AUTOMATIC LIQUID DISPENSER

KingTubeAuto – M

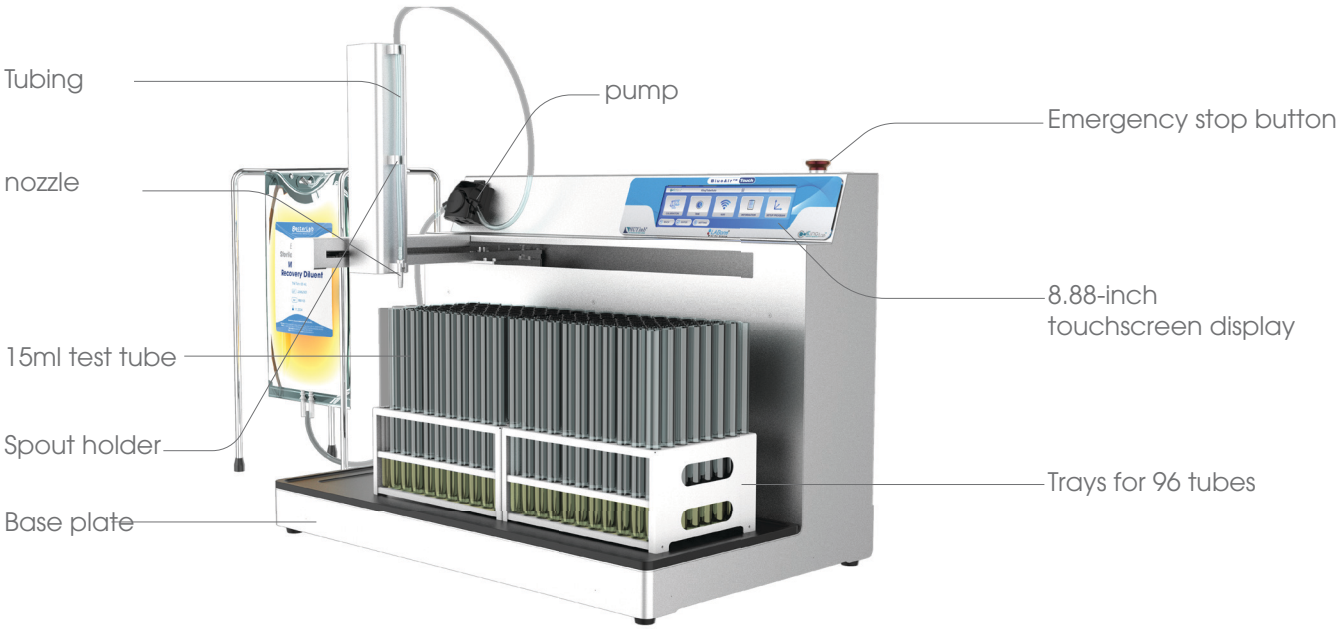
- Simple yet effective operation
- Precise and powerful peristaltic pump
- Convenient and easily portable and clean
- User-friendly interface
- 3-year warranty

MENU

Dear customers,

We sincerely thank you for trusting and choosing our products. To ensure that the Automatic Liquid Dispenser- KingTubeAuto operates safely, effectively and durably, we we kindly request you to thoroughly read the user manual prior to operation. This document provides comprehensive information on the installation, operation, and maintenance of the device, enabling you to maximize its performance and maintain safety throughout its use. Additionally, we have included the circuit diagram and technical specifications to assist you in using, maintenaning and repairing of the equipment effectively.

THE PRODUCT PACKAGE INCLUDES



- 1 KingTubeAuto - M
- 1 Power cord
- 1 nozzle
- 1 Spout holder
- 1 Tube clamp
- 1 Tube weight
- Tubing
- 1 Base plate
- 1 Y-shaped splitter
- 15ml test tube
- Trays for 96 tubes/96 well-plate
- Pipette tips
- 1 User manual

Please adhere to the following critical safety instructions:

- **Protective equipment:** Always wear safety glasses, gloves, and protective clothing while operating the machine to ensure personal safety.
- **Equipment inspection:** Prior to use, confirm that the machine and its accessories are undamaged and properly installed.
- **Correct position:** Place the machine on a flat and stable surface to avoid tipping or shifting during operation.
- **Appropriate power supply:** Connect the machine to the power source as specified by the manufacturer.
- **Avoid direct contact:** Refrain from placing hands or any body parts into the machine's moving components during operation.
- **Power off when not in use:** Disconnect the power supply when the machine is not in operation to ensure safety.
- **Professional repairs:** Repairs should only be conducted by trained and qualified personnel.

Adhering to these safety instructions not only protects the user but also ensures that the Automatic Liquid Dispenser - KingTubeAuto operates stably and efficiently throughout its usage.

Thank you sincerely, and we hope you are satisfied with the KingTubeAuto!

1. AUTOMATIC LIQUID DISPENSER - KINGTUBEAUTO – M

1.1. EXTENDED USE

The automatic liquid dispenser is an advanced and professional solution for modern laboratories, designed to meet stringent sample distribution needs. This device allows for the rapid and precise distribution of multiple samples simultaneously according to preset volumes, ensuring significant time savings and efficiency, thereby optimizing workflow. It is particularly effective in preparing microbial culture media, dispensing chemical solutions, and biological samples, helping to minimize contamination risks and errors, and ensuring the sterility and accuracy of results.

1.2. FEATURES AND HIGHLIGHTS

The KingTubeAuto automatic liquid dispenser is a powerful tool for laboratories, capable of dispensing sample volumes ranging from 100µL to 100L. Equipped with a robust and precise peristaltic pump, it ensures stable operation. The casing, made from stainless steel, is not only durable but also easy to clean and corrosion-resistant, making it suitable for the harsh working conditions of laboratories. The device is capable of keeping samples sterile, minimizing the risk of contamination and ensuring accurate laboratory results.

KingTubeAuto features a smart touch interface with 8.8 inch screen, allowing users to easily monitor and adjust operations. The quick calibration time permits flexible setting changes without disrupting workflows. Additionally, the device is equipped with an emergency stop button, ensuring maximum user safety in all situations. Operating on a simple and efficient weight-based sample distribution principle, it automates tasks quickly and accurately.

With its high flexibility, KingTubeAuto meets the specific demands of laboratories. It is not just a sample dispenser but also a reliable partner, helping scientists and technicians enhance efficiency and save time and effort in their daily work.

1.3. SPECIFICATIONS:

Model	KingTubeAuto - M
Dimension (L x W x H)	718 x 445 x 660 mm
Net weight	20 kg
304L stainless steel	✓
Display screen	8.8 inch touchscreen
Emergency stop button	✓
Drip tray	✓
High accuracy	✓
Number of pump	1
Distribution volume	100 µL – 100 L
Precision with 3.2mm tubing	10 mL: >98% - 20 mL: >99% - 225 mL: >99.5%
Compatible types of tubes	Ø 1.6 mm - Ø 3.2 mm - Ø 4.8 mm
Tubing inner diameter (Optional)	1.6 mm – 3.2 mm – 4.8 mm
Tubing wall thickness	1.6 mm
Flow rates	1.5 mL/m – 198 mL/m
Tubes per minute (type 3 mL)	32
Tubes per minute (type 10 mL)	12
96-well plates for 10 – 20 mL tubes	2
96-well plates for 2 – 5 mL tubes	4
96-well plates	8
Axis stroke	X: 565, Y: 205, Z_{max}: 280, Z_{min}: 160
Pump head rotating speed	10 – 400 rpm
Voltage – Frequenciens	220 – 240V 50 – 60 Hz
Power	80 W
Warrantly	3 years

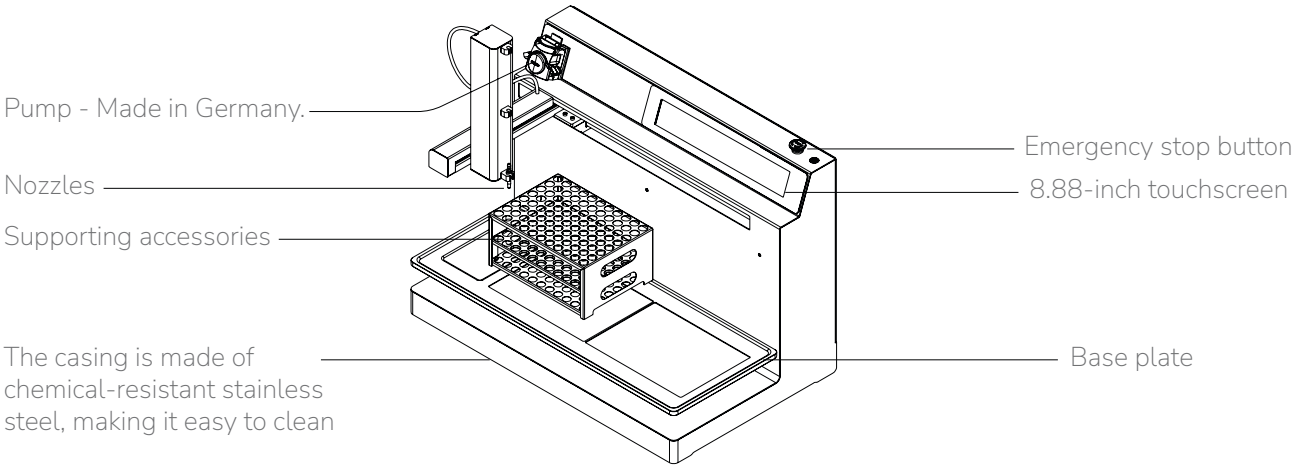


Fig. Structure of KingTubeAuto - M

2. OPERATION

2.1. INSTALLATION

Installation Location: Place the KingTubeAuto – M on a flat and stable surface to prevent instability. Avoid placing the machine in humid environments and select an appropriate location within the laboratory that accommodates the device's size. Adhere to environmental and temperature requirements suitable for each intended use.

