

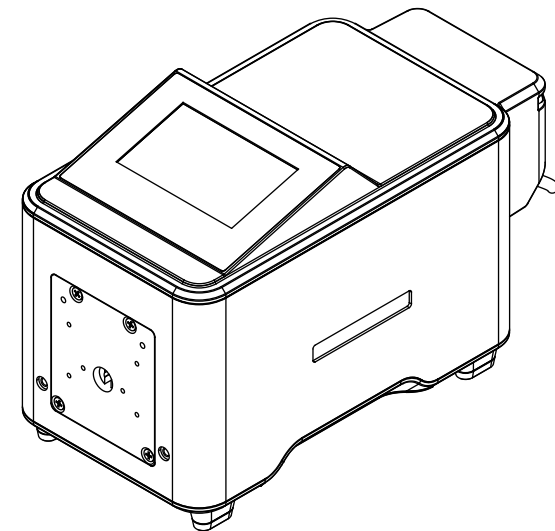


Manual No.

MFX06

High Protection

Peristaltic Pump Operation Manual



Website: www.ussolid.com
Customer Support: service@ussolid.com

Safety Precautions



Important information:

Be sure to read the manual carefully before operation!

	This icon warns: Keep fingers away from moving parts.
	This icon warns: Be careful.
	This icon warns: Be careful, the surface is hot.
	This icon warns: Be careful, electric shock hazard.
	This icon warns: To recycle this product.
	This icon warns: Personal protective equipment (PPE) must be worn.

Danger:

	Please use the same power supply as that on the nameplate of the machine, otherwise the equipment will be damaged!
	Please do not disassemble the shell or modify the interior of the equipment by yourself, otherwise it may cause malfunctions or even electric shock accidents!
	When installing and disassembling the pump tube, please turn off the power first and do not approach the rotating roller to prevent fingers and clothing from getting entangled in the mechanical mechanism!
	When installing and disassembling external control devices, please turn off the power first to prevent electric shock accidents or damage to the equipment!



Please connect the protective area of the machine to the ground, otherwise there is a risk of electric shock, electromagnetic interference, or induced static electricity!



If it is used to transport dangerous liquids, special operating procedures must be developed for this liquid, and personnel must also be prevented from being injured during use.



This product is not suitable for explosion-proof environment, and it should not be used in explosive environment.

Warning:



Before using, please confirm that the transmitted liquid will not react chemically with the tube or pump head, otherwise it will damage the tube or pump head. If unsure, please consult our engineers.



The tube is a vulnerable part, please check it regularly. Our company is not responsible for the loss caused by tube damage, especially the leakage of toxic, harmful and valuable liquids!



Due to the fact that the actual working environment conditions (including temperature, humidity, power supply voltage, etc.) exceed our technical specifications and the machine is damaged, our company is responsible for the paid warranty, but we will not be responsible for any other damages caused by it!



The primary protection for the operator against injury from the moving parts of the pump is provided by the pump head safety device. Please note that safety devices vary from product to product, depending on the model of pump head. See pump head section in manual.



If the pump was running before the power failure, the pump will automatically start when the power is turned back on.

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Peristaltic Pump Introduction

Peristaltic pump is a safe and reliable fluid transmission equipment, the fluid only contacts with the inner wall of the tube line, through squeeze the tube to realize the fluid transmission. Its unique design, which integrates tube lines without valves or seals, ensures fluid cleanliness, reduces the risk of leakage, and provides a more reliable, safe, and clean method of transmission.

Working Principle

The tube fits between the roller and the pressure block, forming a seal at the point of contact when squeezed. As the roller rotates and advances along the tube, the sealing contact advances with it. As the rollers pass, the tube returns to its original shape, creating a vacuum that draws in liquid. Before the roller reaches the end of the pressure block, a second roller starts compressing the tube at the beginning of the pressure block, isolating the fluid between the two compression points. As the first roller clears the pressure block, the second roller continues to expel the liquid through the discharge port of the tube.

At the same time, a new partial vacuum is created behind the second roller, sucking in more liquid from the inlet. There is no back flow and siphoning, and the pump effectively seals the tube when not in use, so there is no need for a separate valve.

Description

This series of peristaltic pumps adopts color LCD touch screen, and the operation interface is simple, intuitive and clear. This series of peristaltic pumps are mainly suitable for quantitative dispensing of various complex liquids, and can also be used for flow transmission control. It is more convenient to use the liquid volume dispensing mode when the accuracy of liquid volume dispensing is required. It is more convenient to use the time dispensing mode when the demand for production is high. When set to flow mode, it is completely equivalent to a flow type peristaltic pump.

Integrated RS485 bus interface, Ethernet interface, RS232 serial interface and other digital interfaces. With MODBUS communication protocol, it is easier to connect with other control equipment such as computer, human-machine interface, PLC, etc.

This series of high protection peristaltic pump provides a more stringent IP protection level than ever before, and can work stably in harsh environments such as humidity, weak acid, alkali, salt fog, dust, etc. It is applicable to food hygiene, biological agents, laboratories and other application fields.

Applications

- The pump body does not touch the liquid.
- No valve blockage.
- The inner surface is smooth and easy to clean.
- The suction lift can reach up to 8 meters of water column.
- Low shear force, can be used to transfer emulsions or liquids containing foam, cells, etc.
- Suitable for transporting liquids containing gases, magnetic beads, or suspensions containing small particles.
- It is suitable for accurate metering and quantitative feeding, and high filling accuracy can be obtained by selecting appropriate tube diameter and filling efficiency.
- Suitable for transporting viscous liquids.
- The liquid only comes into contact with the tube
- If use food and medical grade tube, this pump can be used for food and medical transmission and filling.
- Replacement tube of special material to transfer abrasive liquids.

Functions and Features

- Color LCD display, wide viewing angle, status at a glance.
- It has positive and negative reversible direction, start and stop, full speed function.
- The speed resolution is 0.1 rpm, and the accuracy error is less than $\pm 0.2\%$.
- Flow display and flow control.
- Flow calibrate function.
- It has five working modes: flow mode, volume mode, time dispensing mode, programming mode and external control mode.

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- Liquid volume dispensing, five groups of dispensing parameters are stored in the time dispensing mode.
- External analog variable-speed, high and low level control, start/stop, reversible direction .
- RS485 bus interface, support MODBUS-RTU protocol, facilitate connection with various control equipment, and realize remote automatic monitoring and control.
- RS232 serial interface, support MODBUS-RTU protocol, facilitate connection with personal computer and industrial control computer, and realize automatic monitoring and control.
- Ethernet network interface, supporting MODBUS-TCP protocol, can realize remote monitoring and control through the network, and realize complex automation applications.
- The internal structure adopts double-layer isolation design, and the circuit board is sprayed with three-proofing paint to achieve the effect of dust and moisture prevention.
- Strong anti-interference characteristics, wide voltage design, suitable for complex power supply environment.
- Aluminum shell is easy to clean and effectively protects against the corrosion of various acids, alkalis, salts and organic solvents.

Components and Interfaces

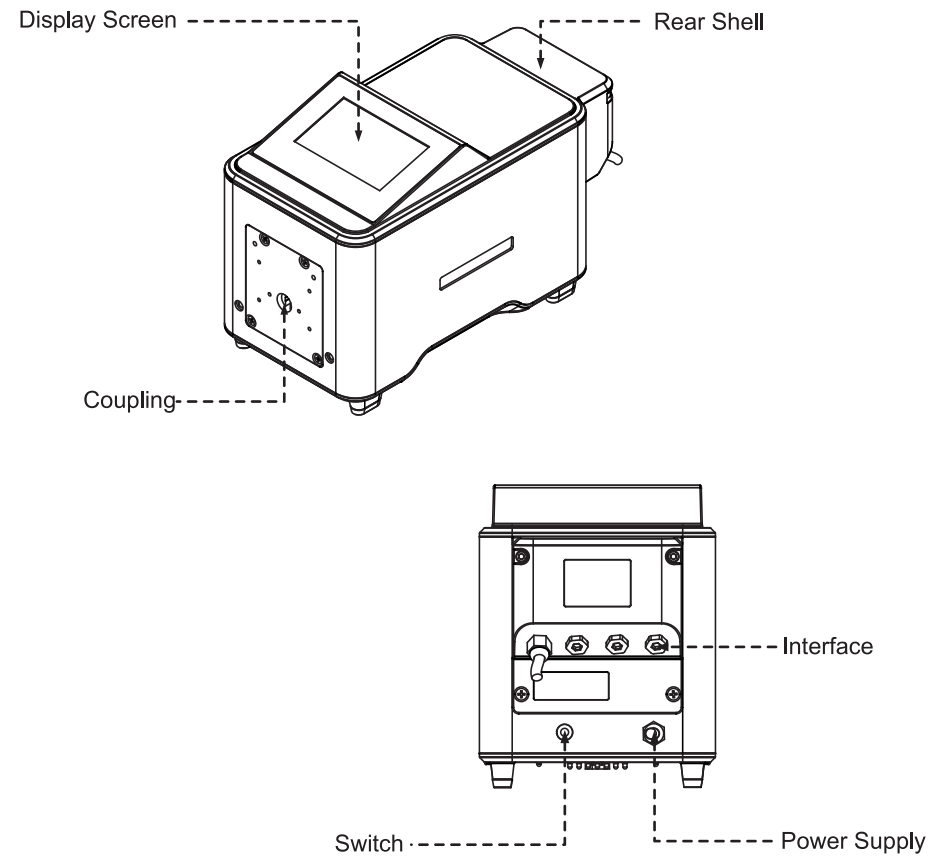


Figure 1 Components and Interfaces

Operation and Display Instructions

◆ Panel and Key Description

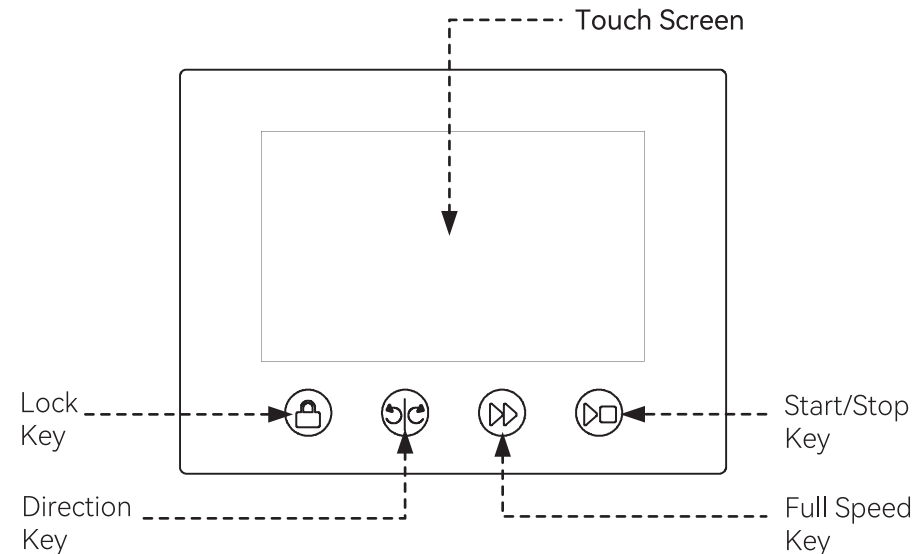


Figure 2 Display Panel

The pump supports touch screen operation, and the touchscreen adopts a four-wire resistive screen. Touch operation is safe and reliable, suitable for industrial use.

