WF600

High performance dispensing pump

User manual

Safety Information

Before using this product, please follow the notes below in order to avoid fire, lighting strokes and personal injuries.

1) Please turn off the drive power before installing or disassembling the pump head and tubing, otherwise fingers or coat corner may get caught into the drive;

2) Turn off the power before connecting to external control equipment, otherwise the pump may get damaged;

3) Put the pump on a flat, horizontal, rigid surface, free from excessive vibration;

4) Put the pump in a protected place to avoid being stepped over, which may lead to personal injuries;

5) Pull out the power plug before cleaning the pump;

6) You are forbidden to break down, alternate or repair this product. If needed, please contact us.

Attention

1) Before using peristaltic pump, please carefully read this manual and make sure you fully understand this manual;

2) Before using peristaltic pump, please carefully read and follow the safety guidance in this manual;

3) Pump tubing is consumable product, long-term use may lead to split because of fatigues, please inspect and change tubing frequently so as to avoid unnecessary leaking accidents;

4) Take care of this manual.

Warning! 

1) In certain kinds of special industrial environment or nearby the wireless firing device, pump may have error because of electromagnetic field interference;

2) Please don’t make unwarranted repair or alternation to the pump, otherwise the warranty could be invalid.

Contents

1. General

WF600 series peristaltic pump is a high precision dispensing pump with a large LCD for displays of parameters and operation modes. Metal casting drive housing with streamline appearance and special coating guarantees IP54 rating and features easy cleaning and corrosion resistance.

The maintenance-free brushless DC motor drive equipped has advantages of low heat, stable and quiet running, and superior accuracy. Those entire features make the pump ideal for the wide applications of food & beverage, chemical, biological, pharmaceutical, printing, etc.

➢ **WF600 Series**

➢ **The product consists of two main parts:**

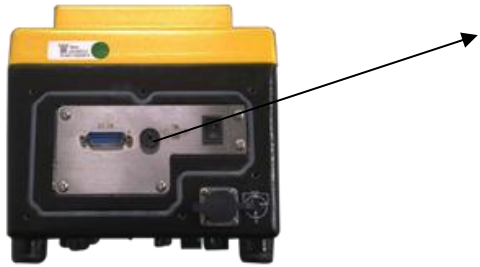
- **Pump head** See ***Pump head Instruction*** for more information
- **Drive** Main part of the pump (power source)

➢ **Fuse**

There is a standard 2A fuse at the rear of pump. If it needs to be replaced, please remove the rear module and unscrew the fuse drawer using cross screwdriver to replace with another fuse of the same.

Fuse Type : 2A, 250V ,20mm. Size 5*20mm

Please unplug the power plug before replacing the fuse!



2. Introduction

2-1 Functions

- Graphic LCD screen displays the parameters and operation mode intuitively and clearly.
- Friendly man-machine interface is convenient for operation.
- Two working modes are available for dosing and transfer. Multiple control modes meet different applications.
- Keypad beep can be enabled and disabled.
- Remote control of start/ stop, running direction and speed enabled.
- Speed, direction, start and stop can be controlled by RS485 interface and Modbus RTU protocol.
- Brushless maintenance-free DC drive, closed-loop control, silent running.
- Power-off memory. When power is reapplied, pump will return to the operating state it was in when power was lost.
- Maximum 16 parameter sets can be stored for rapid calling and efficient operation.

2-2 Specifications

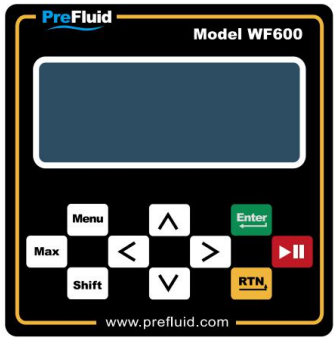
Model	WF600
Driver	BLDC Motor, servo drive, silent running, free maintenance
Control range	0.1~600 RPM(Decided by pump head)
Step	0.1rpm
Regulating Mode	Adjust parameters, Keypad presses with beep
Display Mode	Large LCD screen displays the parameters and working status. Language can be set as English or Chinese
External control interface	Contact signal controls start/stop and direction. Analog signal(current 4～20mA,voltage 0-10V) controls speed. RS485 interface、 Modbus RTU Protocol control S/S, direction and speed; Stateful output function
Power	≤70W
Working Condition	Temperature 0～40℃, Humidity <80%, Indoor Use
Pump head	KZ15,KZ25
Flow rate range	See ***Pump Head Specification***
Housing	Die – cast chassis with special coating
Weight	9kg
Dimension	390×200×196 (mm)

Note 1: See ***Pump Head Specification*** for reference flow rate.

3 .Control panel and Rear panel

3-1 Control panel

The control panel consists of a LCD screen and 10 operation keys, as shown below:



- **LCD display:** Displays pump parameters and working mode.
- **Operation keys:**

 —— Start/stop

 —— Enter

 —— Return/Exit

 —— Up

 —— Down

 —— Left

 —— Right

 —— Prime and empty

 —— Menu Switch between screens of File SET and Sys SET.

 ——Function key. Usage in certain modes as follows:

① 

Reset dose batch number in **Quantitative** mode, reset cumulative volume in **Continuous** mode.

② 

Go to **Calibration** menu from working screens.

③ 

Lock and unlock keys in both two working modes. Page up fast in **Sys-Set** menu.

④ 

Switch positions between **rpm** and **flow rate**, the boldface digit can be changed. Page down fast in **Sys-Set** menu.

⑤ 

Change rotating direction in working modes.

3-2 Pump Rear

The machine is supplemented with a watertight module (removable) for high IP rating.

The watertight module can be removed when using the external control connector if there are no special waterproof rating requirements. Use a standard DB15 external control cable to interface the external control connector.

The rear panel (without the module) as shown below：

- **Power switch:** I as ON， O as OFF.
- **External Control Connector:** External control signal input.

See ***5 External Control configure. Standard DB15 external control cable can be used.***

- **Fuse Holder:** Built-in Fuse

Fuse type: 250V， 2A， 5mm*20mm， time-delayed.

When using external control, the user with higher waterproof requirement should first remove the case tail cover, pull one end of the standard 15-core external control cable (unpressured terminal) out of the cable connector of the case tail cover, and connect DB15 and the other end of the case to the corresponding interface as required.Check the connection cables are connected correctly and reliably, then cover the chassis cover and tighten the screws.

Cable tail Cable connector

Cover tail: In order to prevent the harm of dust and impurities such as water, thus improve the IP rating of the machine.

Cable connector: external control function on the lead through the port access or pick up.

