MICROLIT PERISTALTIC PUMP

OPERATION MANUAL

Intelligent Flow Peristaltic Pump

(MP100I, MP300I, MP600I)
(MP110I, MP300I, MP610I)

CII INDUSTRIAL INNOVATION AWARDS 2022

9TH DESIGN EXCELLENCE AWARDS 2019

GOOD DESIGN AWARD 2019

GOOD DESIGN INDIA DESIGN MARK

EXPERIENCE PRECISION

TABLE OF CONTENTS

1. Symbols Description

	Danger
	Caution / Warning
	Wi-Fi
	Voltage/ Electrical Warning
	Personal protective equipment (PPE) must be worn
	Special Instructions
	Preview Mode
	Quick Setting
	System Setting
	Calibration Guide
	Warranty Policy
	Disposal

2. Important information

Be sure to read the instructions carefully before operation.

Danger 

- Please use the power supply consistent with that on the nameplate of the machine, otherwise the equipment will be damaged.
- Do not disassemble the casing and modify the interior of the equipment by yourself, otherwise it will cause faults and even electric shock accidents.
- When installing and removing the pump tube, please turn off the power first and do not get close to the rotating roller to prevent fingers and clothes from being drawn into the mechanical mechanism.
- When installing and removing the external control device, please turn off the power first to prevent electric shock accident or damage to the equipment.
- Please connect the protective ground of the machine to the earth, otherwise there will be the risk of electric shock, electromagnetic interference or Induced static electricity.

Warning 

- Before using, please make sure that the transmitted liquid will not react with the tube and pump head, otherwise the tube or pump head will be damaged. If you are not sure, please consult our technical support team.
- Tubes are vulnerable parts. Please check them regularly. Our company is not responsible for the losses caused by tube damage, especially the leakage of toxic, harmful and precious liquids.
- If the actual working environment conditions (including temperature, humidity, power supply voltage, etc.) exceed our technical indicators and cause machine damage, our company is responsible for paid warranty, but we are not responsible for any other damage caused thereby.

3. Introduction

The Intelligent peristaltic pump is mainly suitable for accurate measurement and quantitative distribution of liquid to realize high-precision flow transmission control. Compared with the previous generation of products, it adopts a larger true color LCD touch screen, which is more convenient to operate and more comprehensive to display information. The new cycle allocation mode realizes the more complex experimental process and meets different experimental requirements by customizing the cycle control process. RS485 communication adds more settings on the basis of MODBUS to meet the requirements of different communication equipment.

This series of flow peristaltic pumps include:

MP100I/MP110I flow range 0.00016-720 mL/min, speed range 0.1-150 RPM

MP300I/MP310I flow range 0.006-1600 mL/min, speed range 0.1-350 RPM

MP600I/MP600I flow range 0.006-2900 mL/min, speed range 0.1-600 RPM.

4. Applications

- Suitable for abrasive liquids
- The pump body doesn't comes in contact with liquid
- No valve blockage
- The inner surface is smooth and easy to clean
- The liquid comes in contact only with the tube
- The maximum suction can reach 8m water column
- Low shear force can be used to transfer emulsion or liquid containing foam
- Suitable for transporting liquid containing large amount of gas
- Suitable for precise timing and fixing volume, and can achieve certain accuracy can transport viscous liquid
- By changing the tube and material, it can be used in various applications like food and beverage and medical treatment

5. Functions and Features

- True color LCD display, touch screen and key operation
- Capacitive touch screen with key operation
- Have positive and negative, start/stop and full speed functions
- The speed resolution is greater than 0.1 and the accuracy is higher than 0.2%
- Flow display
- Flow rate calibration function
- Time dispensing working mode
- Five groups of working parameters are pre stored for time dispensing
- Intelligent temperature control function
- Alarm clock function
- WIFI control function

- External analog speed regulation, external control signal control start/stop, positive and negative, dispensing, physical isolation of external control signal.
- RS485 communication, support MODBUS protocol, facilitate connection with various control equipment.
- The circuit board is sprayed with three anti paint process to achieve dust-proof and moisture-proof effect.
- Strong anti-interference characteristics, wide voltage design, suitable for complex power supply environment.
- The novel stainless steel shell is easy to clean and effectively prevents the corrosion of various acid, alkali, salt and organic solvents.

6. Components and Interface

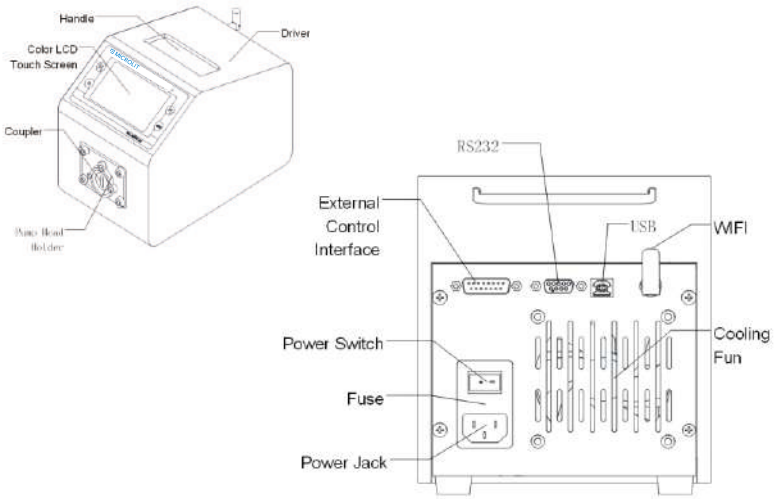


Figure 1: Components and connectors

7. Display Panel and Operating Keypads

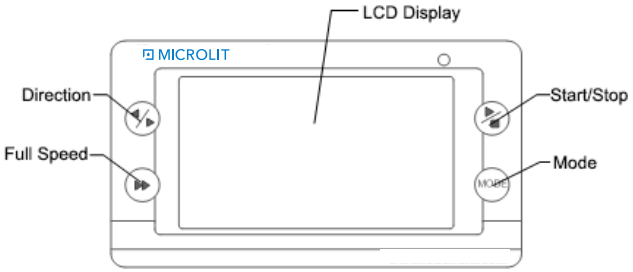


Figure 2: Display Panel

7.1 Keypads

KEY	FUNCTION
	UP Key. When press it shortly, the last digit of the value will increase by 1. Hold the key to increase the value quickly.
	DOWN Key. When press it shortly, the last digit of the value will decrease by 1. Hold the key to decrease the value quickly.
	MENU Key. When on main screen, press the MENU key to enter the setting menu. When on the setting menu, press it to return to main screen. When the drive is running, this key is disabled.
	MODE Key. When the drive is not running, use the MODE key to change the working mode: Internal Control mode, External Control mode, Time Dispense mode, Logic Level 1 control mode or Logic Level 2 Control mode. Invalid when the motor is running.
	PRIME Key. Press the key to run pump at maximum allowed speed in the direction shown on the display. Press again to return to the previous state.
	DIRECTION Key. Press to key to change the drive rotating direction, clockwise or counterclockwise.
	START/STOP Key. Press to start or stop the drive, press this key to enter the submenu in menu mode.

7.2 Digital Display

Icon	Function	Icon	Function
	Start		Stop
	Pause	>>>>>>	Full Speed
	Clockwise rotation		Counter Clockwise rotation
	Tone on		Tone off
	Locked		Unlocked
#1	Show pump number in communication		Communication is disconnected

7.3 LCD Display

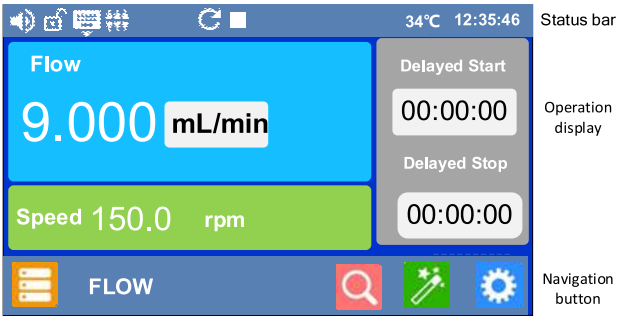
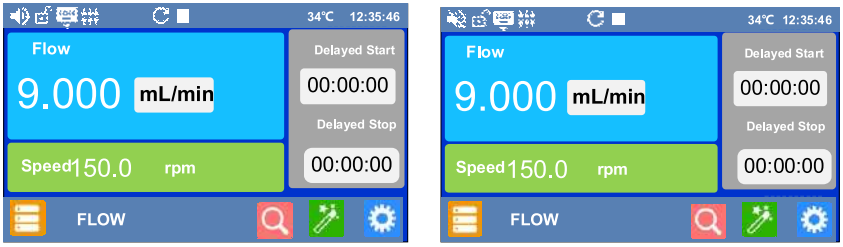


Figure 3: LCD display

7.4 Status Bar

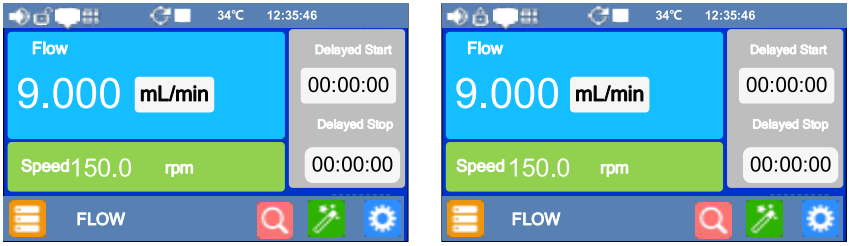
A. Tone button status: The icon shows the key tone is on/off.
The icon is show in the figure below.



