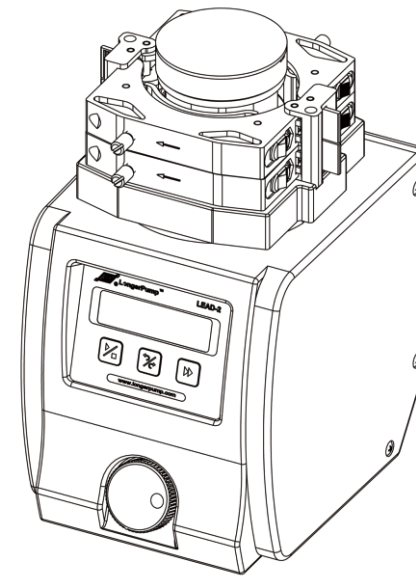


LONGER

LEAD - 2 PERISTALTIC PUMP OPERATING MANUAL



LONGER

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LEAD-2 Longer Peristaltic Pump

Baoding Longer Precision Pump Co.,Ltd.

LEAD - 2 OPERATING MANUAL

⚠ IMPORTANT INFORMATION :

Please read operation manual carefully before operation.

⚠ WARNINGS :

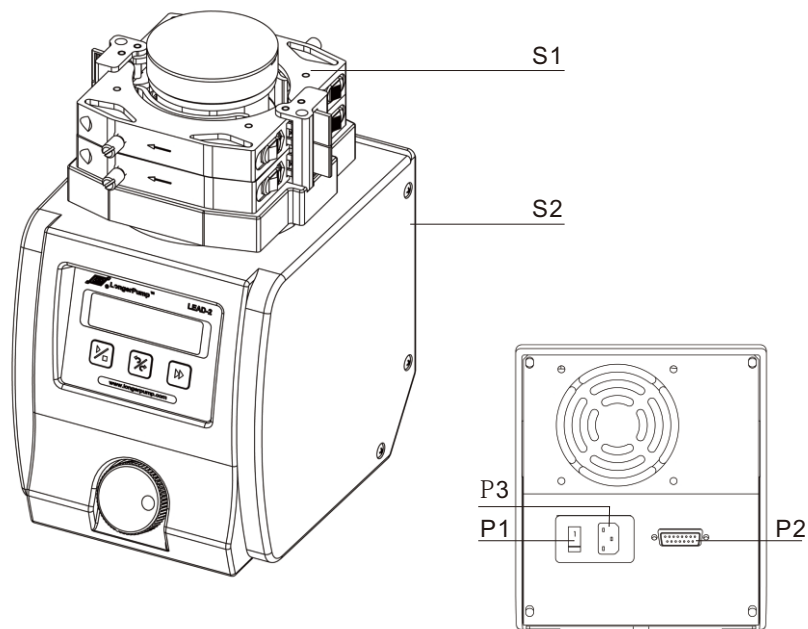
- Tubing breakage may result in fluid being sprayed from pump. Use appropriate measures to protect operator and equipment. Please check the tubing frequently and change the tubing in time.
- If the power line or the plug is worn or damaged please pull out the plug (Hold the plug not the power line when pulling out).
- Please shut down the power supply and pull out the plug when meet below circumstances (Hold the plug not the power line when pulling out).
The fluids splash on the body of the pump.
You think the pump needs to be maintained or repaired.
- Please shut down the power supply before install the external control equipments.

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Introduction

Lead-2 peristaltic pump is an accurate flow rate pump. Its acceptable pump heads are 15-48, 15-88, 15-24 and 15-44. 2, 4 and 8 channels are available. It offers flow rates of 0.001 - 300 mL/min(Single Channel). It has flow rate and speed adjusting function. Lead-2 has other functions like start/stop, cw/ccw, prime (fast filling and emptying), flow rate calibration, tubing selection, RS485 communication and remote control, etc.



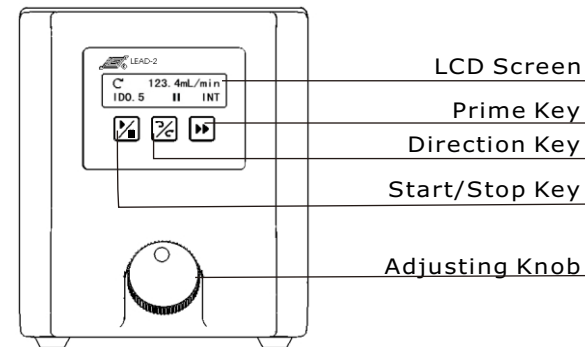
S Standard Configuration
 S1 Pump Head
 S2 Drive

P Parts
 P1 Power Switch
 P2 Remote Control Interface
 P3 Power Socket

Reference:

For detail information about external control function please see page 13.

