Load-Gel position, it indicates that the equipment has successfully powered on.

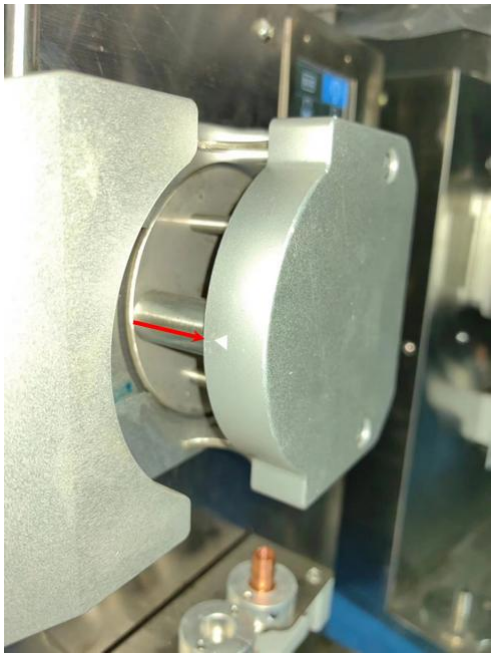
5.3 Scale Calibration

Please refer to "8.2 How to calibrate the large and small scales?"

5.4 Pump Zero Position Calibration

5.4.1 Calibration Purpose

After powering on, the stopping position of the two pumps must be as shown in the figure below. That is, the center line of a certain roller is aligned with the white triangle mark on the pump cover plate. If it's not aligned, you need to perform pump zero calibration operation.



5.4.2 Calibration Steps

1. Enter the password to enter the toolbox, the factory default password is 0000
2. Rotate the knob to move the cursor to "PUMP A" or "PUMP B", then long press the knob for more than 2 seconds and release
3. Rotate the knob left or right one grid, the pump head will slowly reverse or forward rotate one grid. When the center line of the roller is aligned with the white triangle on the cover plate, click the button to end calibration.
4. Click ⮌ to return to the home screen
5. Power off and on the equipment again, check if the pump position is correct. If not correct, please repeat the above steps.

5.5 Z-axis Top Point Calibration

5.5.1 Calibration Purpose

When the equipment is powered on, or after each filling is completed, the nozzle should be raised to the highest position. If it's not at the highest position, Z-axis top point calibration needs to be performed.

5.5.2 Calibration Steps

1. Enter the password to enter the toolbox, the factory default password is 0000
2. Rotate the cursor to ⏲, long press the knob for 2 seconds then release, the icon background turns green
3. Rotate the knob left or right until the nozzle is raised to the highest position
4. Click the knob to end Z-axis top point calibration

5.6 Creating a New Profile

5.6.1 Bottle Profile

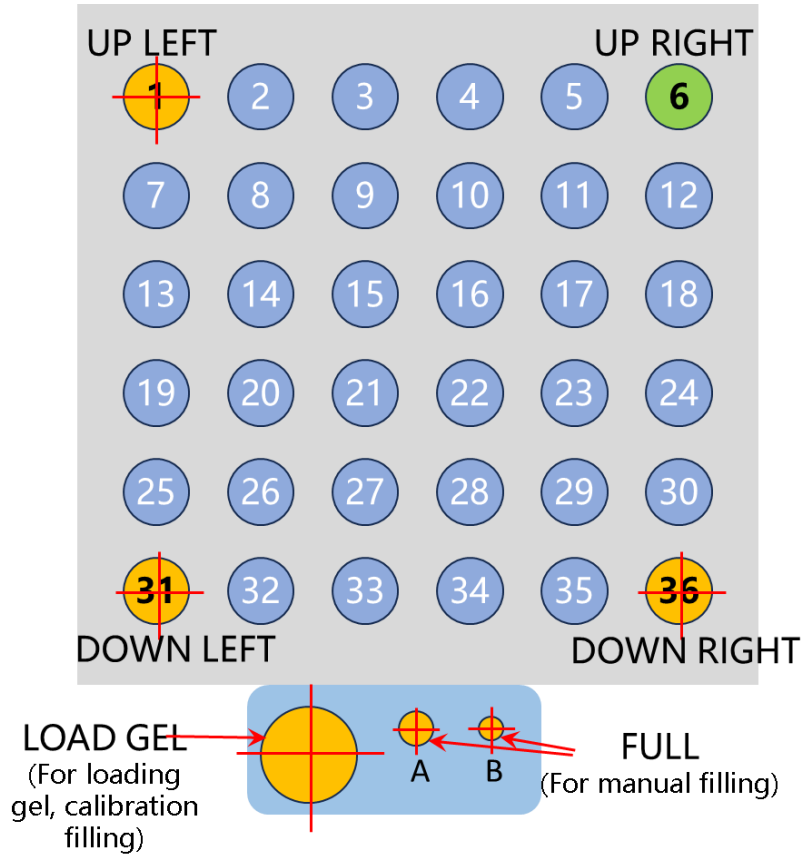
The system supports up to 50 different bottle types. For each bottle profile, it store the following information:

