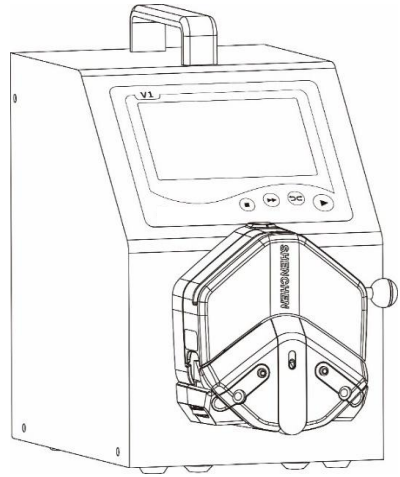
Shenchen Precision Pump Manual of V6 Series



Baoding Shenchen Precision Pump Co., Ltd.

Note:

- Please read the manual carefully before operating the product.

Warning:

- Tubing may have crack due to wear. It results in the overflow of fluid from tubing. In that time human body and instruments may be harmed. So users must check frequently and change tubing in time.
- Connect the power cord to the wall socket directly, and avoid using the extended electric wire.
- If the power cord or plug had wear and other damage, please disconnect the plug. (Hold the plug instead of the wire)
- If following situations happened, please turn off the power supply and disconnect the plug. (Hold the plug instead of the wire)
  1. Fluid splash on the pump.
  2. You think the pump need to maintain or repair.
- The user's power socket must have ground wire, and have reliable grounding.

Note: The foot pedal switch and other external control plugs must be connected or disconnected in the power-off status to prevent the external control interface from being burned.

Catalogue

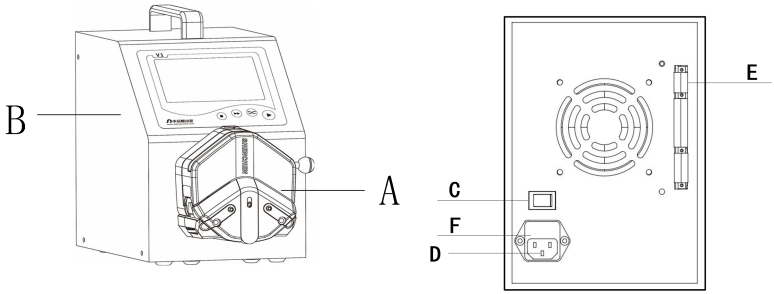
1. Product Introduction

V6 series products are the flow measurement type intelligent peristaltic pump, with 4.3 inch color touch screen control, animation shows working state. The flow data, setting parameters and system settings are displayed in the same screen. With intelligent calibration and on-line micro adjusting function, three kinds of measurement modes: Fixed volume measurement; fixed time and volume, Timer start/stop. This product can load different pump heads, multiple external methods are optional. It is ideal choice for laboratory, equipment supporting and industrial production.

V6 series include many product types: V6-3L, V6-6L, V6-12L.

Suitable for many pump heads: EasyPump pump head, YZ1515x, YZ2515x easyload pump head; DZ25-3L, DZ25-6L, DY15, DY25, YZ35.

2. Product Appearance



A——Pump Head

B——Drive

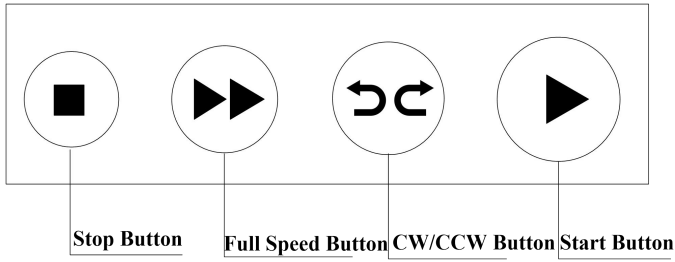
C——Power Switch

D——Power Socket

E——External Control Interface

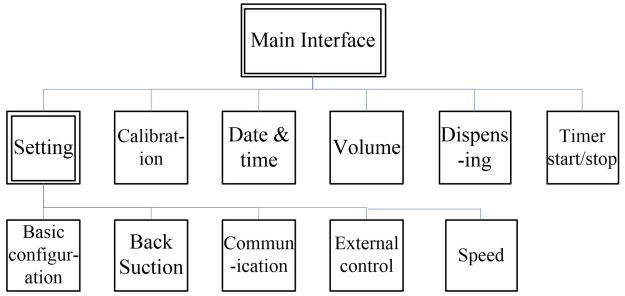
F——Built-in fuse

3. Keyboard Instruction



- **Stop Button**: Press stop button, pump stops working. Forbidden buttons can be used on the main interface. Keep pressing the button and turn on the pump power supply, that will initialize the pump and all the parameters will be lost.
- **Full Speed Button**: When stop state or transferring state, press this button, the pump will running with full speed. This button can be used for wash tube or fast filling liquid.
- **CW/CCW Button**: Press this button, the motor will change running direction.When the pump working with fixed volume measurement function or fixed time and volume function, this button does not work.
- **Start Button**: Press this button, the motor start running. When fixed volume measurement function or fixed time and volume function turn on, press this button, the pump will start work with the function.

4. Operation Interface Structure



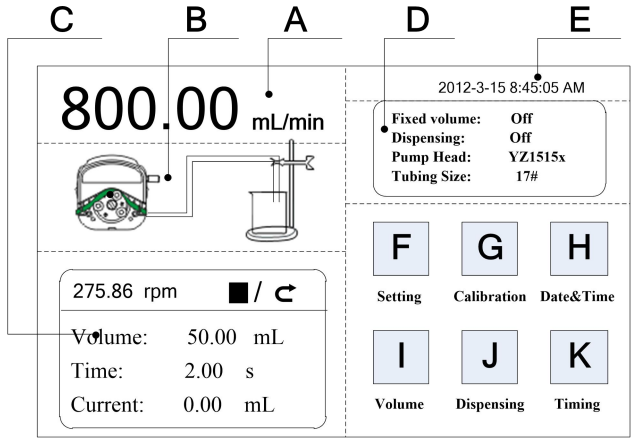
V6 Series Operation Interface Instruction

4.1 Boot Interface

After power on the system, enter the welcome interface. Click anywhere or wait for 2.5 seconds it will enter the English main operation interface automatically.