Environmental Conditions: Install KingTubeAuto – M in a laboratory environment with appropriate environmental and temperature conditions according to device specifications. Ensure the workspace is clean and safe.

Power Supply Check: Use a 220V/50-60Hz power supply for the machine. The power source should be stable. In cases of unstable power supply, consider using a stabilizer to protect the machine

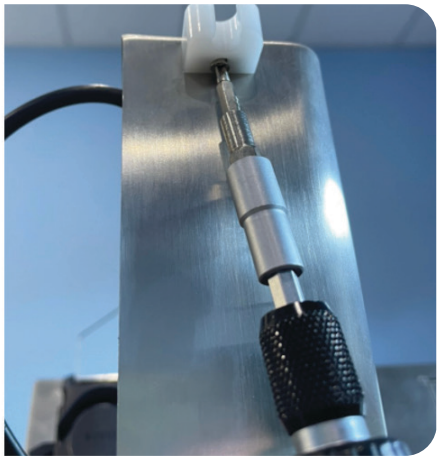
STEPS TO INSTALL EQUIPMENT BEFORE OPERATION

Step 1: Attach the Spout Holder to the Dispensing Arm

- Attach the spout holder and tube clamp to the dispensing arm (1a).
- Use a hex key to tighten the M3x6mm hex bolt from underneath (1b).
- Insert the spout into the holder from above, and place the peristaltic pump tube into the clamp (1c).

1(a)

1(b)

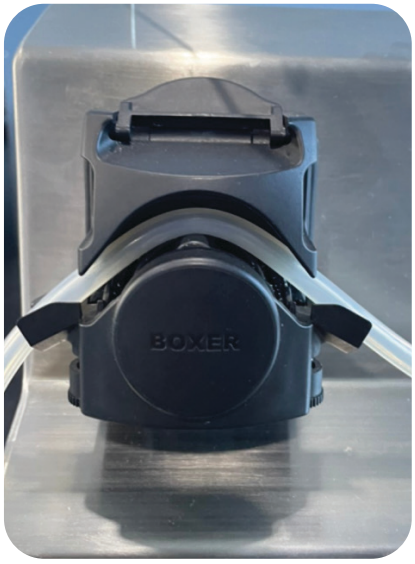


1(c)

Step 2: Insert the Pump Tube into the Pump Head

- Open the latch on top of the peristaltic pump head to open the tube compression unit (2a).
- Thread the pump tubing through the peristaltic pump (2b).
- Push the latch down to close the tube clamp unit on the pump head (2c).

2(a)

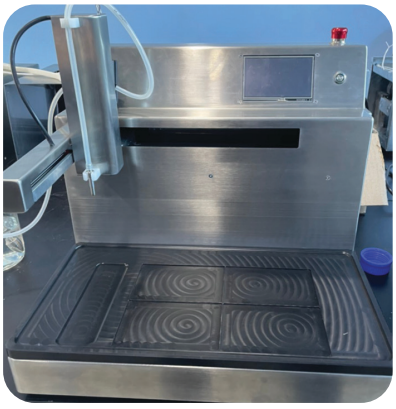


2(b)

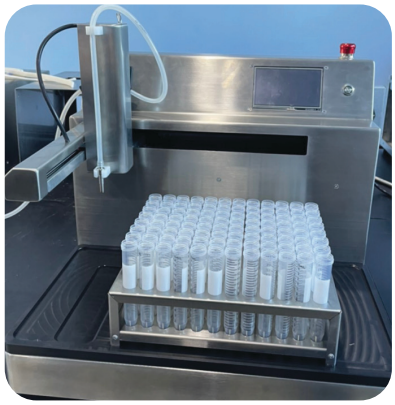
2(c)

Step 3: Mount the Test Tube Racks onto the Machine

- Attach the machine base plate so that the positioning pins on the base plate suitable with the slots on the machine table (3a).
- Place the test tube racks/plates onto the base plate, ensuring the racks/plates fit with the recesses on the base plate (3b).

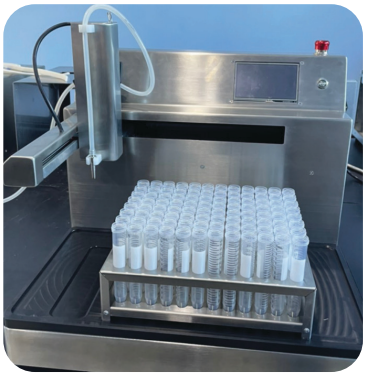


3(a)



3(b)

Step 4: Attach the Pipette Tip to the Spout to Dispense Solution into Small Wells (if necessary)



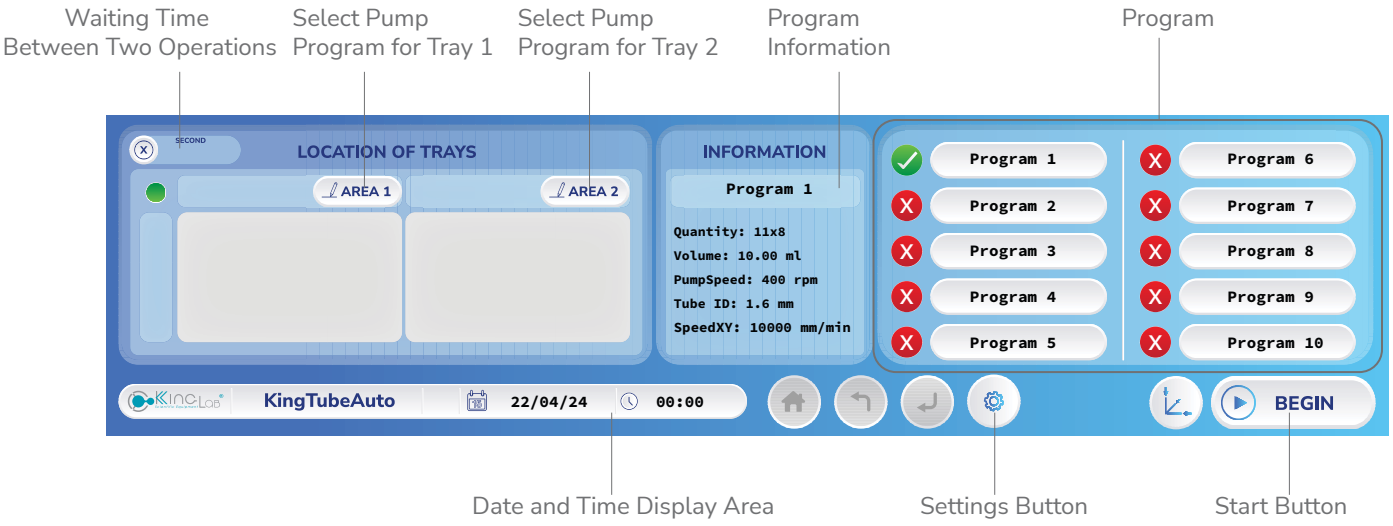
2.2. OPERATION:

Step 1: Install the Dispensing Tube into the Peristaltic Pump Head

Step 2: Prepare the Liquids for Dispensing

Strep 3: Connect the power cord and supply power to the device, turn on the power switch located at the back of the machine. Press and hold the power button on the machine for about 3 seconds to wait for the machine to start up. The screen will automatically return to to the origin coordinates (Home)

Step 4: After the machine returns to the origin of coordinates the main control interface will appear on the screen.