4 .Operation

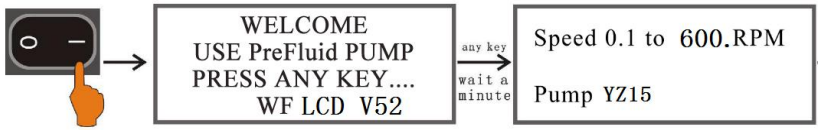
4-1 Pump head and tubing installation

Please follow the Pump head Instruction to install the pump head and tubing first.

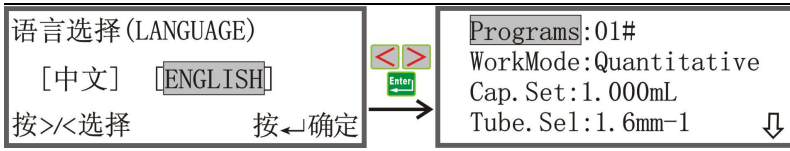
4-2 Power on

Connect the pump to a suitable power supply. Turn the pump on.

Turn the pump on for the first time, or turn it on after factory reset:



Select “English” and press Enter. You will see ***File Setting menu*.**

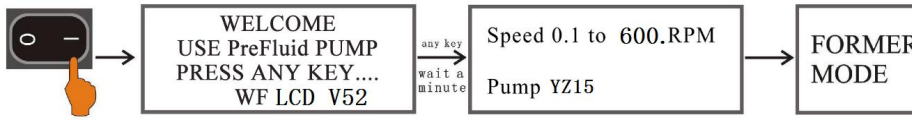


Note: Make sure the voltage fits this pump.

- **Power Switch:** "I" as ON, "O" as OFF
- **Upon switching pump on for the first time** or after factory reset, Users will be prompt to choose a language between Chinese and English. Press any key or wait for 3 seconds when welcome screen shows, then select a language on Language menu, and press Enter to confirm and go to **File Setting** menu.

- **How to enter File Setting menu:**
  - Press RTN in working screens;
  - Press Menu in Sys SET screens.

Power on process after this time:



Welcome window, RPM and pump head information, the last working mode before power off.

4-2-1 File ID

File ID is from 00#-16#. There are 3 types: current file, 00# file, 01#-16# files.

- **Current file**, current parameters, can be changed and saved. File ID shows 00#-16# in file setting menu.
- 00# file, stores the default parameters which are unchangeable. Whenever

selected it shows default parameters. Any changes of it will be saved as current file or file #1-16.

- 01#-16# files are used files, recall them by selecting the certain file no. （using keys  and  ） For example: Select #1 to restore the user settings previously saved as File# 1. Once any changes are made, there will be a current file. Recall file #1 by reselecting #1.

4-2-2 Working mode

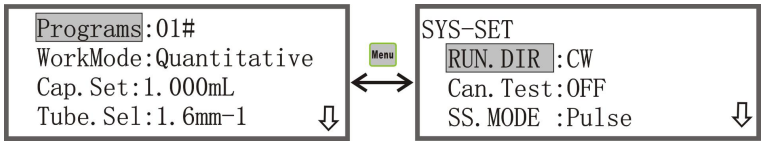
- **Quantitative mode:** Pump works according to setting volume, time and speed.
- **Continuous mode:** Pump works according to setting speed and flow rate.

4-2-3 Status of pump

- ▶II, Pump is stopped and requires a start input to resume work.
- ▶▪▪, Pump is working, waiting to be triggered to stop.
- ▶▪I, Pump pauses. The next dosing will auto start after the period of interval.
- ▶▶, Priming or emptying. Appears while Max is pressed.
- PC ▶II, Pump is stopped, requires a Modbus telegram to start.
- PC ▶▪▪, Pump is working, requires a Modbus telegram to stop.
- PC ▶▪I, Pump is in communication control and pauses. The next dosing will auto start after the interval period.
- RC▶II, Pump stops, Pins 2 and 8 are connected, waiting to be triggered to start by external control. Analogue controls speed in Continuous mode.
- RC▶▪▪, Pump is working, Pins 2 and 8 are connected, waiting to be triggered to stop by external control. Analogue controls speed in Continuous mode.

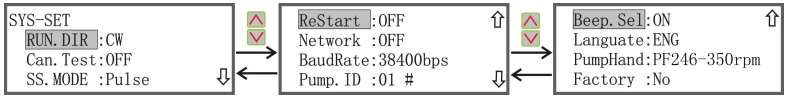
4-3 System setup

In files setting screen, users can press Menu to enter Sys-Set menu.



There are many options in Sys-Set menu. Press ∧ or ∨ to select one option to be set, and press Enter to allow its parameter to be changed using ∧, ∨ and Enter key. If there is a multi-digit parameter, users can press < or > key to switch between digits. Press Shift+∧ or Shift+∨ to page up or down quickly.

Note: When you are looking the first page of setting menu, you will see ⇩ on the bottom right of the screen，⇧ will be displayed in the last page, and ⇧ and ⇩ will be shown in the middle pages.



Instruction of parameters:

Run. Dire: CW and CCW can be selected. Besides, directions can be selected by pressing Shift+< or Shift+> when the drive is stopped.

Can.Test: Selecting “ON” enables the bottle signal control. The dosing start will be triggered by the bottle signal inputs. Choose “off” to disenable it.

Note: This setting is active in Quantitative mode under external S/S control（See *5 External Control “Wiring 1”*）

SS.Mode: “Pulse” and “Voltage” can be chosen. “Pulse” enables a contact signal control of Start/Stop. “Voltage” enables a TTL voltage signal control of Start/Stop.

ReStart: ON and OFF can be chosen. If ON is selected, it restores the pump when power returns to the operating state it was in when power was lost. When it is OFF, pump remains stopped when it is turned on.

Note: The above two settings are used in **Continuous** mode.

①Disconnecting Pins 2 and 8 causes pump start/stop being controlled by Pins 2 and 9 and direction being controlled by PIN2 and PIN3. See "***Wiring 2***".

②Connecting Pins 2 and 8 causes pump star/stop being controlled by Pins 2 and 9, direction being controlled by PIN2 and PIN3 and speed being controlled by PIN5. See "***Wiring 3***".

NetWork: ON and OFF can be chosen. When it is ON, pump is controlled by communication. When it is OFF, pump is controlled by key-presses or external signals.

BaudRate: 9600bps, 19200bps, 38400bps.

Pump.ID: #01-16. #01 is the default.

Note: The above 3 settings are necessary for communication mode.

Beep.Sel: ON and OFF

Language: CHINESE and ENGLISH.

PumpHead: KZ15,KZ25,YZ15 etc. Press Shift + Enter to select the appropriate pump head. The max speed is dependent on pump head selected.