4.2 Main Interface

Main interface composition as below:



A. Speed/Flow Rate Display: In the flow rate mode, display the current flow rate, the motor speed is displayed at the C frame. In the rotating speed mode, display the current set up speed, flow rate is displayed at the C frame. Click A to amend the flow rate or speed. When fixed time and volume function turn on, A is forbidden, not allowed to amend the flow rate or speed.

B. Real-time Dynamic Display: Real-time display of the current running status, dynamic display of the running results.

C. Real-time Parameter Display: Display the current running state and set up parameter. When the fixed volume measurement turn on, display the fixed volume measurement parameter; when the fixed time and volume function turn on, display the fixed time and volume parameter. When these two functions turn off, display the parameter is all 0.

D. Setting Parameter Display: Display the fixed volume measurement, fixed time and volume state information, the model of pump head and tube size.

E. Date and Time Display: Display the current data and time, you can change it in the date&time interface. When it display an alarm clock on the right side, it means the timer start and stop function is turn on.

F. System Settings Button: Click this button, set up other parameters.

G. Flow Calibration Button: Click this button enter the flow rate calibration interface.

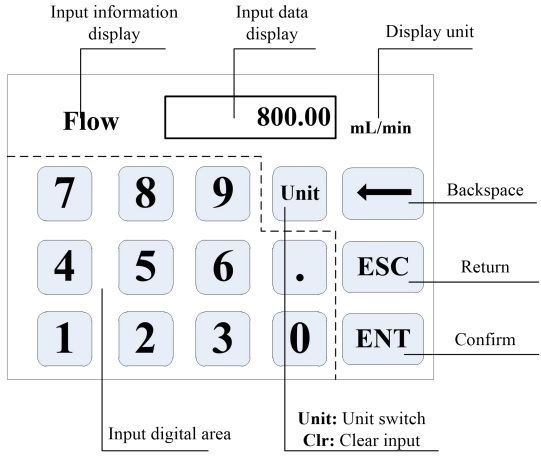
H. Date & Time Button: Click this button enter set up current date and time interface.

I. Fixed Volume Measurement Button: Click this button, enter the fixed volume measurement interface.

J. Fixed Time and Volume Button: Click this button, enter fixed time and volume interface.

K. Timer Start/Stop Button: Click this button, enter timer start and stop interface.

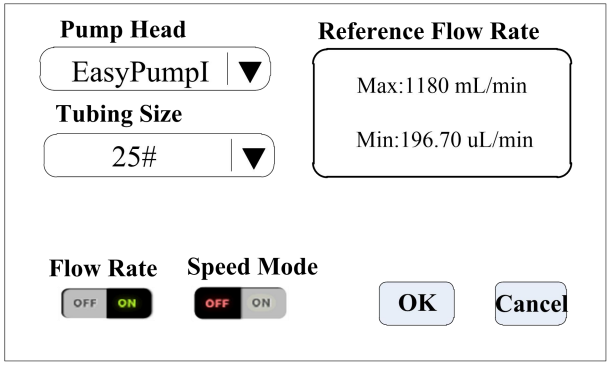
4.3 Numeric Keypad Input Interface



- **Input Information Display**: The information displayed is the current operation object.
- **Input Data Display**: Display the current input data, range is 0.01-9999.
- **Unit Display**: Display input units when input flow rate or volume.
- **Input Digital Area**: Numeric keypad.
- **Unit/Clr Button**: When input flow rate or volume, this button is unit switch, you can choose different units. When it is Clr, you can clear the current input data.
- **Backspace Button**: Delete an input digital.
- **ESC Button**: Cancel the current input, back to previous interface.
- **ENT Button**: Confirm the current input.

4.4 The Basic Configuration Interface

The basic configuration interface:



Click the pump head and tubing size to choose the pump head and tubing.

Reference flow rate display the max. and min. flow rate with the current pump head and tubing.

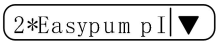
Click the Flow rate mode or Speed mode button to choose the working mode. When you choose the flow rate mode, the flow rate is adjustable, the speed will change with the flow rate. When you choose the rotation speed mode, the speed is

adjustable, the flow rate will change with the rotating speed.

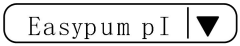
Click the confirm button when you had finished choosing parameter then back to the main interface.

Note that: When the pump comes with two pump heads, the output of two pump heads are connected to one channel, then you will need to choose 2* pump head model; In other cases, you need to choose a separate pump head model.

For example, the pump comes with two EasyPumpI, the output of two pump heads are connected to one channel, then when choose pump head need to select 2*EasypumpI, as in below picture:

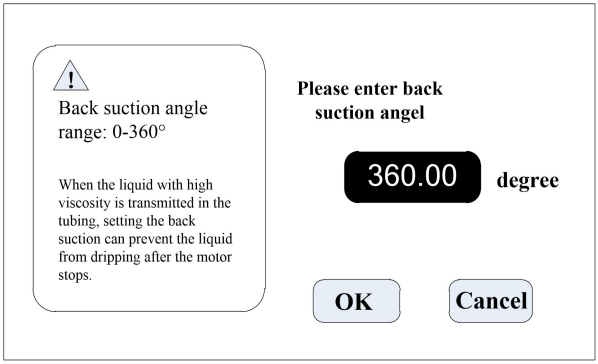


In other cases, such as: the pump comes with one pump head EasypumpI, or with two EasypumpI use as two channels, or with 3 or 4 EasypumpI pump heads, need to select single pump head EasypumpI, as in below picture:



4.5 Back Suction Angle Interface

The back suction angle interface as below:



Click the **System Settings** button in the main interface, then click **Back suction** button to enter the back suction angle setting interface. Click **angle** button, pop up the numeric keyboard for inputting the suction angle, enter back suction angle

then click **OK.** If click the **Cancel** button, it will back to the system settings main interface.

