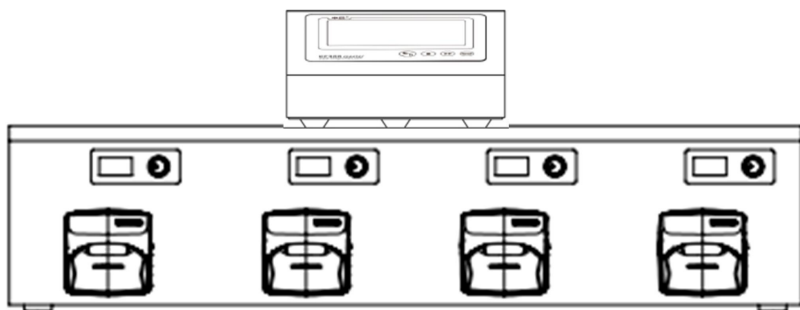


Shenchen Precision Pump

Manual of KF300 Plus



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.

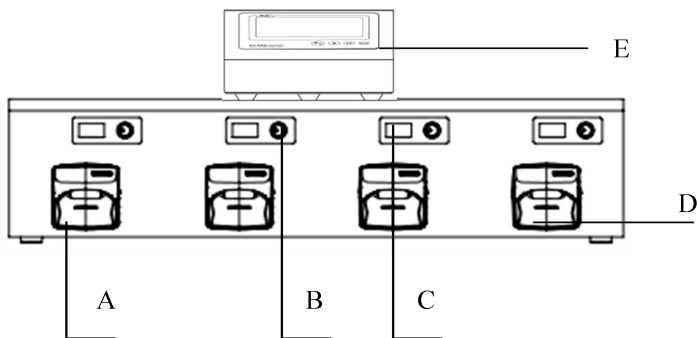
Catalogue

- 1. Product Introduction - 1 -
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- 4. Controller Membrane Keypad Description - 4 -
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1. Product Introduction

The KF300 Plus series are a high-precision, low-pulsation intelligent filling system consisting of a control unit and an integrated filling units. Each group integrates 4 filling units, and 8 groups and a total of 32 filling units can be controlled by one controller at the same time. It adopts 4.3-inch color touch screen control, graphical interface, animation displays working status, the filling parameters or filling times are displayed on the same screen. Filling accuracy can reach 0.5%.

2. Product Appearance

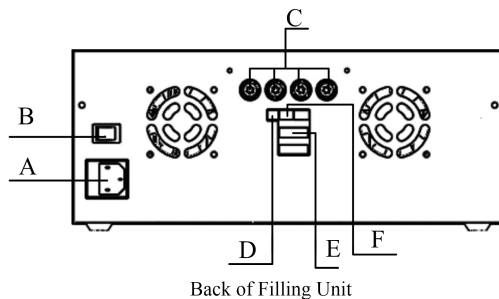


Composition:

- A—Pump Head
- B—Speed Control Knob
- C—Speed Display
- D—Filling Unit
- E—Controller

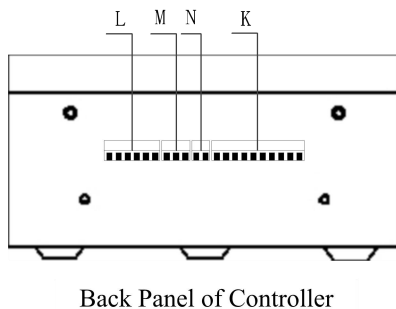
3. Interface Instruction

3.1 Filling unit port instruction



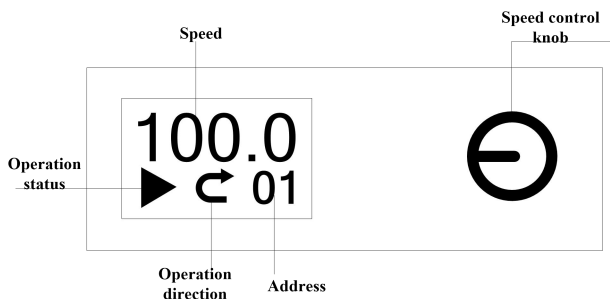
- Interface Instruction:**
- A——Power supply socket
 - B——Power supply switch
 - C——The input port of lack of bottle stop filling and output port of operation indication
 - D——Connecting controller power port (N)
 - E——Connecting controller signal port (L)
 - F——RS485 communication port (M)

3.2 Controller port instruction



Interface Instruction:

- M——RS485 Communication port, connect with the communication interface port (F) of the side panel of the filling unit
- N——Power supply port, connect with the external control interface with port (D) on the side of the filling unit
- K——External control input port
- L——Signal port, connect with communication port (E) on the side of the filling unit.