Factory Setting: YES and NO. If users select **YES**, all the parameters will be reset to factory defaults. Use caution when setting.

4-4 Quantitative mode operation

4-4-1 Preparation

Process:

Step1: System Setting

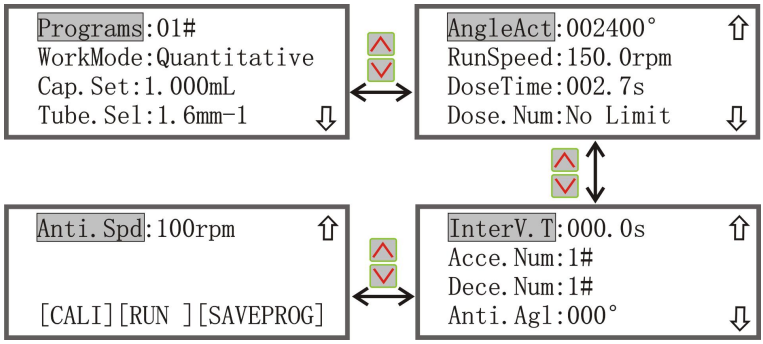
See **4-3 Sys-Set**, "NetWork= OFF".

Step 2: Select Program ID

Enter file setting screen, select the file ID to recall the saved parameters.

Step 3: File Setting

Set parameters



File ID: 00#-16#, select #01.

WorkMode: There are two modes: **Quantitative** and **Continuous**, select **Quantitative**.

Cap.Set: Target dose, 0.010mL-9.900L, set it to 1.000mL.

Tube,Sel: There are 0.8mm、1.6mm、3.2 mm、4.8 mm、6.4 mm. -1 means 1 channel, -2 means 2 channels. Set it to 1.6mm-1. Reselect the tubing, you will have the default parameters.

AngleAct: 180°-999999°, refers to the running angle of pump head. The angle displayed is calculated based on the settings of "**Cap.Set"** and" **Tube,Sel"**. It is unchangeable.

RunSpeed: 0.1-600.0rpm. The max RPM is limited by pump head fitted.

DoseTime: 0.3-999.9s. Set it to 2.7s. **RunSpeed**, **flow rate** and **working time** influence each other. When one of them is changed, the other two will be changed too.

DoseNum: 0-999, the target batch size. Pump will stop and display an ending prompt once the batch is complete. When it is 0 the drive will run for an infinite number of cycles and "no limit" will be displayed on the screen. Use this setting together with Interval time setting for different usages.

InterV.T: 0-999.9s.① When it is 0s, the dosing is repeated each time a start/stop signal is received.② If **InterV.T>0,** the pump receives a start signal to start the cycles of dispensing- pause-next dispensing, repeatedly.

ACCE.Num: #1-9, the larger number means the longer acceleration time. The setting depends on the dosing impact.

Dece.Num: #1-9, the larger number means the longer deceleration time. The setting depends on the extent of dosing splashing.

Anti.Agl: 0-360°, the angle the drive runs in reverse direction every time the normal dispensing is finished. Set it to prevent dripping when dispensing the viscous fluid.

Anti.Spd: 50-300rpm.

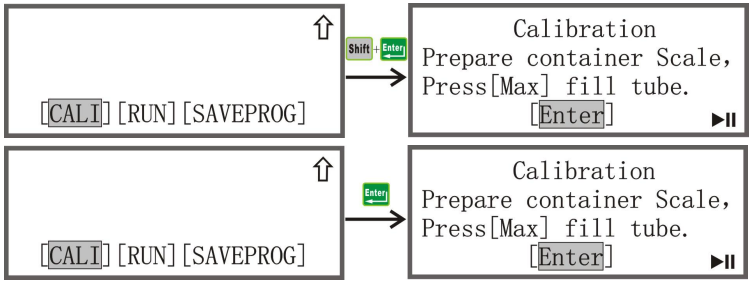
[CALI]: When it is highlighted, press Enter to enter calibration menu.

[RUN]: When it is highlighted, press Enter or ▶II to enter Quantitative working screen.

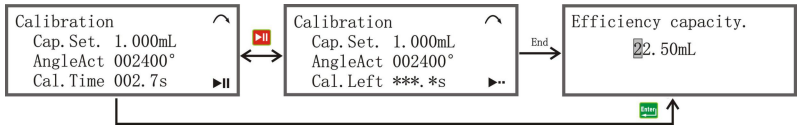
[SAVEPROG]: When it is highlighted, press Enter to enter parameter save screen.

Step 4: Calibration

In file setting screen press ∧ or ∨ to choose [CALI], press Enter to enter calibration screen. (Or press Shift+Enter for faster entry):



Prepare a scale which can handle your target volume, press Max to prime the tubing, make sure there is no bubble in the tubing. Press Enter to enter the next menu, and then press ▶II to start calibration or, if the actual volume has been known, press Enter to enter it directly.

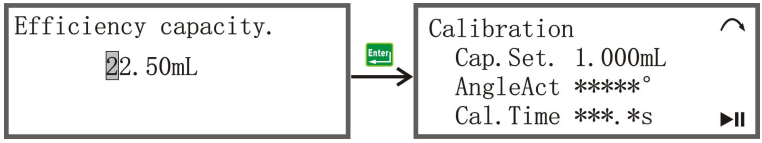


Cap.Set: 1.000mL. Shows the target volume to be dispensed and calibrated.

AngleAct: 002400°. Shows the running angle calculated based on set target and tube size.

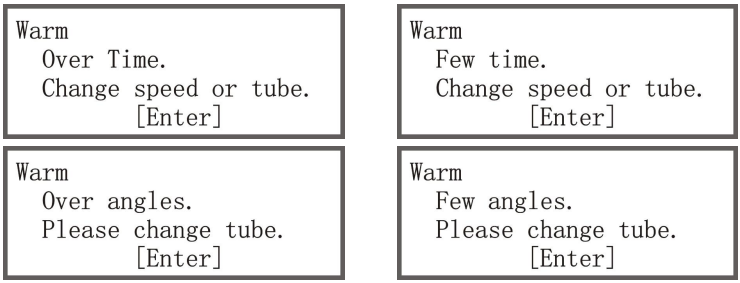
Cal.Time: 002.7s, Calibration time.

When the calibration run period is complete, users can enter the actual volume according to the scaling reading. After pressing Enter to confirm the adjustment, the screen will display the calibration data.