Tone on Tone off

Figure 4: Key tone

B. Keypad lock: Shows the state of the keypad lock. When the keypad is locked, the control mode and system parameter settings cannot be changed



Keypad unlocked Keypad locked

Figure 5: Keypad lock

C. Control mode: Displays the current control mode.

Figure 6: Internal control mode

- Internal Control Mode: The Peristaltic Pump is controlled by keypad and touch screen.

Figure 7: Footswitch control mode

- Footswitch Control Mode: Footswitch controls start/up, and the other parameters controlled by keypad and touch screen.

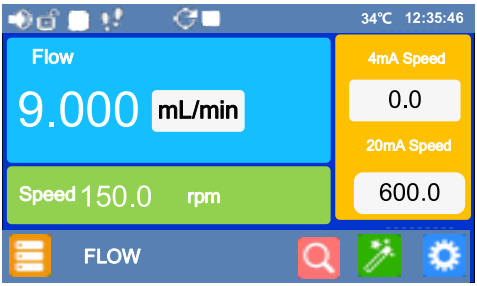


Figure 8: Current control mode

- Current Control Mode: External 4-20mA analog current signal controls flow rate, external logic level signal controls start/stop. Keypad is disabled.

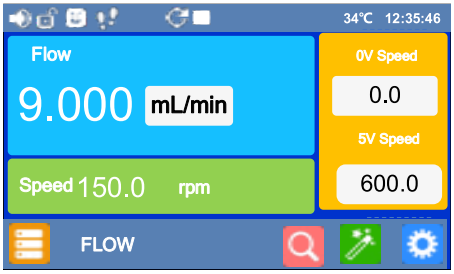
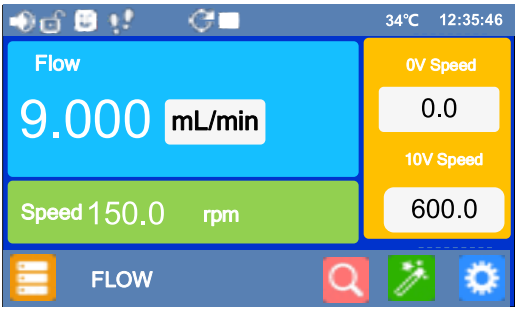


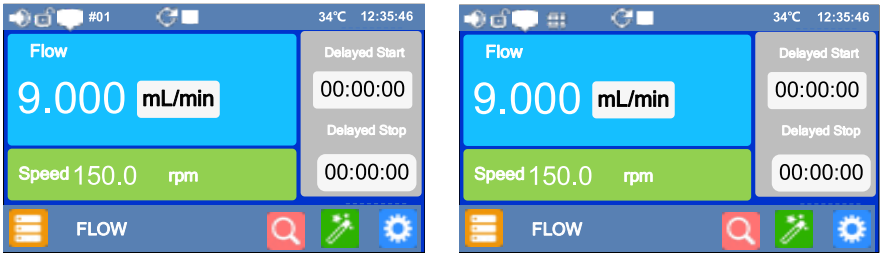
Figure 9: Voltage control mode

- Voltage Control Mode 0-5V: External 0-5V analog voltage signal controls flow rate. External logic level signal controls start/stop and direction. Keypad is disabled.



- Voltage Control Mode 0-10V: External 0-10V analog voltage signal controls flow rate. External logic level signal controls start/stop and direction. Keypad is disabled.

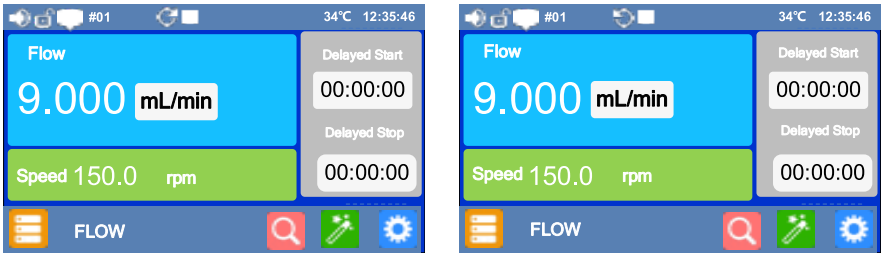
D. Communication status: Displays whether the current communication is connected, as shown in the following figure:



Communication connected Communication disconnected

Figure 10: Communication state

E. Rotation direction: Displays the status of the current pump operation. The icon in shutdown status is shown in the following figure:



Clockwise Counterclockwise

Figure 11: Rotation direction icon

F. In the running state: The current running direction is displayed by animation, and the following icon indicates clockwise rotation.

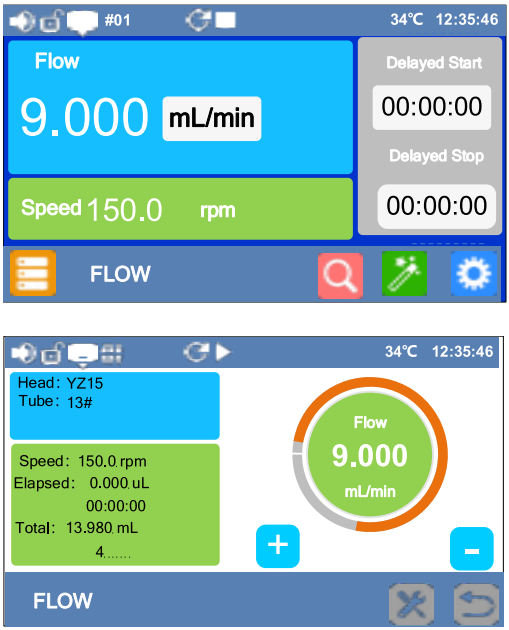


Figure 12: Running icon

G. Temperature display: Displays the current internal temperature of the driver, such as 34°C.

H. Time display: Displays the current time, such as 12:35:46.

7.5 Special Instructions

A. Value input setting: In the stopped state, you can click the value to directly input the value to be modified in the pop-up dialog box, and pay attention to the value range and unit on the dialog box.

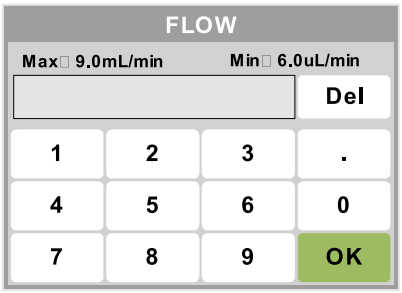


Figure 13: Value input box

B. The flow unit settings. In the stopped state, click the flow unit button to open the dialog box, and select the company to be set. The following figure sets the flow unit.

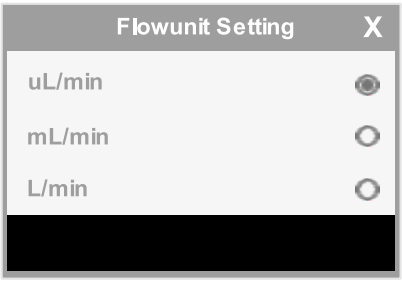
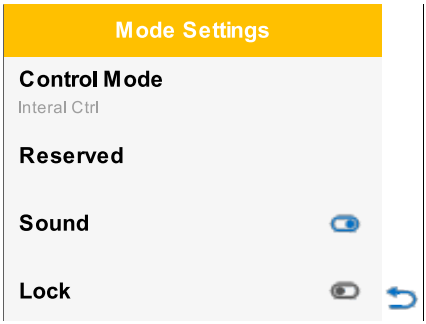


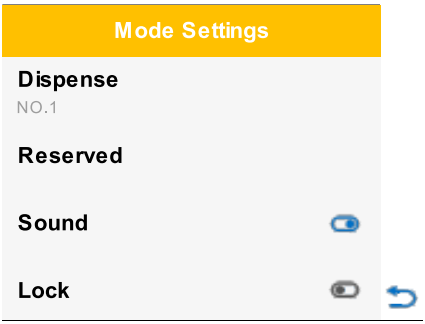
Figure 14: Choose Flow Rate

7.6 Navigation Buttons

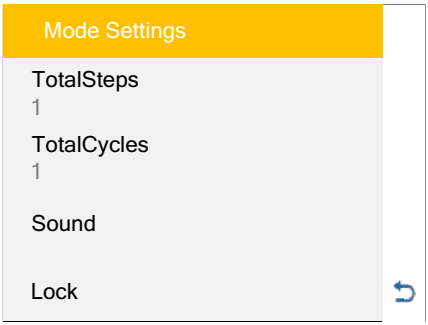
Mode setting: Set specific control modes under different working modes, prompt tone on/off, lock on/off.