Operation Panel



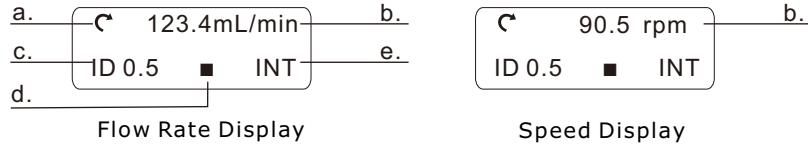
Basic Operation

- ❖ Start/Stop Key
 Press the **Start/Stop Key** to start or stop the pump.
- ❖ Direction Key
 Press the **direction key** to change the rotation direction of the pump. This key is valid when the pump is running.
- ❖ Adjusting Knob
 Function 1: Adjust the flow rates or speed in running state.
 Function 2: In menu selection state when the pump is idle, press the **adjusting knob** for confirmation and turn the **adjusting knob** for selecting and setting the menus.
- ❖ Prime Key
 In common state, press the **Prime Key** to enter prime state when the pump runs at full speed for emptying, filling and rinsing operation; Press the **Prime Key** again to return to common state. In prime state, other keys are invalid except **Direction Key**. Prime state interface is shown as below:



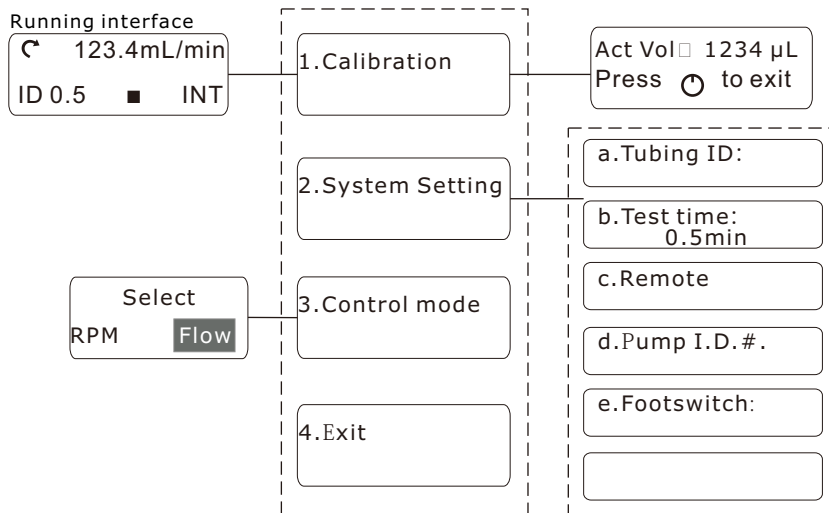
Running Interface

Display running interface after initialization.



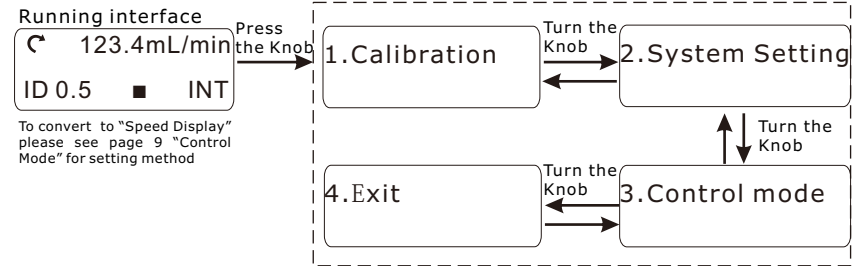
- a. Running direction.
- b. Current flow rate or speed.
- c. Tubing inner diameter. "ID0.5" means the inner diameter of the tubing is 0.5 mm.
- d. Start/Stop state: "Start" state displays "▶", "Stop" state displays "■".
- e. Control mode: "INT" means the pump is controlled by internal control; "shut" means remote control is in "off" state; "V" means the pump is controlled by remote control analog voltage signal; "mA" means the pump is controlled by remote control analog current signal.

Menu Frame Work



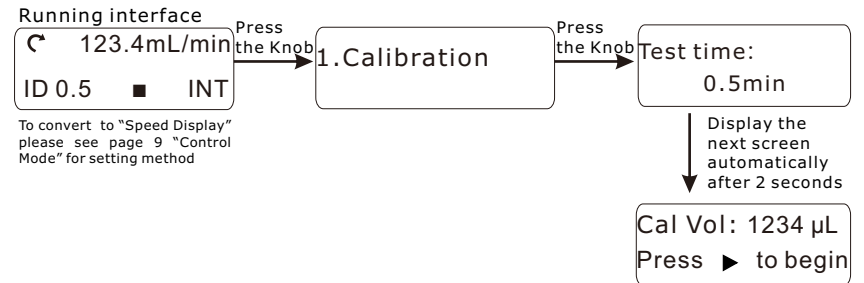
Function Setting

- In running interface, press the **Adjusting Knob** to enter the calibration interface. Turn the **Adjusting Knob** to select 4 function setting interfaces.