When the target settings are far beyond the calibrated parameters, the warning screen will show to indicate: ①Over time (>999.9s) ②Short time (<0.1s) ③ Over angles (>999999°) ④Small angles (<180°).t

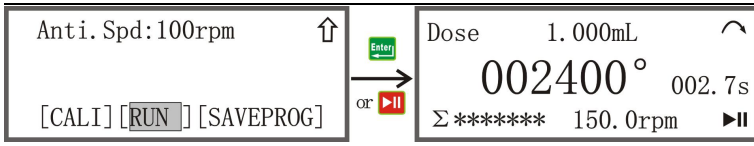
Four warning screens as follows:



Refer to the prompts shown on the warning screen for error handling. In general, the parameters will be correct for use after a few calibrations.

5: Quantitative mode

After calibrating, pump will go back to file setting menu. Press ▶II or choose [RUN] and press Enter to enter Quantitative working screen.



1.000mL: Target dose.

002400°: Running angle, calculated with target dose and tube settings. It is allowable for fine adjustment as described later. See ***4-4-3***.

002.7s: Running time, counts down during pump running.

Σ*****:** Displays the number of cycles dispensed. The number will increase by 1 per dosing, the initial value is 0. When "Σ***/***"is displayed, the first *** refers to the number of cycles dispensed, and the second *** refers to the target batch size. The first *** will increase by 1 per dosing until it equals to the target.

: CW.

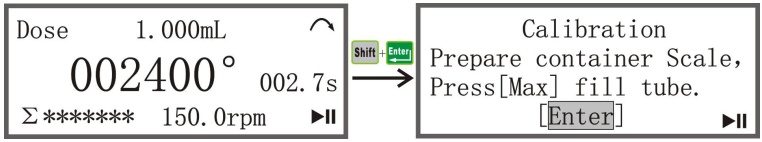
: CCW.

4-4-2 Key Combinations

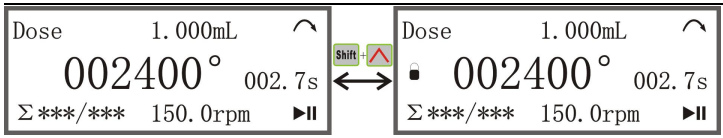
In Quantitative working screen，

（1）When pump is stopped, users can press Shift + < or Shift + > to change the running direction. Or enter Sys-Set menu to set direction.

（2）When pump is not running, users can press Shift + Enter to enter calibration menu.



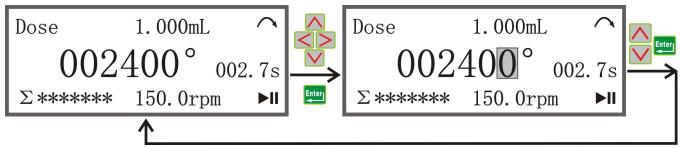
（3）Press Shift + ^ to lock and unlock the keypad. The operation can be done when the drive is running or not. When the keypad is locked, only ▶II functions.



（4）Press Shift + Max to reset the number of cycles dispensed to 0 in stop mode.

4-4-3 Fine adjustment of running angle

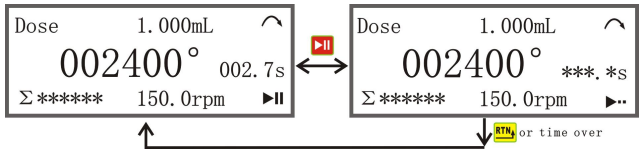
In Quantitative working screen, when the slight flow rate variation occurs after a long time of tube duty, Users can adjust the flow rate via fine adjustment of running angle. Press ∧, ∨, <, > or Enter to select digit to be adjusted. Press ∧/∨ keys to adjust the value. Press Enter to confirm. The adjustment can be operated in stop or running statuses.



4-4-4 Manual operation

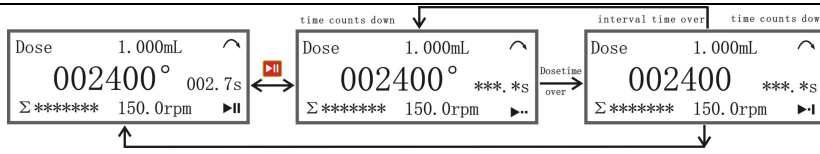
Ⅰ When setting DoseNum.=0(no limit) & InterV.T=0

Press ▶II once, pump works once, the batch count increases by 1. When counting to 10000000, the batch count is reset to 0.



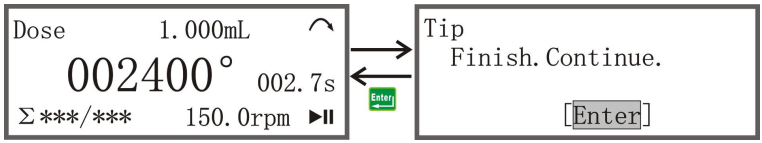
Ⅱ When setting DoseNum.=0(no limit) & InterV.T=n (n>0)

Press ▶II key to operate the drive continuously with batch count increments. When counting to 10000000, the number is reset to 0. Press ▶II again to stop drive.



Ⅲ When setting DoseNum.= n (n>0) & InterV.T=0

Press ▶II once, pump works once, the batch count increases by 1. **Σ***/*** is displayed on screen. When batch is complete, the screen displays the ending tips as shown below,



Ⅳ When setting DoseNum.=n (n>0) & InterV.T=n (n>0)

Press ▶II to operate the drive continuously with count increments. Σ***/*** is shown on screen. Drive will automatically stop once batch is complete.

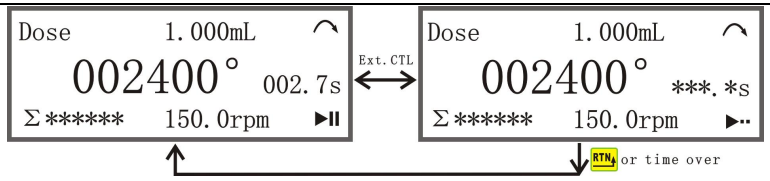
4-4-5 External control

Using external control requires ① setting **Can.Test=ON (under bottle signal control) or OFF (out of bottle signal control)** in **Sys-Set menu,**

② Connecting pump to external control according to "***Wiring 1***". (See ***5 External Control***)

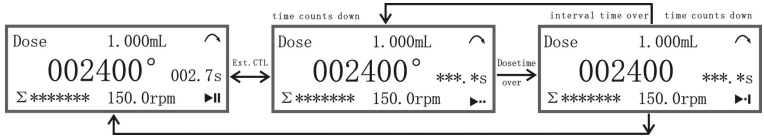
Ⅰ When setting DoseNum.=0(no limit) & InterV.T=0

Drive receives remote start input once, operates once with the batch count increasing by 1. When counting to 10000000, the batch count is reset to 0 automatically.