4.6 Communication Setting Interface

The communication setting interface as the follow picture shows

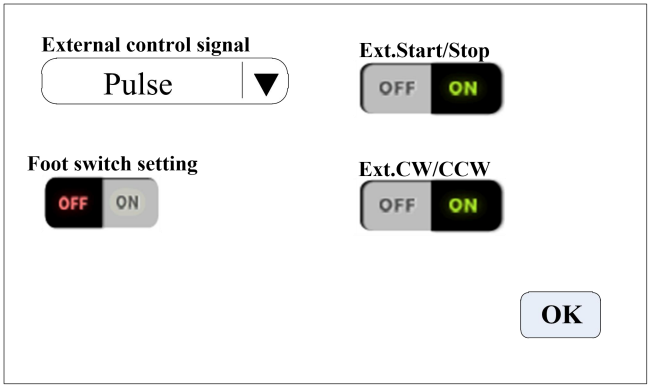
Click **System Settings** button in the main interface, then click **Communication** button to enter communication settings interface.

This pump support MODBUS——RTU Mode. Please select baud rates and communication interface (RS485/RS232). Click **Slave No.** button to enter peristaltic pump address No.(range:1-32), select communication enable is **ON**. Then this pump can communicate with master, receiving master signal.

NOTE: **Peristaltic pump only receives communication control when in the main interface, it's out of communication control when in other interface.**

4.7 External Control Setting Interface

External Control Setting Interface as below:



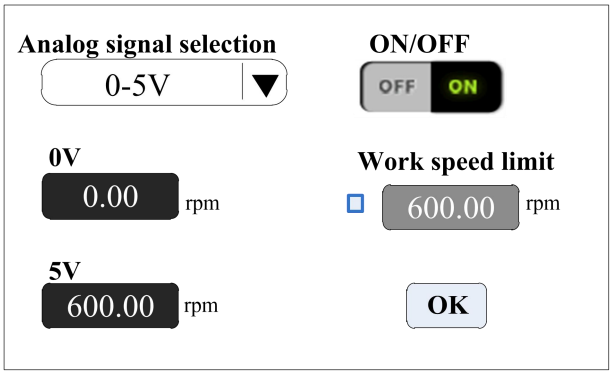
Click **System Settings** button in the main interface, then click **External control** to enter **External Settings** interface.

a. **There are two types of signals for external control motor start/stop and direction**: **Level mode** and **Pulse mode**. Connection interface refer to the external control interface instruction.

b. **Various external control modes are independently set on switches, which will only work after the corresponding external control function is turned on**.

4.8 External Control Speed Setting Interface

External control speed as the follow picture shows



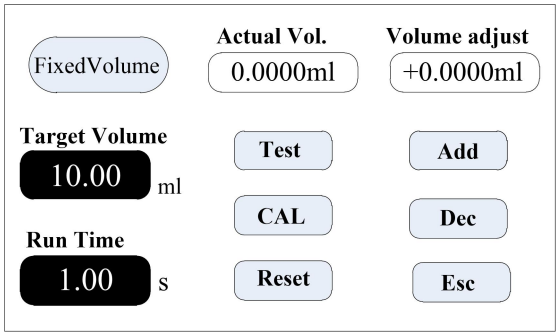
Click **System Settings** button in the main interface, then click **External Speed Control** button to enter external speed control settings interface.

According with external input signal to set the analog signal, **0-5V**, **0-10V or 4-20mA**. Between analog signal voltage range and motor speed, there is linear relationship. (when the working speed limit is off).

After turning on the maximum working speed limit, **the motor speed will be limited**. For example: if 0V to 0rpm, 5V to 600rpm (then 2.5V should be 300rpm). But if the maximum working speed limit is 300rpm, when external input signal is 2.5V, the motor speed will be 300 rpm.The input signal over 2.5V, the motor speed maximum is 300rpm.

4.9 Flow Rate Calibration Interface

Flow Rate Calibration Interface as below:



The top left corner display the function, when fixed volume measurement turn on, display fixed volume; when fixed time and volume turn on, display fixed time and volume. Others display transferring mode.

If fixed time and volume turn on, the target volume and running time is set up parameter, unable to amend. Other modes, the running time is 60s, you can click the run time button to amend the running time.

Before the pump working, need to calibrate the flow rate to ensure the transferring or dispensing accuracy

Process as below:

(1) Confirm the running time, if fixed time and volume function, the running time is set up time, unable to change.

(2) Click **Test** button to test, the run time displays with countdown, it will stop automatically, and display numerical keyboard, input the actual volume, then it will ask whether continue test (suggest more than 3 times), choose **Yes**, the pump will test again, choose **No**, back to the calibration interface.

(3) After clicking the Test button, during the pump running, you can click the Stop button to stop the test.

(4) After several tests, the actual volume area display the average data, click the CAL button, prompt the calibration is successful

(5) If request higher accuracy, you can click **Add** and **Dec** button to micro adjust the flow rate, to reach high accuracy transferring and dispensing.

(6) Click **Reset** button, recover to the default parameter of leaving factory.

Online Micro Adjust Volume Process:

Flow Rate Transferring Mode: If the actual flow rate during the production is big or small than the set up flow rate, you can micro adjust the flow rate online without affecting the product line.

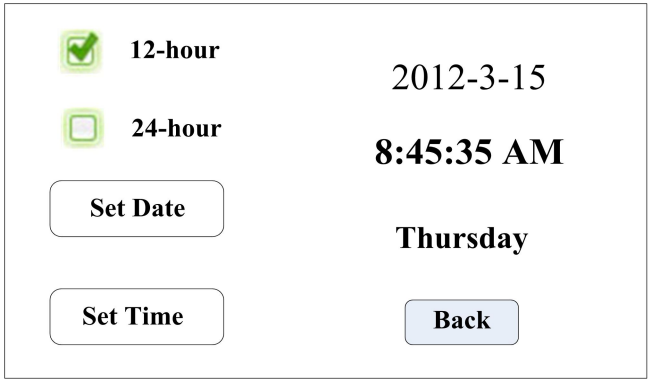
Fixed Time and Volume Mode: If the dispensing volume is big or small than the set up volume, you can micro adjust the volume online, no need to stop the pump.