The common functions of the device are designed as physical keys to realize quick operation. Key functions are as follows:

[Lock Key]: Used to lock and unlock the touch screen. Relevant parameters cannot be modified when the touch screen is locked, which can avoid misoperation during operation.

[Direction Key]: Control the direction of rotation of the drive.

[Full Speed Key]: Control the full speed state of the driver.

[Start/Stop Key]: Control the start and stop of the driver.

◆ Parameter Setting Interface

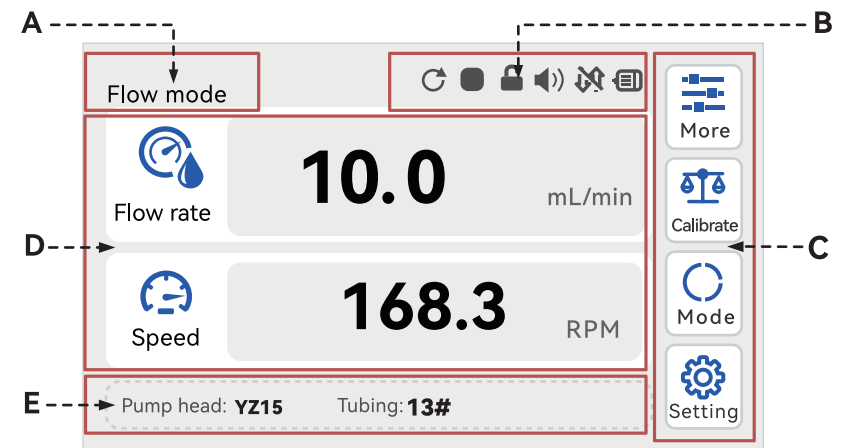


Figure 3 Parameter Setting Interface

You can set work-related parameters in the parameter setting interface. Based on different working modes, the specific parameters are slightly different. The figure shows the parameter setting interface under the flow mode. The interface is divided into five main operation display areas according to the function. The functions are as follows:

Zone A: Working mode display. Display the current working mode (flow mode, volume mode, time dispensing mode, programming mode, external control mode).

Zone B: State indication. Using icons to indicate the current equipment states. For specific icons and their corresponding status, see the icon and status description.

Zone C: Function buttons. There are four function buttons. Click them to jump to the relevant parameter settings or function options.

Zone D: For parameter setting, working parameter setting zone, different parameters can be set according to different working modes.

Zone E: This is for information prompt, which displays the pump head, tube, formula and other information set by the user. It is used for customer monitoring and confirmation of relevant parameter settings.

◆ Parameter Input Interface

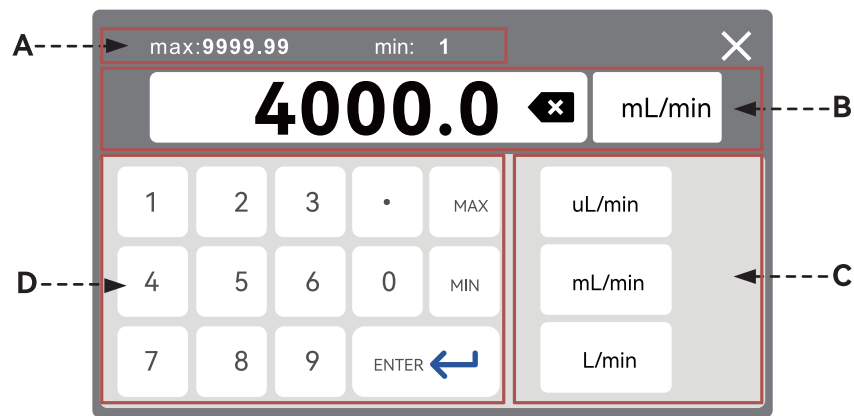


Figure 4 Parameter input setting interface

The user can click the flow, liquid volume and other parameter display areas to be set in the mode parameter setting interface. Enter the parameter setting interface to set the relevant parameter values and units. The setting interface is slightly different based on different input parameters. The figure shows the flow input interface, which is divided into four main operation display areas according to functions, and the functions are as follows:

- Zone A:** Display the maximum and minimum values that can be entered.
- Zone B:** Shows the current input value and unit displayed.
- Zone C:** This is a zone for input the unit. Click to input the demanding unit.
- Zone D:** This is a zone for input the value. Click to input the demanding value.

◆ Operation State Interface

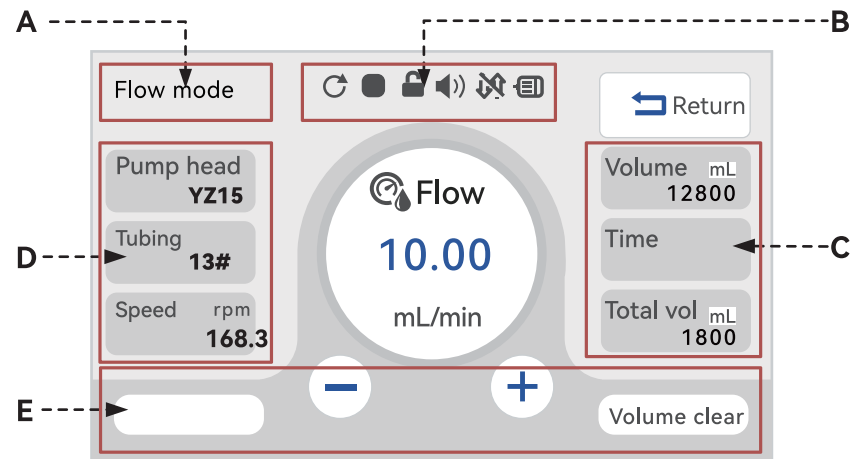


Figure 5 Operation status interface

The user can observe and operate the working status of the driver in the mode operation status interface. Based on different working modes, the specific status display is slightly different. The figure shows the operation states display interface under the flow mode. The interface is divided into five main operation display areas according to the function. The functions are as follows:

- Zone A:** Working mode display. Shows the current working mode (flow mode, volume mode, time dispensing mode, programming mode, external control mode).
- Zone B:** State indication. Using icons to indicate the current equipment states. For specific icons and their corresponding status, see the icon and status description.
- Zone C:** State display. Display the current liquid volume transmitted by the driver, running time, accumulated liquid volume and other information.
- Zone D:** Show the pump head model, tube, speed and other information.
- Zone E:** Users can complete fine adjustment, cumulative reset and other operations in this area.

 **Note:** This interface can only return to the mode parameter setting interface when the driver stops running.

◆ Full Speed State Interface

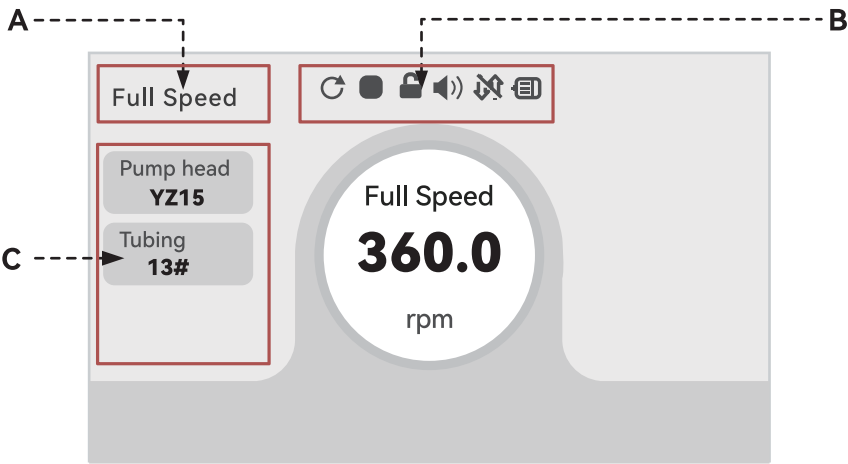


Figure 6 Full Speed State Interface

Users can enter full speed operation by clicking the [Full Speed] key. In this state, the drive working at its set maximum speed. Generally used for cleaning, filling and other operations. The interface is divided into four main operation display zones according to functions, and the functions are as follows:

Zone A: Display the mode, currently using, which is full speed mode.

Zone B: Working state indication. Using icons to indicate the current equipment states. For specific icons and their corresponding status, see the icon and status description.

Zone C: Show pump head and tube.

◆ Additional Settings Interface

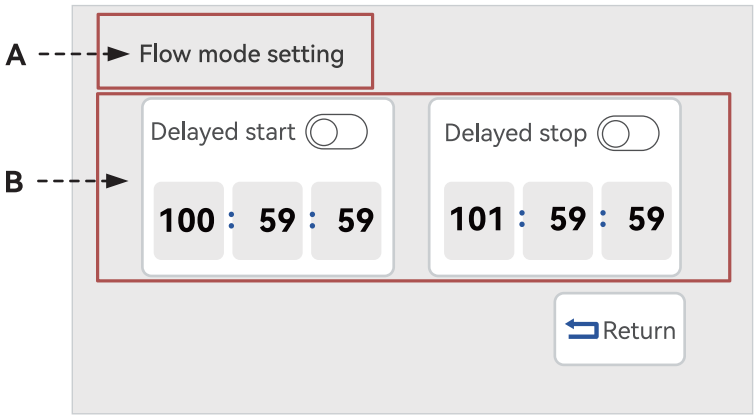


Figure 7 Additional Parameters Interface

The user can set some auxiliary parameters in the current mode in the mode more settings interface. Based on different working modes, the specific auxiliary parameters are slightly different. The figure shows the mode more parameters interface under flow mode. The interface is divided into two main operation display areas according to function, and the functions are as follows:

Zone A: The title shows the set working mode.