Flow mode



Volume dispensing mode and Time dispensing mode



Loop dispensing mode

Figure 15: Mode setting interface

Preview mode: View operation status and parameter changes

Figure 16:Preview interface

The current operation parameters are displayed on the left side of the interface and the operation status is displayed on the right side, as shown in the following figure:

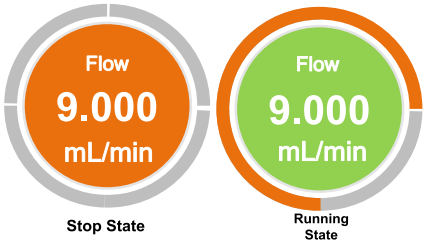


Figure 17: Running status display

In the flow mode, orange indicates the stop state. Green indicates operation status; The current flow is displayed in the middle.

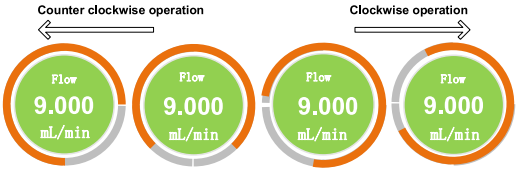


Figure 18: Direction indication

In the running state, the rotation direction of the ring indicates the running direction of the pump.

Figure 19: Dispense status indication

In the dispensing mode, orange indicates the stop state, green indicates the running state, and yellow indicates the pause state.

Quick setting: It can clear the accumulated liquid volume and accumulated times, prompt tone on/off, lock on/off.

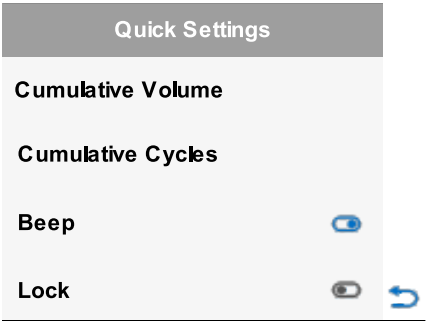


Figure 20: Quick settings interface

Fine tuning key. Adjust the flow in real time. Click the plus icon to increase the flow by a minimum unit. Click the minus icon to reduce the traffic by one minimum unit. Long press the key for 1 second, and the flow increases

or decreases rapidly.
The icon is shown in Figure 21:

 increase key  decrease key

Figure 21: Fine tuning key

Calibrate guide：In order to improve the flow accuracy of conveying liquid, it is necessary to calibrate the flow. According to the guide prompt, weigh the transmitted liquid through the balance or measuring cylinder to make the displayed value accurately correspond to the actual flow.

Note: If it is necessary to accurately display the flow, flow calibration must be carried out.

System settings: In the main control interface and stop status, press the system menu icon to enter, and the interface is as follows:

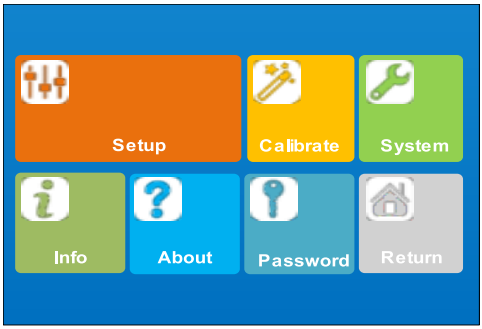


Figure 22: System settings

General setting：Set the general setting of peristaltic pump. The following parameters can be displayed by sliding upward, as shown in the figure below:

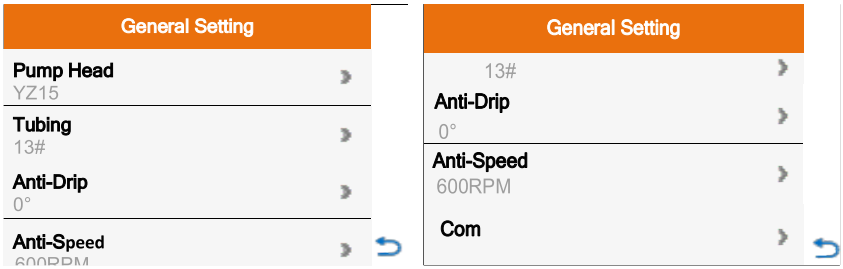


Figure 23: General settings interface

- Pump head setting: Select the appropriate pump head model according to the actual situation, and view other options by sliding up and down.

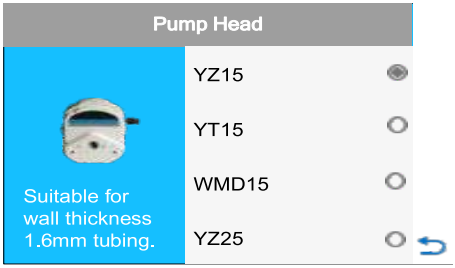


Figure 24: Pump head setting interface

- Tubing setting: Select the appropriate tube model according to the actual situation, and view other options by sliding up and down.

Note: The corresponding pump head corresponds to a series of hoses suitable for it.

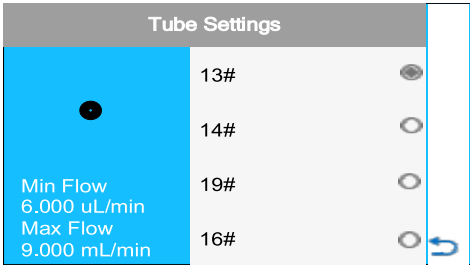


Figure 25: Tube setting interface

- Anti-Drip setting: When the peristaltic pump stops, in order to prevent the liquid in the pipeline from dripping, the peristaltic pump rotates an

angle in the opposite direction. To set the angle of suction back, select the following options or enter a custom value. This function fails when the angle is set to 0.

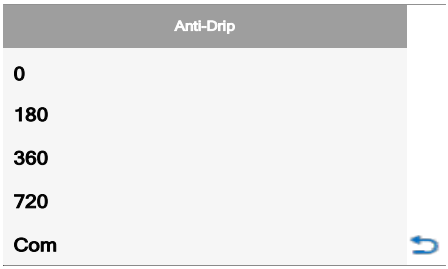


Figure 26: Anti-Drip setting interface

- Anti-Speed: Set the speed of the pump when sucking back according to the actual situation.

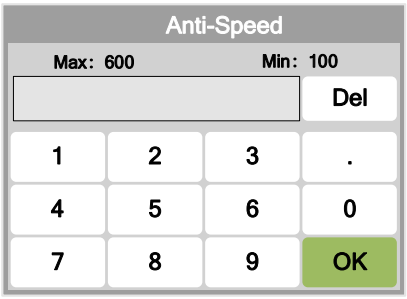


Figure 27: Anti-Speed setting interface

- Communication setting: Set some parameters of RS485 communication, as shown in the following figure:

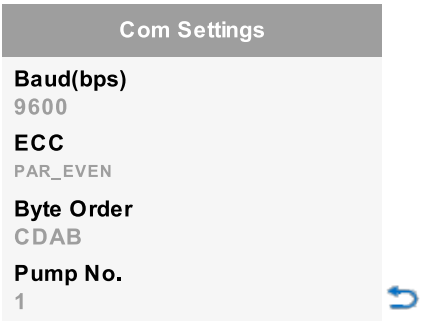


Figure 28: Communication setting interface

When you enter the user's password (blank by default), you can view more parameter settings in common parameters and view the menu by sliding up and down.

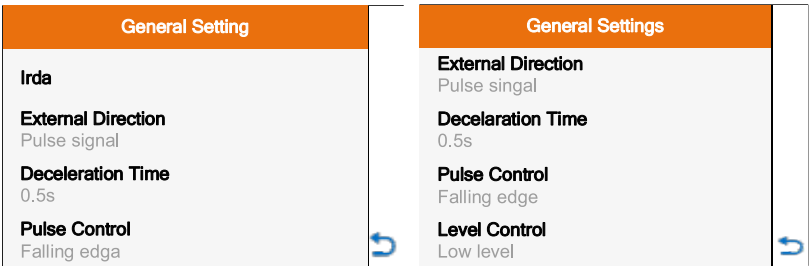


Figure 29: General settings (Advanced) interface

- External control direction: Select whether the external control direction signal is level mode or pulse mode. Level mode refers to that the external control signal switches the state by keeping closed or disconnected, such as switch. Pulse mode refers to the switching state of external control signal through instantaneous closing and breaking, such as no lock button.
- Deceleration time: Refers to the time from the set speed to stop under the liquid distribution mode and circulating distribution mode. By modifying this parameter, the problem of splashing in the process of liquid filling can be reduced.
- Pulse signal: When the external control signal is a pulse signal, select whether the falling edge or rising edge works through the option. The falling edge is the jump from high level to low level, and the rising edge is the jump from low level to high level.