SN	Parameter	Range	Memo
1	Profile ID	1 ~ 50	
2	Single Bottle Target Net Weight	0.5 ~ 499.9g	
3	Viscosity Type	1. Default 2. Base&top Coat 3. Solid Color 4. Glitter Color 5. Builder Gel 6. Color Cap	
4	Number of Pumps	Single, Double	
5	Tray UP LEFT Position Coordinates		
6	Tray UP RIGHT Position Coordinates		no calibration needed
7	Tray DOWN LEFT Position Coordinates		
8	Tray DOWN RIGHT Position Coordinates		
9	Tray LOAD GEL Position Coordinates		
10	FULL Position Coordinates		
11	Tray Type	4x4 6x6 8x8 10x10	

Note: The Z-axis top point coordinate is a common setting and not related to bottle type.

5.6.2 Bottle Positions and Calibration Points

Taking a 6x6 tray as an example, the bottle positions and points that need calibration are shown in the following diagram: :



Note: The UP RIGHT position does not need calibration. This position will be automatically completed based on the UP LEFT, DOWN LEFT, and DOWN RIGHT three positions.

5.6.3 Creating a New Profile

The machine comes preset with 50 bottle profiles, but they are all the same. Customers should plan and record the bottle profile ID corresponding to each type of bottle according to their actual situation. When adjusting, do not overwrite bottle profiles that have already been set up.

The following example uses bottle profile ID 1 to illustrate how to create a new bottle profile.

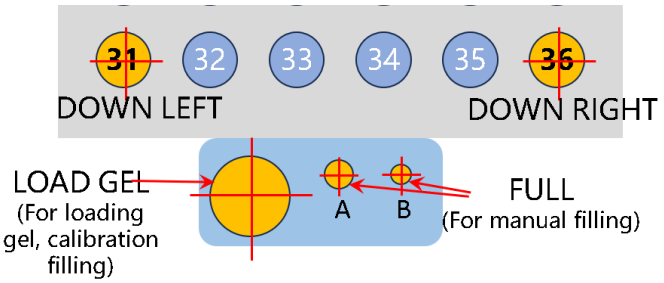
1. Enter the password to enter the toolbox. The factory default password is 0000.
2. Turn the knob to move the cursor to the "xx" number on the right side of [PROF.], then click.
3. Continue turning the knob to "1", then click to confirm and exit.

5.7 Loading Gel Position Calibration

5.7.1 Purpose of the Loading Gel Position

The Load-Gel position is used for loading and unloading gels, and is also the bottle position for manual calibration filling, corresponding to the leftmost hole position of the small scale bottle holder fixture.

When calibrating filling, a disposable cup will be placed in the leftmost hole position of the small scale bottle holder fixture, and the two pumps will fill the cup with gel one after another.