Zone B: System Parameter Setting In the flow mode, you can set the time and enable of timing start and timing close.

◆ Icon and States Description

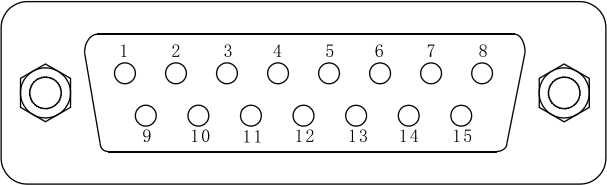
The device uses icons as states display, which is simple and intuitive. The icons and their corresponding states are as follows:

ICON	DESCRIPTION	REMARKS
	Current setting or running direction of the drive, clockwise	
	Current setting or running direction of the driver, counterclockwise	
	Driver current working state, stop	
	Driver current working state, running	Working operation status includes non-motor operation status such as cycle interval, delayed start, etc
	Driver locking state, unlock	
	Driver locked state, lock	
	Motor working state, normal	
	Motor working state, abnormal	
	Driver Modbus connection state, disconnected	
	Driver Modbus connection state, connected	
	Driver buzzer state, mute	
	Driver buzzer state, beep	

Table 1 Description of Icon Function

Driver Interface Pin Definition

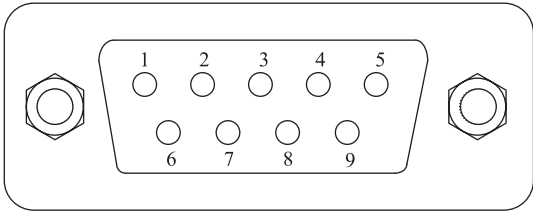
◆DB15 Hole Interface Definition (MF006)



DB15 Pin	English Notes	Description
1	ADC	The positive input of external analog signal
2	B-	Communication interface, B pole of RS485
3	A+	Communication interface, A pole of RS485
4	VCC	External DC power input
5	DAC	Analog voltage signal output
6	IN1	Input signal 1 (direction)
7	OUT2	Output signal 2
8	COM	External commons
9	AGND	Negative input of external analog signal
10	12V	Internal +12V power supply output
11	0V	Internal power ground
12	OUT1	Signal output 1
13	IN0	Signal input 0 (start/stop)
14	IN2	Signal input 2 (pulse)
15	OUT0	Signal output 0

Table 2 Definition of DB15 Pin Interface

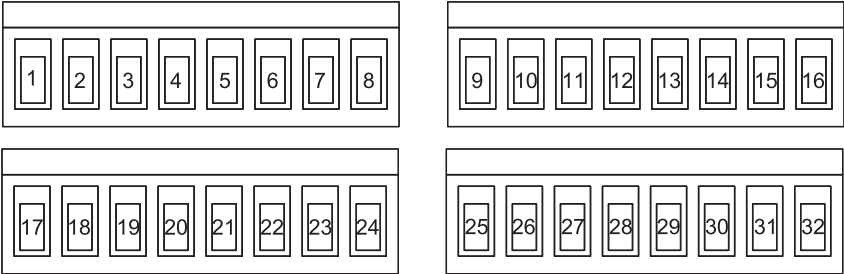
◆DB9 Hole Interface Definition



DB9 Pin	English Notes	Description
1		
2	RXD	RS232 accepts data
3	TXD	RS232 sending data
4		
5	GND	Signal ground line
6		
7		
8		
9		

Table 3 Definition of DB9 Pins

◆Plug-in Terminal Block Interface Definition (MF106)



No.	English Notes	Description
1	COM	External commons
2	IN0	Signal input 0 (start / stop)
3	IN1	Input signal 1 (direction)
4	IN2	Signal input 2 (pulse)
5	COM	External commons
6	OUT0	Signal output 0
7	OUT1	Signal output 1
8	OUT2	Output signal 2
9	COM	External commons
10	VCC	External power input
11	0V	Ground of Internal power source
12	12V	Positive of internal +12V power source
13、14、15、16	NC	Keep
17	B-	Communication interface, RS485 bus B end
18	A+	Communication interface, RS485 bus A end
19	B-	Communication interface, RS485 bus B end
20	A+	Communication interface, RS485 bus A end
21	CANL	Communication interface, CAN bus L end
22	CANH	Communication interface, CAN bus H end
23	CANL	Communication interface, CAN bus L end
24	CANH	Communication interface, CAN bus H end
25	DAC	Analog voltage signal output
26	AGND	Negative input of external analog signal
27	ADC	The positive input of the external analog signal
28	AGND	Negative input of external analog signal
29、30、31、32	NC	Keep

Table 4 Definition of Plug-in Terminal Interface

Operation Instructions

◆ Before Operation

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

◆ Install Pump Head and Tube

- The equipment is suitable for YZ15, YZ25, KZ25, DMD25, YZ35 pump head
- Align the flat shaft of the pump head with the groove of the driver coupling and push it in, rotate the pump head to align the locating hole at the rear of the pump head with the locating pin of the driver pump head bracket, fit the pump head with the pump head bracket, and tighten the two fixing screws through the fixing hole of the pump head.
- Pull the pump head lever to open the pump head, put the tube into the pump head smoothly and straighten it, pull the lever in the opposite direction to the horizontal position, and the tube is installed.

Note: When installing the YZ35 pump head, the positioning pin on the pump head bracket must be removed, as shown by the arrow in the figure below.

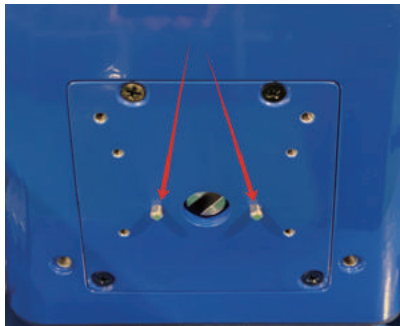


Figure 8 Pump Head Installation Instructions

◆ Power Connection

- The power supply should match the power supply used as indicated by the nameplate on the rear of the case.

- Plug the supplied power cord into the power socket on the rear of the drive.

◆ First Power on Wizard

When customers use the device for the first time, they need to set relevant parameters according to the wizard prompts. To ensure the reliable operation of the equipment. The setting process is as follows:

Step 1: Start the machine to display the boot screen, and automatically enter the next step after 3 seconds

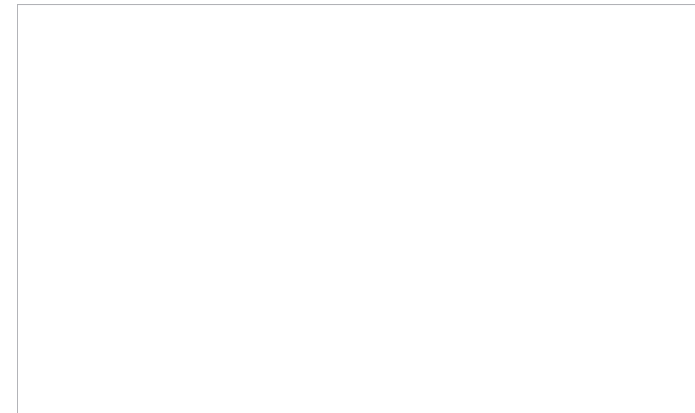


Figure 9 Power On Interface

Step 2: Choose the language

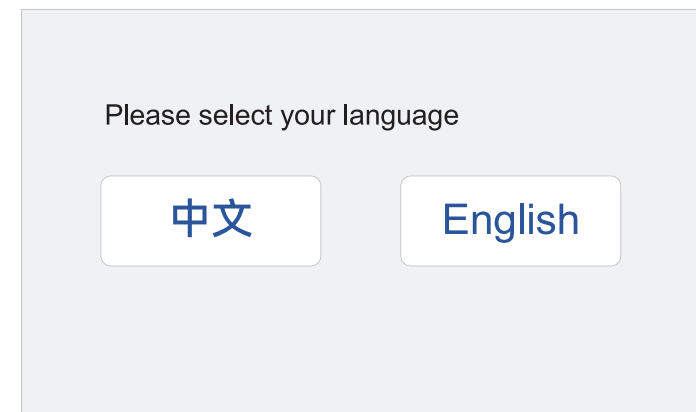


Figure 10 Language Selection interface

Step 3: Choose the pump head model

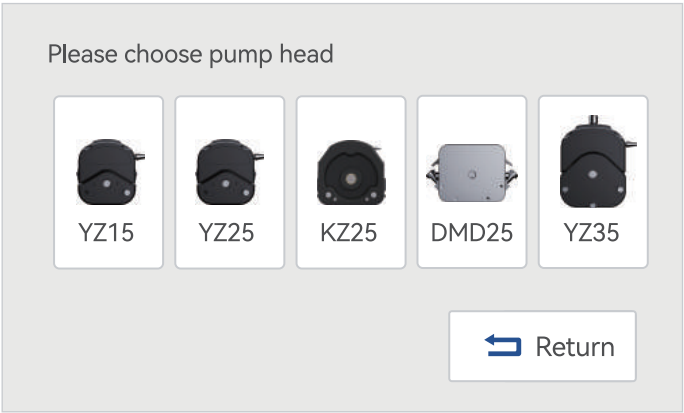


Figure 11 Pump Head Selection Interface

Step 4: Choose the using tube, or choose the appropriate tube model according to the flow range