❖ **Calibration Setting**

- Flow rate calibration is needed in below situations:
 1. Use the pump the first time;
 2. Change the pump head;
 3. Change the tubing;
 4. Setting new flow rate;
 5. Operating condition changes;
 6. Environmental condition changed
- Enter calibration function setting interface:



💡 **Note:**

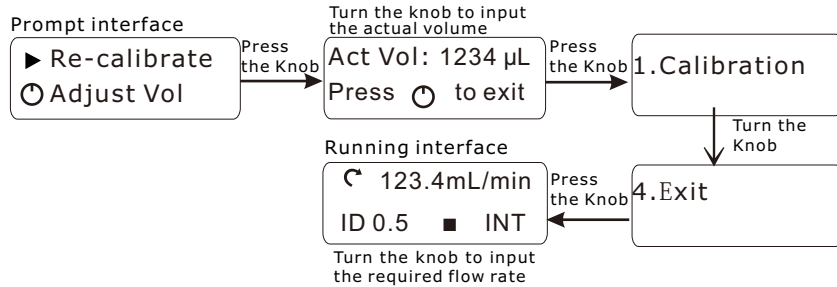
In speed Display, the calibration function is forbidden. In Running Interface, press the **Adjusting Knob**, it will display:

In RPM mode
Press ⏻ to exit

Press the **Adjusting Knob** to exit.

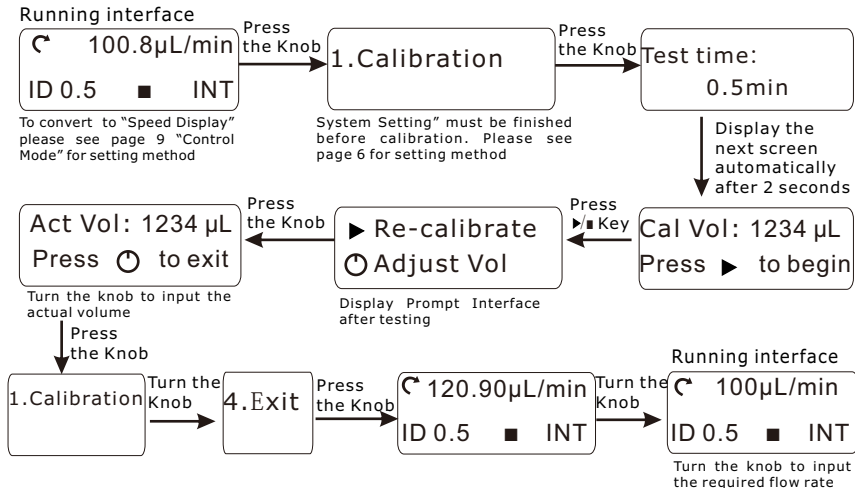
• Flow Rate Calibration:

1. For the first time flow rate calibration, "System Setting" must be finished in advance. Please see page 6 for setting method.
2. Press the **Start/Stop Key** to begin the testing. Press the **Start/Stop Key** again to stop the testing. The pump stops automatically and enter "prompt interface" as soon as the setting time is up. In "prompt interface" press the **Start/Stop Key** to repeat the testing. Press the **Adjusting Knob** to enter actual volume modification interface. Actual volume need to be measured and calculated. Turn the **Adjusting Knob** to input the actual volume and then press the **Adjusting Knob** to return to "1. Calibration" interface.
3. Turn the **Adjusting Knob** to enter "4. Exit" interface. Press the **Adjusting Knob** to return to "Running Interface". The flow rate displayed in the "Running Interface" is actual flow rate. Turn the **Adjusting Knob** to input the required flow rate.