Ⅱ When setting DoseNum.=0(no limit) & InterV.T=n (n>0)

Input a remote start signal to operate drive continuously with count increments. When counting to 10000000, the number is reset to 0. Press ▶II again to stop drive.



Ⅲ When setting DoseNum.= n (n>0) & InterV.T=0

Drive receives remote start input once, operates once with the batch count increasing by 1. Σ***/*** is shown on screen.

Ⅳ When setting DoseNum.=n (n>0) & InterV.T=n (n>0)

Input a remote start signal to operate drive continuously with count increments. Σ***/*** is shown on screen.

Note: ① When **Can.Test=ON** is set, the screen will shows "**no can**" if there is no bottle available.

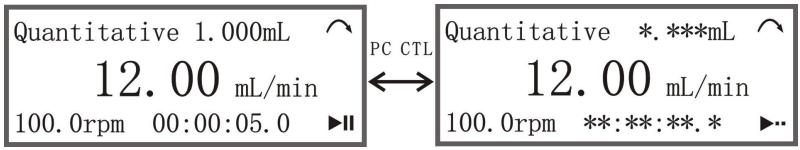
② The settings of **DoseNum.=0 (no limit), InterV.T=0 & Can.Test=ON** are general recommendations

③ When pump is controlled by external device, user can press ▶II to stop the pump urgently.

4-4-6 Communication

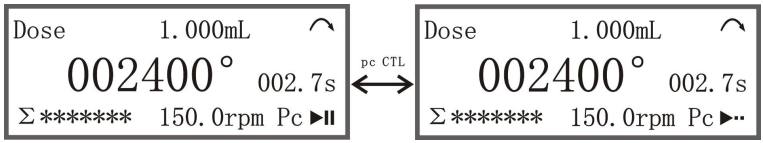
To use communication mode: ①Set "NetWork=ON" in **4-3 setting**; set baud rate as needed. Set the pump ID between 01-16#.②Connect pump with communication signal according to "***Wiring 4***".

Pump receives a signal from PC once, and then works once.



Ⅰ When setting DoseNum.=0(no limit) & InterV.T=0

Drive receives PC start input once, operates once with the batch count increasing by 1. When counting to 10000000, the batch count is reset to 0.



Ⅱ When setting DoseNum.=0(no limit) & InterV.T =n (n>0)

Input a PC start signal to operate drive continuously with count increments. When counting to 10000000, the number is reset to 0. Press ▶II again to stop dispensing at any time you want.

Ⅲ When setting DoseNum.= n (n>0) & InterV.T=0

Drive receives PC start input once, operates once with the batch count increasing by 1. Σ***/*** is shown on screen.

Ⅳ When setting DoseNum.=n (n>0) & InterV.T=n (n>0)

Input a PC start signal to operate drive continuously with count increments. Σ***/*** is shown on screen.

Notice: ①"PC" stands for "Personal Computer". ②When pump is controlled by external device, users can press ▶II to stop the pump urgently.

4-5 Continuous mode operation

4-5-1 Preparation

Process:

1: Sys-Set

See **4-3 setting**, set "NetWork=OFF" and "ReStart=OFF" .

2: Select File ID

Enter File Setting menu, select file ID to call the saved parameters.

3: Parameter settings

Set parameters as following:

File ID: #00-12, Select #10.

WorkMode: There are Quantitative and Continuous mode, select Continuous mode.

SpeedSet: 0.1-600.0 rpm. Set it to 150.0 rpm

Flux.Set: 0.001-2.200L/min. Set it to 22.50mL/min.

Tube.Sel: Tube bore options: 0.8mm、1.6mm、3.2 mm、4.8 mm、6.4 mm. **-1** means single channel, **-2** means 2 channels. Set it to 1.6mm-1. Once the tube size is confirmed, the flow range is fixed.

20mA-Spd: the minimum speed (**sL**: 0.0-600.0rpm) the pump will run at when receiving the 20mA speed signal.

04mA-Spd: the minimum speed (**sH**: 0.0-600.0rpm) the pump will run at when receiving the 4mA speed signal.

Note: sH-sL≥5.

Cal.Time: 15s, 30s, 60s, 90s, 120s, 150s, 180s, 240s. Select 60s here.

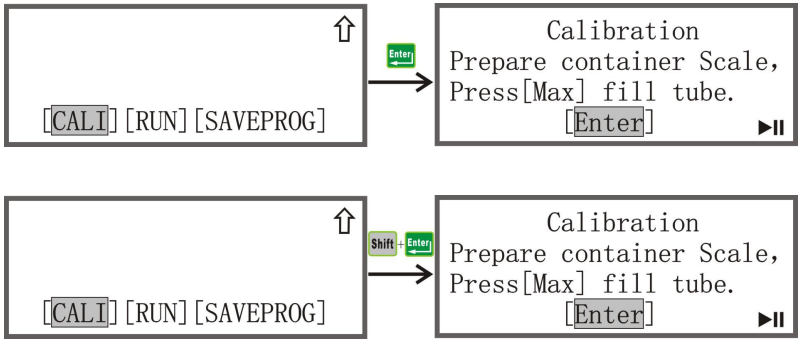
[CALI]: When it is highlighted, press Enter to enter calibration screen.

[RUN]: When it is highlighted, press Enter or ▶II to enter Continuous working screen.

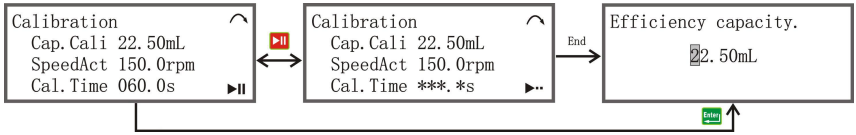
[SAVEPROG] : When it is highlighted, press Enter to enter **File** save screen.

4: Flow rate Calibration

In **File** setting screen press / to choose **CAL**, then press Enter to enter calibration screen. (Or press Shift + Enter in **File** setting menu for faster entry):



Prepare a scale which can handle your target volume, press Max to prime the tubing, make sure there is no bubble in the tubing. Press Enter to enter the next menu, and then press ▶II to start calibration or, if the actual volume has been known, press Enter to enter it directly.

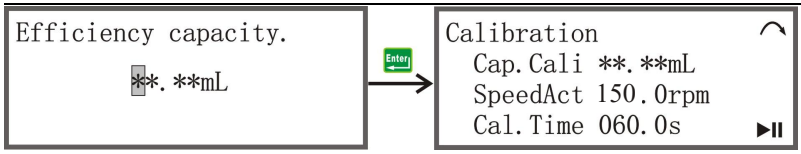


Cap.Cali: 22.50mL.