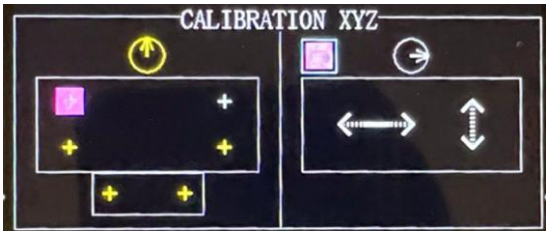


5.7.2 Calibration Purpose

When the platform moves to the Load-Gel position, the nozzles of the two pumps must be positioned directly above the cup, ensuring that all the adhesive dispensed by the two pumps will fall into the cup.

5.7.3 Calibration Steps

1. Enter the password to enter the toolbox. The factory default password is 0000.
2. Turn the knob to move the cursor to  , then click this button to notify the tray to move to the [Load Gel Position], and the nozzles will also descend to the corresponding height.
3. Long press this button until the calibration menu on the right is enabled, as shown in the following figure:



4. In the calibration menu, first calibrate the XY coordinates:
   - X-axis (Left/Right): 
   - Y-axis (Up/Down): 

   Click the X or Y coordinate adjustment button, then turn the knob left or right. Fast rotation means fast movement, slow rotation means slow

movement. When the tray is in the correct position, click the X or Y coordinate button to exit the calibration mode.

5. Calibrate Z coordinate

   After adjusting the XY coordinates, you can adjust the Z-axis coordinate. Move the cursor to Z, first click the knob to let the capping head (Z-axis) descend, then press the knob for more than 2 seconds and release to enter Z-axis calibration mode. In Z-axis calibration mode, turn the knob to adjust the descent height of the capping head. When the height is adjusted properly, click the knob to exit Z-axis calibration mode.

6. When all three XYZ axis coordinates are calibrated, turn the knob to move the cursor to ⮌, then click to return.

5.8 FULL Position Calibration

5.8.1 Purpose of the FULL Position

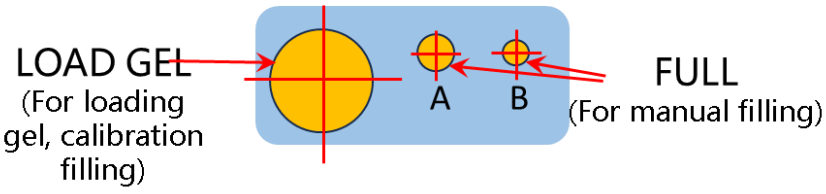
The FULL (top-up) bottle position is used for manual filling. Empty bottles and bottles that are not fully filled can be completed using this function.

This bottle position is located in the two small holes on the right side of the small scale bottle holder fixture, corresponding to pump A and B respectively.

The FULL position for pump A has a 15mm diameter hole;

The FULL position for pump B has a 13mm diameter hole;

The distance between these two holes is exactly equal to the distance between the two nozzles, so when the FULL bottle position for pump A is calibrated, pump B is naturally calibrated as well.



5.8.2 Calibration Purpose

When the platform moves to the FULL (top-up) bottle position, the nozzles of the two pumps must align precisely with holes A and B respectively.

5.8.3 Calibration Steps

Please refer to “5.7 Loading Gel Position Calibration”。

5.9 Three-Points Calibration of Tray

5.9.1 Calibration Purpose

Different specifications of trays and bottles will lead to different placement positions of bottles on the platform. To ensure that the nozzles can be accurately inserted into the bottles during automatic filling, position calibration must be done for each bottle type.

The tray has a total of 4 calibration bottle positions, but we only need to calibrate the [UP LEFT], [DOWN LEFT], and [DOWN RIGHT] three bottle positions. The [UP RIGHT] bottle position will be automatically calibrated based on the first three positions.