Fixed Volume Measurement Mode: Do not support online micro adjust function.

- Click the Calibration button from the main interface, enter the flow rate calibration interface.
- Now only the Add, Dec and Esc button is usable, other buttons are forbidden.
- Click Add or Dec button to micro adjust the flow rate or volume.

4.10 Date & Time Interface

Click the top right corner of time display, it will occur the Setting Date & Time Interface as below:



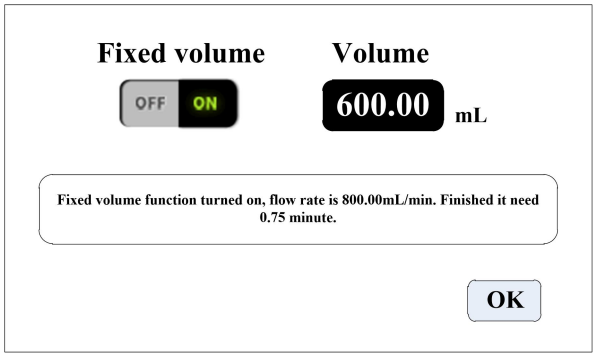
Click the **System Settings** button from the main interface, click **Date** &**Time** button, enter date and time setting interface. The date and time will display on the top right corner of main interface.

Click **Set Date** button, come out the **Set year** numeric keypad, the range of the year is **1970-2099**. After setting up the year, then set the month and date.

Click **Set Time** button, comes out the numeric keypad, set the hour, minute and second.

4.11 Fixed Volume Measurement Interface

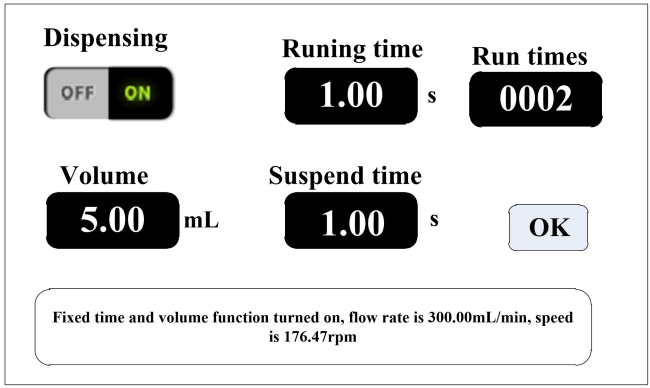
Fixed Volume Measurement Interface as below:



After turning on this function, the peristaltic pump will measure the volume automatically, when the volume reach set up volume, the pump will stop working automatically. The flow rate can be changed during the pump working.

Click the **Fixed Volume** button, set **ON** to turn on this function. Click **Set Volume**, to input volume, the unit can be mL or L, range is 0.01mL to 9999L. The prompting frame display the needed time to finish the volume with set up flow rate. The maximum time is 9999min, when more than 9999min, the system will warn.

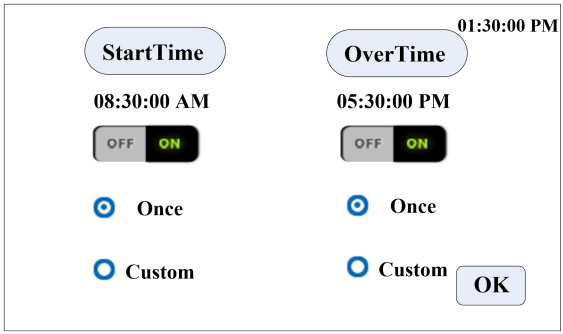
4.12 Fixed Time and Volume Interface



After turning on this function, the pump will enter dispensing mode.

Peristaltic pump transfer fixed volume in fixed time, transfer number of times is the run times, click suspend time button then input suspend time, prompt box display current diameter, after click the OK button, click the start button, the pump begin dispensing according to the parameters.

4.13 Timer Start And Stop Interface

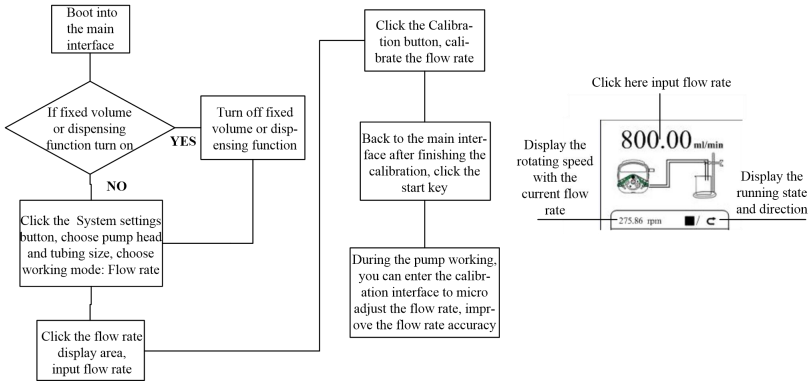


This function can freely set pump to start and stop. After the current time reaches to the setting time, it will automatically start and stop or stop the motor.

When the Fixed volume measurement or fixed time and volume function is turned on, the timer stop function is unavailable.