3.3 Filling unit display screen instruction


Speed control knob: Except for full speed and suction status, the speed cannot be modified. The rest can be modified in any mode such as pump running, stop, etc. After pressing the speed knob, the speed displayed on the left LCD screen starts to flash, at this time, if you rotate the knob in clockwise, the speed will increase, otherwise, the speed will decrease. After the modification is done, press the knob, the speed displayed on the left screen is always on, indicating that the speed modification is completed.

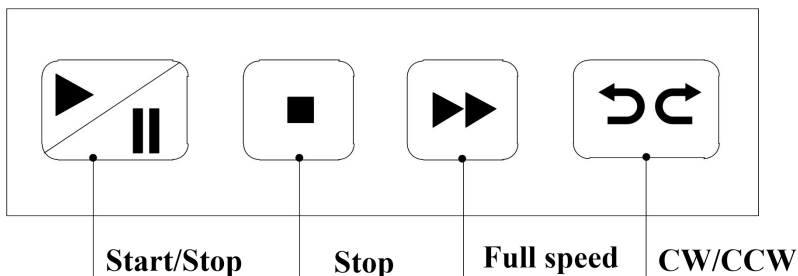
Speed display: Displays the speed of every filling units.

Operation status: Displays four status of running, full speed, stop, pause.

Operation direction: Displays the operation direction of motor.

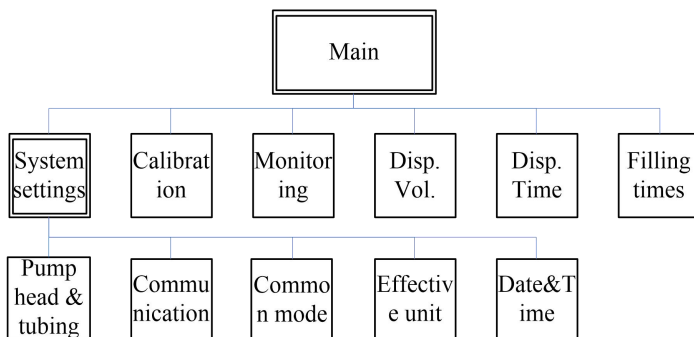
Address display: Displays the address number of the current filling units corresponding to the entire system.

4. Controller Membrane Keypad Description



- **Start/Stop Button:** After setting up the filling parameter, press the Start/stop button, every filling units will run according to the parameters. Press the Start/stop button again, pause the current state. After clicking the Start/stop button, besides the calibration and monitor button on the main interface are colorful (available), other buttons turn gray, forbidden to use.
- **Stop Button:** Press Stop button to stop working. Forbidden buttons can be used on the main interface. Keep pressing the button and turn on the power supply at the same time, and the pump will be initialized and all the parameters will be lost.
- **Full speed Button:** Press this button at the stop state, the filling unit will run with maximum speed. This button can be used to wash tube and fill liquid rapidly.
- **CW/CCW Button:** Press this button once at the stop state, the motor will change running direction once.

5. Operation Interface Instruction



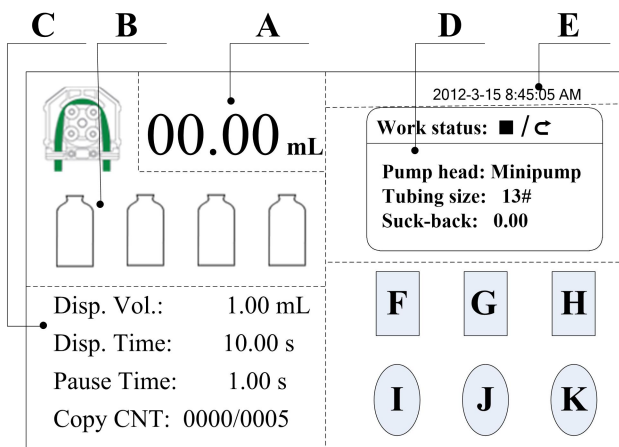
KF300 Plus series controller operation interface instruction

5.1 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 interface automatically.