5.9.2 Calibration Steps

1. Place empty bottles to be filled on the tray
2. Click [LOAD BOTTLE] on the controller's home screen, the platform will move to the bottle loading position
3. Place the tray on the platform and lock the positioning pins
4. Enter the toolbox, perform [UP LEFT] bottle position calibration, refer to "5.7 Loading Gel Position Calibration" for calibration steps.
5. Perform [DOWN LEFT] bottle position calibration
6. Perform [DOWN RIGHT] bottle position calibration
7. Finally, click ⮌ to return to the home screen

Note: For equipment shipped in October 2024 and later, precise platform installation has been completed before delivery. Therefore, when performing tray three-point calibration, the Z-axis coordinates will automatically synchronize to the other 3 bottle positions. So when the Z-axis coordinate is calibrated at any point, it is not necessary to calibrate it at the other two points.

5.10 Filling Parameter Setting

For a certain bottle type, its filling parameters are as follows. Please refer to "4.5 Toolbox Menu" for setting.

Parameter	Description
Target Net W.	Single Bottle Target Net Weight 0.5 ~ 499.9g
Viscosity	Viscosity has the following four options: • Default • Base&top Coat • Solid Color • Glitter Color • Builder Gel • Color Cap

Number of pumps	When using a Funnel, please select [Single pump] When using a Container, please select [Double pump]
Tray type	Supports the following 4 options: • 4x4 • 6x6 • 8x8 • 10x10

5.11 Loading Gel

1. Click the [LOAD GEL] button on the home screen, the platform will move to the loading gel position.
2. Please install different hoppers according to the packaging form of the gel, refer to "3.1 Installing the Hopper Support" for details.
3. Install the gel in the funnel or container.

5.12 Manual Filling Test

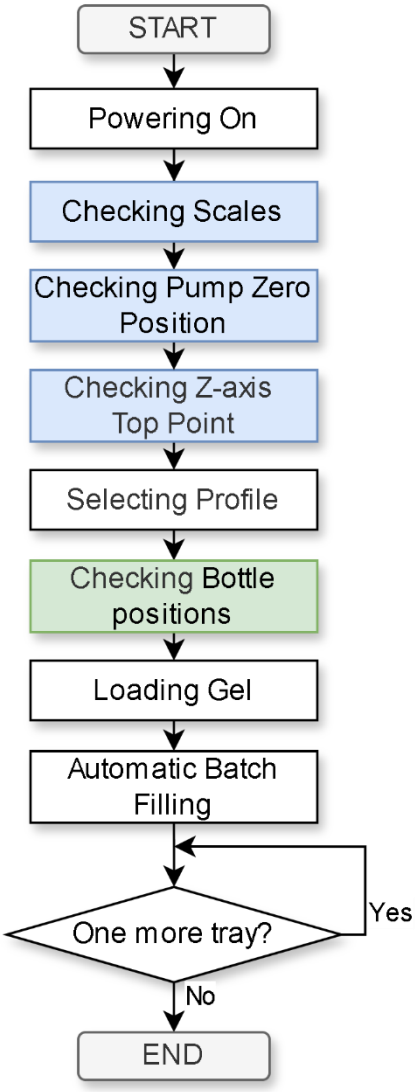
1. According to the size of the bottle, insert it from bottom to top into hole A or B of the small scale bottle holder fixture
2. If the empty bottle is inserted in hole A, please click the [FULL A] button on the home screen; if it's hole B, please click the [FULL B] button.
3. The system will start pump A or B to begin filling
4. When filled to the specified weight, the pump will stop, ending the filling.

5.13 Automatic Filling Test

1. Place empty bottles to be filled on the tray (if not enough for a full tray, that's okay too)
2. Click [LOAD BOTTLE] on the controller's home screen, the platform will move to the bottle loading position
3. Place the tray on the platform and lock the positioning pins
4. Place an empty disposable cup in the “Loading Gel” position
5. Click [UP LEFT] to confirm if the bottle position is correct, if not, please re-execute tray three-point calibration
6. Click [UP RIGHT] to confirm if the bottle position is correct, if not, please re-execute tray three-point calibration
7. Click [AUTO] to execute automatic filling test
8. If there's an abnormality, please click [STOP]
9. After automatic filling is complete, check if there are any abnormal red-marked bottle positions on the screen, record the row and column numbers, then manually check if that bottle is filled properly, you can use the [FULL] function for additional filling.