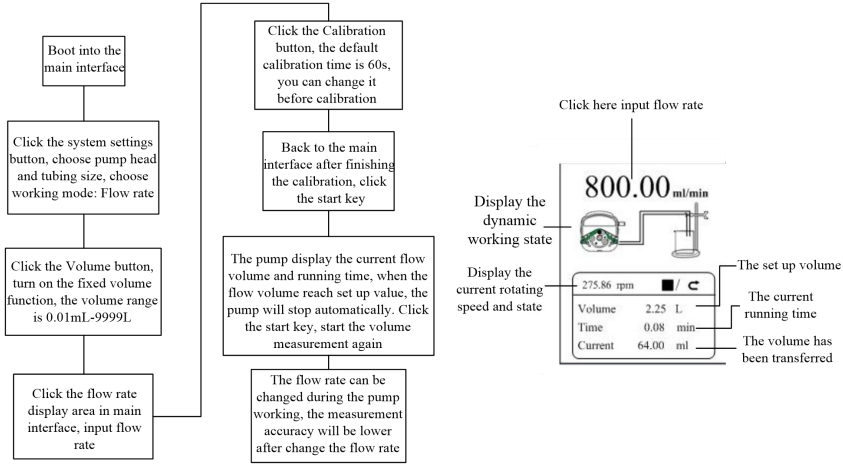
5. Main Functions Operation Process

5.1 Flow Rate Transferring Function



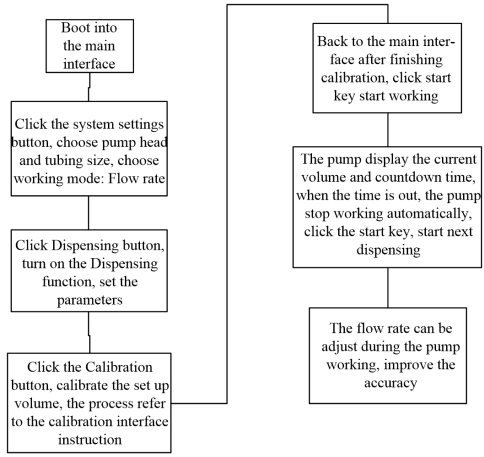
Note: Flow rate calibration process please refer the flow rate calibration interface instruction.

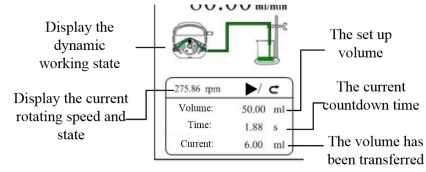
5.2 Fixed Volume Measurement Function



Note: Flow rate calibration process please refer the flow rate calibration interface instruction.

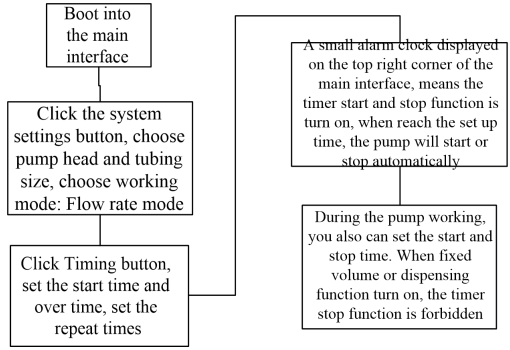
5.3 Dispensing

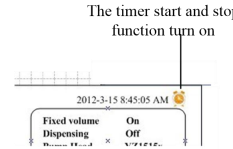




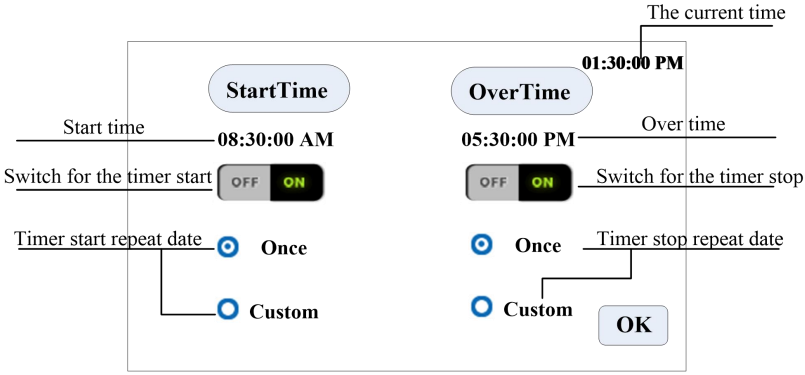
Note: Flow rate calibration process please refer the flow rate calibration interface instruction.

5.4 Timer Start And Stop Function



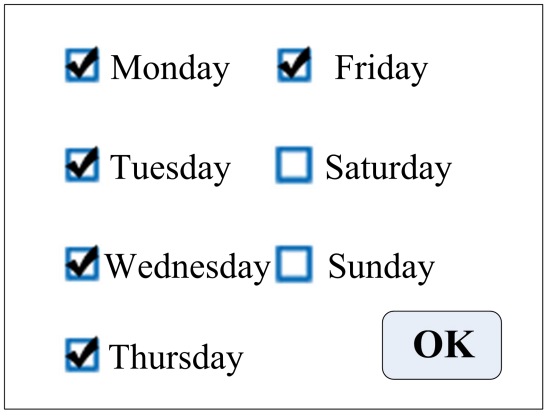


Under the flow rate transferring mode, set the pump start at 8:30 a.m. from Monday to Friday, stop at 5:30 p.m., the process as below:

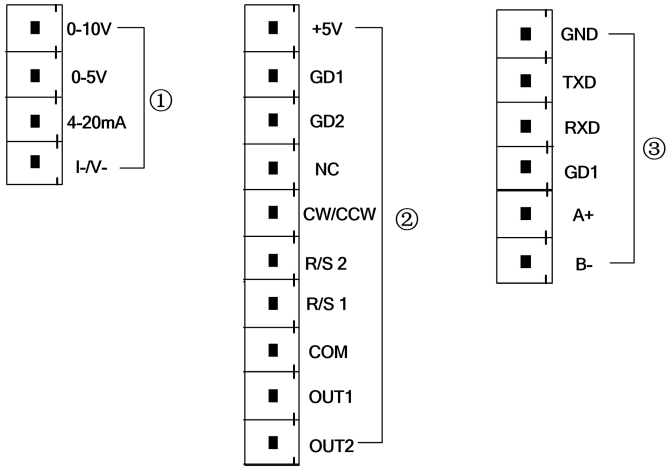


Click **Start Time**, set the start time is 8:30 a.m., turn the button to **ON.**

Click **Custom**, come out the repeat date window, as below:



6. External Control Interface Instruction



①. Analog signal input terminal: After choose the external control speed signal in external control setting interface, to turn on the external control speed function. Control the motor speed from 0rpm to the highest speed by analog signal.