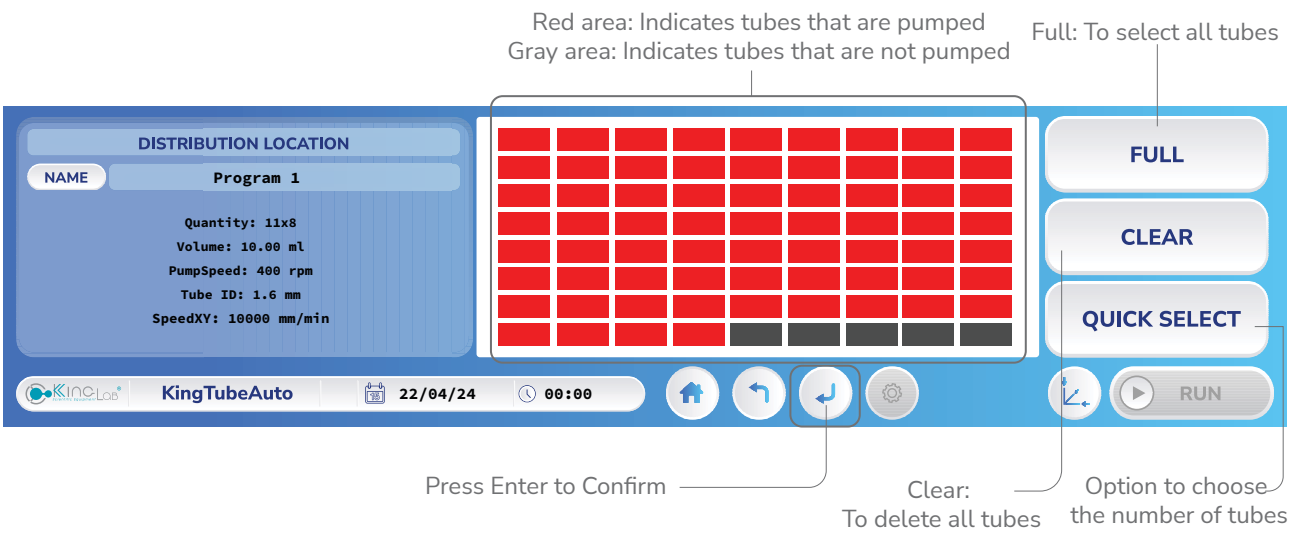


Bước 5: Select the program to start running

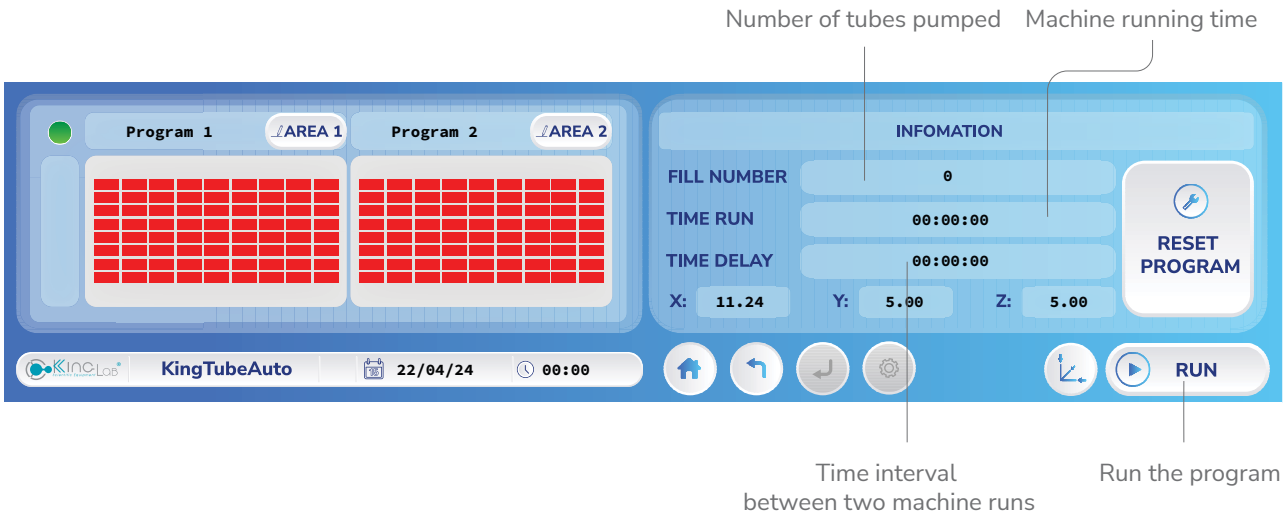
- On the main control interface, press "Area 1" to select the program for tray 1, or "Area 2" for tray 2.
- After selecting "Area 1", the window to choose the program to run will appear:

- Press "Program 1", the program information will display on the left, then press enter:

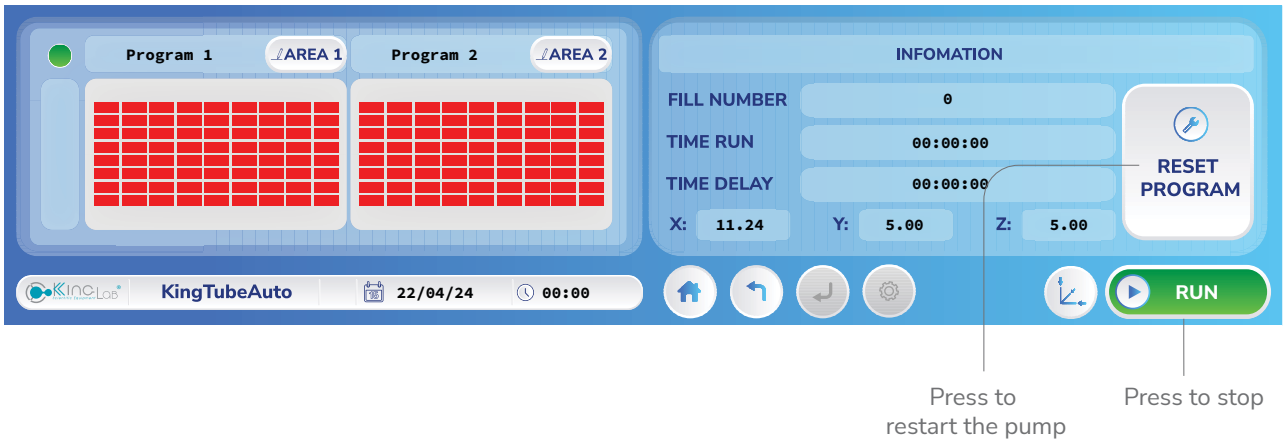
- The tube selection page will appear, allowing you to adjust the number of tubes to pump. You can select or deselect tubes by clicking on them in the tube selection area:



- After pressing Enter from the tube selection page, the confirmation page for selecting the program will appear. Similarly, for Program 2, as shown in the figure. Then press Begin to enter the machine operation page.

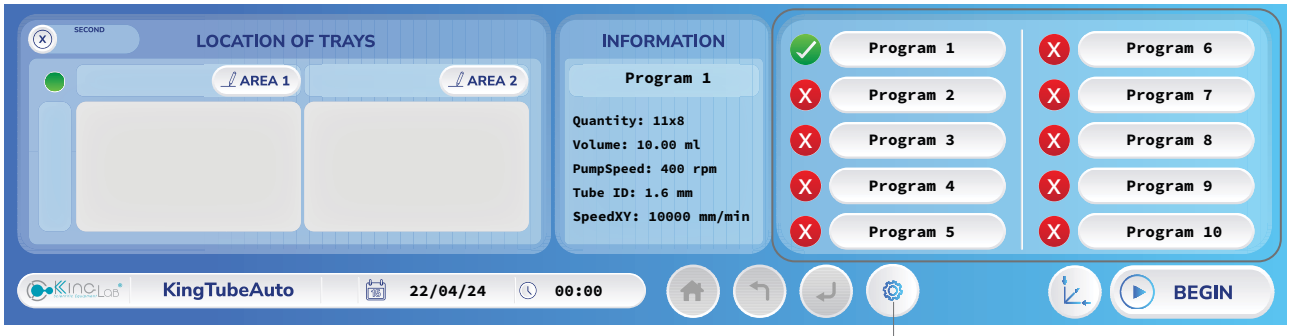


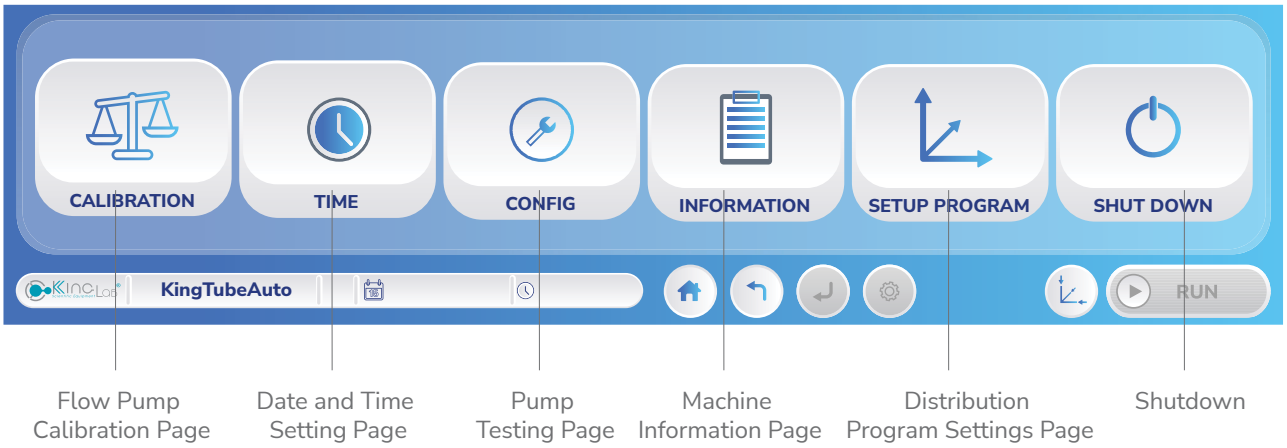
- While the machine is running and you want to stop it, press the RUN button. After stopping, you can press "RESET PROGRAM" if you need to restart the tube pumping process from the beginning..