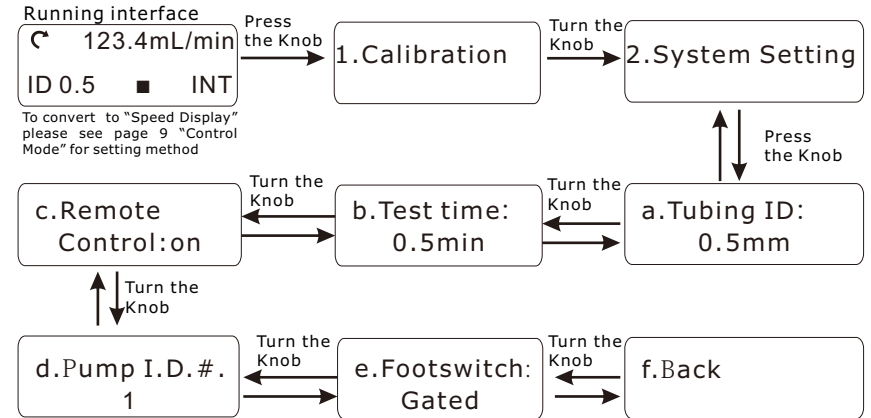
• Calibration Example

Assume the required flow rate is 100 µL/min.



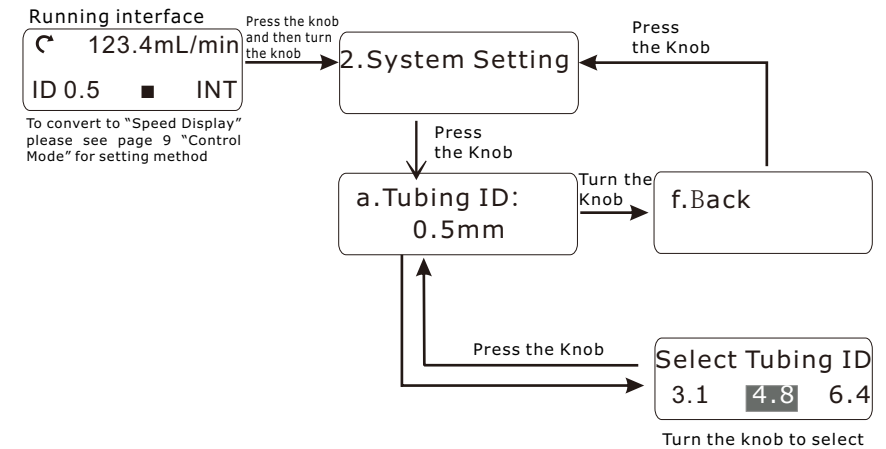
❖ System Setting

- The submenus of "System Setting" menu are "a. Tubing ID", "b. Test time", "c. Remote Control", "d. Pump I.D. #", "e. Footswitch" and "f. Back".



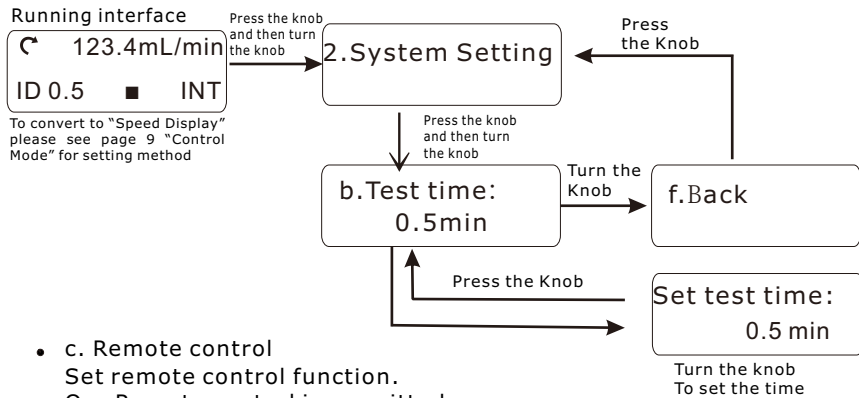
• a. Tubing ID

In "System Setting" interface, press the **Adjusting knob** to enter "a. Tubing ID" interface. Press the **Adjusting Knob** to enter "Select Tubing ID" interface. Turn the **Adjusting Knob** to select the required tubing inner diameter. Press the **Adjusting Knob** to save and return back to "a. Tubing ID" interface.