0-10V: 0V to 10V voltage signal input terminal.

0-5V: 0V to 5V voltage signal input terminal.

4-20mA: 4mA to 20mA current signal input terminal.

I_/V_: Analog signal negative terminal.

Notice: Please do not connect 0-10V signal to 0-5V terminal or 4-20mA input terminal. This is forbidden. Wrong connection will damage the pump.

②. External control signal input terminal (the interface of handing dispenser and foot pedal provided by our company)

a. Internal isolation 5VDC output

+5V: Internal 5V output positive

GD1: Internal 5V output negative

b. External control start/stop, cw/ccw signal input terminal:

Active signal input (5-24 VDC).

GD2: External control signal common input terminal.

NC: External control full speed signal input.

CW/CCW: External direction signal input

R/S 2: External start/stop signal input

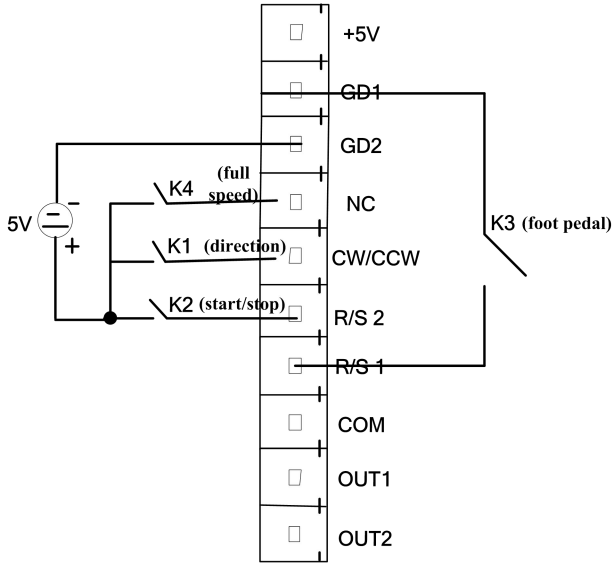
Set up the external control mode in the setting interface, turn on the correspond external control function, external control signal is active.

c. **External control start/stop signal input port**

R/S1: External control start/stop signal input port: Passive signal input

The passive switch or foot pedal switch can be connected with the terminal. Set the validity of this input in external setting interface--foot pedal option.

The external control wiring diagram is as follows:



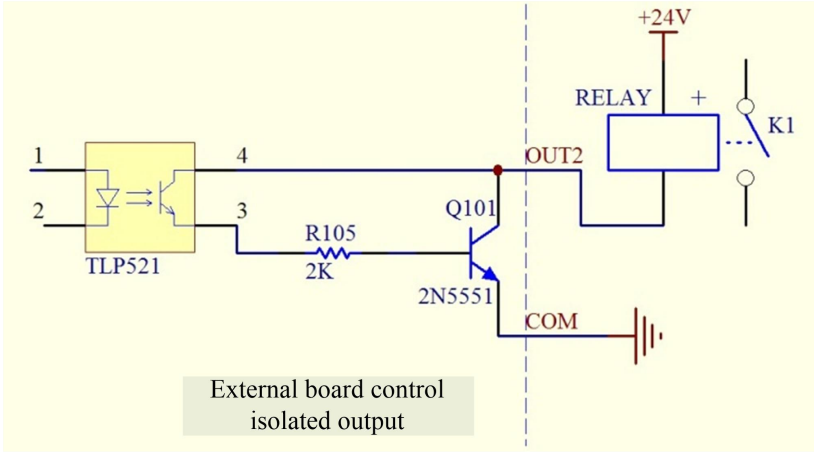
a. **In pulse mode**, short circuited K2 then disconnect, the motor starts running; Short circuited and disconnect again, the motor stops running. **In level mode**, short circuited K2, motor starts running, disconnect K2, motor stops running.

b. **In pulse mode**, short circuited and then disconnect K1 once, the motor changes working direction once. **In level mode**, short circuited K1, motor runs clockwise, disconnect K1, motor runs anticlockwise.

c. **In pulse mode**, short circuited K3 then disconnect, the motor start running; Short circuited K3 and disconnect again, motor stops running. **In level mode**, short circuited K3, the motor starts running; disconnect K3, the motor stops running.

d. **In pulse mode,** short circuited K4, the motor runs with full speed. Disconnect it, the motor stops running with full speed; **In level mode,** no full speed.

The motor working status output terminal: the output motor works status, as follows:



If connect with relays, when the motor runs, K1 connect; when the motor stops running, the K1 disconnect.

③. Communication port

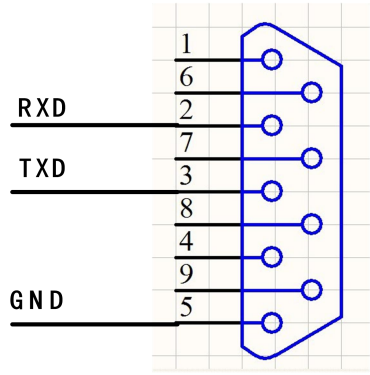
RS232 communication port: Choose RS232 in the communication setting interface, this terminal is active.

GND: Communication ground terminal.

TXD: Master sends, peristaltic pump receives signal terminal.

RXD: Peristaltic pump sends, master receives signal terminal.

RS232 Communication Interface Connection Diagram as below:



RS485 Communication Interface: Choose RS485 in the communication setting interface, this terminal is active.

GD1: RS485 signal interface

A+: Connect RS485 A+ terminal

B-: Connect RS485 B- terminal

Instruction: No matter choose RS232 or RS485, the communication protocol is standard MODBUS protocol.