2.3. SYSTEM SETUP

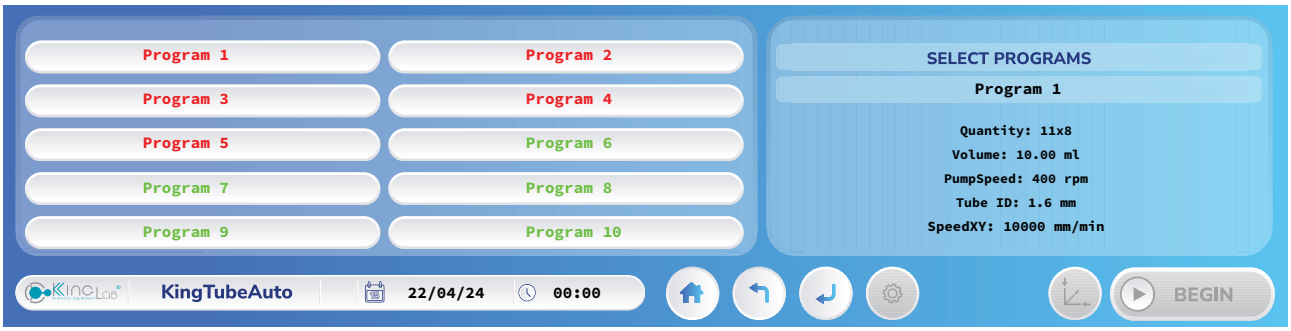
On the main screen interface, press the button “Setting” to enter the system setup interface.



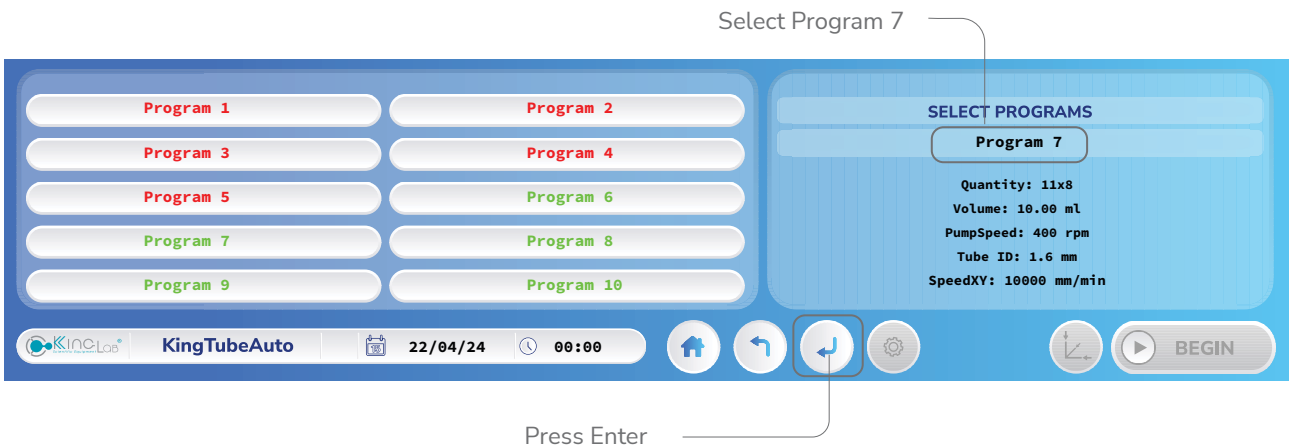


2.3.1. DISTRIBUTION PROGRAM SETTING

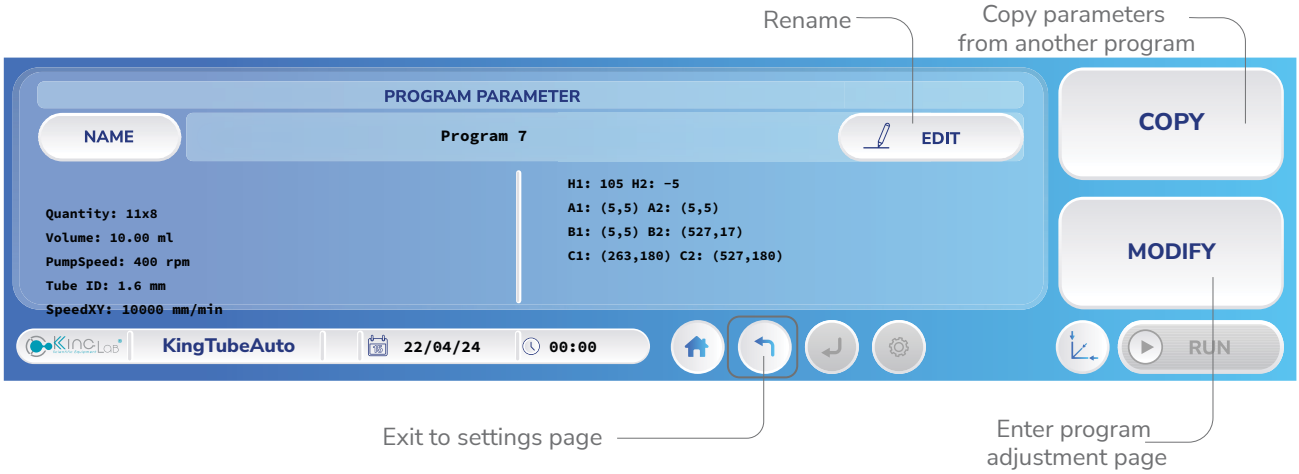
Step1: In the system setup interface, press "SETUP PROGRAM" to access the program setup screen. Programs marked in red (Program 1, 2, 3, 4, 5) require a password (password: 12345) for editing, while programs marked in green do not require a password



Step 2: Select the program you want to set up and press the Enter key to enter the program setup interface.

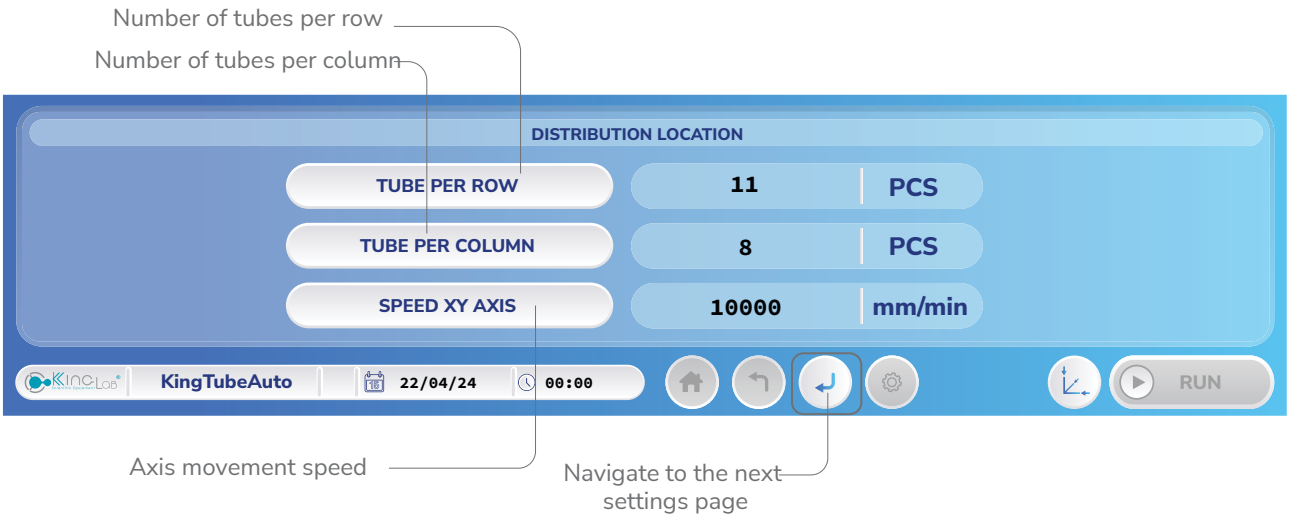


Step 3: In the program setup interface, you can edit the program name, copy parameters from another program to this one, or customize the program settings as needed.