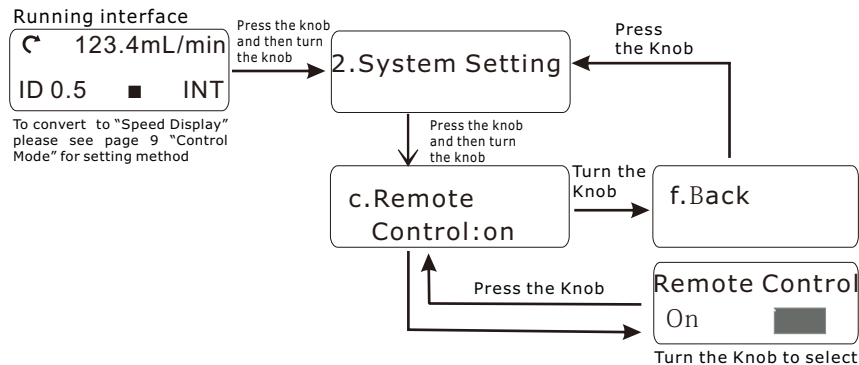


- b. Test time
The test time is the required time for one time flow rate calibration.
In "System Setting" interface, press and then turn the **Adjusting Knob** to enter "b. Test time" interface. Press the **Adjusting Knob** to enter "Set test time" interface. Turn the **Adjusting Knob** to set the test time. Press the **Adjusting Knob** and return back to "b. Test time" interface.

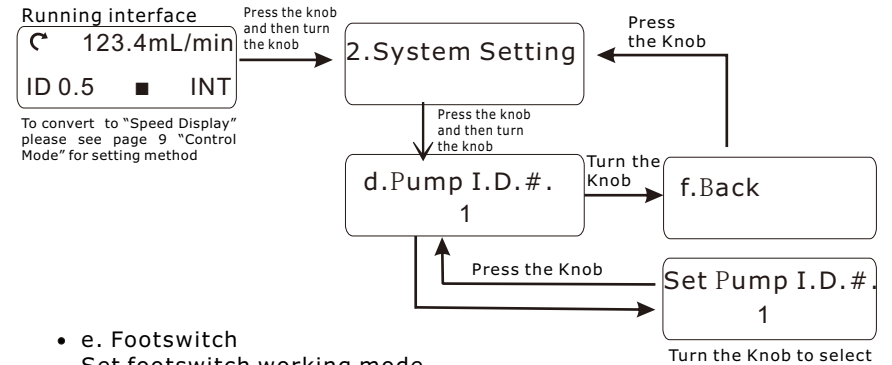
Note: The time range is 0.5-25 min. The resolution is 0.5 min.



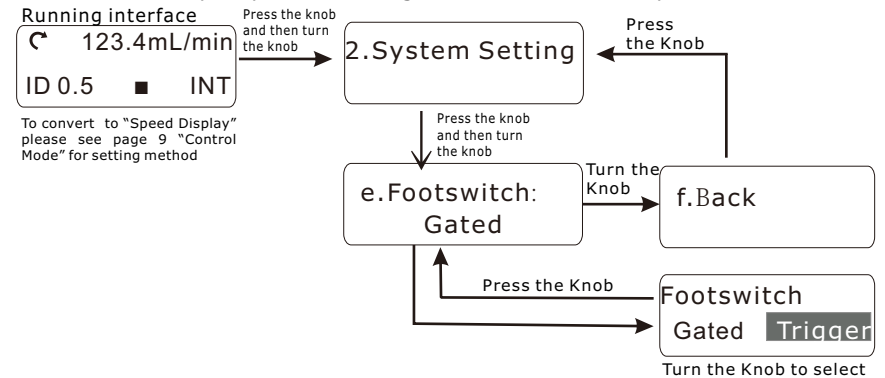
- c. Remote control
Set remote control function.
On: Remote control is permitted.
Off: Remote control is forbidden.
In "System Setting" interface, press and then turn the **Adjusting Knob** to enter "c. Remote Control" interface. Press the **Adjusting Knob** to enter remote control selection interface. Turn the **Adjusting Knob** to select the remote control state. Press the **Adjusting Knob** to save and return back to "c. Remote Control" interface.



- d.Pump I.D.
When control computer controls many pumps through RS485 serial communication bus interface, it must identify each pump's I.D.. This pump I.D. should be unique. It's the identification of this pump.
In "System Setting" interface, press and then turn the **Adjusting Knob** to enter "d. Pump I.D." interface. Press the **Adjusting Knob** to enter pump I.D. setting interface. Turn the **Adjusting Knob** to set the pump I.D. # (1 -30). Press the **Adjusting Knob** to save and return back to "d. Pump I.D." interface.



- e. Footswitch
Set footswitch working mode.
In "System Setting" interface, press and then turn the **Adjusting Knob** to enter "e. Footswitch" interface. Press the **Adjusting Knob** to enter footswitch setting interface. Turn the **Adjusting Knob** to select footswitch working mode. Press the **Adjusting Knob** to save and return back to "e. Footswitch" interface.
Trigger: Press footswitch, the pump starts running; Press footswitch again, the pump stops.
Gated: The pump runs as long as the footswitch is pressed.