5.2 Main Interface

Main Interface Composition as below:



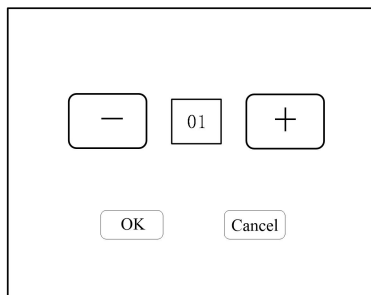
A. **Real-time Display Filling Volume:** After starting filling, the total current

filling volume will be displayed in real time.

- B. **Real-time Dynamic Display:** Display the filling unit working state in real-time, animation shows monitor results, and has alarm function. If one of the bottle appear red alarm signal, means the relevant filling unit error, please check the communication connection. Starting from the left, the first bottle filling unit number corresponding to No.1/5/9/13/17/21/25/29, the second bottle filling unit number corresponding to No.2/6/10/14/18/22/26/30, the third bottle filling unit number corresponding to No.3/7/11/15/19/23/27/31, the forth bottle filling unit number corresponding to No.4/8/12/16/20/24/28/32.
- C. **Real-time Parameter Display:** Display the set filling volume, countdown filling time, countdown pause time, and filling numbers.
- D. **Set Parameter Display:** This area display filling unit current working state, pump head, tubing size and back suction angle etc.
- E. **Date and Time Display:** Display the current date and time, they can be amend in system settings.
- F. **System settings Button:** Press this button enter system settings interface, include set the pump head and tube size, set the back suction angle, choose and set common filling mode, set effective filling unit, set current date and time.
- G. **Flow Calibration Button:** Press this button enter calibration interface.
- H. **Real-time Monitor Button:** Press this button enter monitor interface.
- I. **Filling Volume Button:** Press this button, the numerical keyboard comes out, input the filling volume here.
- J. **Filling Time Button:** Press this button, the numerical keyboard comes out, input the filling time. Click confirm, it will ask whether continue to input the pause time, choose 'YES', you can input the pause time, choose 'NO', back to the main interface.
- K. **Filling Numbers Button:** Press this button, the numerical keyboard come out, input the filling numbers. If input '0', the filling number is unlimited.

5.3 Adjust Address Interface

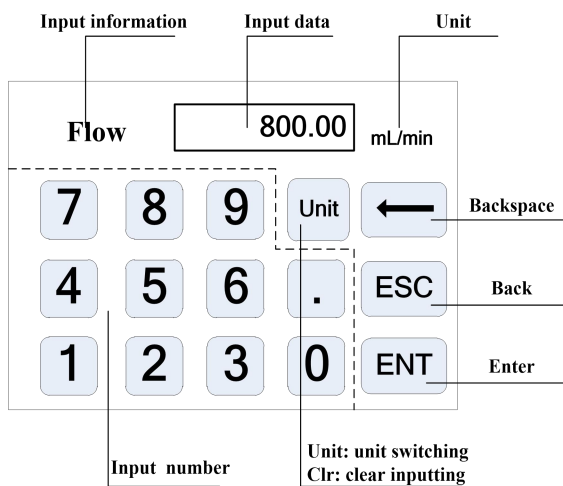
Adjust address interface as below:



In main interface press more than five times in a row and then click the system settings button in main interface to enter interface of setting address.

Click “+”, “-” button to select filling units address number (the range is 1-32). Press the speed control knob of the filling units whose address needs to be set and do not lift it. Click OK button to set the filling unit address NO. After the setting is successful, return to the setting success prompt message.

5.4 Digital keyboard input interface



Input information: The displayed information is the object of the current operation.

Input data: Display the current input number, the range is 0.01-9999.

Display unit: Display input units when input flow rate or in fixed volume measuring liquid.

Input number: Digital keypad area.

Unit/Clr button: When input flow rate or volume, this button is unit switch, you can choose different input units. When it is Clr, you can clear the current input data.