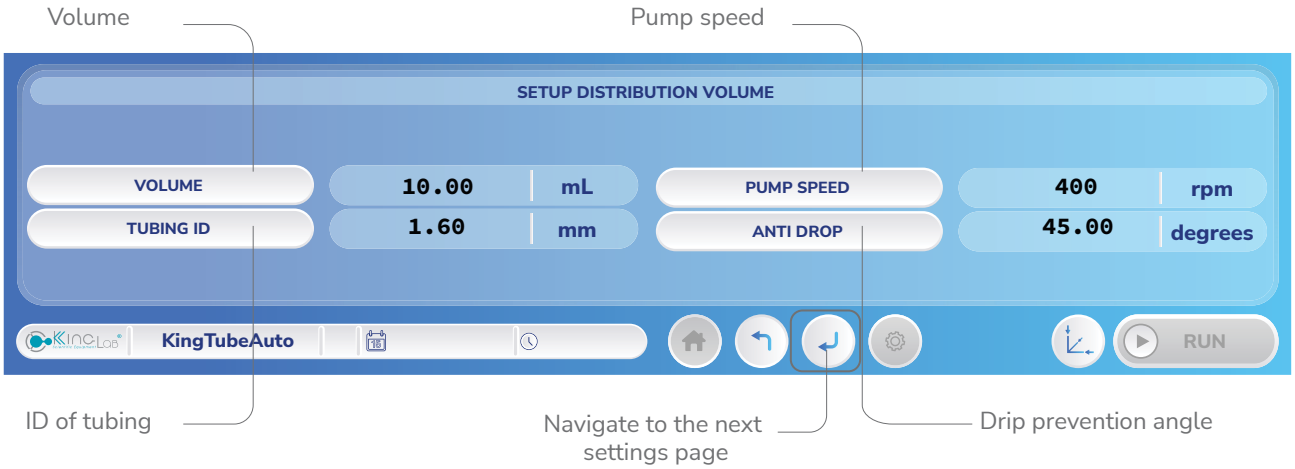


Step 4: Press "MODIFY" to enter the interface for editing the parameters of the program

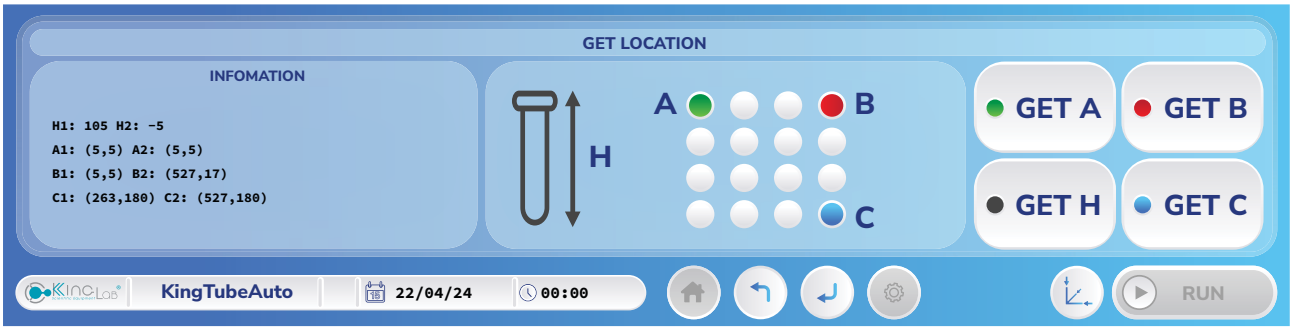
- Enter the parameters you want to adjust:



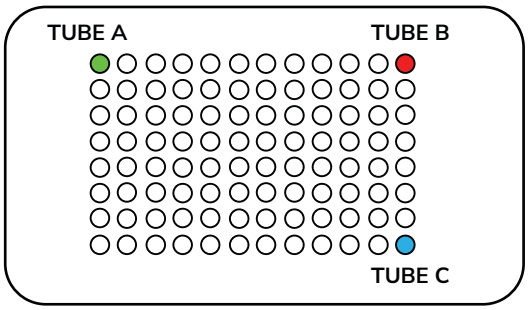
- After entering the parameters, press Enter to proceed to the next setup page



- After entering, press Enter to go to the coordinate setup page:

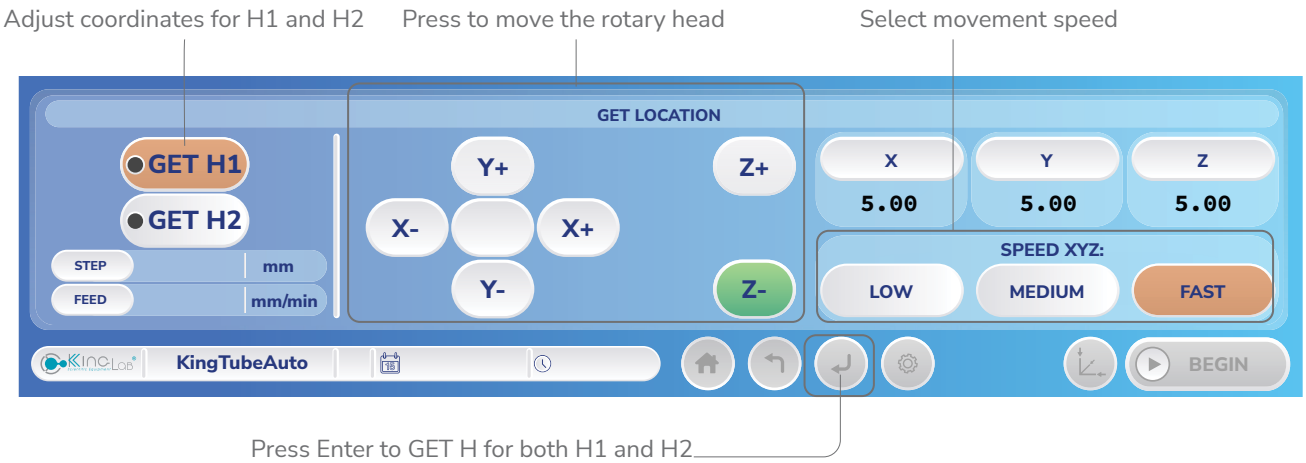


- GET H: Set the height position when the dispensing head is lowered.
- GET A: Set the position information of tube A on the tray.
- GET B: Set the position information of tube B on the tray.
- GET C: Set the position information of tube C on the tray.



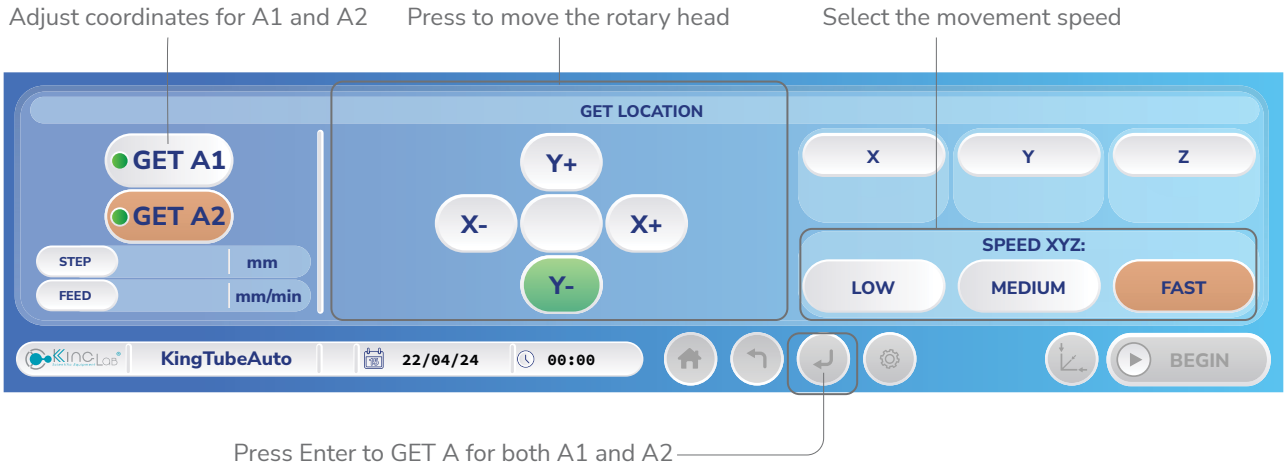
* **Set the height position when the dispensing head is lowered:**

- Press “GET H” to switch to the manual control interface for the dispensing head
- Use the directional buttons "X+", "X-", "Y+", "Y-" to move the dispensing head to the desired position.
- Press "Z-" to lower the dispensing head to the appropriate height, and "Z+" to raise it (set so that it does not touch the tubes, with the head about 5mm above the tube openings).
- "GET H1" is the height of tray 1, and "GET H2" is the height of tray 2.
- Press Enter to save the parameters.