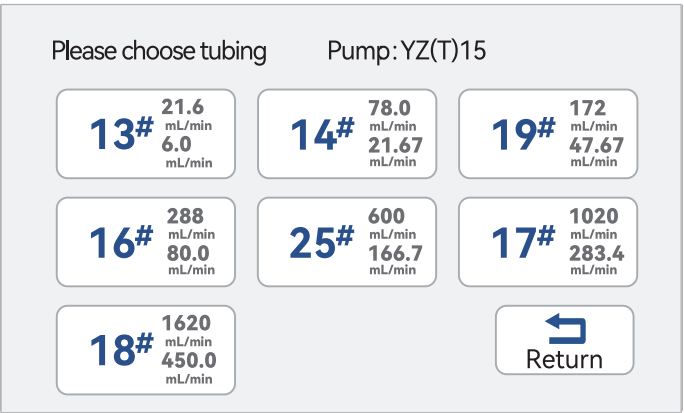


Figure 12 Tube Selection Interface

Step 5: Choose the required working work mode

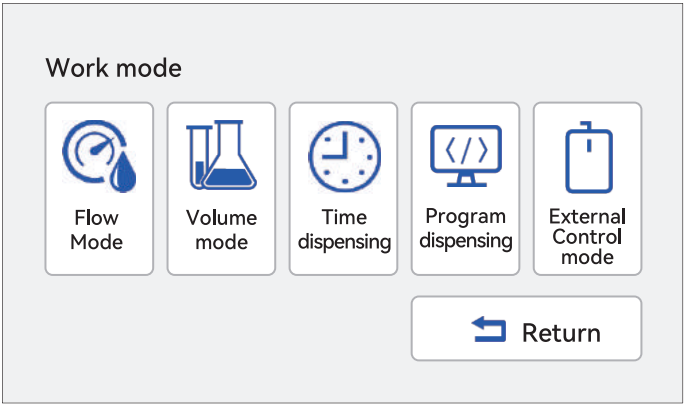


Figure 13 Working Mode Selection Interface

Step 6: The system finish setting and can be used normally

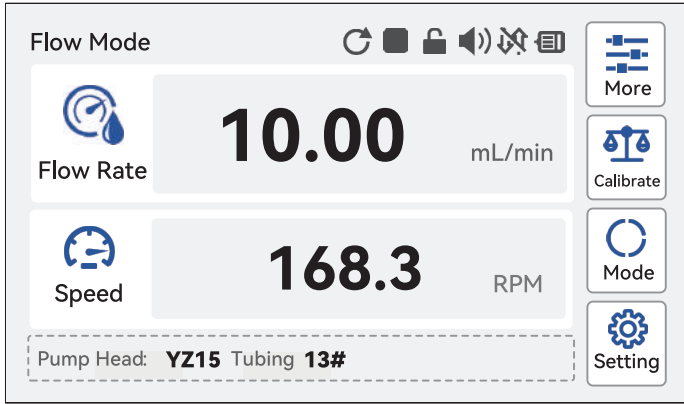


Figure 14 Flow Mode Operation Interface

◆ User Permissions and Screen Locking

The drive has four levels of user permissions to ensure the reliability of parameter setting and working process. Avoid economic and property losses caused by misoperation of the drive during using. The permissions from high to low are administrator permissions, technician permissions, operator permissions, and visitor permissions (locked status). You can enter the password to obtain the corresponding permissions and then perform the relevant operations.

By default, the driver has operator permissions when starting up, and can perform parameter setting, flow correction and other operations. By clicking the [Lock] key, the driver will enter the screen lock state, and the permission will be reduced to the guest permission. In the locked state, you can click the [Lock] key or click the effective touch button on the screen to pop up the permission password input interface, and enter the corresponding permission password to obtain the corresponding permission.

The operational functions of permissions at all levels are as follows:

Functions	Visitor	Operator	Technician	Administrators
Stop mission	X	X	X	X
Start mission	-	X	X	X
Full speed mission	-	X	X	X
Direction switching	-	X	X	X
System Parameter Setting	-	-	X	X
Additional Parameter setting	-	-	X	X
Calibration	-	-	X	X
Mode Switch	-	-	X	X
System Parameters	-	-	-	X
Permission password management	-	-	-	X

X: allow -: prohibit

Table 4 User Permission

The system defaults to 0000 for all levels of permissions. When the password is set to 0000, when the user needs to unlock the permission, he can directly

obtain the highest permission with the password set to 0000 without a password. That is, when the permission password is not set, click [Lock] to directly obtain the administrator permission.

• Password setting

Setting (administrator authority) - Password setting, enter the password setting interface. In this interface, users can set the password of non-guest permissions separately.

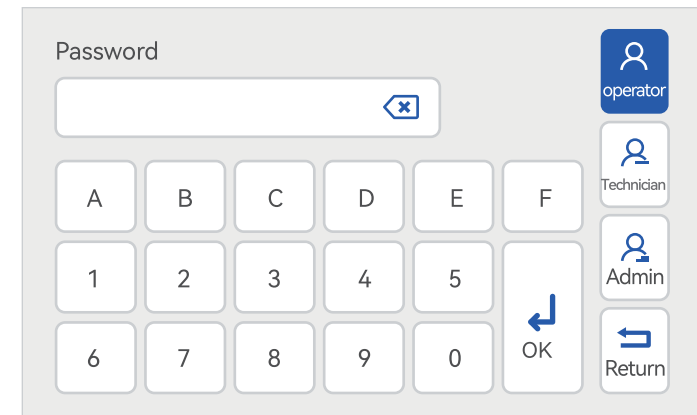


Figure 15 Password Setting Interface

Password setting process:

Click [Operator], [Technician] or [Admin] to confirm permissions.

Enter a 4-digit password, which can consist of digits 0-9 and characters A-F. When the password is set to 0000, the permission is blocked, and no password is required to unlock.

Click [OK] to complete the password setting, or click [Return] to terminate the operation and exit.

• Prompt of Insufficient Authority

When the user's permission is insufficient, the system will automatically pop up a prompt window of permission not always. As shown below:

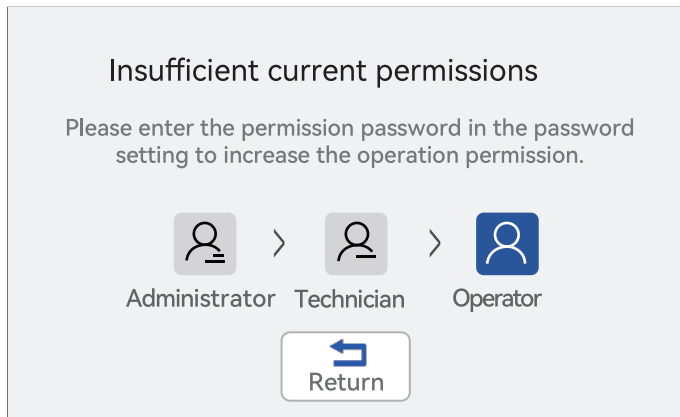


Figure 16 Permission selection interface

In this interface, the current user's permission will be displayed. Users can enter a password by clicking any user rights icon.

◆Flow Calibration and Fine Adjustment

The transmission accuracy of the product can be improved through calibration during using. Through our patented algorithm, customers can quickly complete the correction. Due to the characteristics of peristaltic pump, it is generally recommended that an effective correction should be carried out under the following conditions:

- After replacing the tube, pump head and other hardware.
- Drive has not been used for a long time.
- Adjust the position of the tube, observe the usage of the tube, etc., after opening and closing the pump head;
- When the tube flow changes significantly after 4 hours of continuous operation.
- Adjust the flow parameter setting greatly, or replace the transmitted fluid.

The drive provides two calibration methods. One method is standard calibration. The system guides customers to calibrate in the way of calibration wizard.

The other is online fine tuning. The customer can perform manual fine tuning during operation in some modes to compensate for the flow. Fine adjustment is generally used for flow attenuation compensation under continuous operation.

Standard Calibration and Wizard Workflow

1. Preparation: Before conducting standard calibration, the customer needs to prepare standard measuring tools such as a balance and measuring cup to measure the total volume of fluid actually transferred for input into the calibration process. At the same time, it is recommended to use a fluid with viscosity close to or the same as the actual transmission fluid, and correct it at the actual flow rate.
2. Fill the tube: Click the [Full Speed] key to make the fluid fill the tube line quickly eliminate the bubble impurities in the tube and other factors affecting the measurement.
3. Choose the calibration mode the [Calibration] key in the function area to enter the calibration mode choose interface.

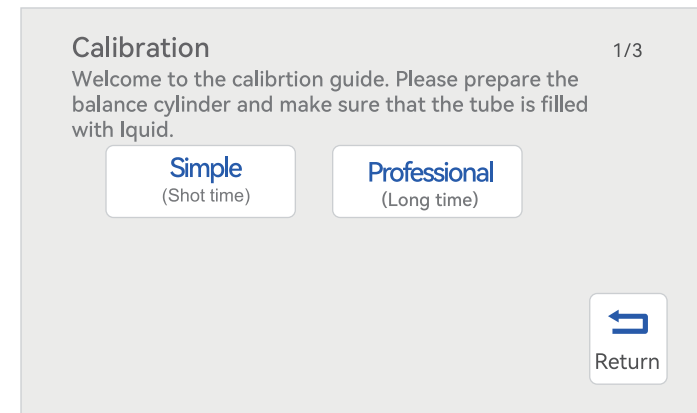


Figure 17 Calibration interface

This interface can choose two correction modes: [Simple] and [Professional]

- **Simple:** The fast mode takes a short time and is suitable for applications with low accuracy requirements.
- **Professional:** The high accuracy mode takes relatively long time and achieves higher accuracy.

Users can choose the correction mode according to their own application requirements.

4. Start the actual dispensing and measure the input:

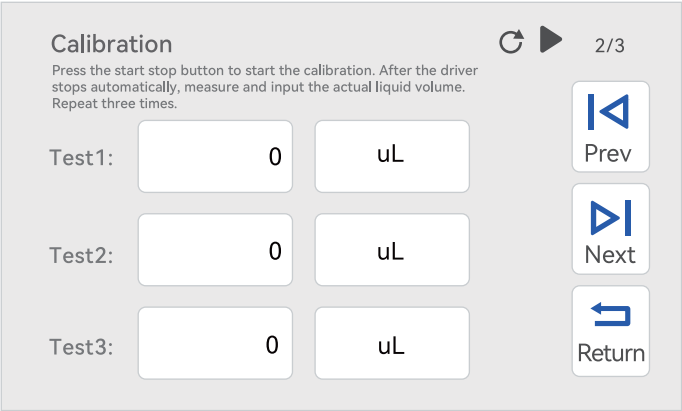


Figure 18 Calibration test liquid volume input interface

In the measurement input interface, the user needs to manually click the [Start/Stop] key to trigger a calibration dispensing. At this time, the driver starts to carry out fluid transmission. According to the chose calibration mode and the set flow parameters, the driver automatically runs for a period of time and then automatically stop Then the customer needs to weigh the liquid volume obtained and convert it into the liquid volume unit displayed on the current page, and then enter the actual liquid volume.