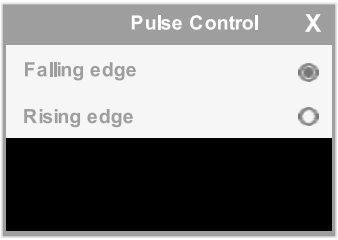


Figure 30: Pulse signal interface

- Level signal: When the external control signal is a level signal, select whether low level or high level is valid through the option.

Figure 31: Level signal interface

- Calibration wizard: In order to improve the flow accuracy of transported liquid, the flow needs to be corrected. According to the guide prompt, weigh the transmitted liquid through the balance or measuring cylinder to make the displayed value accurately correspond to the actual flow.

  Note: If it is necessary to accurately display the flow, flow correction must be carried out.

  System parameters: Set the system parameters of peristaltic pump and view the menu by sliding up and down, as follows:

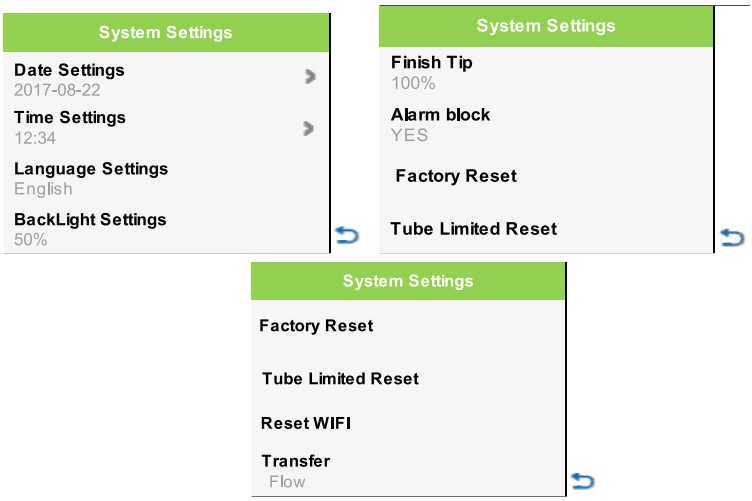


Figure 32: System parameter interface

- Date setting: Set the current month, year and day, press the left and

right keys to select the year and month, and then select the date.

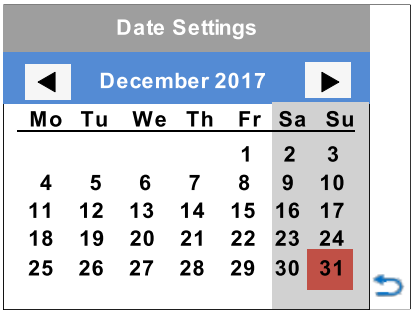


Figure 33: Date setting interface

- Time setting: Set the current hour, minute and second through up and down keys.

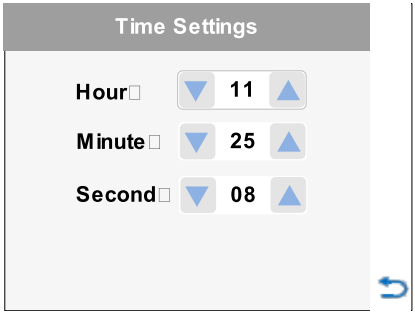


Figure 34: Time setting interface

- Language: Select the language to English

Figure 35: Language setting interface

- Factory reset: Restore all parameters to the factory default value and

restart the drive. You can also press and hold the direction key and mode key MODE to start the machine. When you hear a beep, release the key to restore the factory value.

Figure 36: Factory reset interface

- Reset WIFI: Clear WIFI binding information and rebind after reset.
- Transfer mode selection: Select liquid volume transmission mode, liquid volume, flow mode or liquid volume and time mode

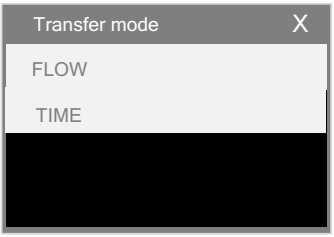


Figure 37: Reset WiFi & Figure 38 Transfer Mode Selection

- Information query: The use information of peristaltic pump can be viewed by sliding up and down

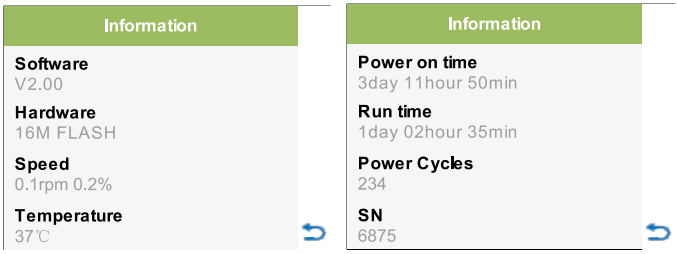


Figure 39: Information Query

- Password setting: Set the password to unlock and prevent others from modifying parameters. The default password is empty.

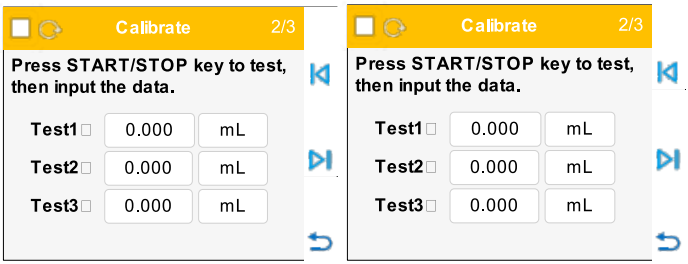
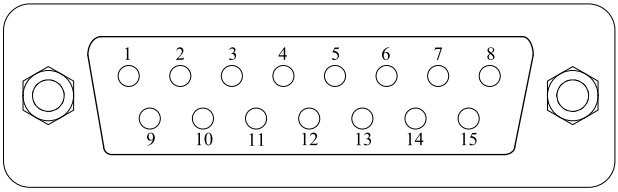


Figure 40: Password setting interface

- Return to the main control interface.

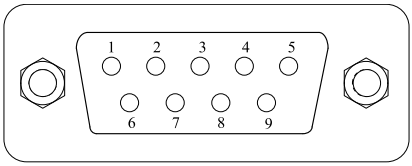
8. External Control Interface



DB15	Mark	Note
1	ADC_W	Positive of external analog input
2	B	Communication interface, B pole of RS485
3	A	Communication interface, A pole of RS485
4	VCC_W	External DC power input
5	DAC	Analog voltage signal output
6	CW_W	External input signal to control direction
7	PWM	Pulse signal output
8	COM	Ground of external power
9	AGND	Negative of analog signal input
10	+12V	Positive of internal +12V power source
11	GND	Ground of Internal power source
12	CW	Direction signal output
13	RS_W	External start/stop signal input

14	PWM_W	External Pulse signal input
15	RS	Internal Start/stop signal output

Table 1: External definition



No.DB9	Mark	Note
1		
2	RXD	Receiving data
3	TXD	Send data
4		
5	GND	Signal ground line
6		
7		
8		
9		

Table 2：RS232 definition

9. Operation Instructions

- Please check whether all accessories are available according to the packing list. If any problem is found, please contact the manufacturer or distributor in time.
- Carefully read the instruction manual and keep it at hand or in a fixed place for easy reference at any time.
- Place the pump on a horizontal table with the rear at a distance of more than 200 mm from the obstacle.

10. Install Pump Head and Tubing

Install pump head

- **Install PH15T**

  Align the flat shaft of the pump head with the groove of the driver coupling, push it in, rotate the pump head to align the screw hole of the pump head with the screw hole of the driver pump head support, fit the pump head with the pump head support, insert two fixing screws into the fixing hole of the pump head and tighten it.

- **Install the tubing**

  Pull the pull rod of the pump head, open the pump head, put the tube smoothly into the pump head and straighten it, pull the pull rod in the opposite direction to the horizontal position, and the tube installation is completed.

- **Installation of multichannel pump head**

  Align the flat shaft of the pump head with the groove of the driver coupling, push it in, rotate the pump head to align the screw hole of the pump head with the screw hole of the driver pump head support, and fit the pump head with the pump head support. Thread two hexagon socket set screws into the fixing hole of the pump head and tighten them. Put the tube smoothly into the card and straighten it, fix both ends of the hose, install one end of the card in the pump head guide rail, and press the other end into the card, and the tube installation is completed.