SpeedAct: 150.0rpm

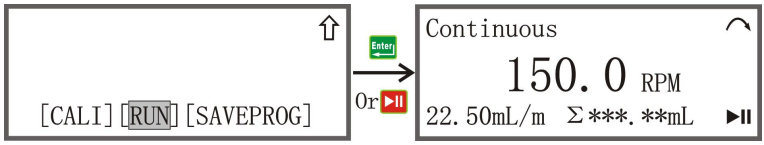
Cal.Time: 060.0s.

When the calibration run period is complete, users can enter the measured volume in volume calibrating screen.



5: Enter Continuous working screen

After calibration, the pump will go back to **File** setting menu. Press ▶II or highlight [RUN] and press Enter to shift to Continuous working screen as shown below,



150.RPM: The speed at which the pump needs to run, or the speed at which it is set, is generated based on the set flow rate and the number of hoses and hose channels.

22.50mL/m: Target flow rate, users can set it or pump will calculate it according to set RPM. Unit is ml/min.

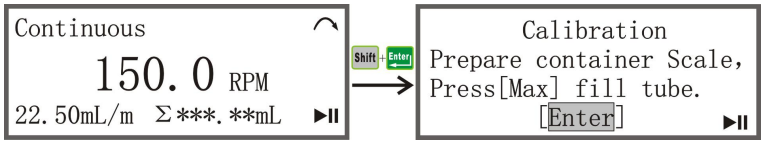
Σ*.**mL:** Cumulative volume dispensed. Unit can be ml, L and KL. Users can press Shift + Max to reset it to 0 ml.

4-5-2 Combination keys

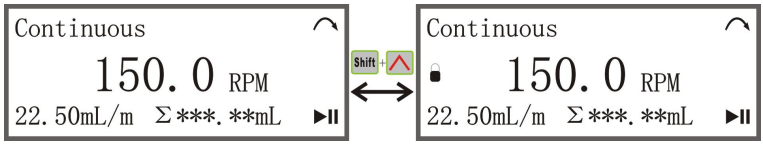
In **Continuous** working screen,

（1）When pump is stopped, users can press Shift + < or Shift + > to change the running direction. It can also be changed in **Sys-Set** menu.

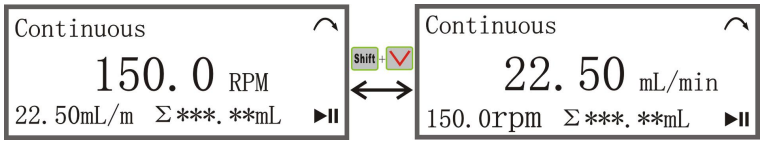
（2）When pump is stopped, users can press Shift + Enter to enter calibration menu.



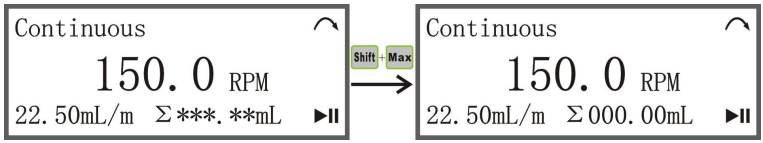
（3） Pressing Shift + ∧ can lock/unlock keypad whether the pump is running or not. When the keypad is locked, only ▶II functions.



（4）Press Shift + ∨ to switch between speed and flow rate.

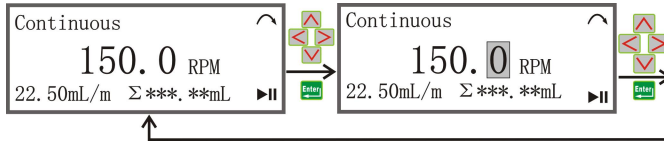


（5）When pump stops, users can press Shift + Max to reset the cumulative volume to 0.



4-5-3 Adjusting flow rate and speed

When the flow rate alteration occurs after a period of duty, the fine adjustment of speed is necessary for matching the current flow rate to the target while the value of flow rate shown on the display stays the same. When adjusting flow rate, the RPM will change and be shown as well. Operations: press ∧, ∨, <, > or Enter to adjust. Press Enter to confirm.

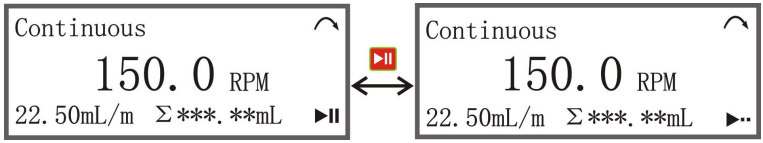


Note: ① Invalid adjustment exists due to the flow rate range limited by selected tube size and pump head. ② Flow rate and RPM can be adjusted no

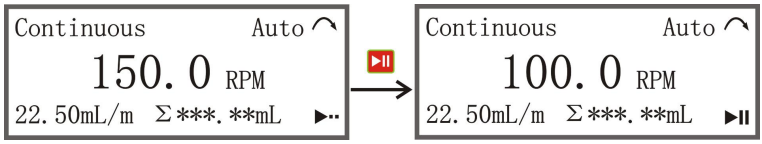
matter the pump is in operation or not. ③ When pump is stopped, users can press Max to prime or empty tubing.

4-5-4 Manual operation

Press ▶II to start pumping. Pressing it again stops pump.



When "ReStart= ON", turn the pump on, it will remain the same status with what it is before shut down.



4-5-5 External operation

If users want to use external device to control the pump ①Set "NetWork=OFF". ②"SS.Mode" must be "Pulse" or "Voltage". ③external control cable must be connected according to "***Wiring 2***" for SS/direction control signal accessing (via pins 2, 3 and 12) or "***Wiring 3***" for direction/analogue control signal accessing (via pins 2, 3, 5,/15 11 and 12).

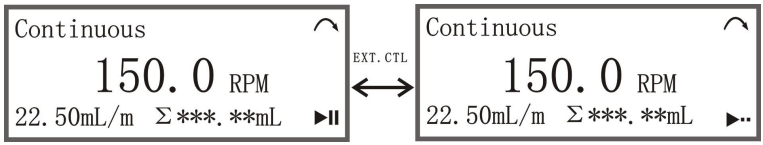
（1） There are 2 ways for external signal to control direction and S/S. See "***Wiring 2***".

