LabN Series Manual

Innofluid Co., Ltd.

Note:

- Please read the manual carefully before operating the product.

Warning:

- 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

Table of Contents

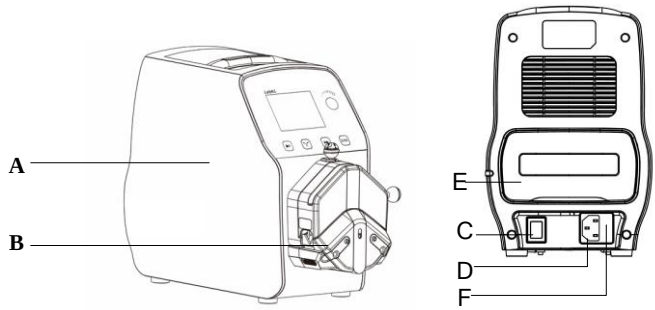
1. Product Introduction

LabN series adopt ABS engineering plastic housing, 3.2 inch LCD display; Multiple external control modes are optional, the pumps support RS232/RS485 communication, standard MODBUS protocol (RTU mode), meet different applications.

This series include: LabN1, LabN3, LabN6, LabN1-II, LabN3-II, LabN1-III, LabN3-III, LabN6-III.

Suitable pump head: EasyPump pump head, AMC pump head (AMC1-AMC12), YZ1515x, YZ2515x pump head; MC series pump head (MC1-MC12); SN series pump head (SN15, SN25).

2. Product Appearance



A——Drive

B——Pump Head

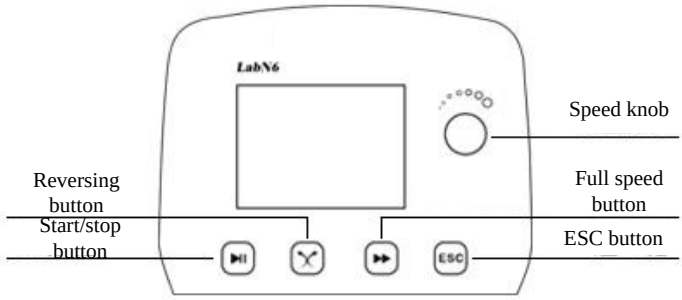
C——Power Switch

D——Power Socket

E——External Control Interface

F——Built-in Fuse

3. Operation Keypad Instruction



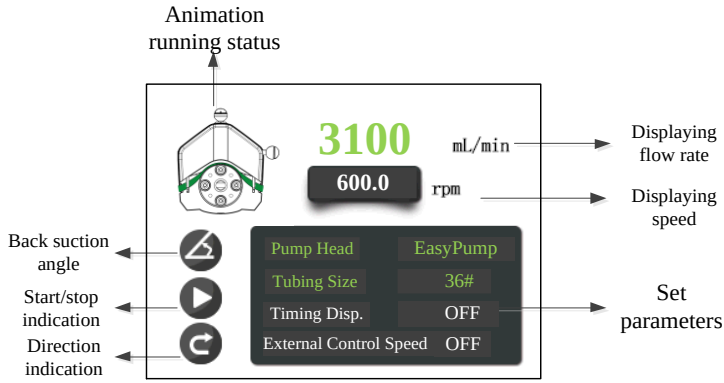
- **Start/stop button**: Press [**Start/stop**] button, pump will run with current speed, press again, the pump will stop.
- **Reversing button**: Press [**Reversing**] button each time, the pump will change running direction once.
- **Full speed button**: Press [**Full speed**] button when in stopping status or transmission mode, the pump will run with maximum speed to washing tubes or fast filling. The button is unavailable in dispensing.
- **Speed knob**: Rotate the [**Speed knob**] in the main interface to control the speed, the flow follows the change.

In stop state, press the [**Speed knob**] enter the [**Menu selection interface**], rotate the knob to choose corresponding entry, press knob to select the parameter that you want to change when set parameters.

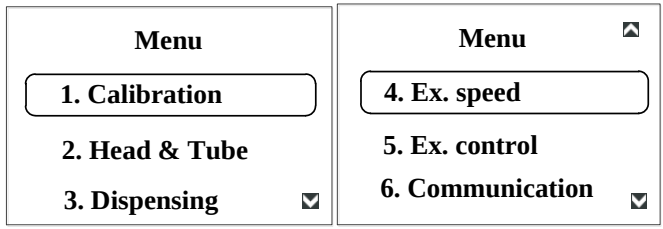
- **ESC button**: When set parameters in menu interface, this button is the button of back to previous page menu. Keep pressing this button and turn on the pump power supply in the same time. That will be initialize the pump and all the parameters will be lost.