- **Power Connection**

  The power supply shall be consistent with the power supply indicated on the nameplate at the rear of the chassis. Plug the supplied power cord into the power socket on the back of the drive.

Flow Rate Calibration

Weigh the liquid actually transmitted through the balance or measuring cylinder to complete the flow correction of the driver. The following conditions must be calibrated:

- First boot
- Replace the pump head
- Replace the tube
- Two pump heads transmit the same liquid
- Reinstall the tube
- Long continuous working time

The specific operations are as follows:

a) Install the pump head and tube, and prepare a suitable balance or measuring cylinder and measuring cup

b) In the general parameters, the pump head setup and tube setup are set to the actual pump head and tube (refer to figure 24 and figure 25 in the introduction of common parameters for details)

c) Press the full key  to fill the tube with liquid.

d) In the shutdown state, press  or enter the system menu parameter selection calibration wizard icon

e) Enter the calibration wizard interface, and the system displays the current flow and liquid volume to be calibrated. The flow rate refers to the speed of liquid transmission, and the liquid volume refers to the volume of liquid transmission.

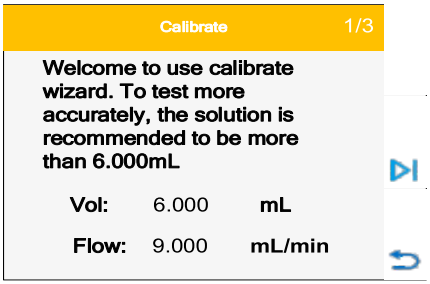


Figure 41: Calibration wizard setting interface

As shown in Figure 39, 9.000 ml / min is the flow to be tested and 6.000 ml is the liquid volume to be tested. These two values and units can be

modified directly, and then click the button to enter the test interface. Click the button to exit the calibration wizard and return to the system parameter interface.

Note: In order to ensure the test accuracy, the liquid volume value shall not be less than the value recommended by the system.

f) The test interface is shown in the figure

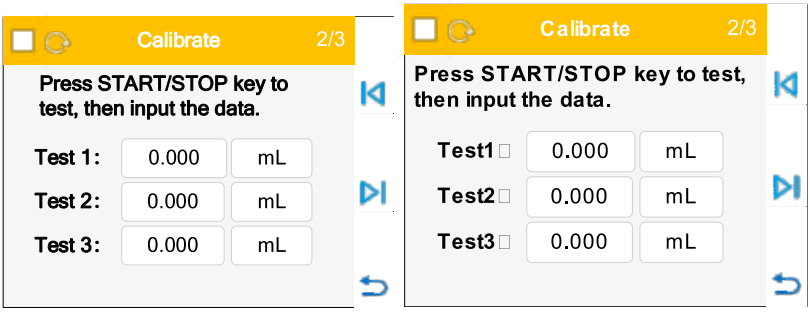


Figure 42: Actual measurement interface of calibration wizard

Prepare the measuring cylinder or beaker, confirm that the hose is full of liquid, press the start and stop button , the peristaltic pump starts to transmit liquid, observe the progress bar at the bottom, wait for the peristaltic pump to stop automatically after transmission, weigh the liquid with a balance or measuring cylinder and record its value. Repeat the above process, weigh the liquid transmitted for many times, fill its value into test 1, test 2 and test 3, pay attention to whether their units are correct, and then click to enter the calibration calculation interface. If you want to modify the test flow and liquid volume again, click to re-enter the value. Click this button to exit the calibration wizard and return to the system parameter interface.

Tip: In case of any accident during the test, press the start / stop key to

abort the test, and press the start / stop key again to retest.

The test value can be selected to input one or more groups of data, and the system will automatically calculate the average value.

g) The system automatically calculates the calibration coefficient and displays the original coefficient reference. If the variation is more than double, please pay attention to whether there are errors in the following aspects

- Measurement error
- The unit of test value is incorrect
- Pump head and tube model setting error
- Excessive liquid viscosity
- Use double pump heads

If there is no problem, press the key ✓ and the system will save the new coefficient. Press the key ⏮ to retest. Press the key ↩ to return to the system parameter interface without saving the new coefficient.

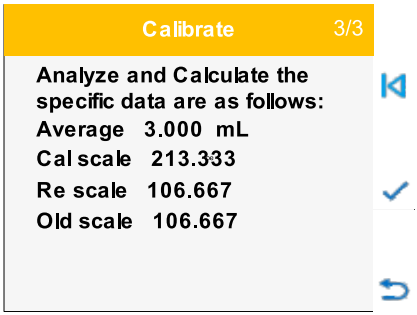


Figure 43: Calculation result interface of correction wizard

If no data is entered, it will display as shown in the figure. Please click ⏮ retest.

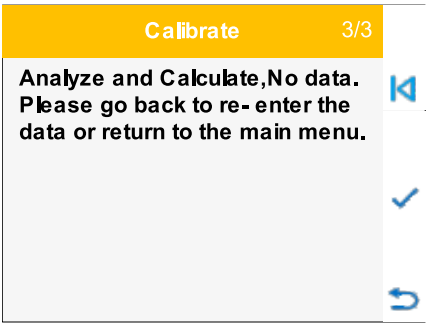


Figure 44: No data interface of calibration wizard

11. Type of Working Mode

In the main interface, in the stop state, press the MODE key to enter the working mode interface, as shown in the figure

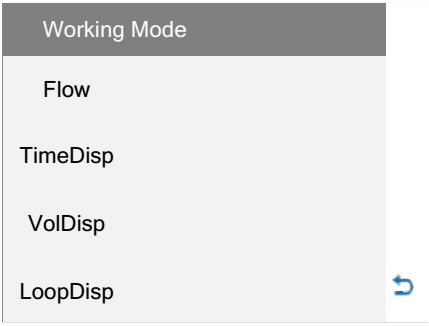


Figure 45: Working Mode Interface

11.1 Working Mode/Flow Mode

The pump operates continuously according to the set flow and records the accumulated liquid volume. In the main interface, the flow and flow unit can be set, and the speed can also be set to change the flow. In the preview interface, the model of the current pump head hose, the current running time and liquid volume are displayed. You can also press the plus or minus key to fine tune the flow.

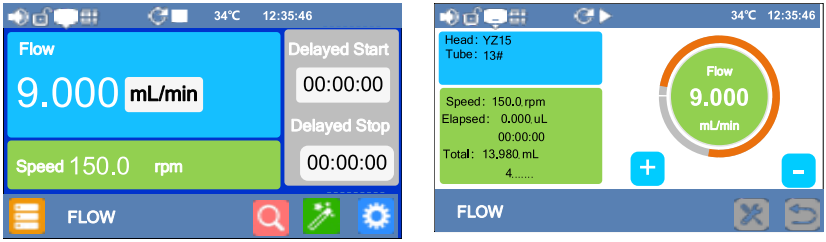


Figure 46: Flow interface

In the flow mode, the functions of delayed start and delayed stop can be realized, such as automatic start with a delay of 30 minutes and automatic stop after running for 1 hour and 30 minutes. Click the time below to set the delay start time and delay stop time respectively in the pop-up dialog box.

Figure 47: Time setting interface

Then click the start / stop button  to start the delayed process, and there is an alarm sign in the status bar, as shown in the figure below.

Note: If the delayed stop time is set to 0, the delayed process cannot be started.

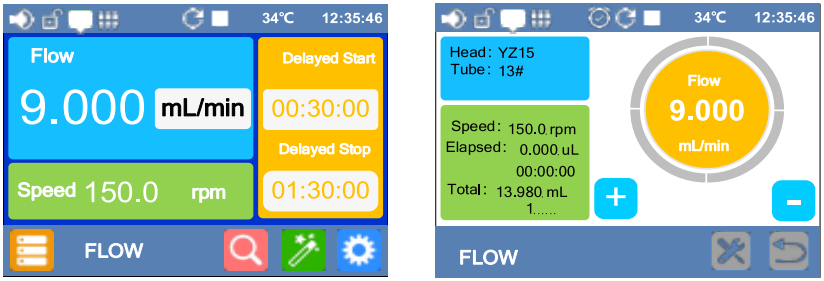


Figure 48: Timing on status icon

11.2 Volume Dispensing Mode

By setting the liquid volume and flow, the pump automatically calculates the dispensing time for dispensing.