6 Batch Filling Guide

6.1 Batch Filling Flow Chart



6.2 Powering On

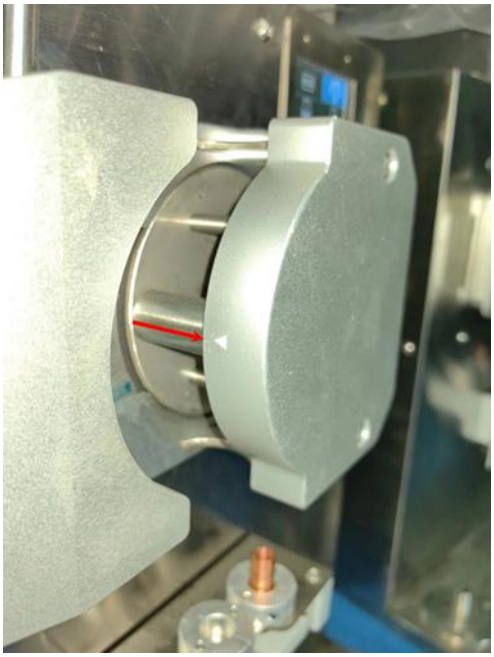
Please refer to “5.2 Powering On”

6.3 Checking Scales

1. Click [TARE] on the home screen
2. Place a 1000g weight on the platform, check if the screen displays a weight of 1000g. If the weight is inaccurate, please refer to "8.2 How to calibrate the large and small scales?"
3. Place a 20g weight on the small scale bottle holder fixture, check if the screen displays a weight of 20g. If the weight is inaccurate, please refer to "8.2 How to calibrate the large and small scales?”

6.4 Checking Pump Zero Position

After power-on, the parking position of the two pumps must be as shown in the figure below. That is, the centerline of a certain roller is aligned with the white triangle mark on the pump cover plate. If not aligned, please refer to "5.4 Pump Zero Position Calibration" to perform calibration operation on the pump.



6.5 Checking Z-axis Top Point

After the equipment is powered on, the platform will stop at the [Loading-Gel] bottle position, and the nozzle (Z-axis) will stop at the highest point. If the nozzle doesn't stop at the highest point, please refer to "5.5 Z-axis Top Point Calibration" to calibrate the Z-axis top point.

6.6 Selecting Profile

1. Click [LOAD BOTTLE], the tray moves to the bottle loading position, place the tray with empty bottles arranged and lock the positioning pins
2. Enter the password (default factory password is 0000) to access the toolbox according to the bottle type, select the corresponding bottle profile ID
3. Confirm if the tray type is consistent with the actual one

6.7 Checking Bottle positions

1. Click [UP LEFT] on the Home Screen to check the bottle position in the first row and first column to see if the nozzle is aligned with the bottle mouth
2. Click [UP RIGHT] again to check the bottle position in the last column of the first row to see if the nozzle is aligned with the bottle mouth

3. If the position is incorrect, please refer to "5.9 Three-Points Calibration of Tray" for calibration.

6.8 Loading Gel

1. Click the [LOAD GEL] button on the home screen, the platform will move to the loading gel position.
2. Please install different hoppers according to the packaging form of the gel, refer to "3.1 Installing the Hopper Support" for details.
3. Install the gel in the funnel or container.

6.9 Automatic Filling

1. Place an empty disposable cup in the “Loading Gel” position
2. Click [AUTO] to execute automatic filling
3. If there's an abnormality, please click [STOP]
4. After automatic filling is complete, check if there are any abnormal red-marked bottle positions on the screen, record the row and column numbers, then manually check if that bottle is filled properly, you can use the [FULL] function for additional filling.