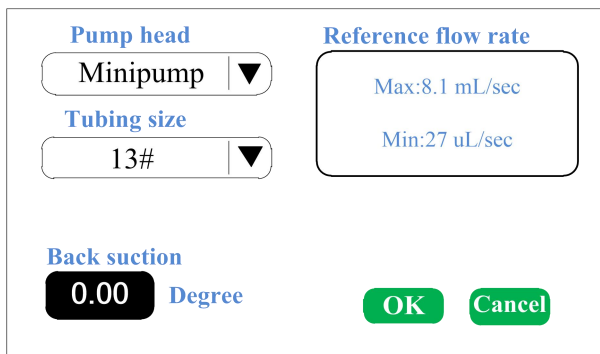
Backspace button: Delete an input digital.

ESC button: Cancel the current input, back to previous interface.

ENT button: Confirm the current input.

5.5 Pump head & tubing interface

Pump head & tubing interface as below



Pump head
Minipump ▼

Tubing size
13# ▼

Back suction
0.00 Degree

Reference flow rate
Max: 8.1 mL/sec
Min: 27 uL/sec

OK **Cancel**

Click **System settings** in the main interface, then click **Pump Head & Tubing button**, enter pump head and tubing setting interface.

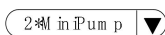
Click **Pump head** and **Tube Size** drop-down menu, choose pump head and tube. The reference flow rate area display the max. and min. flow rate with the pump head and tubing size.

Click **back suction button**, pop up the numerical keyboard, input the back suction angle and click **OK button**. All filling units are set with this suction angle. Click

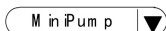
Cancel back to the system settings interface.

Note that: When the pump come with two pump heads, the output of two pump heads are connected to one channel with Y type connector, then you will need to choose 2* pump head model; if the two pump heads use as two channels, then you need to choose single pump head model number.

For example, the pump come with two MiniPump, and output connect with Y type connector to one channel, then when choose pump head need to select 2*Minipump, as in below picture:

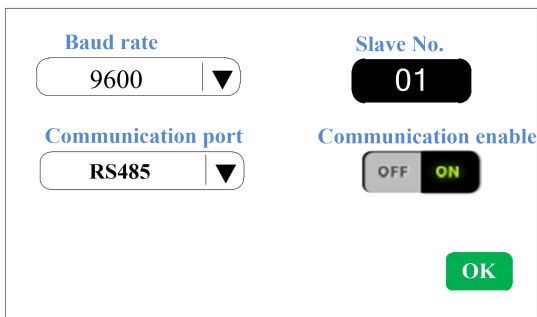


In other cases, such as: the pump come with one pump head Minipump, or with two Minipump use as two channels, or with 3-4 Minipump pump heads, need to select single pump head Minipump, as in below picture:



5.6 Communication Setting Interface

Communication Setting Interface as below



- This interface is for the communication between controller and HMI. The communication between controller and pump only need to change the filling unit address. Controller just need to choose the relative effective unit. When you change the slave address need to be re-powered to take effect.
- Click **Setting button** in the main interface, then click **Communication button** to enter Communications Setting interface.

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

NOTE: After finishing setting, the peristaltic pump receive the communication signal only in main interface, it is invalid in other interface.

5.7 Common Mode Interface

Common mode interface as below

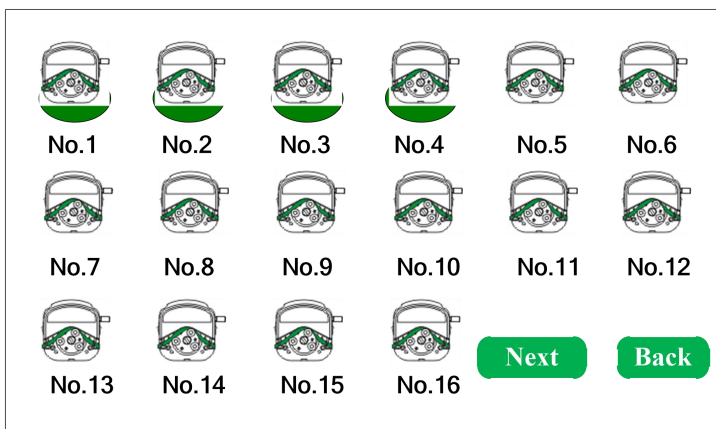
Pump Head	Tube	Disp. Vol. (mL)	Disp. Time (s)	Pause Time (s)	Back suction (%)
Minipump	13#	2	30	2	0
Minipump	14#	7	50	2	0

«
 Add
Del.
Clear
OK
Cancel
 »

Click **System settings** button on the main interface, click **Common Mode** button, enter choose common mode interface.