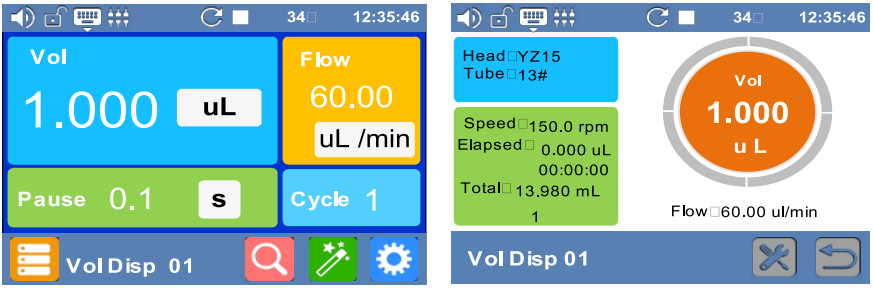
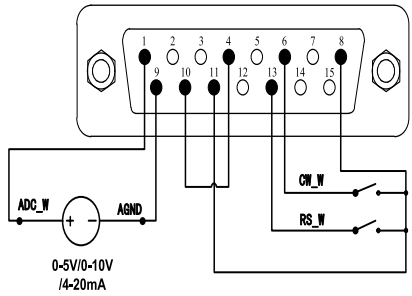


Figure 49: Volume dispensing mode

The parameters that can be set in the main interface are as follows:
Liquid volume: The liquid volume to be dispensed. The unit can be selected (μ L, mL, L)

Flow: The flow during dispensing. The unit can be selected (μ L / min, mL / min)
Interval: Interval time. In case of multiple allocation, the intermediate stop time, with optional units (hour, minute, second)
Cycle: Number of assignments. When the dispense times is 0 times, the pump will run circularly until the start stop key is pressed. When the distribution times is once, the pump only runs once, and the interval time is invalid. When the distribution times are greater than 1, the pump runs to the set times and stops automatically.
The preview interface displays the current model of pump head tube, the number and time of operation.

Click  the mode setting icon and select different group numbers in the interface to pre store five groups.



11.3 Time Dispensing Mode

By setting the running time and flow rate, the pump automatically calculates the liquid volume for dispensing.

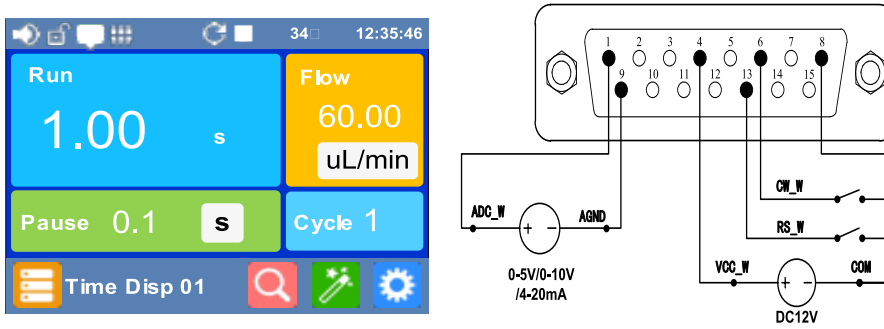


Figure 50: Time dispensing mode

Running: Time to dispense.

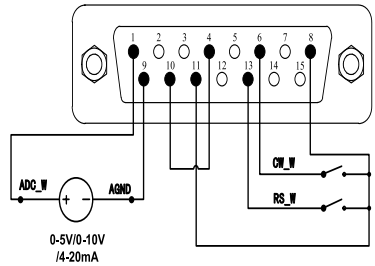
Flow: The flow during dispensing, with optional units (μL/min,mL/min)

Interval: Interval time. In case of multiple allocation, the intermediate stop time, with optional units (hour, minute, second)

Cycle: Number of assignments. When the distribution times is 0 times, the pump will run circularly until the start stop key is pressed. When the distribution times is once, the pump only runs once, and the interval time is invalid. When the distribution times are greater than 1, the pump runs to the set times and stops automatically.

The preview interface displays the current model of pump head tube, the number of runs and liquid volume.

Click the mode setting icon and select different group numbers in the interface to pre store five groups



11.4 Loop Dispensing Mode

By setting the steps to run and the number of cycles, the pump automatically completes each step by following the steps.

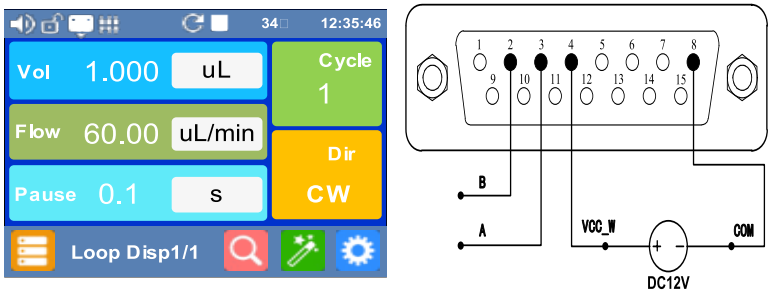


Figure 51: Copy allocation interface

Liquid volume: The liquid volume to be distributed. The unit can be selected (μL,mL,L)

Flow: The flow during distribution. The unit can be changed (μL/min,ml/min)

Interval: Interval time. In case of multiple allocation, the intermediate stop time, with optional units (hour, minute, second)

Cycle: Number of assignments. When the distribution times is once, the pump only runs once, and the interval time is invalid; When the distribution times are greater than 1, the pump runs to the set times and automatically enters the next step.

Direction: The direction of pump operation during distribution. Clockwise and counterclockwise are optional.

The preview interface displays the model of the current pump head hose, the running liquid volume, time and times

Click the mode setting icon to set the total steps and total cycles in the interface

12. External Control Mode

The speed is controlled by the external input mode analog quantity, and the start stop and direction are controlled by the external signal. Front panel buttons do not work.

- In the pump power off state, connect the circuit according to figure 50 or figure 51, and connect the DB15 interface to the back interface of the pump.

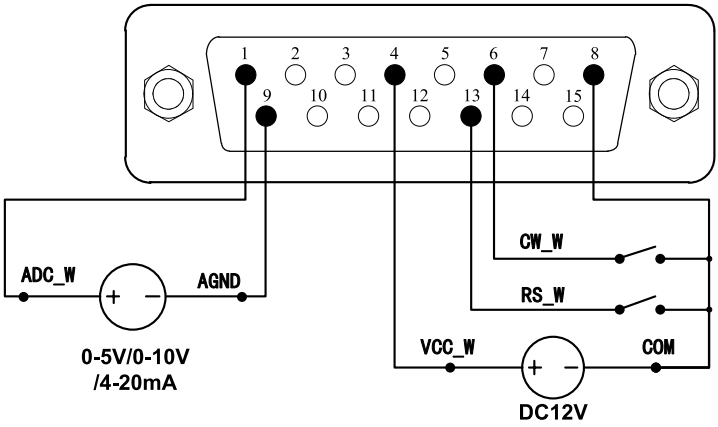


Figure 52: Wiring diagram of external control mode connecting external DC12V power supply

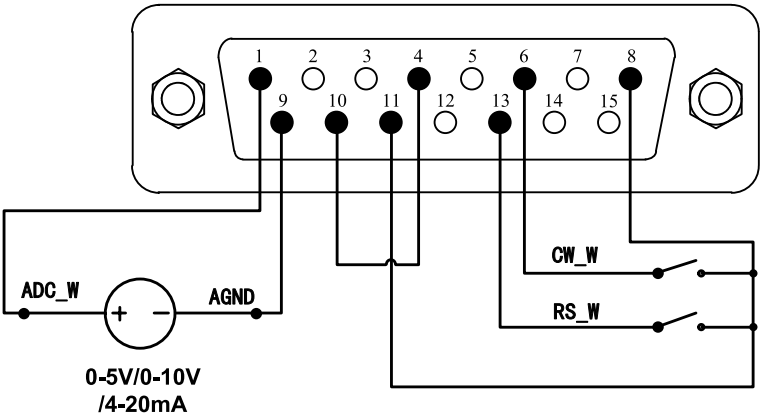
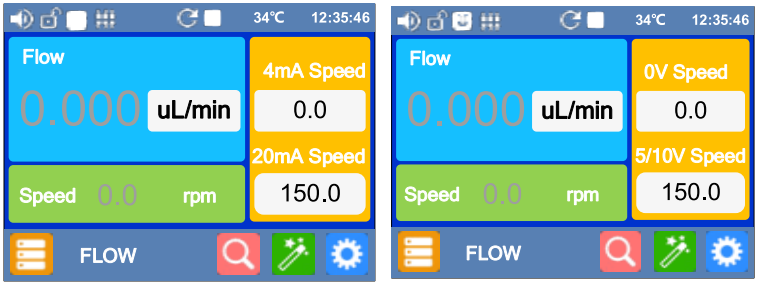


Figure 53: DB15 Wiring with Internal 12V DC Power Source

- Turn on the power switch. Pump will display the main screen.
- Press the MODE key to select the flow mode.
- Select voltage mode or current mode by control mode.