In order to improve the accuracy of calibration and reduce human error, it is recommended to repeat the process of three subpackage measurements and input the results of three measurements in turn.

Click [Next] to complete the calibration measurement input.

Complete calibration and confirm

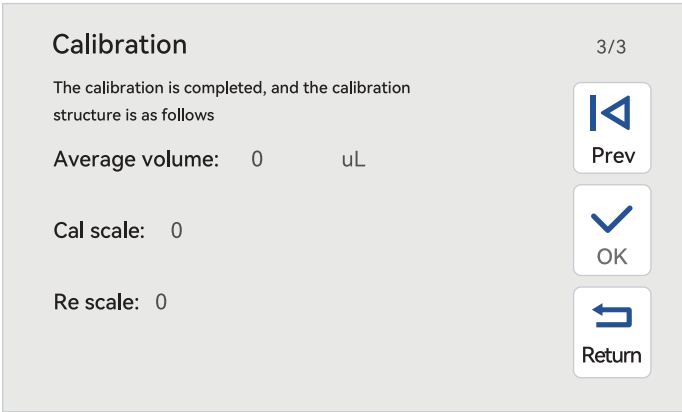


Figure 19 Result Interface

After the measurement input is completed, the driver automatically calculates the average liquid volume and correction coefficient. The customer can preliminarily determine whether there is obvious abnormality in the correction result according to the reference coefficient prompted in the interface.

If you have no objection to the correction result, you can click [OK] to finish the correction.

If you have any doubts about the calibration results, you can click [Prev] to return to the previous step and start the calibration again.

◆Communication Interface and Protocol

The driver supports RS232, RS485, Ethernet port and other communication interfaces. Communication parameters can be set.

The customer can remotely monitor and control the operation of the driver through the chose communication interface. Users can modify the parameters of each communication interface in the Settings - System Settings interface to adapt to different system integration requirements.

RS232 parameter setting

RS232

Baud (bps)

☐ 115200 ☐ 38400 ☐ 19200 ☐ 9600

Parity Bit

☐ None ☐ Odd ☐ Even

Return

Figure 20 RS232 parameter setting Interface

RS485 parameters:

RS485

Baud (bps)

☐ 115200 ☐ 38400 ☐ 19200 ☐ 9600

Parity Bit

☐ None ☐ Odd ☐ Even

Return

Figure 21 RS485 parameters setting Interface

RS232 parameters:	RS485 parameters:
Baud(bps): 9600 (factory default)	Baud(bps): 9600 (factory default)
Start bit: 1	Start bit: 1
Data bit: 8	Data bit: 8
Parity Bit: Even (factory default)	Parity Bit: Even (factory default)
Stop bit: 1 bit	Stop bit: 1 bit

Note: After the parameters are modified, restart the device to take effect.

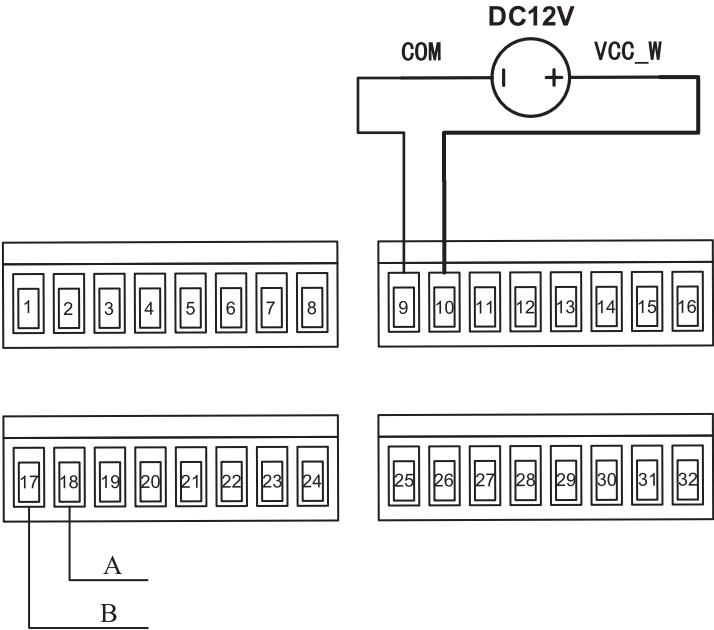


Figure 22 Communication External 12V Power Supply Wiring Diagram

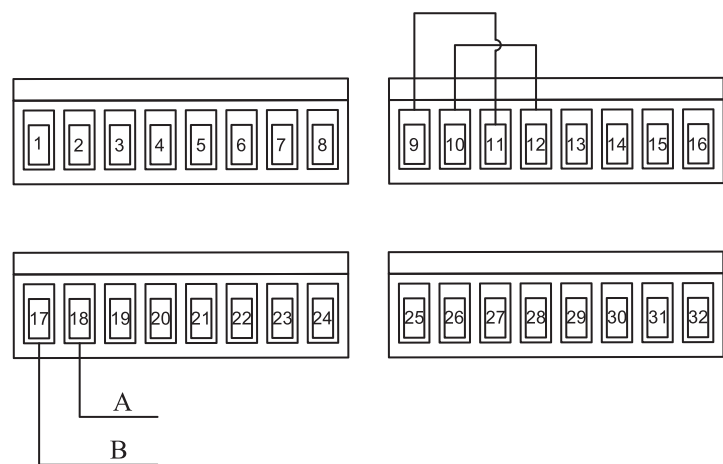


Figure 23 Communication Internal 12V Power Supply Wiring Diagram

Network Interface Parameters

IP

1921680240

Gateway

19216801

Server Port

24

Return

Figure 24 Network Parameter Setting

Ethernet network interface parameters:

IP address: 192.168.0.240 (factory default)

Gateway address: 192.168.0.1 (factory default)

Baud(bps): 24 (factory default)

Protocol: TCP-IP

Note: After the parameters are modified, restart the device to take effect.

◆MODBUS Protocol

The communication of the drive is based on the MODBUS protocol. The serial port (RS232, RS485) uses the MODBUS-RTU protocol stack, and the network port (Ethernet) uses the MODBUS-TCP protocol stack. Through memory mapping technology, users can select different physical interfaces to access the drive.

Through this protocol, it is convenient to form centralized monitoring and distributed control with various industrial equipment, and support various industrial controllers (including man-machine interface, industrial computer, computer, PLC, etc.). The program adopts modular design, which is stable and reliable.

The function codes supported by the protocol are shown in the following table:

Function Code	Name	Function
0x03	Read Holding Register	Get the current binary value in one or more holding registers
0x04	Read input register	Get the current binary value in one or more input registers
0x06	Write a single register	Load the specific binary value into a holding register
0x10	Write multiple registers	Load specific binary values into a series of continuous holding registers

Table 5: Communication Protocol Function Codes

For register address and function, refer to the Description of 《Communication Address of High Protection Peristaltic Pump》.

◆Flow Mode Parameter Setting

The flow mode can be used for continuous fluid transmission. By setting the timing start and timing shutdown parameters, the functions of delayed start and delayed shutdown can be realized. The parameter setting interface is as follows:

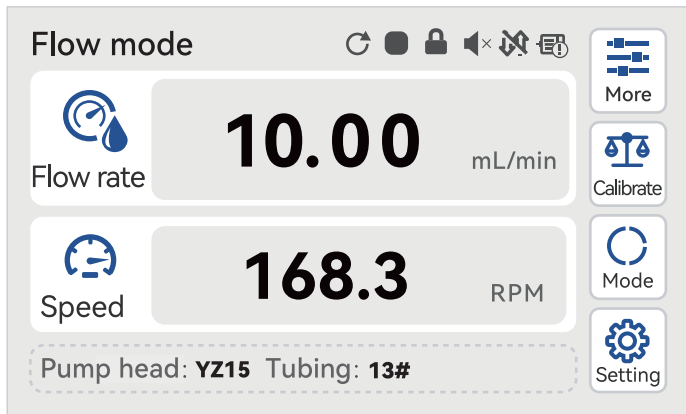


Figure 25 Flow Mode Interface

- [Flow rate] The current flow is displayed in the area. Click to set the flow and unit. After the setting is complete, the rotational speed changes accordingly.
- [Speed] displays the current rotational speed.
- [More] key, click to enter the quick parameter setting interface.
- [Calibrate] key, click to enter the flow calibration interface.
- [Mode] key click to enter the mode setting interface.
- [Setting] key click to enter the system settings interface.

Quick parameter setting interface:

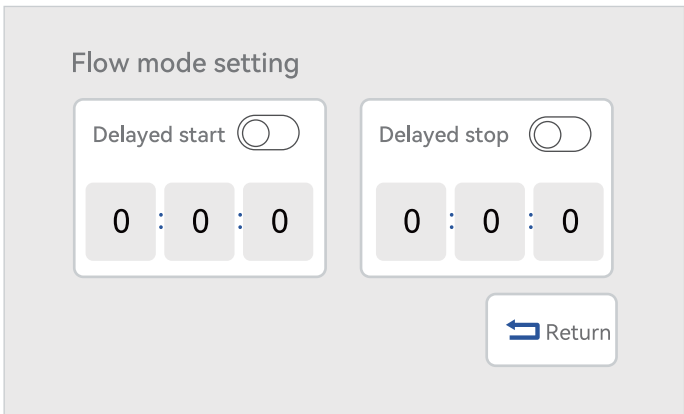


Figure 26 Flow Mode Quick Setting Interface

- [Delayed start] Area displays the timing start time, which can be set in hours, minutes and seconds. The enable button in the upper right corner can set the enable and disable of the function. The set time is valid only if the function is enabled.
- [Delayed stop] Area displays the timing off time, and the combination of hours, minutes and seconds can be set respectively. The enable button in the upper right corner can set the enable and disable of the function. The set time is valid only if the function is enabled.