7 About Filling Calibration

7.1 Purpose of Filling Calibration

The machine's biggest feature is "High-speed filling without weighing."

Before the machine can do high-speed filling, the pumps must be calibrated. This means the system needs to record how efficiently each pump fills (grams per rotation).

Since the two pumps have different physical properties, they fill at different rates. That's why each pump needs its own calibration.

7.2 Two Ways to Calibrate

You can do it manually or let the system do it automatically.

For manual calibration: You must use the small scale

For automatic calibration: The system will choose either the large or small scale based on its settings

	Manual	Automatic
Scale Used	Small scale only	CALIB.BY.SMALL: Uses small scale CALIB.BY.LARGE: Uses small scale if target weight < 6.5g, otherwise uses large scale. CALIB.BY.AUTO: If you do manual calibration right after turning on the machine, it will work the same way as " CALIB.BY.SMALL" mode. If you start automatic filling right after turning on the machine, it will work the same way as " CALIB.BY.LARGE" mode
Location	Loading Gel	Small scale: Loading Gel Large scale: First few bottles on tray
Water Cup Required	Yes, at Loading Gel position	No

7.3 How to Do Manual Calibration?

If the "A" in button [CALIBRATE A] has a green background with white text, pump A is already calibrated

If the "B" in button [CALIBRATE B] has a green background with white text, pump B is already calibrated

1. Put an empty cup at the Loading Gel position
2. Click [LOAD GEL] - the nozzle moves to Loading Gel position
3. Select target weight per bottle in the toolbox

4. Click [CALIBRATE A] - pump A will fill about 5g and stop
5. Click [CALIBRATE A] 3-5 more times until the "A" changes from white-on-black to white-on-green
6. Repeat steps 4-5 for pump B using [CALIBRATE B]

7.4 How to Do Automatic Calibration?

The machine does this automatically. Just put an empty plastic cup at the Loading Gel position.

7.5 How to Choose Calibration Mode?

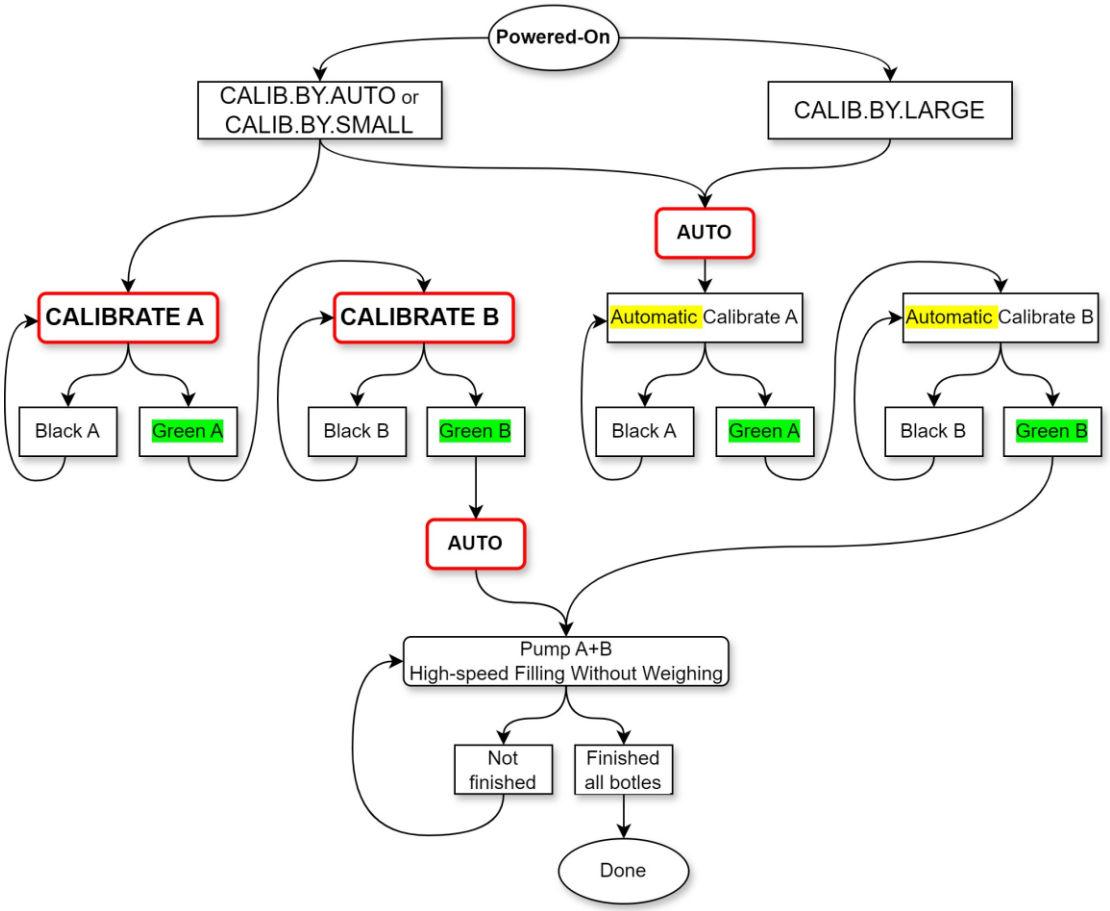
There are three modes:

1. CALIB.BY.AUTO (factory default)
2. CALIB.BY.LARGE
3. CALIB.BY.SMALL

	CALIB.BY.AUTO	**CALIB.BY.LARGE**	**CALIB.BY.SMALL**
Factory Default	●		
Scale Used	Either	Large	Small
Accuracy	Small scale: Higher Large scale: Lower	Lower	Higher
Bottle Position	Small scale: Loading Gel Large scale: First few bottles on tray	First few bottles on tray	Loading Gel
Water Cup Required	Small scale: Yes Large scale: No	No	Yes
Icons on home screen			
Manual Calibration	Allowed	Not Allowed	Allowed

For most filling jobs, use "CALIB.BY.AUTO" or "CALIB.BY.LARGE" mode.
For high-accuracy filling, use "CALIB.BY.SMALL" mode.

7.6 Filling Calibration Process



8 Questions and Answers

8.1 How to enter the toolbox?

On the home screen (after startup), turn the knob to move the cursor to [TOOL], then click:

- Turn the knob to change the 1st digit of the password, then click;
- Turn the knob to change the 2nd digit, then click;
- Turn the knob to change the 3rd digit, then click;
- Turn the knob to change the 4th digit, then click. If the password is correct, you'll enter the toolbox.

8.2 How to calibrate the large and small scales?

8.2.1 Preparation

5. End the current filling task (if any)
6. Clear all items on the platform and small scale bottle holder
7. Prepare 20g and 1000g weights

8.2.2 Small Scale Calibration

1. Enter the password to access the toolbox, the default factory password is 0000
2. Turn the knob to move the cursor to the "0g" position of small scale calibration, don't place any weight, then press this button and hold for more than 2 seconds before releasing, at this time the background of "0g" will turn yellow, and real-time display the current weight, click again to complete 0g calibration.
3. Turn the knob to move the cursor to the "20g" position, at this time place the 20g weight on the small scale pan, then press this button and hold for more than 2 seconds before releasing, at this time the background of "20g" will turn yellow, and real-time display the current weight, click again to complete 20g calibration.
4. Turn the knob to move the cursor to ⮌, then click to return to the home screen.

8.2.3 Large Scale Calibration

1. Enter the password to access the toolbox, the default factory password is 0000
2. Turn the knob to move the cursor to the "0g" position of large scale calibration, don't place any weight, then press this button and hold for more than 2 seconds before releasing, at this time the background of "0g" will turn yellow, and real-time display the current weight, click again to complete 0g calibration.