Current Control Mode Voltage Control Mode

Figure 54: Analog control interface

- When the external control mode of common parameters is level mode, close the external RS_W switch, the pump will run and the speed will change according to the analog input signal. Disconnect RS_W switch to stop pump. When CW_W switch is open, pump will run in clockwise direction. When CW_W switch is closed, pump will run in counterclockwise direction.

- When the external control mode of common parameters is pulse mode, close the external RS_W switch, open the analog power, the pump will run and the speed will change according to the analog input signal. Close the external RS_W switch again to stop pump. When the external control mode of common parameters is pulse mode, close the external CW_W switch, pump will run in clockwise direction; when close CW_W switch again, pump will run in counterclockwise direction.

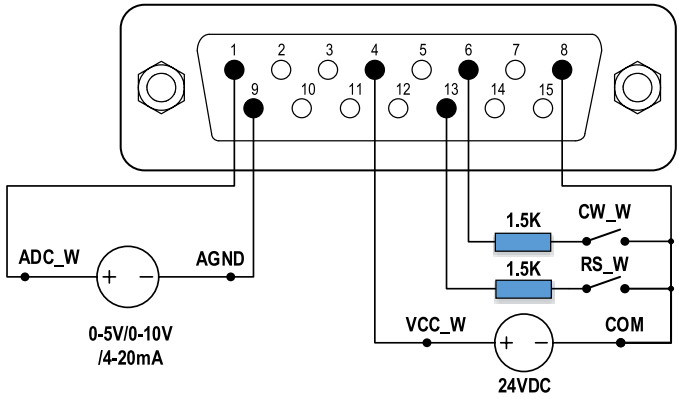


Figure 55: Wiring Diagram of external Control Mode connecting external DC24V Power supply

13. Communication Mode

The RS485 interface supports standard MODBUS protocol. Pump can be controlled by external device via the communication port. Please refer to the Intelligent Peristaltic Pump Communication Instruction manual for the parameters and supported commands.

When the power is cut off, connect the circuit according to the following wiring diagram and connect the DB15 interface to the back interface of the pump.

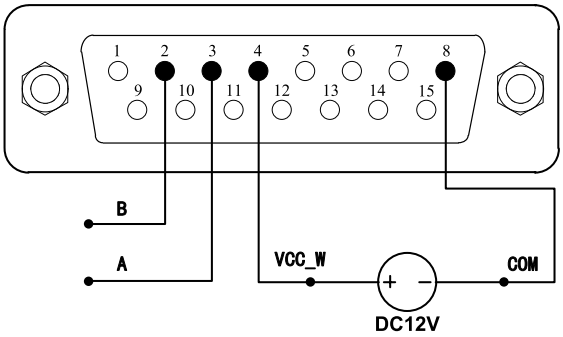


Figure 56: Control Start/Stop with external12V Power Source

Figure 57 Control Start/Stop with internal 12V Power Source

Turn the power on. Pump will display the main screen.

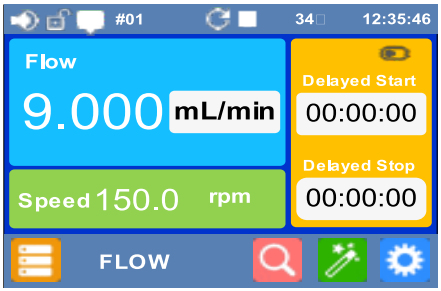


Figure 58: Communication Connected

- In the internal control mode, the status bar displays the pump number (such as #01), indicating that the communication is normal, otherwise it indicates that the communication is interrupted.

- The peristaltic pump communicates through RS485. The default setting is 9600 communication rate, 8 data bits, parity check bit and 1 stop bit. The communication parameters can be modified in the communication setting of common parameters, as shown in the figure below.

Figure 59: Communication Connected

- After successful connection, control various functions of the pump through communication command.

14. Footswitch Mode

- When the power is cut off, connect the circuit according to the following wiring diagram and connect the DB15 interface to the back interface of the pump.

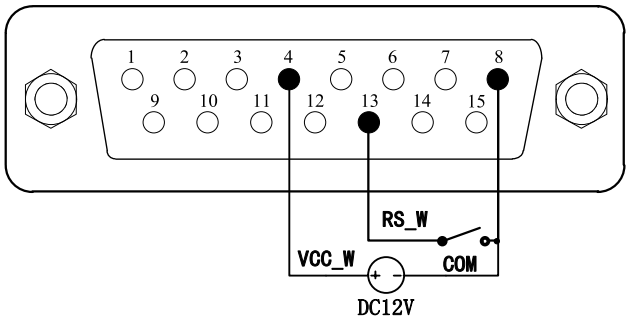


Figure 60: Wiring diagram of external 12V power supply of foot switch

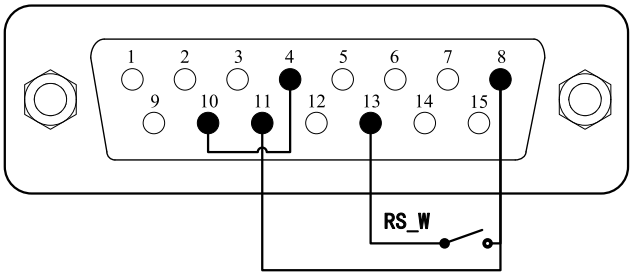


Figure 61: Internal 12V power supply wiring diagram of foot switch

- Turn the power on. Pump will display the main screen.
- In the internal control mode, the liquid volume, time dispensing mode, the foot switch is closed once, and the pump sub assembly starts.
- In foot switch mode, the external control mode is level, the foot switch is closed and the pump runs. The foot switch is disconnected and the pump stops.
- In foot switch mode, the external control mode is pulse, the foot switch is closed, and the pump runs. Close it again and the pump stops.

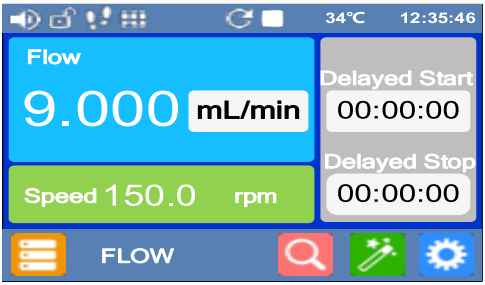


Figure 62: Footswitch Control

15. Malfunction and Maintenance

Routine Maintenance

Peristaltic pumps do not require special maintenance.

- There is a cooling fan behind the peristaltic pump. Please do not cover it to avoid affecting the cooling.
- The peristaltic pump cannot be washed with water. If the pump tube breaks during operation, the liquid in the pump head shall be wiped dry or dried in time.
- Do not use chemical solvents to clean the peristaltic pump.

15.1 Malfunction Solutions

NO.	Malfunction	Description	Solution
a)	Hardware	No display	1. Check the power cord 2. Check the fuse is. If it was blown, replace it with a 0.5A slow–blow fuse 3. Check the internal power cord connection inside the pump. 4. Check the wire connection between the LCD panel and the main control board.
b)	Hardware	Motor is trembling	1. Check the wire connection between the motor and the driver board. 2. The motor is overloaded. Check the mechanical connection.
c)	Hardware	Motor is trembling	1. Check the wire connection between the motor and the driver board. 2. The motor is overloaded. Check the mechanical connection.
d)	Hardware	The motor rotates in only one direction	1. Check whether the connecting line between the drive board and the main control board is in good condition
e)	Hardware	Keypad does not work	1. Check the wire connection between keypad and the main board. 2. Check the key if it's broken.
f)	Hardware	External control does not work	1. Check the wiring of the connector. 2. Check if the external control

			power voltage is provided. 3. Check the connections of the external control board.
g)	Hardware	External control does not work	1. Check the wiring of the connector. 2. Check if the external control power voltage is provided. 3. Check the connections of the communication board.
h)	Hardware	The sound is loud when the pump is running	1. Check whether the pump head screw and plate rod are tightened 2. Check whether the connecting wire between the motor and the drive board is in good condition 3. It is normal that the sound is too loud at 70 rpm and 120 rpm
i)	Software	External control does not work	1. Check whether the mode is external control mode
j)	Software	Flow is Inaccurate	1. Calibrate
k)	Software	Communication does not work	1. Check whether the mode communication mode 2. Reset machine address 3. Check whether there are two machines on the bus with the same address

Note: This product is not medically certified. When it is used as a component in a medical device, the medical device itself must have medical certification.