◆Volume Mode Parameter Setting

Volume mode can be used for quantitative fluid transmission. The driver has built-in 5 groups of formula storage space, and customers can choose different formula storage parameters and call parameters according to their own needs.

The volume mode can use the liquid volume-flow combination to determine the transmission rate, and also supports the liquid volume-time combination to determine the transmission rate. Loop and interval settings are supported.

The parameter setting interface is as follows:

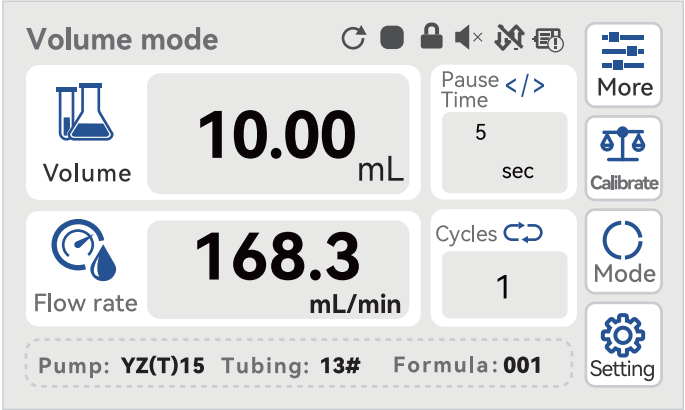


Figure 27 Volume Dispensing- Flow Setting Interface

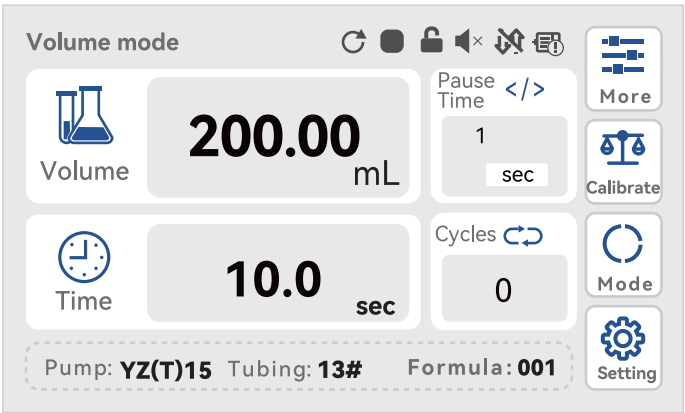


Figure 28 Volume Dispensing- Time Setting Interface

[Volume] Displays the current liquid, click to set the liquid, and the unit.
[Flow rate] Displays the current flow, click to set the sub-load flow and unit. Available when **[Flow rate]** is selected as the transmission rate unit.
[Time] Displays the current time, click to set the packing time and unit. Available when **[Time]** is selected as the transmission rate unit. When using

the volume-time mode, it is the user's responsibility to confirm the validity of the set time. When the set time is lower than the dispensing time of the current liquid volume at the highest speed, the drive will dispense according to the maximum speed and ensure a reliable liquid volume. In this case, the actual dispensing time may be greater than the set time.
[Pause time] displays the cycle interval time to which the loop function is applied (the Loop setting is not 1), click to set the interval time and unit.
[Cycle] displays the number of cycles. 0 means infinite loop, and the factory default is 1.
[More] key, click to enter the quick parameter setting interface.
[Calibrate] key, click to enter the flow calibration interface.
[Mode] key click to enter the mode setting interface.
[Setting] key click to enter the system settings interface.

Quick parameter setting interface:

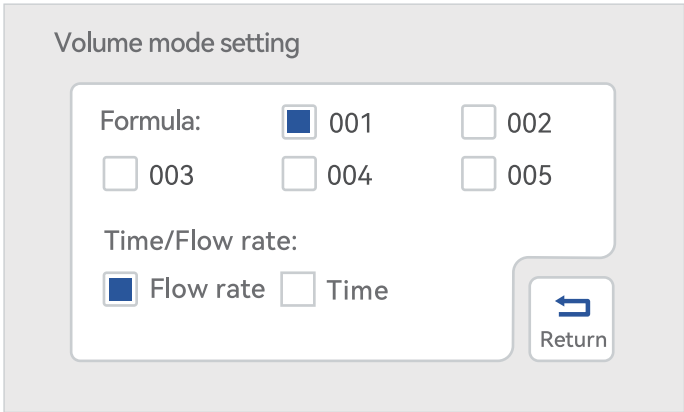


Figure 29 Volume Dispensing Mode Quick Setting Interface

[Index] This mode supports 5 groups of formula storage, and users can switch working parameters by switching different formulas. The parameters of the current formula need to be changed to store in the current formula in real time. The formula only saves the set parameters, it is recommended to

check the dispensing accuracy after changing the formula, and calibrate it in time.

[Time/Flow rate] This mode supports two transmission rate (traffic) setting methods. By clicking to switch different units, the combination of liquid volume-flow rate and liquid volume-time can be switched.

◆Time Dispensing Mode Parameter Settings

Time dispensing mode can be used for timed fluid transfer. The driver has built-in 5 groups of formula storage space, and customers can choose different formula storage parameters and call parameters according to their own needs. Loop and interval settings are supported.

The parameter setting interface is as follows:

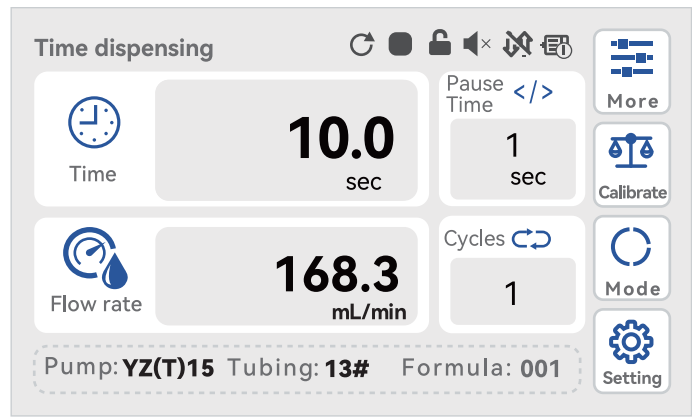


Figure 30 Time Dispensing Mode interface

- [Time]** Displays the current time, click to set the packing time and unit.
- [Flow rate]** Displays the current flow, click to set the sub-load flow and unit.
- [Pause time]** displays the cycle interval time to which the loop function is applied (the Loop setting is not 1), click to set the interval time and unit.
- [Cycle]** displays the number of cycles. 0 means infinite loop, and the factory default is 1.
- [More]** key, click to enter the quick parameter setting interface.
- [Calibrate]** key, click to enter the flow calibration interface.

- [Mode]** key click to enter the mode setting interface.
- [Setting]** key click to enter the system settings interface.

Quick parameter setting interface:

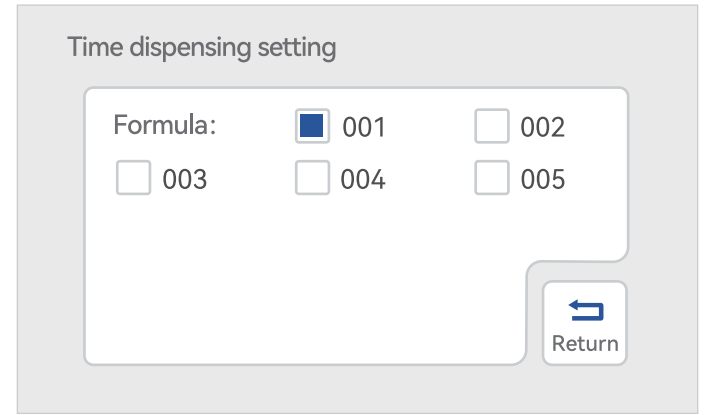


Figure 31 Time Dispensing Mode Quick Setting Interface

[Index] This mode supports 5 groups of formula storage, and users can switch working parameters by switching different formulas. The parameters of the current formula need to be changed to store in the current formula in real time. The formula only saves the set parameters, it is recommended to check the dispensing accuracy after changing the formula, and calibrate it in time.

◆Programming Mode Parameter Settings

Programming mode is available for programmatic fluid transfer. The driver has a built-in 30 sets of programming step space, customers can choose different lengths of programming steps according to their needs, and each programming step space, customers can choose different lengths of programming steps according to their needs, and each programming step can be individually enabled and disabled. Each programming step supports cyclic and interval settings.

The parameter setting interface is as follows:

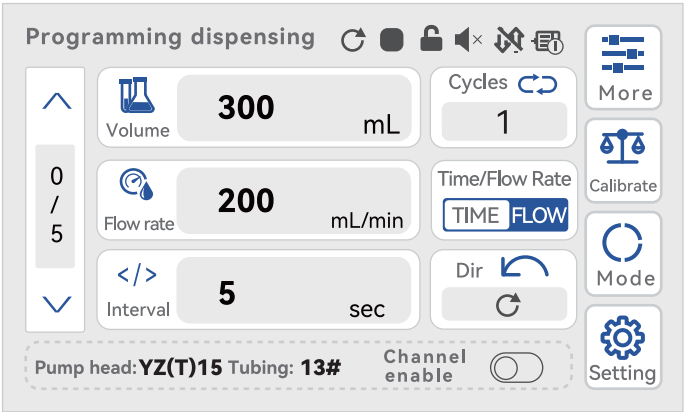


Figure 32 Programming Mode(Flow Rate) Interface

- [Volume]** Displays the current liquid, click to set the liquid, and the unit.
- [Flow rate]** Displays the current flow, click to set the sub-load flow and unit. Available when **[Mode]** is turned off.
- [Time]** Displays the current time, click to set the packing time and unit. Available when **[Mode]** is on.
- [Pause time]** displays the cycle interval time to which the loop function is applied (the Loop setting is not 1), click to set the interval time and unit.
- [Mode]** can set the turn on and off of the liquid-time function.