3. Turn the knob to move the cursor to the "1000g" position, at this time place the 1000g weight in the center position of the platform, then press this button and hold for more than 2 seconds before releasing, at this time the background of "1000g" will turn yellow, and real-time display the current weight, click again to complete 1000g calibration.
4. Place the 1000g weight randomly at any position on the platform, check if the large scale result is 1000g, if not, please re-execute large scale calibration.
5. Turn the knob to move the cursor to ⮌, then click to return to the home screen.

8.3 How to check software and hardware versions?

Enter the toolbox and look at the bottom few lines of the screen. For example:

SC: 6.30 [20230726]

This means the main control unit software is version 6.30, and the hardware version is 20230726.

Note:

SC - Main control unit

BX – X-axis unit

BY – Y-axis unit

BZ – Z-axis unit

DS – Scale unit

PA – Pump A

PB – Pump B

8.4 What do the icons in the upper right corner of the screen mean?

Icon	Represents	Background Color Meaning
	Pump A	Green: Online Yellow: Running Red: Offline
	Pump B	
	X-axis motor	
	Y-axis motor	
	Z-axis motor	
	Large scale	Green: Online

	Small scale	Red: Offline Pink: Sensor fault

8.5 Will the device go to sleep if not used for a long time?

Yes. If there's no motor action and no menu operation for 30 minutes, the device will enter power-saving sleep mode. An alert dialog will pop up to indicate this.

When the system is in sleep mode, all motors switch to low-power mode.

To exit sleep mode, click  on the screen. The system will immediately wake up.

8.6 Will the counter automatically reset to zero?

Yes. The system will reset the "Power-on Time" and "Accumulated Bottles" counters to zero when either of these conditions is met:

- Total Power-on Time ≥ 100 hours
- Total Accumulated Bottles > 99999

8.7 How to interpret fault location information?

In the middle-lower part of the toolbox, system status information will be displayed, which can be used to locate what fault has occurred in the equipment.

8.7.1 Three-axis coordinate and motor action information

X = xxx/41000 A=0

Y = xxx/41000 A=0

Z = xxx/6080

A=0 A[PA] = 0

A[PB] = 0

The xxx before "/" indicates the current coordinate value, the number after "/" indicates the maximum coordinate value. The A in the last column represents the action currently being executed by the motor, different values represent different actions. When the motor is on standby, the action = 0.

8.7.2 Pump’s index information

A=5.136 B=5.136

8.7.3 System status information

FTMZAB=0 |0 |0 |0 |0 |0 |0

or

FTZAB=0 |0 |0 |0 |0 |0 |0

Letter	Status	Letter	Status
F	System status	**Z**	Nozzle status (Z-axis)
T	Tray status	**A**	Pump A status
M	Manual filling status	**B**	Pump B status
C	Calibration filling status		

8.8 How to clean the tubes?

1. Refer to section **Error! Reference source not found.Error! Reference source not found.**, take two additional sections of silicone tube and extend the connection at the nozzle. After extension, immerse both ends of the tubing in alcohol solvent, and clamp the tubing into the peristaltic pump.
2. Enter the toolbox, click [**FLUSH**], both pumps will start to reverse 5 turns simultaneously, then forward 5 turns, repeating this operation continuously
3. After clicking [**FLUSH**] again, the two pumps will stop.

9 Technical Parameters

Rated Voltage	AC 110V or AC 220V (set at factory, not interchangeable)
Rated Power	
Dimensions (with packaging)	Width x Height x Depth mm
Dimensions (net)	Width x Height x Depth mm
Total Weight (with packaging)	Xx kg
Total Weight (net)	Xx kg
Filling weight	0.5 ~ 99.9g
Filling speed	When target weight is 5 grams, xxxxxxx seconds/bottle
Filling accuracy	
Number of Bottle Profiles	50
Tray Specifications	4 × 4，diameter：XX ~ XXmm 6 × 6，diameter：XX ~ XXmm 8 × 8， diameter：XX ~ XXmm 10 × 10，diameter：XX ~ XXmm

10 Electrical schematic