- **Add Button:** Click this button to add one common mode, it can save 30 modes.
- **Delete Button:** Choose one common button, click **Delete** button, it will ask whether delete, click 'YES', then you can delete this mode.
- **Clear Button:** Click this button, it will ask whether empty all, click 'YES', then empty all the common mode.
- **OK Button:** Choose one of the common mode, click '**OK**' button, then it will back to the main interface. The filling parameter is same as the one you choose from the common mode.
- **Cancel Button:** Click this button back to the system settings interface.
- "<<",">>": Check the previous and next page common mode.

5.8 Choose Effective Unit Interface



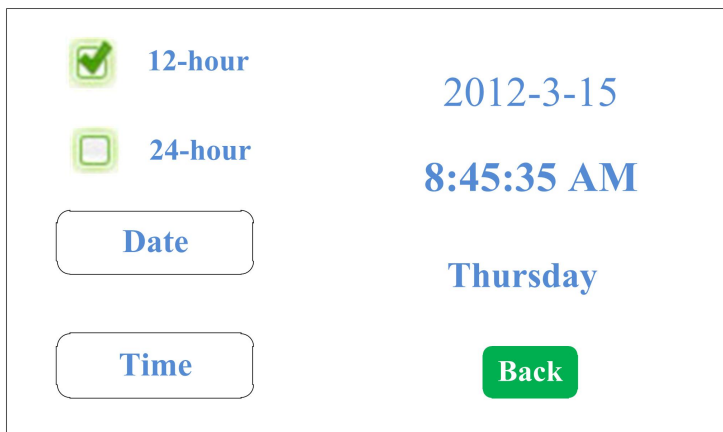
Click the **System settings** button on the main interface, click **Effective Unit** button to enter Effective Unit setting interface.

You can choose the effective filling unit freely, click pump head icon to make the relevant filling unit effective or noneffective. There is a green shadow under the pump head icon when it is valid as in the above picture No.1, No.2, No.3 and No.4. No shadow when invalid.

This function can turn on or turn off one or several filling units when using it, to meet different requests of the filling channel. Click **Back** button, back to the system settings interface.

5.9 Date and Time Setting Interface

Date&Time Setting Interface as below:



The interface is a rectangular box with a light gray border. On the left side, there are two radio button options: '12-hour' with a checked green square icon, and '24-hour' with an unchecked green square icon. Below these are two rounded rectangular buttons labeled 'Date' and 'Time'. On the right side, the date '2012-3-15' is displayed in blue, followed by the time '8:45:35 AM' in blue, and the day 'Thursday' in blue. At the bottom right, there is a green rounded rectangular button labeled 'Back'.

Click **System settings** button on the main interface, click **Date & Time** button, enter date and time setting interface.

You can set the current date and time, it is displayed on the top right corner on the main interface.

Click **Set Date** button, the numerical keyboard comes out, input the Year, setting year range is 1970-2099. After input the year, click OK to set the month and day.

Click **Set Time** button, the numerical keyboard comes out, input the hour, minute and second.

5.10 Flow Calibration Interface

Flow calibration interface as below:

Valid Unit	Volume	Time
NO. 1 ▼	1.20 mL	2.86 s
	Test	Restore
Please enter the micro-adjustment liquid volume		
+	0.0000 mL	- ESC

First, click the **Valid Unit** drop-down menu, select the number of the filling unit to be calibrated. The filling volume and time are previously set data.

Calibration Process as below:

- Choose the pump head No.
- Click **Test** button to start the test, display countdown filling time, it will stop automatically, and the numerical keyboard comes out, after inputting the actual filling volume and clicking ENT button, calibration is completed and back to calibration interface.
- Test the data again to check whether meet the requirements of filling volume. If needs higher precision, you can input the value of micro-adjustment liquid volume in the micro-adjustment area. Click “+” or “-” to achieve calibration of micro-adjustment.
- Click **Restore** button, restore to the factory default calibration parameters. And the filling units need be restored individually.

Liquid Volume Micro-Adjustment:

If you need to micro-adjustment without stopping the production line, you need to rotate the knob of the lower computer and directly modify the speed to reach the

required liquid volume.