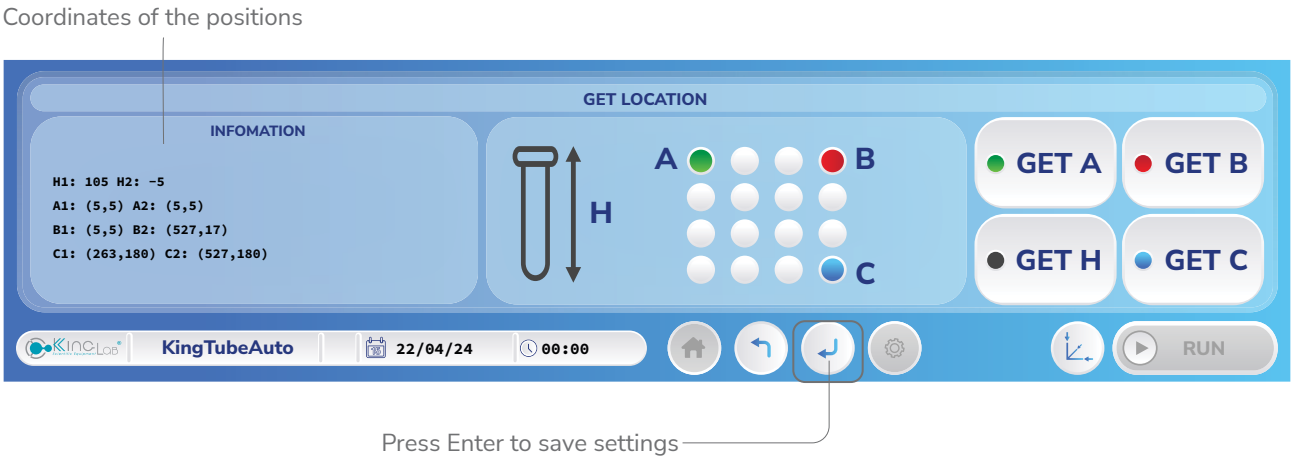


* **Set the position information of tube A on the tray (Similarly for tube B/C)**

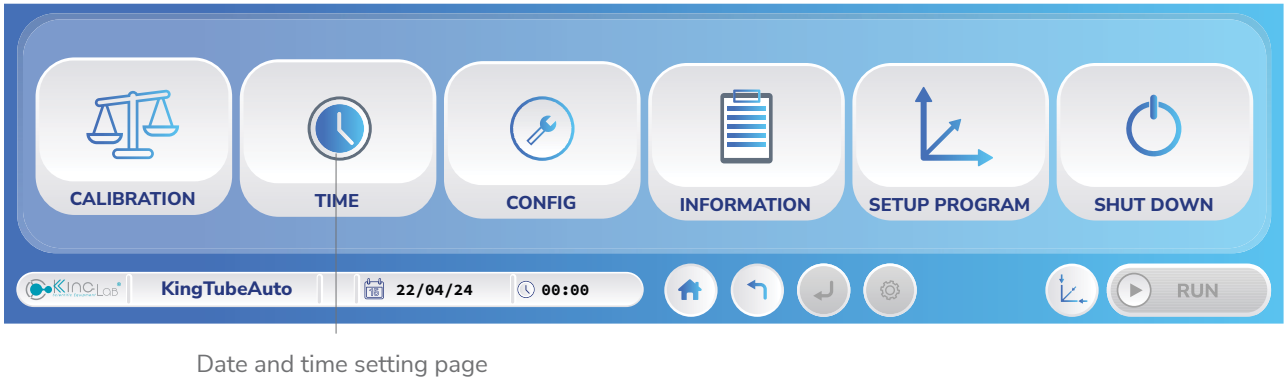
- Press “GET A” o switch to the manual control interface for the dispensing head.
- Use the directional buttons "X+", "X-", "Y+", "Y-" to move the dispensing head to position B on the tray (ensure the dispensing head is centered over the tube).
- “GET A1” is the position of tube A on tray 1, “GET A2” is the position of tube A on tray 2.
- Press Enter to save the parameters.



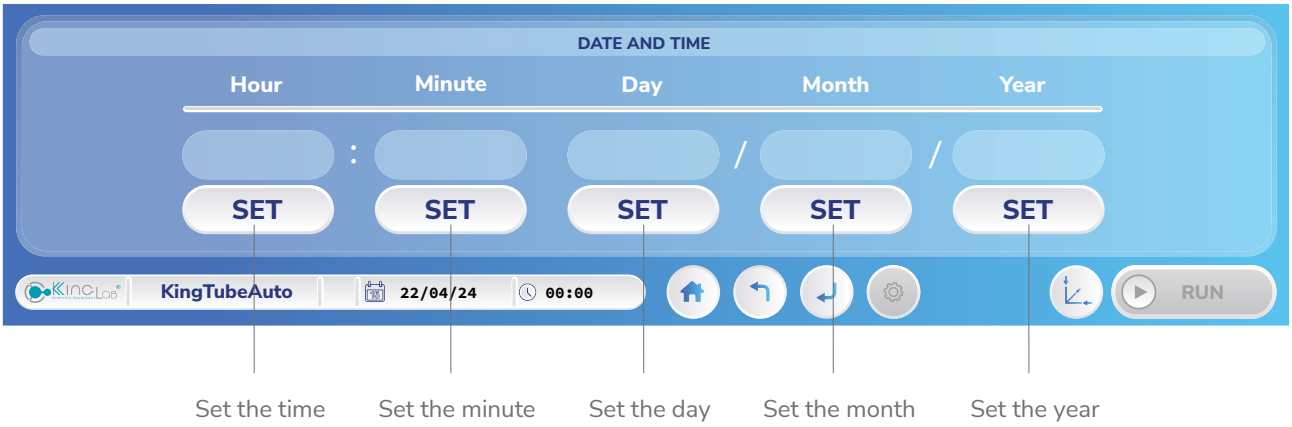
Step 5: After completing the setup of position parameters, press Enter to save the program settings:



2.3.2. TIME SETTING



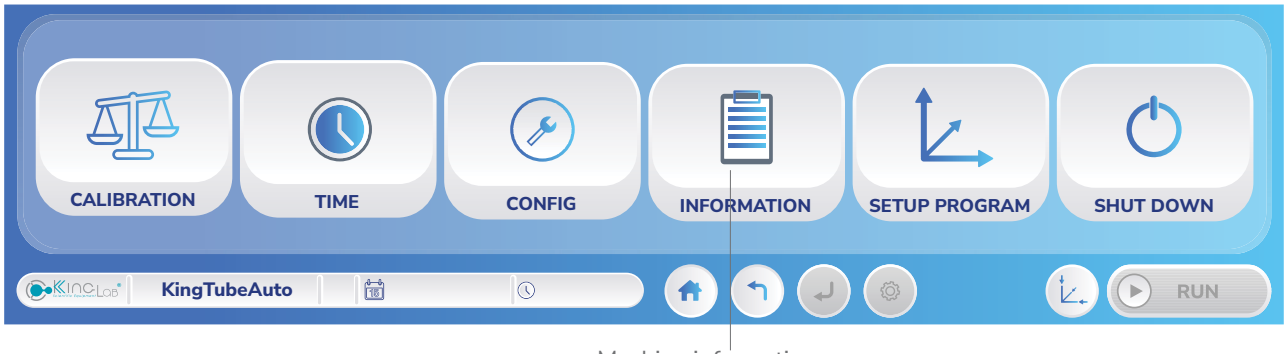
Step 1: On the main screen interface, select "TIME" to enter the time setup page



Step 2: In the time setup interface, sequentially press "SET" for each item: Hour, Minute, Day, Month, Year to set the time for the machine. Then, press Enter to save the settings.