① When "SS.Mode=Pulse", pump will start when pump receives a pulse signal, and stop when pump receives a pulse signal again. When pump receives a low level direction signal, the running direction will be changed. If pump is working, the change will not take effect immediately until next start. (See ***5 External control***)

② When "SS.Mode=Voltage", pump will start when pump receives a lower signal, and stop when pump receives a higher level. When pump receives a

low level direction signal, the running direction will be changed. If pump is working, the change will not take effect immediately until next start. (See ***5 External control***)

Working screen as below:

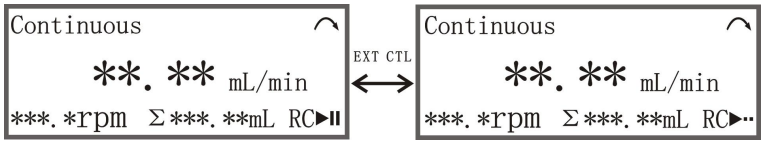


（2）There are 2 ways for external signal to control pump direction and S/S, analog signal controls speed. Connect PIN2 and PIN11 according to "***Wiring 3***".

① When "SS.Mode=Pulse", pump will start working when pump receives a pulse signal, and stop when pump receives a pulse signal again. When pump receives a lower level direction signal, the direction is CW. When pump receives a higher level direction signal, the direction is CCW. RPM or flow rate is controlled by the analogue signal received by pump. (See **5 External control**)

② When "SS.Mode=Voltage", pump will start working when pump receives a lower signal, and stop when pump receives a higher level. When pump receives a lower level direction signal, the direction is CW. When direction receives higher level, the direction is CCW. RPM or flow rate is calculated based on the received analogue signal received. (See **5 External control**)

Working screen as below:



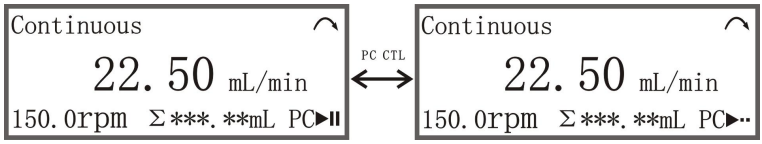
Note:When pump is controlled by external signal, users can press ▶II to stop the pump urgently.

4-5-6 Communication

If users want to control pump via communication

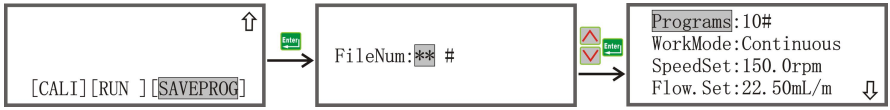
①please set "NetWork= ON". Set "BaudRate" and "Pump.ID" between 01-16#.

② Connect communication signal with pump according "***Wiring 5***". (See ***5 External control***)



4-6 Save file

Select [SAVEPROG] and press Enter to enter SAVE screen as below:



4-7 Prime and Empty

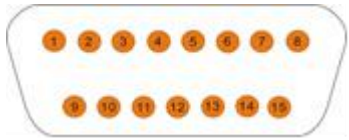
Before using the pump, the tube must be primed. Press Max in any modes to prime the tube rapidly. Reverse the flow direction and then press Max to empty tube after use.

5 External Control Instruction

The pump can be controlled by key-presses or by means of analogue / communication signal inputs.

5-1 Configuration with wiring scheme

DB15 Definitions:



Pin#	Color	Description
1	Brown	+5V, for external device use, current less than 100mA.
2	Red	GND, common ground wire.
3	Orange	F/R, rotation direction control signal.
4	Yellow	+12V, for external device , current less than 100mA.
5	Green	Iin, current input (4 ~ 20mA), control speed (flow).
8	NC	GND, RS485 communication ground.
6/9	Blue	A, RS485 communication Terminal A.
7/10	Purple	B, RS485 communication Terminal B.
11	Grey/Black	REM, analog volume enabling port/bottle signal access.
12	White	S/S, trigger and switch control signal access point.
13	NC	13 NC COM, common port of relay output.
14	NC	NO, constant start of relay output.
15	NC	Vin, voltage input (0 ~ 10V), control speed.

5-2 Wiring Scheme

There are five wiring schemes for external analogue control and communication control, as follows,

Wiring 1: Connect pins 2,11 and 12 to external control device.

Wiring 2: Connect pins 2, 3 and 12 to external control device.

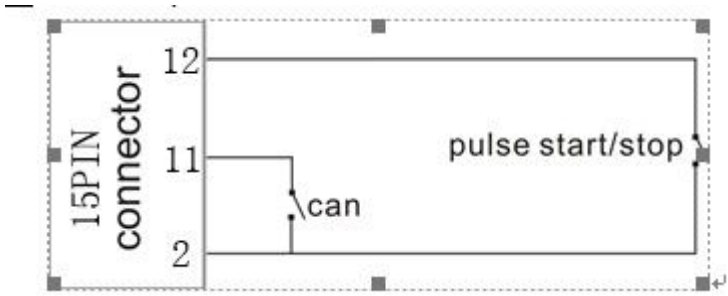
Wiring 3: Connect pins 2, 3, 5, 11 and12 to external control device.(4-20mA)

Wiring 4: Connect pins 2, 3, 5, 11 and12 to external control device.（0-10V）

Wiring 5: Connect pins 6/9 and 7/10 to external control device.

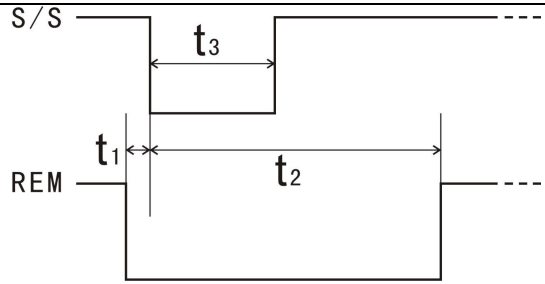
Typical Use Case Diagram:

Wiring 1: Connect pins 2, 11 and 12 to the external control device.



Note: ①Connection of pins 2 and 11 means “bottle available” and disconnection means “no bottle available”. A momentary contact of pins 2 and 12 means SS signal being received.

②Timing sequence of “pulse start/stop” and “REM”:

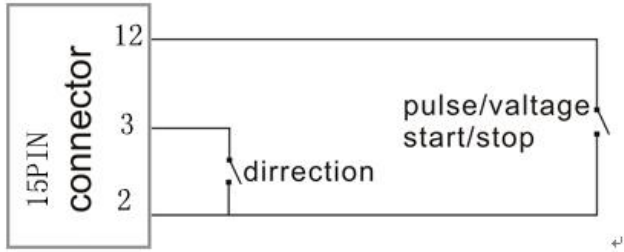


S/S—Start/stop signal； **REM**—bottle signal； t_1—Lead time of bottle signal 3； t_2—bottle signal duration； t_3—start signal duration

Timing table:

Attribute / Period	Shortest (ms)	Recommended (ms)	Longest (ms)
t_1	0	10	100
t_2	150	200	till next start
t_3	100	150	till next start

Wiring 2: Connect pins 2, 3 and 12 to external control device.