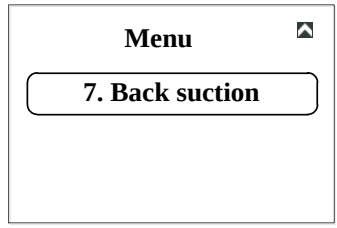
4. Structure Diagram of Operation Interface

4.1 Main interface structure diagram



4.2 Set menu selection interface





Operation steps:

a. In main interface, press **[Speed knob]** to enter menu selection interface, press

again to select setting parameters.

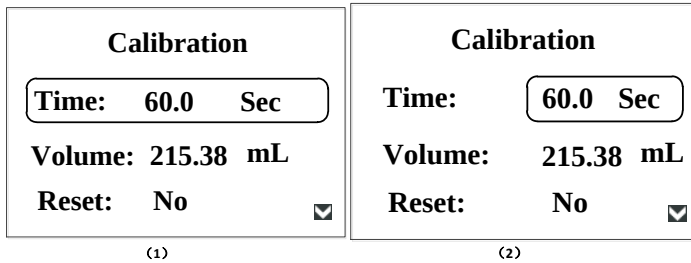
b. Rotary [**Speed knob**] to move up and down, choose the parameters which needed to be set.

c. Press **[Speed knob]** to enter level down interface setting.

d. Press **[ESC]** button to return previous or main interface.

e. Press other buttons to fail.

4.3 Flow rate calibration interface



Operation steps:

a. In this interface, the default test time is 60s, the actual flow rate is displayed based on the current flow rate by default.

b. Press [**Speed knob**] button to select test time, in status of (1), rotary the [**Speed knob**], the cursor moves to the line of actual liquid volume. Then press [**Start/stop**] button, motor will work to start calibrate. Display countdown at test time.

c. Press [**Speed knob**] button in status of (1) to switch to status of (2), and in that status, rotary the [**Speed knob**] button to set test time.

d. When the countdown is over, the cursor jumps directly to the actual flow volume, rotary the knob to enter actual flow.

e. You also can choose the actual flow column, press [**Speed knob**] button to set actual flow volume.

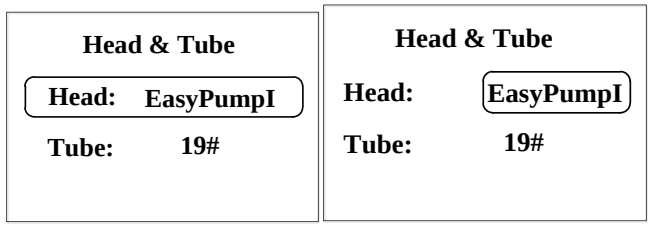
f. After entering, press the [**Speed knob**] button, confirm it, the " Calibration OK " dialog will pop up, that means the calibration is complete. Press [**Speed**

knob] button again, back to calibration interface.

g. Restore calibration function: Choose [**YES**], press [**Speed knob**] button, the "Restore calibration OK" dialog will pop up and to restore calibration factor.

h. After calibrating, back to interface, the speed does not change, the flow rate change according to the actual value from calibration. If the speed is 100rpm, the original corresponding flow rate is 20mL/min, the actual liquid volume tested in 60 seconds is 30mL/min, after performing calibration, the speed displays 100rpm in main interface, the flow is 30mL/min.

4.4 Choose pump head and tube interface



Operation steps:

a. Press [**Speed knob**] to select pump head size in the interface of selecting pump head and tube. Rotary [**Speed knob**] button in the status of (1), cursor up and down to select pump head and tube.

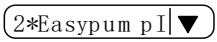
b. In the status of (1), press [**Speed knob**] button to change to status of (2).

c. Rotary the [**Speed knob**] button to select pump head and tube in the status of (2).

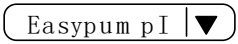
d. In the status of (2), press [**Speed knob**] or [**ESC**] button back to status of (1), and confirm the input values.

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.

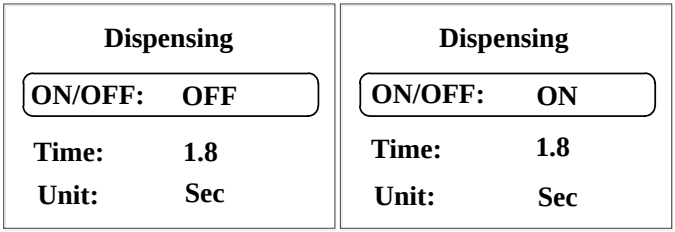
For example, the pump come with two EasyPumpI, and output connect with Y type connector to one channel, then when choose pump head need to select 2*EasypumpI, as in below picture:



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



4.5 Timing dispensing interface



(1) (2)

Operation steps:

a. Press [**Speed knob**] button to select timing dispensing in the timing dispensing interface, rotary the [**Speed knob**] to move up and down in the status of (1), choose timing dispensing, timing time or time unit.

b. Press [**Speed knob**] button back to status of (2) when in status of (1).