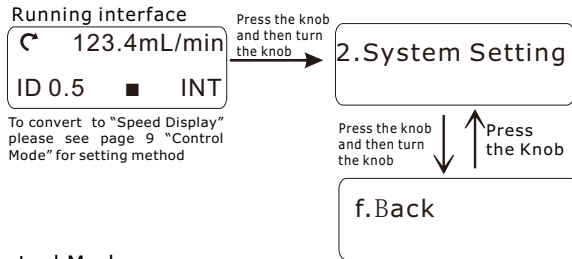


Note:

The pump identifies the Longer Footswitch automatically. When the pump connects the footswitch, the **Start/Stop Key** on operating panel is invalid no matter the remote control is on or off.

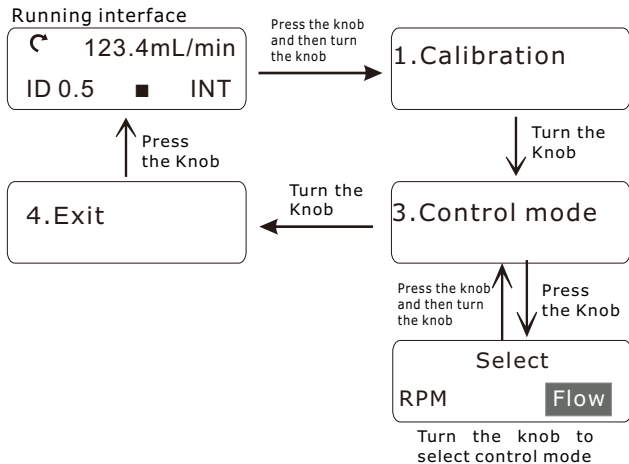
f. Back

Return back to "System Setting" interface after all the parameters in "System Setting" menu are set. Press and then turn the **Adjusting Knob** to enter "f. Back" interface. Press the **Adjusting Knob** to return back to "2. System Setting" interface.



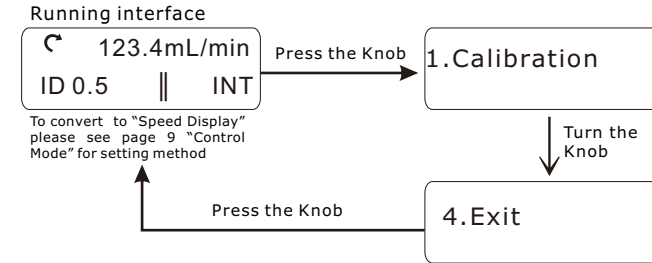
Control Mode

- In "Running Interface", press and then turn the **Adjusting Knob** to enter "Control Mode" interface
- In "Control Mode" interface, press the **Adjusting Knob** to enter control mode selection interface. Turn the **Adjusting Knob** to select the control mode. Press the **Adjusting Knob** to save and return back to "3. Control Mode" interface.

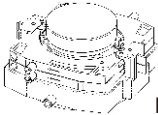
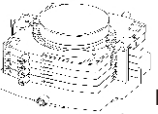




Exit

- Return back to running interface after all the parameters are set through this interface. In "Running Interface", press and then turn the **Adjusting Knob** to enter "4. Exit" interface. Press the **Adjusting Knob** to return back to "Running Interface".