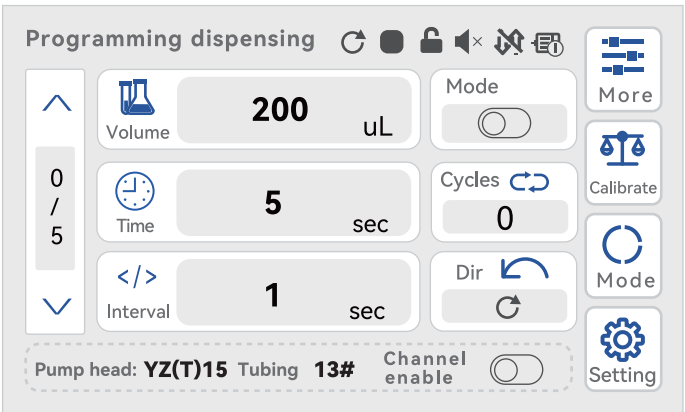


Figure 33 Programming Mode(Time) Interface

[Cycle] displays the number of cycles. 0 means infinite loop, and the factory default is 1.

[Dir] The direction of rotation of the current step.

[Step Enable] When step enable is enabled, the current step participates in the programming process. When step enable is turned off, the programming process skips the current step.

[More] key, click to enter the quick parameter setting interface.

[Calibrate] key, click to enter the flow calibration interface.

[Mode] key click to enter the mode setting interface.

[Setting] key click to enter the system settings interface.

Quick parameter setting interface:

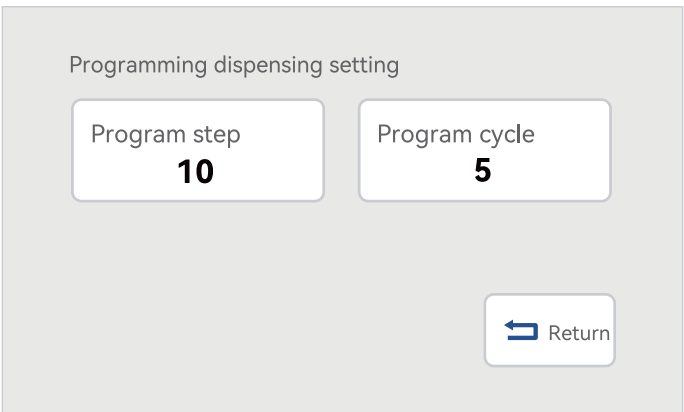


Figure 34 Programming Mode Quick Setting Interface

[Program step] Total programming steps This mode supports up to 30 steps

[Program cycle] Overall number of cycles. The number of programming cycles. 0 means infinite loop, factory default 1.

◆ External Control Mode Parameter Setting

The external control mode can be used for external signal control drivers such as analog and digital. Automatic integration of the drive with other systems is possible via external signals. The parameter setting interface is as follows:

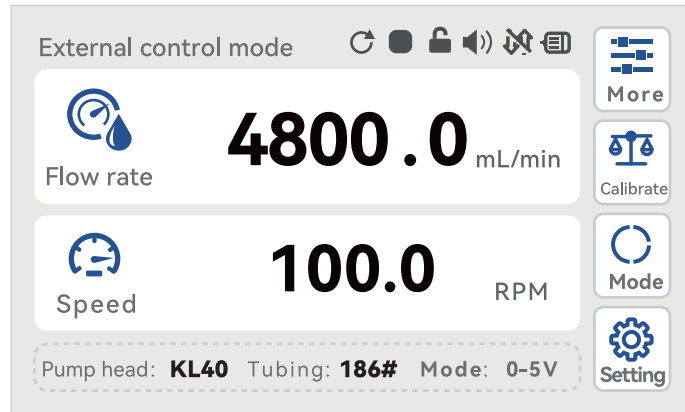


Figure 35 External Control Mode Interface

[Flow rate] displays the current flow rate. When [Control Method] selects the foot switch, click to set the flow rate and unit. After the setting is complete, the rotational speed changes accordingly. When [Control Mode] selects 0-5V, 0-10V, 4-20mA, the flow rate changes with the external analog signal input and cannot be set.

[Speed] displays the current rotational speed.

[More] key, click to enter the quick parameter setting interface.

[Calibrate] key, click to enter the flow calibration interface.

[Mode] key click to enter the mode setting interface.

[Setting] key click to enter the system settings interface.

Quick parameter setting interface:

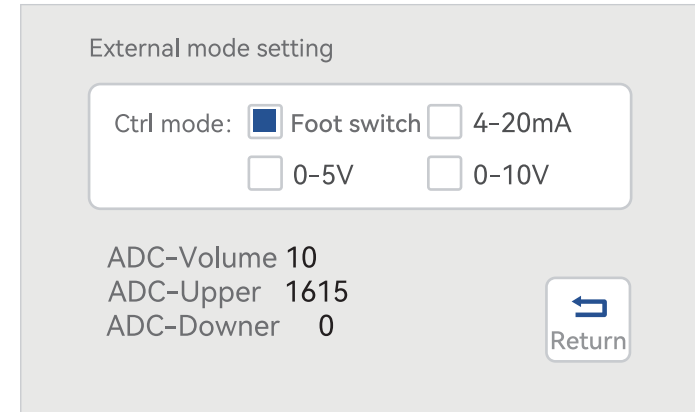


Figure 36 External Control Mode Quick Setting Interface

[Ctrl mode] Users can choose different flow control methods.

[ADC-Volume] displays the digital conversion value of the current analog quantity.

[ADC-Upper] displays the upper digital value of the analog quantity. The upper limit value and the lower limit value are combined to realize analog speed control. Click Can Settings.

[ADC-Downer] displays the lower digital limit value of the analog quantity. The upper limit value and the lower limit value are combined to realize analog speed control. Click Can Settings.

Analog speed control algorithm:

$$\text{Speed} = (\text{Current value} - \text{Downer}) / (\text{Upper} - \text{Downer}) \times \text{Maximum speed}$$

Analog calibrate method:

The analog quantity needs to adjust the upper and lower ADC values to accommodate different analog signals.

1. Adjust the analog signal input to the maximum value required by the system, read the data of the current value of the ADC write the upper limit value of the ADC
2. Adjust the analog signal input to the minimum value required by the system, read the data of the current value of the ADC write the downer limit value of the ADC

3. Test the analog signal from the minimum value to the maximum value, and observe whether the speed follows.

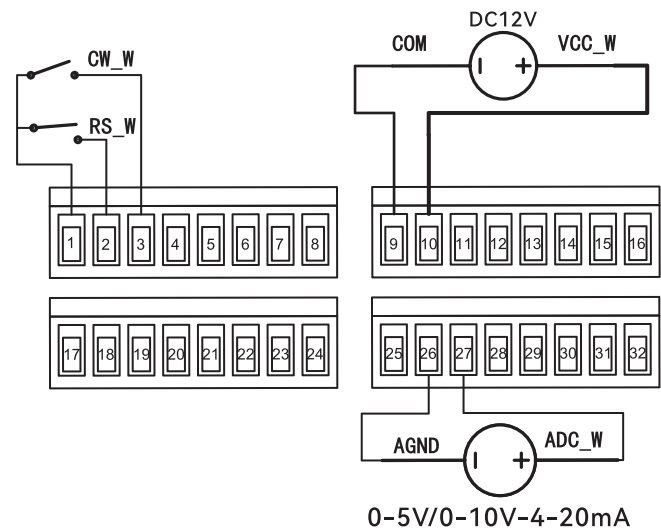


Figure 37 Wiring Diagram of External Control Analog Mode Connected To External DC12V Power Supply

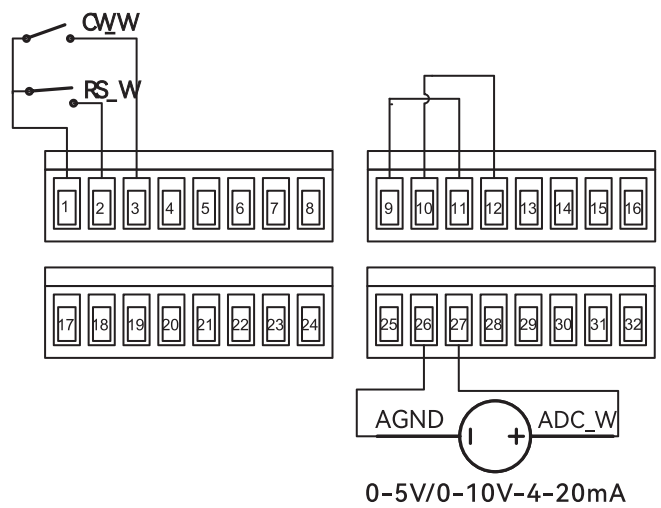


Figure 38 Wiring Diagram of External Control Analog Mode Connected To Internal DC12V Power Supply

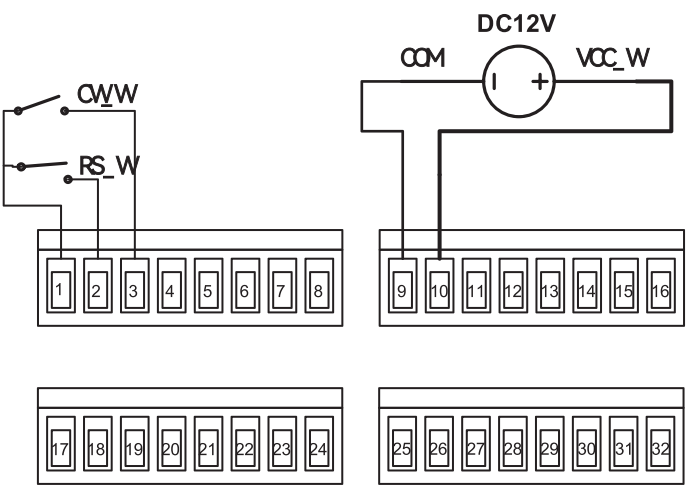


Figure 39 External 12V Power Supply Wiring Diagram For Foot Switch Control

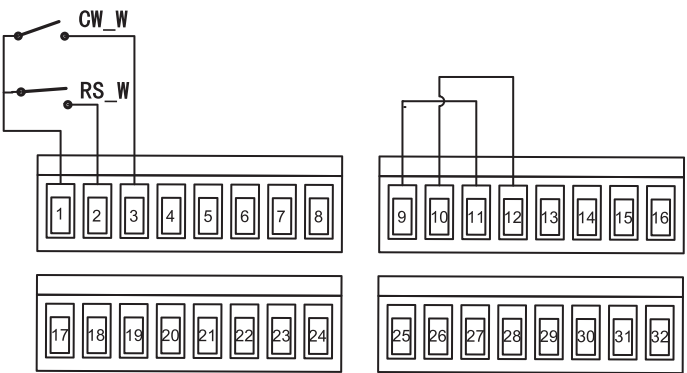


Figure 40 Internal 12V Power Supply Wiring Diagram For Foot Switch Control

Malfunction and Maintenance

◆ Drive Spare Parts

Spare parts	Model	Spare part number
fuse	3A	3020200100006
Power cord	250V 10A	3022300200016

Table 6 Drive Spare Parts

◆ Daily Maintenance

- Peristaltic pump routine maintenance can refer to the following table.
- There is a cooling fan behind the peristaltic pump, please do not cover it to avoid affecting heat dissipation.
- Peristaltic pumps can not be flushed with water, if the pump tube ruptures during operation, the liquid in the pump head should be dried or dried in time.
- Do not use chemical solvents to clean the peristaltic pump and pump head.