5.11 Real-time Monitor Interface

Monitor interface as below:

Address	Speed (rpm)	Instruction
01	305.25	Normal
02	298.34	Normal

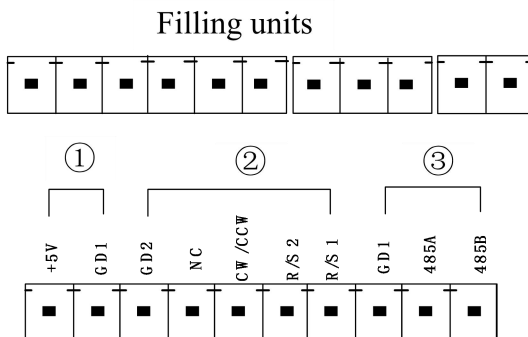
PauseESC

Click **Monitoring** button on the main interface to enter the monitor interface, check the current working state of the effective filling unit, include current speed and running status instruction. All the filling units working state cycle display on this interface, click **Pause** button to pause the cycle display, click again it will continue display.

6. External Control Interface Description

6.1 Controller External Control Interface Instruction

The green terminal on the back of the controller is the external control interface, as show in the below picture:



- ① Internal isolated +5VDC output

+5V: internal 5V output active

GD1: internal 5V output negative

- ② External control signal input port (Hand-held dispenser and foot pedal are equipped by our company)

External control direction, start/stop signal input port: Active signal input (5-24 VDC)

The signal recognition is rising edge effective, the minimum duration of the high level is 200ms.

GD2: The common port of the external control signal input.

NC: External stop signal input (signal rising edge effective) .

CW/CCW: External direction signal input (signal rising edge effective.)

R/S 2: External start signal input (signal rising edge effective) .

External control start/stop signal input port: negative signal input

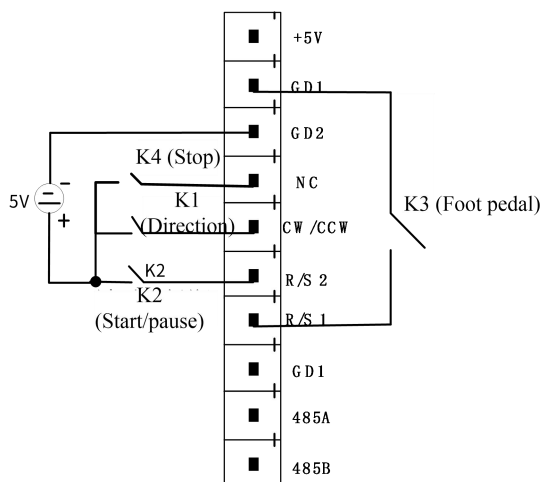
R/S 1: External control start/stop signal

The switch can be connected between R/S 1 and GD1, the signal is effective when

the **momentary of the switch closure**, then start filling.

When received this signal during operation, the device stops, this signal is received again, and the device restarts filling. This port can connect with passive switch or foot pedal. Set the validity of this input in the external control setting interface - foot switch option.

The external control wiring diagram is as follows



- (1) Short circuited K2 and then disconnect it, the motor starts, and do it again, the motor pauses.
- (2) After short circuited K4, the motor stops running.
- (3) Every time disconnect the K1 after short circuited, the motor direction changes once;
- (4) Disconnect K3 after short circuited, the motor starts, and disconnect again after short circuited, the motor stops running.

③ **Communication interface:** Select RS485 in the communication setting interface to realize communication between the human-machine interface and the

controller.

GD1: RS485 signal ground.

A+: Connect RS485 converter A+ terminal.

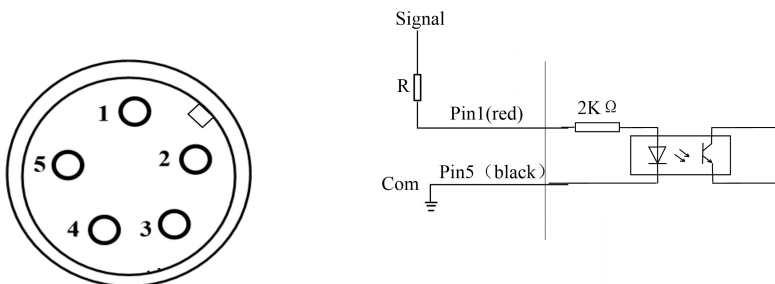
B-: Connect RS485 converter B- terminal.