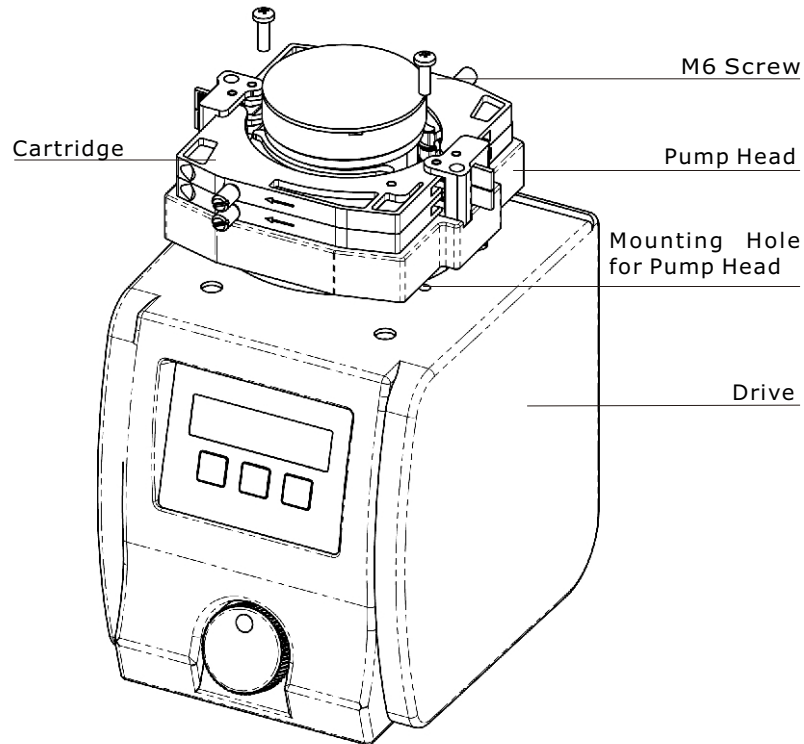


Acceptable Pump Heads and Tubing

Pump Head	Tubing (mm)	Flow Rates (mL/min)
 LEAD15-48 (4 Channels 8 Rollers)	Inner Diameter ≤ 2.4 Wall Thickness ≤ 1.0	Per channel 0.01 - 80
 LEAD15-88 (8 Channels 8 Rollers)	Inner Diameter ≤ 2.4 Wall Thickness ≤ 1.0	Per channel 0.01 - 80
 LEAD15-24 (2 Channels 4 Rollers)	16# 25# 17#	Per channel 0.8 - 300
 LEAD15-44 (4 Channels 4 Rollers)	16# 25# 17#	Per channel 0.8 - 300

Pump Head Mounting

The pump head is mounted on drive before the pump ship to customer. Follow below procedure to change another pump head.



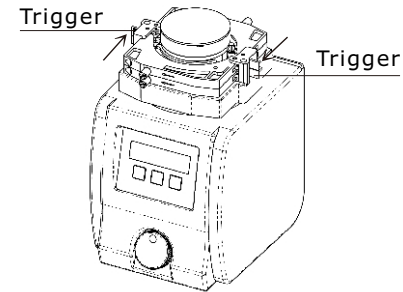
1. Loose the two M6 screws which connect the pump head and the drive. Dismantle the pump head slightly.
2. Insert the slot of the pump head's shaft to the flat end of drive's main shaft. Make the bottom of the pump head match the top of the drive.
3. Insert the two mounting screws into the mounting holes for pump head. Then tighten the mounting screws.



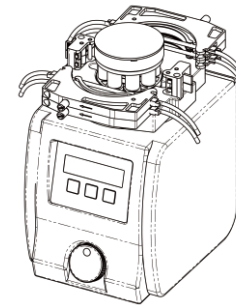
Note:

Shut off the power supply before changing the pump head.

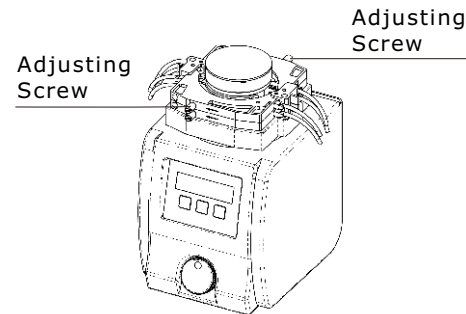
Tubing Loading



1. Press the trigger according to the arrow mark directions. Take out the cartridges.



2. Load tubing with stops in the cartridges. Mount the cartridges on the pump head.

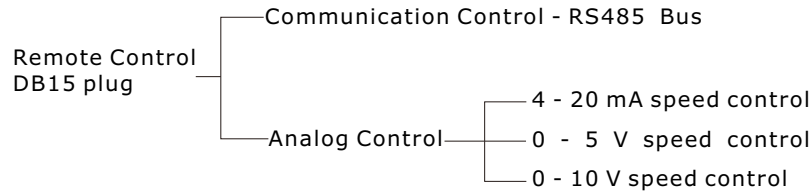


3. Turn the adjusting screws and adjust the occlusion between the cartridges and the rollers. Make sure the fluids can get through the tubing smoothly.

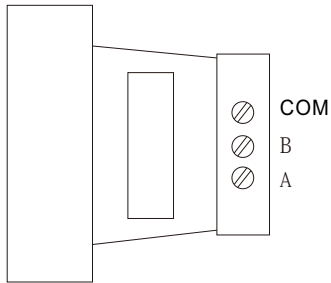
• **Occlusion Adjustment**

After loading tubing in pump head, turn the adjusting screws to make the occlusion maximum. Insert one side of tubing in water and blow to the other side of the tubing. If there is not air bubble in water the screws doesn't need to be adjusted. If there is air bubble in water, adjust the screws until the location where there is not air bubble in water.