It should be noted that: when leaving the factory, the external control interface will be plugged with terminals. If you need to use other external control equipment of our company, such as foot pedal, hand-held dispensers, etc., please unplug the terminals first, and then plug the external control equipment.

7. Technical Specification

Flow rate resolution	0.01mLl/min	Power supply	AC220V±10% 50Hz/60Hz (standard) AC110V±10%
Operation mode	Touch screen and mechanical keypad	External control	Switch signal
Temperature	0-40℃	Relative humidity	<80%
Communication interface	RS232/RS485	Output Interface	Output motor working status (open-collector-output)
Back suction angle	0-360°	Protection rating	IP31
Speed range	V6-3L/V6-6L/V6-12L	0.1-600rpm	
Power consumption	V6-3L	<80W	
	V6-6L	<180W	
	V6-12L	<300W	
Motor type	V6-3L/V6-6L/V6-12L	Closed-loop stepper motor	

8. Main Function and Features

- 4.3 inch color touch screen control, animation shows working state, the flow volume and motor speed are displayed in the same screen.
- Intelligent calibration function, it can calibrate the flow rate and dispensing volume, ensure the flow accuracy, suitable for high accuracy transferring liquid.
- On-line micro adjusting function, it can adjust the flow rate during production progress, to avoid the filling errors because of tubing fatigue and elasticity decreased.
- Accurate angle control technology, reach high precision dispensing and

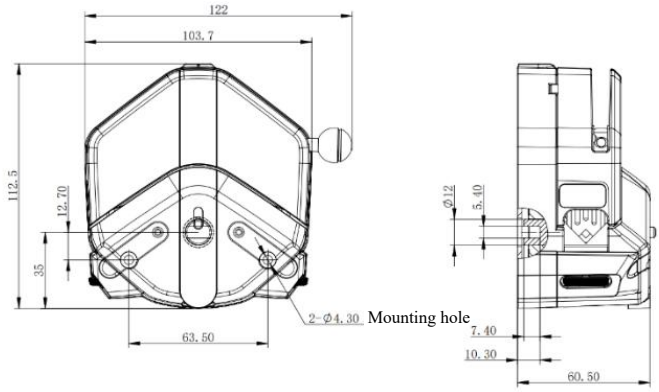
measurement.

- Fixed volume measurement function: After turning on this function, the peristaltic pump will measure the liquid volume automatically, it will stop automatically after the volume reaches the set value. During this process, the flow rate can be changed. It is suitable for liquid metering in the laboratory or quantitative feeding in the chemical reaction process, etc.
- Fixed time and volume function: After turning on this function, the peristaltic pump will transfer fixed volume within set time. It is suitable for liquid dispensing in laboratory and industrial production.
- Timer start and stop function: Can set the pump start and stop time freely, reach automation control.
- Power down memory function, store the running parameters in time, safe and reliable.
- Fast fluid-filled function, can wash the tubing and also fill liquid into tubing.
- High torque and low power loss, it can load several pump heads or multichannel pump head, meet different application requests.
- External control start and stop, convenient for equipment supporting.
- 304 stainless steel shell, anti-corrosion, in line with industrial requirements. Anti-interference, can shield the interference signal.

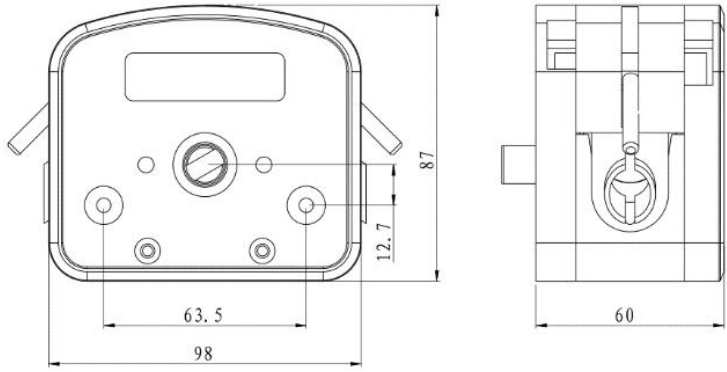
9. Dimension Drawing

Unit: (mm)