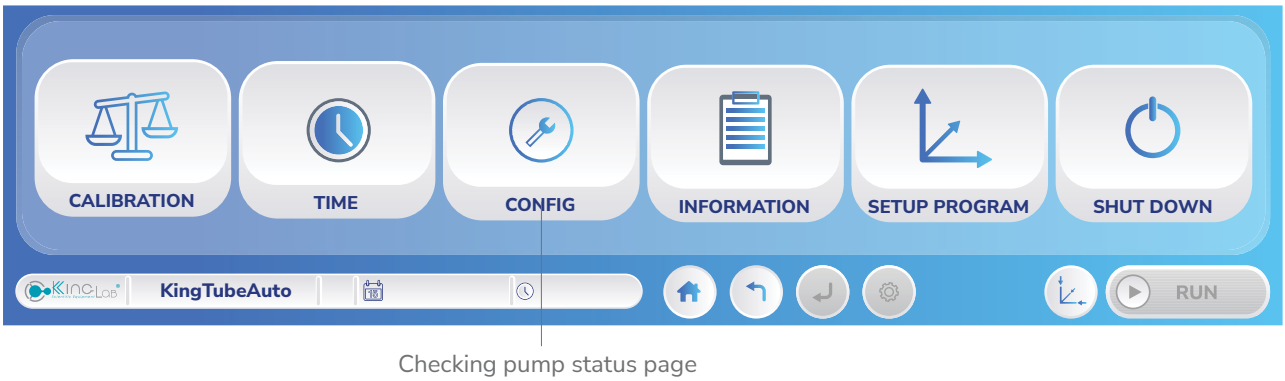
2.3.3. VIEWING MACHINE INFORMATION

On the main screen interface, select "INFORMATION" to view machine details:

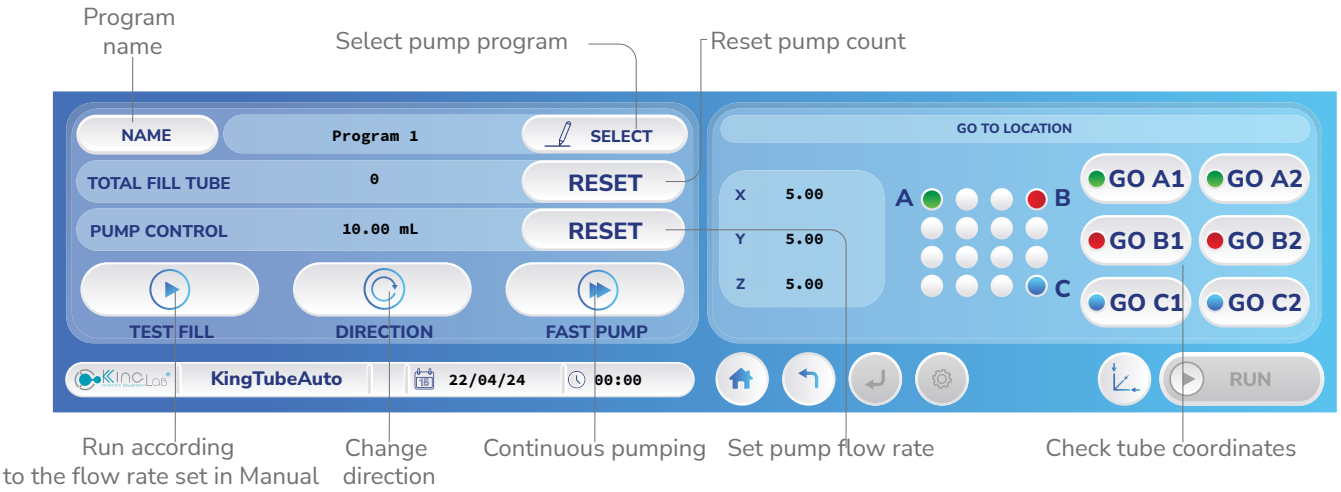


2.3.4. CHECKING PUMP STATUS

Step 1: In the main screen interface, select "CONFIG" to check the pump



Step 2: Press “SELECT” to choose the program:



Step 3: Press “BACK” to return the main screen

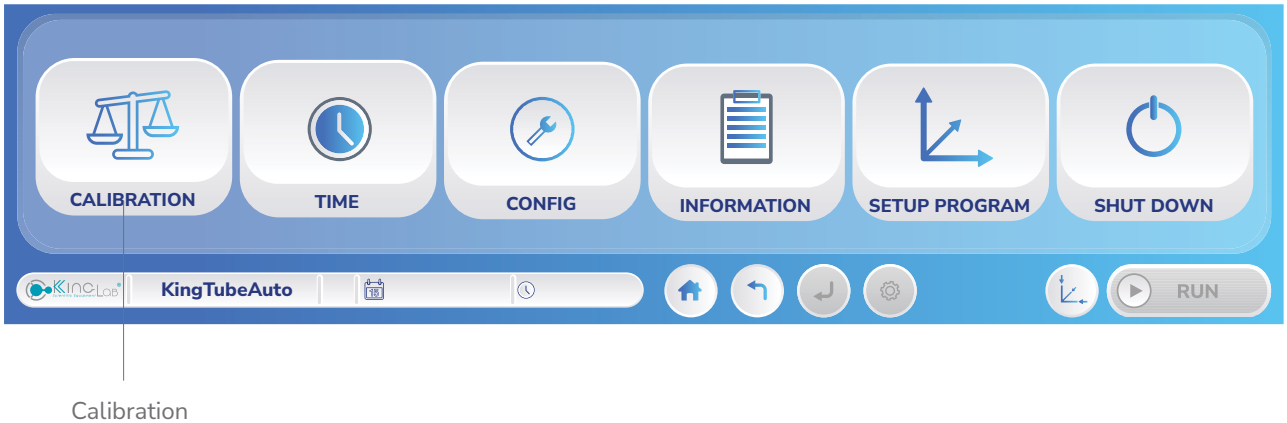
2.3.5. CALIBRATION GUIDE

Preparation:
- Electronic scale with low error margin
- The tube has the correct inside diameter according to the calibration program
- Dispensed solution (e.g. distilled water)
- Container for the solution weighing

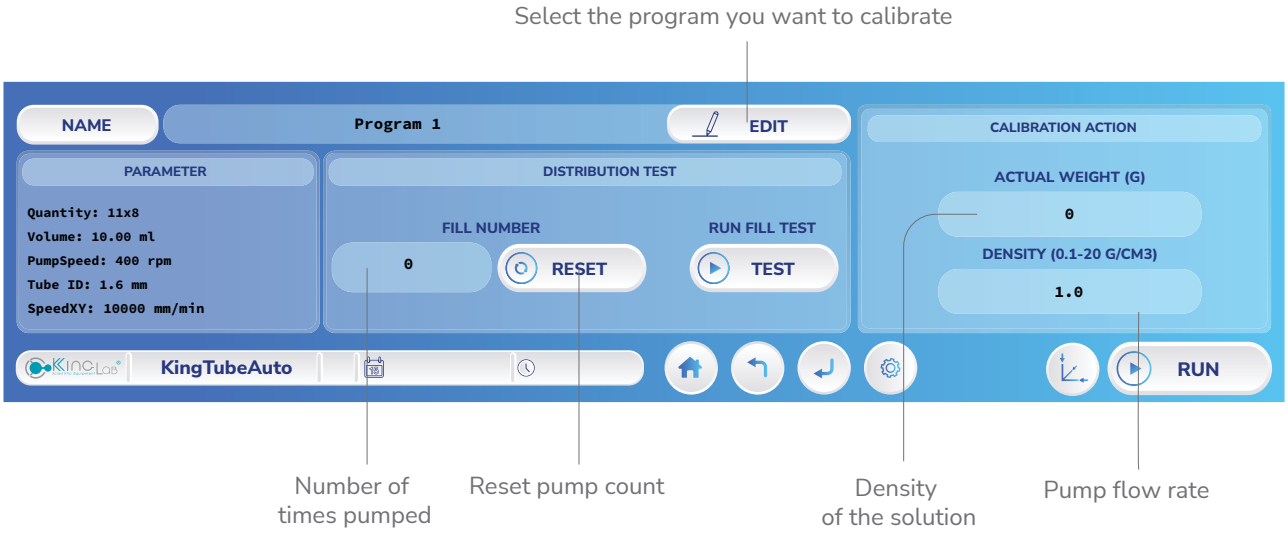
Calibration steps:

Step 1: Connect the tubing to the peristaltic pump, with one end in the liquid to be distributed and the other end in the container.

Step 2: On the main screen interface, press the button to enter settings, select "CALIBRATION" to access the flow calibration section.



Step 3: Press "SELECT" to choose the program you want to calibrate. Ensure the tubing is evenly primed to prevent air bubbles that could affect calibration results. (Use the "CONFIG" feature to prime the tubing). After selecting the program, press “TEST” to run the machine.



Step 4: After the machine completes its run, measure the actual flow rate pumped by the machine. Press "ACTUAL WEIGHT" to enter the actual flow rate (you may pump multiple times to ensure effective calibration).
Step 5: Once the actual flow rate is entered, press ENTER to save the calibration value.
Step 6: Perform a distribution test; if accuracy is not satisfactory, repeat the calibration process.

3. CLEANING AND MAINTENANCE

3.1. CLEANING

Step 1: Turn off the machine and disconnect the power supply. Wear gloves and protective eyewear for safety.

Step 2: Remove the tube trays, base plate, and clean them using a mild cleaning solution.

Step 3: Clean and wipe the machine casing with a soft cloth dampened with a cleaning solution (avoid letting water flow into the scale base holes on the machine).

Step 4: Use a clean cloth to wipe and clean the interior of the peristaltic pump head assembly.

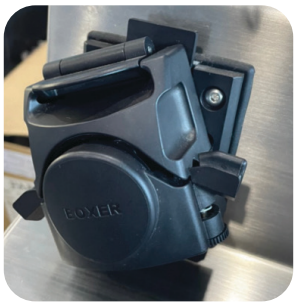
Step 5: Apply grease to the shaft coupling between the motor and the pump head.