Note that: When leaving factory, the wiring terminal will be plugged in the external control port, if you need to use other external control devices from our company, like: foot pedal, hand-held dispenser etc, please unplug the wiring terminal, and then plug the external control device.

6.2 Filling Unit External Control Port Instruction

① Lake of bottles stop filling signal interface description

The 5 pin aviation plug port on the back of filling unit. Port B of the filling unit port instruction.



The signals is optocoupler isolation signal, as picture show, When optocoupler is on, the missing bottle stop filling signal is effective. Now the filling unit do not work. When optocoupler is off, the filling unit works normally.

Pin 1 (red wire)Signal: The signal wire of missing bottle stop filling for the filling unit.

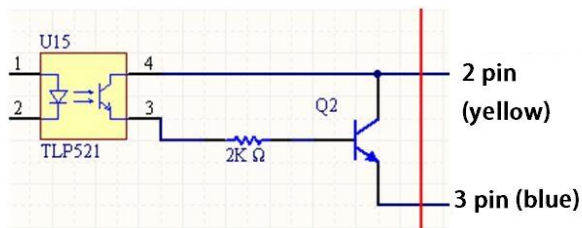
Signal connects sensor signal output terminal (The default sensor is 24VDC) for detecting whether there is a lack of bottle.

Pin 5 (black wire)Com: The negative pole of sensor.

② Filling completion signal interface instruction

The 2 pin (yellow line) and the 3 pin (blue line) of the 5-pin aviation plug on the back of the filling unit are the output signal interface of the filling unit, and the filling is completed once, and the indication signal is output once.

The circuit board output circuit diagram is shown below:



7. Technical Specification

Filling Time Range	0.01-9999.99s	Power Supply	AC 220V±10% 50Hz/60Hz (standard) AC 110V±10% 50Hz/60Hz (optional)
Pause Time Range	0.5-9999.99s	Display	4.3 inch-industrial class-true color LED
Liquid Volume Resolution	0.01mL	Communication port	RS485
Time Resolution	0.01s	External control method	Switching signal
Copy Time Range	1-9999, 0 is unlimited	Dispensing Accuracy	<±0.5%
IP Rate	IP31	Motor Type	Stepper motor
Relative Humidity	<80%	Environment Temperature	0-40°C
Power Consumption	Each unit<15W	Control Method	Touch screen+ pure imported keypad

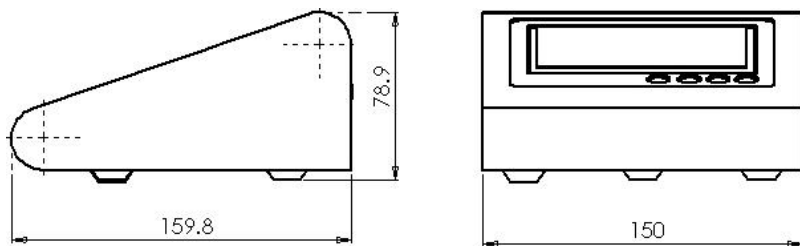
8. Function and Features

- It can load different pump heads
- Accurate angle control technology, high precision filling.
- Color touch screen control, animation displays filling state, filling parameter and system setting are displayed at the same time.
- Intelligent calibration function, you can calibrate the filling volume before production, to ensure the filling accuracy.
- Online micro adjustment function, you can micro adjust the filling volume during production. It can avoid the filling errors because of tubing fatigue and elasticity decreased.
- Filling units can be expanded arbitrarily on one controller, to save cost.
- Real-time monitor, animation displays monitor results, alarm function to ensure produce safely.
- Effective unit setting, you can start or stop one or several of the filling units during production.
- Can save 30 common filling modes, save setting times, improve working efficiency.
- Back suction angle setting:0-3600°, avoid liquid drop off when the pump stop working.
- External control start/stop.
- Each channel receive missing bottle stop signal separately, to make the single channel can stop when missing bottles.
- Fast filling liquid function, not only can wash the tubing, but also can fill liquid in the tubing.
- 304 stainless steel housing, resist corrosion, no rust, conform to GMP sanitary request.
- Standard Modbus communication protocol to realize remote control for variety conditions.