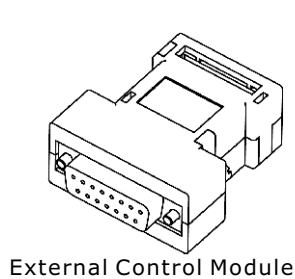
Remote Control



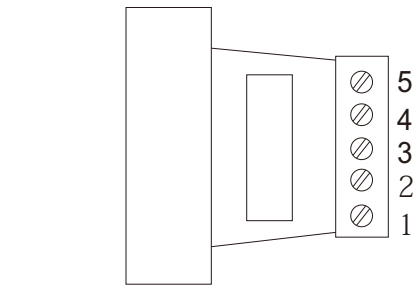
- ❖ **Communication Control**
The pump can connect to control computer (computer, PLC, SCM) through RS485 serial communication module (shown as below). Please contact Longer Company for communication protocol.



- ❖ **Analog Control**
Set the "Remote Control" in "on" state. External Control Module is shown as below.



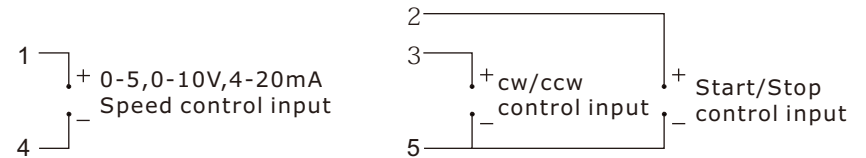
External Control Module



Drawing 14

- 💡 **Note:**
Four kinds of standard external control module need to order separately according to special requirements.

- Terminal Definition of Standard External Control Module
- 1#** Analog speed control input, for external speed control in external control modules of 4 to 20 mA, 0 to 5V and 0 to 10 V.
- 2#** External start/stop control input. When connected to COM, the pump runs, when connected to high level (5 to 12 V), the pump stops.
- 3#** External cw/ccw control input. When connected to COM, the pump rotates cw, when connected to high level (5 to 12 V), the pump rotates ccw.
- 4#** Reference potential for 4 to 20 mA, 0 to 5V/10V speed control input.
- 5#** Reference potential for external cw/ccw, external start/stop input.



0 - 5V, 0 - 10V, 4 - 20mA External Control Module Wiring Diagram

Optional Accessory

❖ Footswitch

Connect to the external control interface. Control the start and stop of the pump.

💡 Note:

Footswitch is optional accessories. It can only control the start and stop of the pump. The speed and direction of the pump are controlled by the knob and switch on the operation panel.

Communication Function

Lead-2 can connect to the control computer (computer, PLC, SCM) through RS485 serial communication interface.

💡 Note:

1. The pump I.D. of the pump which connects to the control computer through RS485 serial communication interface must be unique to prevent the communication from error.
2. Please contact Longer Company for communication protocol.

Maintenance

- When the pump is idle, we recommend you to release the tubing from pressure. This helps to protect the tubing from unnecessary strain and prolongs its service life
- Keep rollers clean and dry. This will prolong the service lives of tubing and pump head.
- The surface of drive and the pump head are not organic solvent and aggressive liquids resistant. Please pay attention when using.

Note

💡 If a trouble happens, please contact us or our dealers.

Warranty

The warranty period for this product is one year. If repair or adjustment is necessary within the warranty period, the problem will be corrected at no charge if it is not due to misuse or abuse on your part, as determined by the manufacturer. Repair costs outside the warranty period, or those resulting from product misuse or abuse, may be invoiced to you.

Technical Specifications

❖ Functions

Applicable Pump Head:	LEAD15-24, LEAD15-44, LEAD15-48, LEAD15-88
Flow Rate Adjustment:	Realize accurate flow rate adjustment function
Flow Rate Calibration:	Calibrate the setting flow rate to get accurate flow rate
Speed Control:	Realize accurate speed control through rotary coded switch
Display:	128 × 32 graphic LCD displays current running status
Prime:	For fast filling and emptying
Direction Control:	cw and ccw reversible
External Control:	Start/stop control, direction control, speed control (0 - 5V, 0 - 10V, 4 - 20mA optional)
Communication Function:	RS485, Baud rate: 1200 bps
Memory Function:	Storing the running parameter automatically
Cooling Mode:	Heat-emitting fan

❖ Specifications

Speed:	0.1 - 100.0 rpm, reversible
Speed Precision:	0.1 rpm
Adjusting Mode:	Continuous rotary coded switch adjustment
Display Mode:	128 × 32 graphic LCD display. Display can switch between flow rate and speed.
Applicable Power:	AC 90 - 260V 50/60Hz
Power Consumption:	< 50 W
Operating Condition:	Temperature 0 to 40°C Relative humidity < 80%
Drive Dimensions (L × W × H):	190 × 162 × 275 (mm)
Drive Weights:	3.5 Kg
IP Rating:	IP 31