Note: Always disconnect the pump from the mains power before opening the pump head cover to change tubes, or performing any assembly, disassembly or maintenance activities.

◆ Maintenance Worksheet

Regular maintenance of the pump according to the maintenance schedule will help reduce damage to pump components and ensure personal and property safety.

Maintenance Tasks	Frequency	Actions after exception
Check if the pump leaks and damage.	Check before each startup; daily visual inspection; periodic inspection during pump operation;	Repair the leakage and damage before operating the pump; Replace parts if necessary; Clean all spilled liquids;
Check for abnormal temperature or noise during pump operation.	Daily visual check; periodic inspection during pump operation;	Check and replace worn parts
Do you need to replace the tube	Check the tube condition at least once every three days;	Please replace the tube in the following situations: When the flow rate is lower than 75% of the original value. When the tube has burst and is badly worn. When the user-defined replacement cycle is reached.
Check pump head and rotor assembly.	Regular weekly inspection of roller flexibility; inspect when replacing the hose; complete annual inspection for wear, check bearing clearance and function;	Worn and damaged surfaces can cause premature failure of the tube, replace worn parts in time.

Table 7 Maintenance Task Table

1	Hardware	No display on the screen after power on	1. Check if the power cord is connected. 2. Check if the fuse is blown, if blown, contact the manufacturer to replace the fuse.
2	Hardware	The motor does not rotate	1. Check if the flow or speed is set too low, such as 0.1rpm.
3	Hardware	Drive shaking	1. Check if the pump head screws and plate rods are tightened.
4	Hardware	The motor only rotates in one direction	1. Check if the direction key is working properly. 2. Check if the external control direction signal is normal.
5	Hardware	Keys do not work	1. Check if it's in locked state.
6	Hardware	The pump makes loud noise during operation	1. Check if the pump head screws and plate rods are tightened.
7	Hardware/ Software	Communication not working	First, troubleshoot the software: 1. Check if the mode is in flow mode. 2. Reset the machine address. 3. Check if two machines on the bus are using the same address. If the problem is not resolved, continue to troubleshoot the hardware: 4. Check if the connection is correct. 5. Check if the external control power supply is powered.
8	Hardware/ Software	External control not working	First, troubleshoot the software: 1. Check if the mode is in external control mode. If the problem is not resolved, continue to troubleshoot the hardware: 2. Check if the connection is correct. 3. Check if the external control power supply is powered.
9	Software	Flow display is inaccurate	1. Perform flow calibration

Table 8 Malfunction Solutions



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

Dimensions (mm)

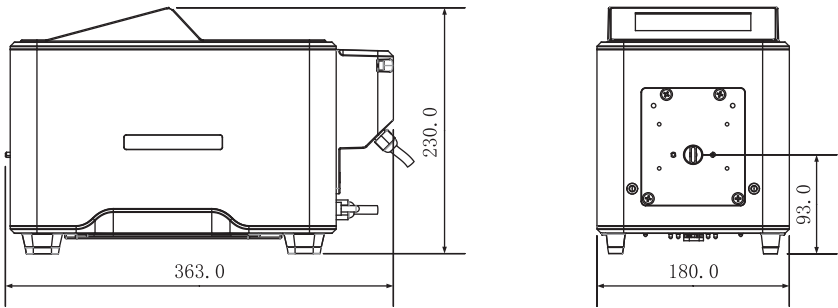


Figure 41 Overall dimensions of MF106

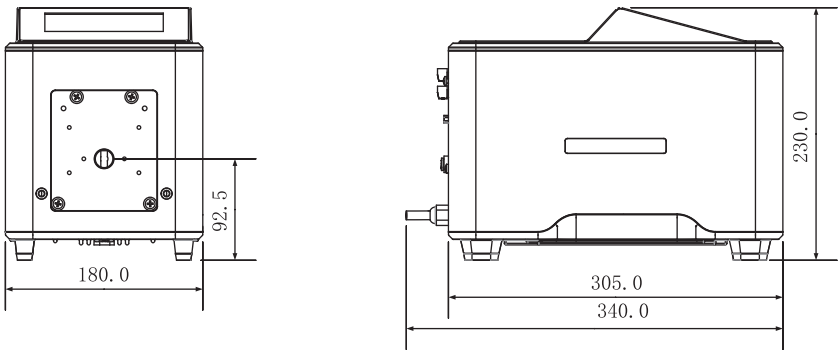


Figure 42 Overall dimensions of MF006

Ordering Information

Product Model	Description	Order Number
MF106		1100300101004

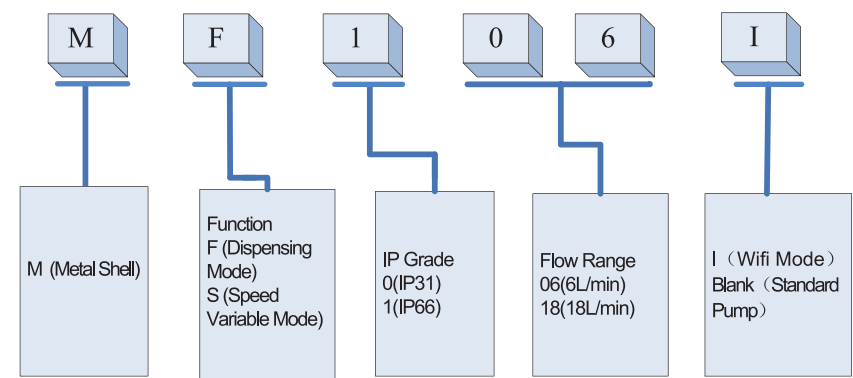
Table 9 Ordering Information

Optional Accessories Table

Accessory Table	Description	Order Number

Table 10 Table of Optional Accessories

Naming Rules



Technical Parameters

MFX06 Technical Parameters

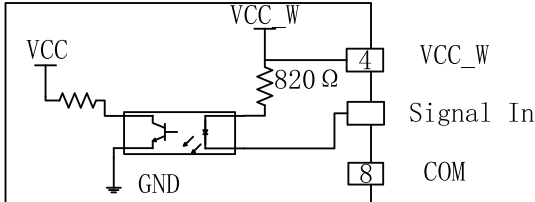
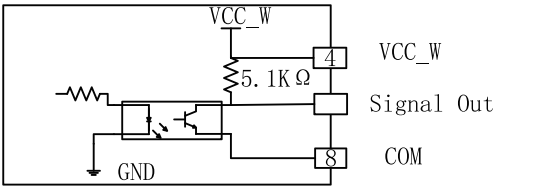
Functions

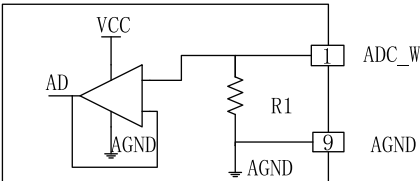
Suitable pump head	YZ(T)15, YT(Z)25, KZ25, DMD25, YZ35
Functions	Key control start and stop, direction, full speed, state memory (power-off memory). Foot switch control, external control start/stop and direction, with physical isolation, 5V/12V/24V level input optional, 0-5V/ 0-10V /4-20mA adjustable speed optional, flow mode, volume dispensing mode and time dispensing mode.
Communication	RS485, RS232, Ethernet, support Modbus Protocol
Display	Color LCD touch screen
Direction Control	Forward and reverse reversibility

Performance

Flow Range	6-7800 mL/min
Speed Range	0.1-360 rpm
Speed Resolution	0.1 rpm, Speed accuracy error < ±0.2%
Adjustment Method	Touch screen operation
Display Method	5-inch IPS LCD
Applicable Power Supply	AC100-240V±10% 50Hz/60Hz
Wattage	<180W
Working Environment	Temperature 0- 40°C Relative humidity<80%
Dimensions (pump head not included)	MF106:363x180x230mm MF006:340x180x230mm
Drive Weight	MF106:11kg MF006:11kg
Degree of Protection	IP66/IP67

External Control Input and Output Performance

Input Switch Value or OC Gate Specification		
Project	Parameter	
Input Interface Principle		
Single Signal Input ON Current	$5.5\text{mA} < I_{on} < 15\text{mA}$	
Single Signal Input OFF Current	$I_{off} < 1.5\text{mA}$	
Signal Input Method	switch (closed, open) or NPN transistor OC gate	
External Control Input Voltage	5V	Input loop requires no series resistors
	12V	
	24V	1.5KΩ resistor in series with the input circuit
Isolation Method	Optoelectronic isolation	
Output Specification		
Project	Parameter	
Principle of Output Interface		
Output Method	NPN transistor OC gate with internal pull-up	
Isolation Method	Optoelectronic isolation	

Input Analog Specifications		
Project	Parameter	
Interface Principle		
Input Impedance (<100HZ)	0-5V	R1=4KΩ
	0 -10V	R1=4KΩ
	4-20mA	R1=248Ω
Allowable Error	0-5V, 0-10V, 4-20mA	±1%
Resolution	0-5V	5mV
	0-10V	10mV
	4-20mA	16uA
Internal Output Power Specifications		
Project	Parameter	
The Output Voltage	DC12V ± 1V	
Allowable Output Current	< 130mA	
External input Power Specification		
Project	Parameter	
Allowable Input Voltage	DC5-25V	
Allowable Input Current	> 350mA	