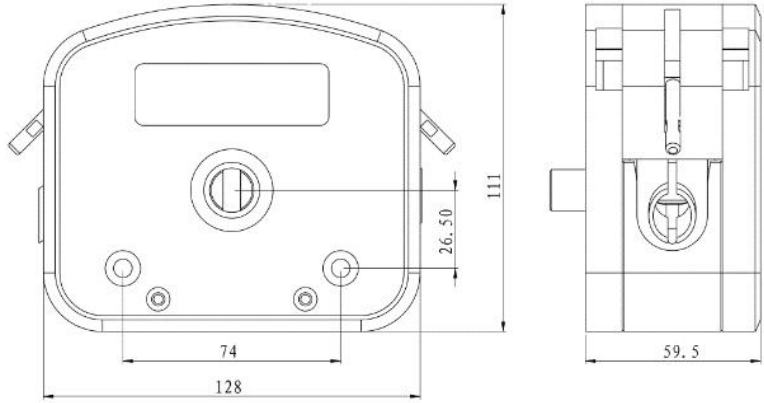
9.1 Single pump head



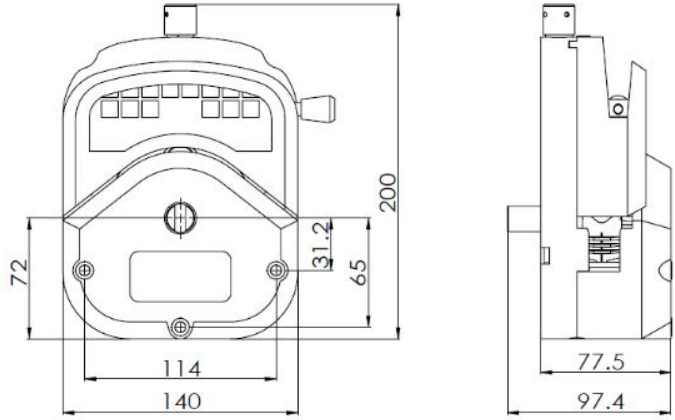
EasyPump Head



DZ25-3L Pump Head

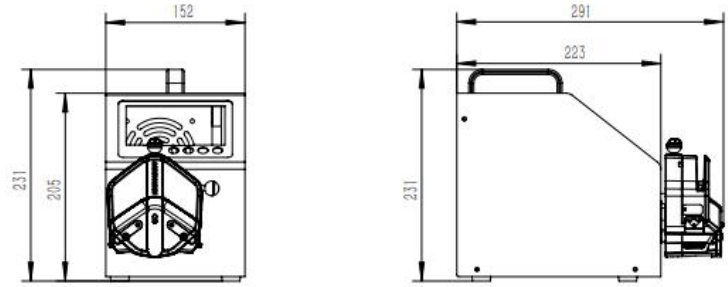


DZ25-6L Pump Head



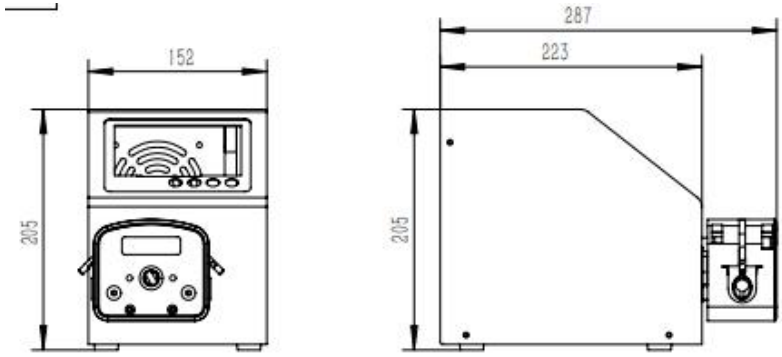
YZ35 Pump Head

9.2 V series product



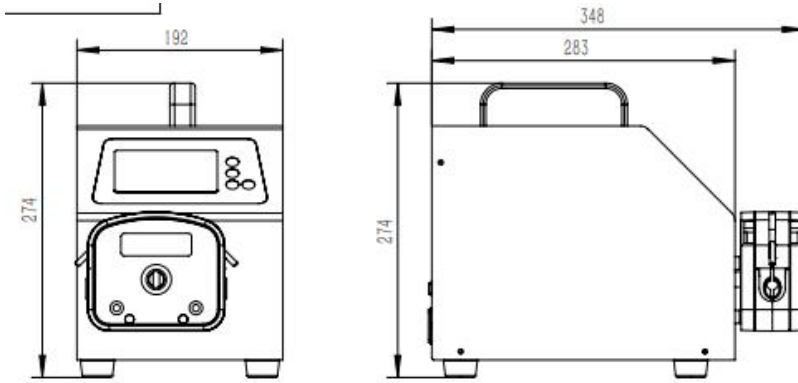
V6-3L series + EasyPump Pump Head

Note: For each additional pump head in series, the longitudinal dimension shall be increased by 61mm.



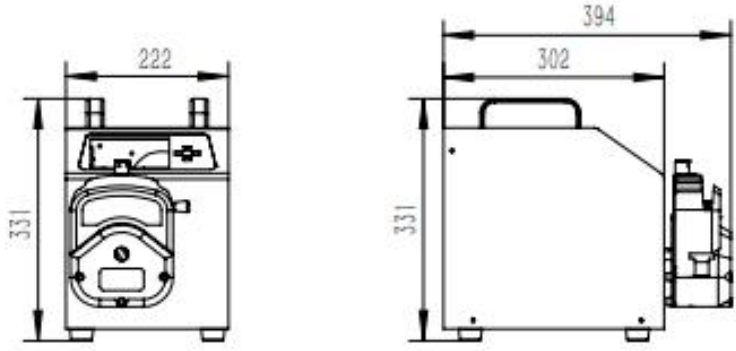
V6-3L Series+DZ25-3L Pump Head

Note: For each additional pump head in series, the longitudinal dimension shall be increased by 60mm.



V6-6L Series+DZ25-6L Pump Head

Note: For each additional pump head in series, the longitudinal dimension shall be increased by 60mm.



V6-12L Series +YZ35 Pump Head

Note: For each additional pump head in series, the longitudinal dimension shall be increased by 78mm.

10. Maintenance

- Check the running status of machine before starting it, normal operation can be put into use.
- Check for leakage, and correct fault which can be appeared.
- Clean liquid overflowed from the pump in time.
- Please turn off the power supply and unplug the power socket (Hold the socket instead of power cord) when liquid splashed on pump. Check whether liquid flows into the machine, if it does, please contact the manufacture.
- The foot pedal switch and other external control plugs must be connected or disconnected in the power-off status to prevent the external control interface from being burned.
- The user's power socket must have ground wire, and have reliable grounding.
- This product has no waterproof measures. Please take protective measures when using in water environment.
- This product does not have special certification such as medical certification. When it needs to be used in special fields such as medical and military, please self-certify.
- If the pump does not use for a long time, please clean it and keep it in dry and ventilated environment.
- The company shall not bear the direct and indirect losses caused by the malfunction or improper operation of this product.

11. Warranty and After-sales Service

We support 3 years warranty for the pumps, subject to the exceptions below. Our company shall not be liable for any loss, damage, or expense directly or indirectly related to or arising out of the use of its products. This warranty does not obligate our company to bear any costs of removal, installation, transportation, or other charges which may arise in connection with a warranty claim.

If the pump fails during the warranty period, after confirmation by our technical department, we will provide spare parts free of charge. Customers will need to bear the shipping cost.

Exceptions:

- The warranty shall not apply to repairs or service necessitated by normal wear and tear or for lack of reasonable and proper maintenance.
- All tubing and pumping accessories as consumable items are excluded.
- Electrical surge as a cause of failure is excluded.
- Chemical attack is excluded.
- Improper operation or man-made damage as a cause of failure is excluded.

MADE IN CHINA
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