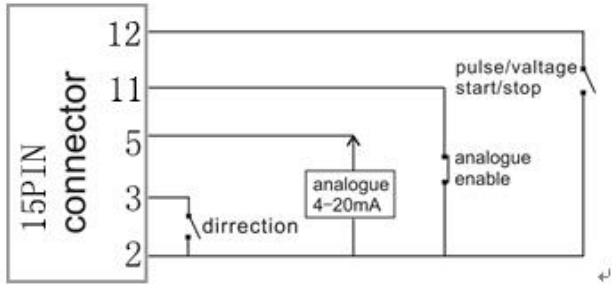
Note:

①When “SS.Mode=Pulse”, pump will start when Pin 12 receives a pulse signal, and stop when PIN12 receives a pulse signal again.

②When “SS.Mode=Voltage”, pump will start when PIN 12 receives a low level signal, and stop when PIN 12 receives a higher level.

③When PIN3 receives a low level direction signal, the direction will be changed.

Wiring 3: Connect pins 2, 3, 5, 11 and12 to external control device.(4-20mA)



Note: Connect Pins 2 and 11 first, speed can be controlled by analogue, direction and S/S are controlled by external signals.

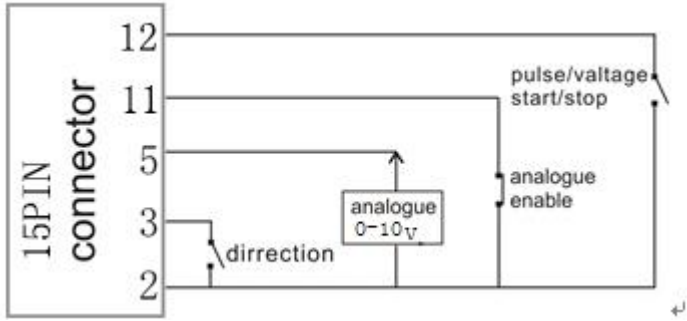
① When "SS.Mode=Pulse", pump will start when PIN 12 receives a pulse signal, and stop when PIN12 receives a pulse signal again.

② When "SS.Mode=Voltage", pump will start when PIN 12 receives a lower signal, and stop when pin 12 receives a higher level.

③ When PIN3 receives a lower signal, the direction will be changed.

④ The speed (flow) is calculated according to the size of the analog quantity received by PIN5 and the speed corresponding to the high and low value of the analog quantity (namely, "4mA speed" and "20mA speed").

Wiring 4: Connect pins 2, 3, 5, 11 and12 to external control device.（0-10V）



Note: Connect Pins 2 and 11 first, speed can be controlled by analogue, direction and S/S are controlled by external signals.

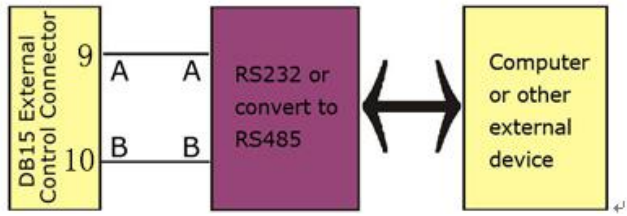
① When "SS.Mode=Pulse", pump will start when PIN 12 receives a pulse signal, and stop when PIN12 receives a pulse signal again.

② When "SS.Mode=Voltage", pump will start when PIN 12 receives a lower signal, and stop when pin 12 receives a higher level.

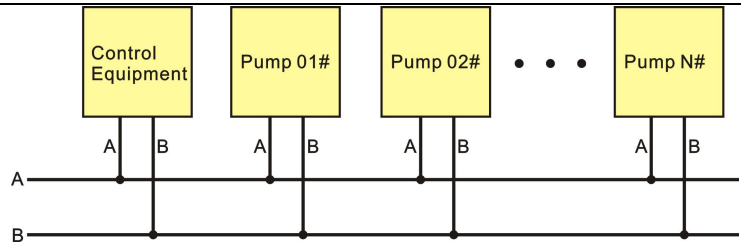
③ When PIN3 receives a lower signal, the direction will be changed.

④ The speed (flow) is calculated according to the size of the analog quantity received by PIN5 and the speed corresponding to the high and low value of the analog quantity (namely, "0V speed" and "10V speed").

Wiring 5: Connect pins 6/9 and 7/10 to external control device.



Remote communication control of multiple peristaltic pumps is needed in some applications. The 6/9 pins (A) and 7/10 pins (B) of the external control interface can be connected out according to Wiring 4 above to form the control system as shown in the figure below



Note1: 1≤N≤16

Note 2: When connecting multiple pumps, please set ID for each pump. See ***Communication Connector Instruction*** for more information.

6 Maintenance and repair

6-1 Maintenance

- Please remove the tubing if the pump is going to be kept unused for a long time.
- Please keep the pump clean on the outside. You can clean the pump with soft cloth and clean water.

Note: Don't use alcohol to clean membrane.

6-2 Repair

Get familiar with the correct operation, external control and other working requirement to avoid man-made damage.

Troubleshooting chart:

Problem	Check	Troubleshooting	Note
Start the pump, but the LCD screen doesn"t work.	Check if the power supply is on; if the power socket is well connected; if the fuse is loose or broken.	Plug in the power supply cable, make sure it"s intact; use a new fuse; make sure the fuse is the required model.	Make sure you find out what caused the fuse burned out.

Start the pump, the LED screen works fine, but the pump head doesn"t work	Check if the pump head is pressed too tight; if the motor is correctly connected; if the external connection is correctly connected and if the the external signal is received.	Adjust the pump head; reconnect the motor; reconnect the external control connector and check the signal input.	If you can"t find out the problem according to this way. Please contact the supplier or our company for resolution.
The pump is running, but the fluid (or air)can"t be transferred.	Check if the tubing is pressed too hard; if the tubing is leaking.	Adjust tubing clipper on both sides of the pump head; use new tubing.	
The tubing moves along with the roller in operation.	Check if the clipper is in the right place.	Adjust the clipper.	

7 Warranty

1. From the day of purchase, within three months, products can be unconditional returned.
2. From the day of purchase, we will provide free maintenance and repair in 1 year.
3. After warranty period, we will continue to provide after-sales service.
4. The following conditions are not covered by our warranty:

- 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 elements as consumable items are excluded.
- Products which, in the judgment of Prefluid , have been abused, misuse, or subjected to malicious or accidental damage or neglect.
- Electrical surge as a cause of failure is excluded.
- Chemical attack.
- All pump head rollers.
- Other modifications or assembling without permission of Prefluid.