***Instructions for opening the peristaltic pump head:**

- Open the lever on the top of the pump head to open the pipe press, exposing the bolt inside the pump head (a).
- Use a hex key to loosen the bolt (b)
- Turn the pump head counterclockwise to remove it. (c-d)

(a)

(b)



(c)

(d)

Note:

Use cleaning and disinfecting agents such as:

- Acid-free and halogen-free cleaning agents.
- 70% alcohol solution.
- Avoid using inappropriate cleaning agents containing acid, chlorine, or corrosive substances.z
- Use a soft cloth and cleaning solution, and avoid spraying or pouring cleaning agents directly onto the equipment surface.

Perform regular cleaning or immediately after any sample spills occur during use.

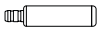
3.2. MAINTAIN AND INSPECT EQUIPMENT PERIODICALLY

- Equipment maintenance should be performed at least every 6 months, or more frequently if the equipment is used with high frequency.
- Maintenance steps should be carried out by individuals knowledgeable in electrical and mechanical engineering.

4. COMMON ISSUES AND TROUBLESHOOTING

Issues	Possible causes	Troubleshooting
The device cannot be turned on, the screen is not displayed	- The device is not plugged in	- Check the power source, jack connection, power cords, and fuses.
	- The main switch is not turned on	
	- Fuse or wire is broken	
	- Poor contact between jack and power cord	
Incorrect distribution	- Calibration is inaccurate	- Recalibrate the volume.
	- Calibration does not match the program	- Adjust the program's set volume up or down to achieve the desired distribution volume.
Stuck, pump not rotating, not pumping	- Pump head is obstructed	- Check the pump
	- Incorrect pump rotation direction	
	- Blocked tubing	- Check the tube
	- Incorrect tubing size/material	
XYZ axes not moving	- There are obstacles on the axis journey	- Check the machine's movement path
	- The wire is broken	- Check the electrical wiring

5. ACCESSORIES

	Products	Order Code	Description
	Trays for 96 tubes (2mL-5mL)	KingRack 2	Stainless steel tray for 2mL - 5mL tubes
	Trays for 96 tubes (10mL-20mL)	KingRack 10	Stainless steel tray for 10mL - 20mL tubes
	Trays for 96-well plates	DeepWell96	Stainless steel tray for 96-well plates
	Independent stand for ready-to-used bags	KingStand	Independent stand for 2 ready-to-used bags
	Trocar	KingTrocar	Trocar for ready-to-used bags
	Nozzles (ø 1.6, 2.4, mm)	KingNozzle-S	Material: Inox 304, suitable for various tubings sizes
	TubeWeight (ø 3.2, 4.8, 6.4 mm)	KingTubeWeight-M	Material: Inox 304, suitable for various tubings sizes
	Tubings (ø 1.6 mm)	KingTubing 1.6	The inner diameter of the tube is ø 1.6 mm with a wall thickness of 1.6 mm
	Tubings (ø 2.4 mm)	KingTubing 2.4	The inner diameter of the tube is ø 2.4 mm with a wall thickness of 1.6 mm
	Tubings (ø 3.2 mm)	KingTubing 3.2	The inner diameter of the tube is ø 3.2 mm with a wall thickness of 1.6 mm
	Spout holder	KingHolder	Material: CNC milled POM plastic, used to fix the pouring tube onto the machine shaft
	Tube clamp	KingTubeClamp	Material: CNC milled POM plastic, used to fix the pump tube onto the machine shaft
	Y-shaped splitter	KingY-Shaped	Material: high-quality plastic, used to split the pump tube into two
	15ml test tube		Material: high-quality plastic
	96-well plate		Material: polystyrene plastic
	Pipette tips		Material: polypropylene

6. TECHNICAL SUPPORT

For technical support or any inquiries related to our products, please reach out to us using the following contact information:

LABone Scientific Equipment Co.Ltd.,
Address: 228/13/3 Nguyen Thi Lang, Tan Phu Trung, Cu Chi, Ho Chi Minh City
Hotline: 0978 782 147
Email: info@labone.vn
Website: www.labone.vn

We are committed to providing the best customer support services, including user guidance, equipment maintenance, and resolution of technical issues. Our team of technicians is extensively trained and ready to assist you in any situation.

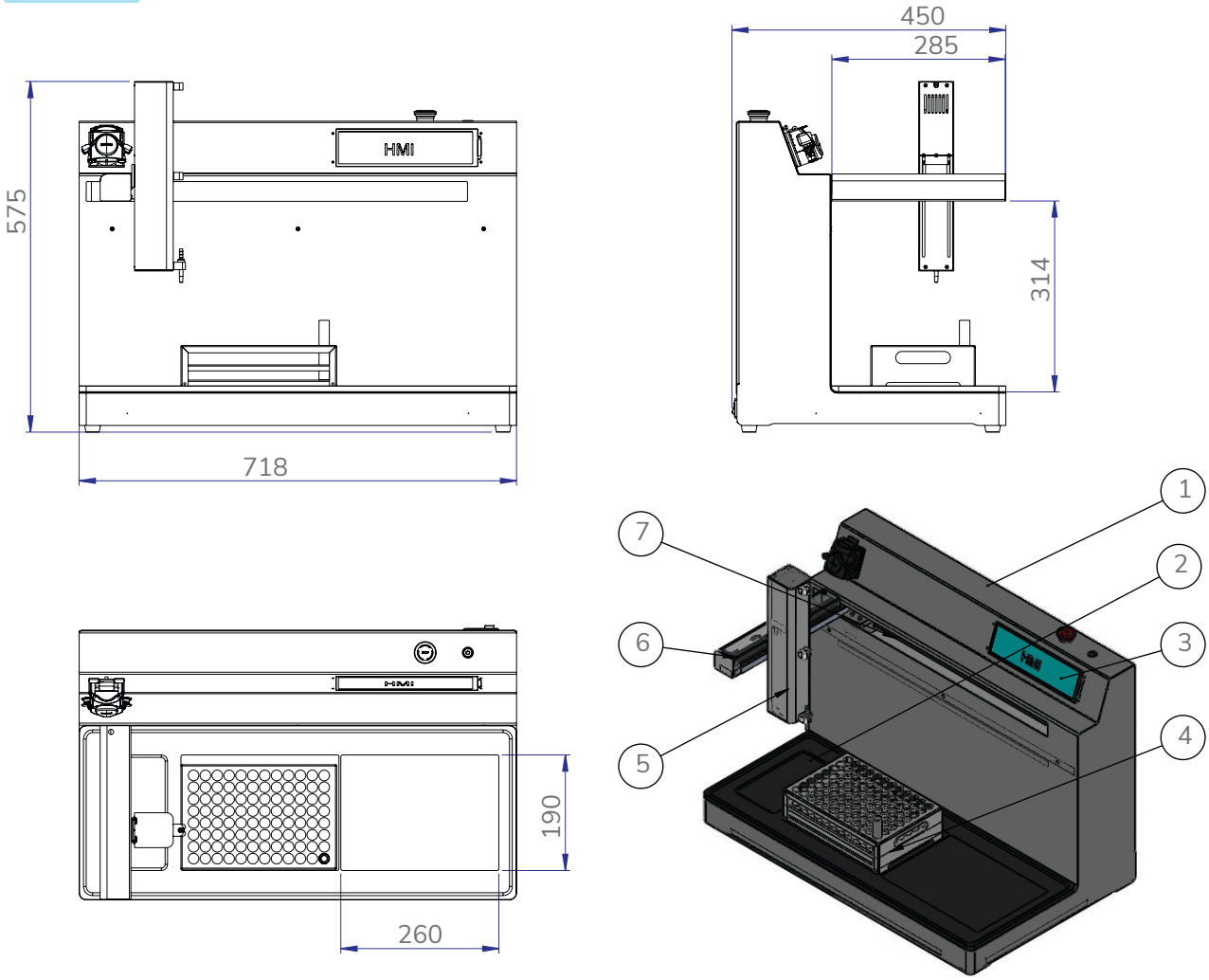
Current user manual version: 2

Warranty and service policy:

All our products come with a 3-year warranty from the date of purchase. During this warranty period, you are entitled to free repair and replacement of components if the product experiences any technical issues due to manufacturing defects. For more details on our warranty policy and applicable terms, please visit our website or contact us directly via hotline or email.

We strive to provide dedicated and professional technical support services at LABone, aiming to ensure absolute satisfaction for our valued customers. We sincerely thank you for trusting and using our products.

7. ELECTRICAL SCHEMATICS



1	Body	4	Test tube rack
2	Machine container tray	5	Axis Z
3	Screen	6	Axis Y
		7	Axis X

KingLab
USER MANUAL

LABone Scientific Equipment Co.ltd.,

Factory: 228/13/3 Nguyen Thi Lang, Tan Phu Trung, Cu Chi, Ho Chi Minh City
Phone: 028 6260 2798 | Hotline: 0978 782 147 | Email: info@labone.vn

KingLab is Brand of LABone Scientific Co.ltd.,