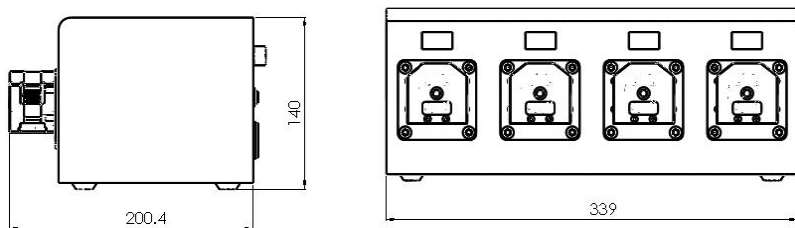
9. Dimension Drawing

(Unit: mm)

9.1 Host and Lower Product Dimension

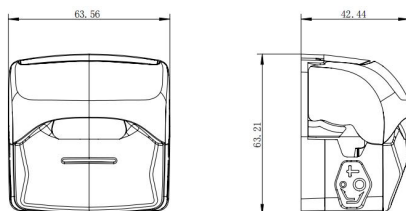


The Host

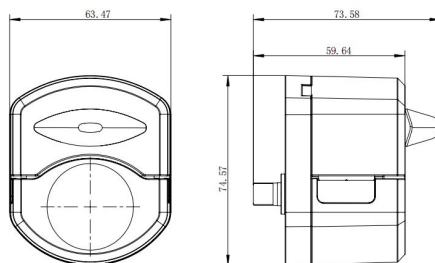


Lower Filling Unit

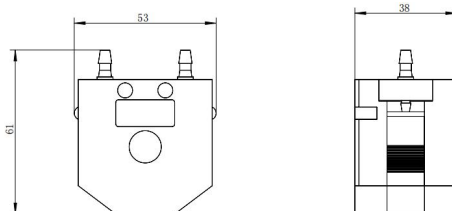
9.2 Single Pump Head



KT15 Pump Head

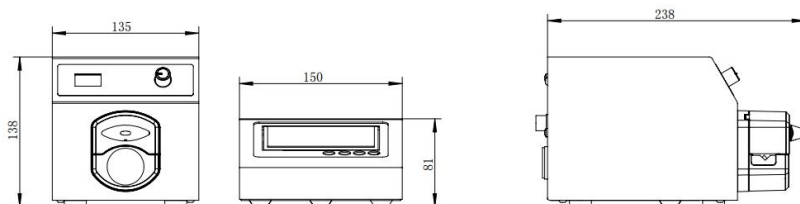


HandyPump Pump Head

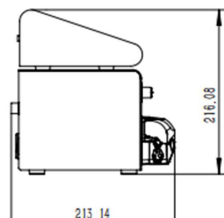
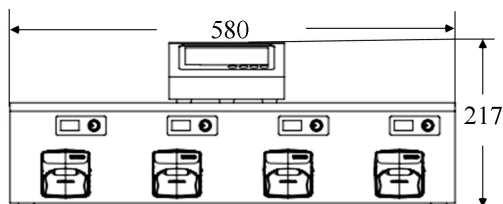


MiniPump Pump Head

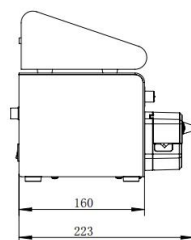
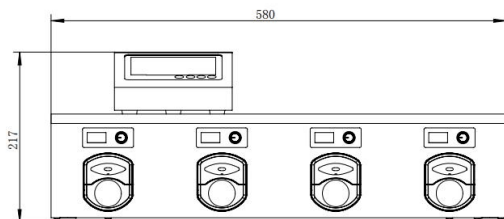
9.3 KF300 Plus Product Dimension Drawing



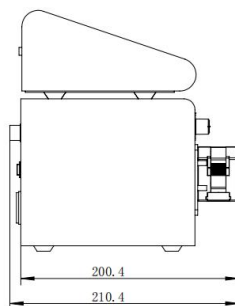
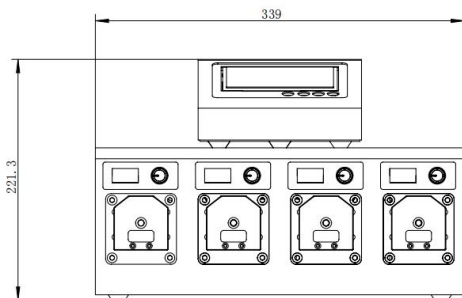
KF300 plus + HandyPump Single Channel



KF300 Plus+KT15



KF300 Plus+HandyPump



KF300 Plus+MiniPump

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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