16. Technical Parameters

Main Function of MP100I

Main function	Keypad to control start/stop, full speed, memory (power–off memory). Footswitch/external voltage signal to control start/ stop, with physical isolation. Optional external control signal 5V, 12V or 24V. Optional external analog control signal 0–5V, 0–10V or 4–20mA to control speed. Flow mode, time dispensing mode
Communication	RS485 communication, support MODBUS Protocol
Display	True color touch screen
Direction control	Forward and reverse reversibility

Main Performance of MP100I

Flow rate range	0.00016-750 mL/min
Speed range	0.1-150 RPM
Speed resolution	0.1 RPM，Accuracy <± 0.2%
Control	Mask Key + Touch screen operation
Display	65565 LCD
Power supply	AC 100-240V 50Hz/60Hz
Power consumption	<40W
Working environment	Working temperature: 0~40 °C Relative humidity <80%
Dimension	292x160x183 mm
Driver weight	4.8kg
IP grade	IP31, IP66

Technical Parameters

Main Function of MP300I

Main function	Keypad to control start/stop, full speed, memory (power–off memory). Footswitch/external voltage signal to control start/ stop, with physical isolation. Optional external control signal 5V, 12V or 24V. Optional external analog control signal 0–5V, 0–10V or 4–20mA to control speed. Flow mode, time dispensing mode
Communication	RS485 communication, support MODBUS Protocol
Display	True color touch screen
Direction control	Forward and reverse reversibility

Main Performance of MP300I

Flow rate range	0.005-1750 mL/min
Speed range	0.1-350 RPM
Speed resolution	0.1 RPM，Accuracy <± 0.2%
Control	Mask Key + Touch screen operation
Display	65565 LCD
Power supply	AC 100-240V 50Hz/60Hz
Power consumption	<50W
Working environment	Working temperature: 0~40 °C Relative humidity <80%
Dimension	292x160x183 mm
Driver weight	4.5 kg
IP grade	IP31, IP66

Technical Parameters

Main Function of MP600I

Main function	Keypad to control start/stop, full speed, memory (power–off memory). Footswitch/external voltage signal to control start/ stop, with physical isolation. Optional external control signal 5V, 12V or 24V. Optional external analog control signal 0–5V, 0–10V or 4–20mA to control speed. Flow mode, time dispensing mode
Communication	RS485 communication, support MODBUS Protocol
Display	True color touch screen
Direction control	Forward and reverse reversibility

Main Performance of MP600I

Flow rate range	0.005-3000 mL/min
Speed range	0.1-600 RPM
Speed resolution	0.1 RPM，Accuracy <± 0.2%
Control	Mask Key + Touch screen operation
Display	65565 LCD
Power supply	AC 100-240V 50Hz/60Hz
Power consumption	<60W
Working environment	Working temperature: 0~40 °C Relative humidity <80%
Dimension	292x160x183 mm
Driver weight	4.5kg
IP grade	IP31, IP66

16. Technical Parameters

Main Function of MP110I

Main function	Keypad to control start/stop, full speed, memory (power–off memory). Footswitch/external voltage signal to control start/ stop, with physical isolation. Optional external control signal 5V, 12V or 24V. Optional external analog control signal 0–5V, 0–10V or 4–20mA to control speed. Flow mode, time dispensing mode
Communication	RS485 communication, support MODBUS Protocol
Display	True color touch screen
Direction control	Forward and reverse reversibility

Main Performance of MP100I

Flow rate range	0.00016-750 mL/min
Speed range	0.1-150 RPM
Speed resolution	0.1 RPM，Accuracy <± 0.2%
Control	Mask Key + Touch screen operation
Display	65565 LCD
Power supply	AC 100-240V 50Hz/60Hz
Power consumption	<40W
Working environment	Working temperature: 0~40 °C Relative humidity <80%
Dimension	292x160x183 mm
Driver weight	4.8kg
IP grade	IP31, IP66

Technical Parameters

Main Function of MP310I

Main function	Keypad to control start/stop, full speed, memory (power–off memory). Footswitch/external voltage signal to control start/ stop, with physical isolation. Optional external control signal 5V, 12V or 24V. Optional external analog control signal 0–5V, 0–10V or 4–20mA to control speed. Flow mode, time dispensing mode
Communication	RS485 communication, support MODBUS Protocol
Display	True color touch screen
Direction control	Forward and reverse reversibility

Main Performance of MP300I

Flow rate range	0.005-1750 mL/min
Speed range	0.1-350 RPM
Speed resolution	0.1 RPM，Accuracy <± 0.2%
Control	Mask Key + Touch screen operation
Display	65565 LCD
Power supply	AC 100-240V 50Hz/60Hz
Power consumption	<50W
Working environment	Working temperature: 0~40 °C Relative humidity <80%
Dimension	292x160x183 mm
Driver weight	4.5 kg
IP grade	IP31, IP66

Technical Parameters

Main Function of MP610I

Main function	Keypad to control start/stop, full speed, memory (power–off memory). Footswitch/external voltage signal to control start/ stop, with physical isolation. Optional external control signal 5V, 12V or 24V. Optional external analog control signal 0–5V, 0–10V or 4–20mA to control speed. Flow mode, time dispensing mode
Communication	RS485 communication, support MODBUS Protocol
Display	True color touch screen
Direction control	Forward and reverse reversibility

Main Performance of MP600I

Flow rate range	0.005-3000 mL/min
Speed range	0.1-600 RPM
Speed resolution	0.1 RPM，Accuracy <± 0.2%
Control	Mask Key + Touch screen operation
Display	65565 LCD
Power supply	AC 100-240V 50Hz/60Hz
Power consumption	<60W
Working environment	Working temperature: 0~40 °C Relative humidity <80%
Dimension	292x160x183 mm
Driver weight	4.5kg
IP grade	IP31, IP66

17. Flow Rate Chart of Pump Head

Model No.	Pump Head	Channel	Tubing Size	Flow rate per channel (ml/min)
MP100I	PH15T	1,2	13# 14# 19# 16# 25# 17# 18#	0.005~641
	PH25	1,2	114# 116# 15# 24# 35# 36#	0.024~750
MP300I	PH15T	1,2	13# 14# 19# 16# 25# 17# 18#	0.005~1495
	PH25	1	114# 116# 15# 24# 35# 36#	0.024~1750
	PH15-24 (4 Rollers)	2	19# 16# 25# 17#	0.67~1307
	PH15-44 (4 Rollers)	4	19# 16# 25#	0.67~770
MP600I	PH15T	1.2	13# 14# 19# 16# 25# 17# 18#	0.005~2562
	PH25	1	114# 116# 15# 24# 35# 36#	0.024~3000
MP110I	PH15T	1,2	13# 14# 19# 16# 25# 17# 18#	0.005~641
	PH25	1	114# 116# 15# 24# 35# 36#	0.024~750
MP310I	PH15T	1	13# 14# 19# 16# 25# 17# 18#	0.005~1495
	PH25	1	114# 116# 15# 24# 35# 36#	0.024~1750
MP610I	PH15T	1	13# 14# 19# 16# 25# 17# 18#	0.005~2562
	PH25	1	114# 116# 15# 24# 35# 36#	0.024~3000

18. Warranty Policy

Microlit warrants that this product will be free from defects in material and workmanship for a period of two (2) years from the date of delivery. If a defect is present, Microlit will, at its option and cost, repair, replace, or refund the purchase price of this product to the customer, provided it is returned during the warranty period.

(Fig. 63)

We are not liable for damage resulting from any actions not described in the operating manual or non-original spare parts or components being used.

This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, or from ordinary wear and tear. If the required maintenance and inspection services are not performed according to the manuals and any local regulations, such warranty turns invalid, except to the extent, that the defect of the product is not due to such non-performance.

Items being returned must be insured by the customer against possible damage or loss. This warranty shall be limited to the aforementioned remedies.

19. Disposal

The adjoining symbol means that storage batteries and electronic devices must be disposed of separately from household trash (mixed municipal waste) at the end of their service life. According to the Directive 2002/96/EC of the European Parliament and of the Council on Waste Electrical and Electronic Equipment (WEEE) published on 27 January 2003, electronic equipment requires disposal according to the relevant national disposal regulations.Batteries contain substances that can have harmful effects on the environment and human health. Therefore, according to the Directive 2006/66/EC of the European Parliament and the Council on Waste Batteries of 6 September, 2006, batteries require disposal according to the relevant national disposal regulations. Dispose the batteries only when they are completely discharged. (Fig. 64)


(Fig. 64)

MICROLIT

Microlit India

629 Pakramau, Kursi Road, Lucknow 226026, India
Phone: +91 9918625629, Email: info@microlit.com
www.microlit.com

Microlit USA

33 Wood Avenue South, Suite 600, Iselin, NJ 08830, USA
Phone: +1 732 321 0852, Email: info-usa@microlit.com
www.microlit.us

Microlit LATAM

Business Place Ibirapuera, Alameda dos Jurupis,1005,
Indianópolis, São Paulo, Brasil
Phone: +55 11 93269-5932,

ISO 14001 CE GERMAN CERT ISO 9001 ASCB(E) UK ISO 13485 ISO 17025