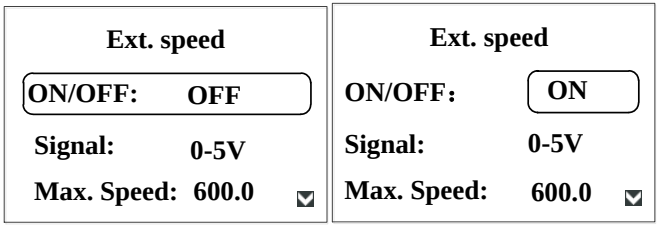
c. In status of (1), press [**ESC**] button back to [**Menu selection interface**].

d. In status of (2), rotary [**Speed knob**] button to choose timing dispensing on/off or setting the timing time (the timing time setting range is 0.1-9999s), or time unit (s/ m/ h).

e. In the status of (2), press [**Speed knob**] or [**ESC**] button back to status of (1), and confirm input values.

When timing dispensing is on, the pump will stop automatically when reaching setting time.

4.6 External control speed interface



Operation steps:

a. Press the [**Speed knob**] to choose external control speed in the external control speed interface. Rotary the [**Speed knob**] button to move up and down to choose external control speed, signal, maximum speed in the status of (1).

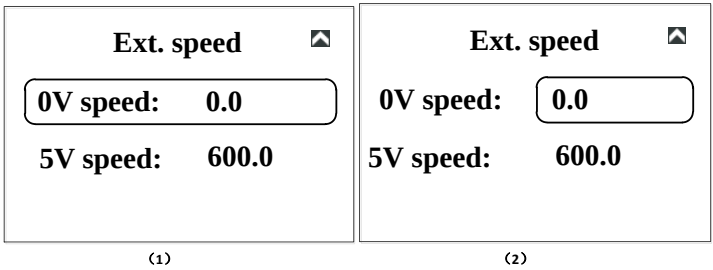
b. In the status of (1), press [**Speed knob**] button change to status of (2).

c. Press [**ESC**] button back to [**Menu selection interface**] in the status of (1).

d. Rotary [**Speed knob**] button to choose external control speed on/ off, signal: 0-5V/0-10V/4-20mA or maximum speed in the status of (2).

e. In the status of (2), press [**Speed knob**] button or [**ESC**] back to status of (1) and confirm selection items.

f. Keep rotating the [**Speed knob**] button in clockwise in the status of (1) to enter to the external control speed custom interface, as the below picture:



g. Rotary the [**Speed knob**] to choose 0V corresponding speed:0 or 5V corresponding speed : 600 in the status of (1). The corresponding speed can be set arbitrarily within the specified speed range of the purchased model. The

peristaltic pump will automatically create a linear speed relationship between the simulated values.

h. Press [**Speed knob**] button back to status of (2) when in status of (1).

i. In status of (1), press [**ESC**] button back to [**Menu selection interface**].

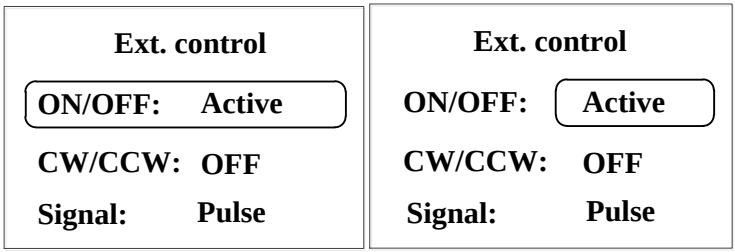
j. In the status of (2), rotary the [**Speed knob**] button to set the speed of corresponding prats.

k. In the status of (2), press [**Speed knob**] button or [**ESC**] back to status of (1) and confirm selection items.

Choose the analog speed signal: 0-5V, 0-10V or 4-20mA according to input signal of external terminal. The external control speed can set the pump maximum speed, when the maximum speed is 600rpm, there are a liner ship between analog signal voltage range and motor speed.

If highest speed is not 600rpm, motor speed will be limited by analog signal, if motor speed and analog signal reach the given highest speed according to corresponding proportional relationship, then if increase analog signal, motor will running at given highest speed, not increase with analog signal. For example, suppose 0Vcorrespond 0rpm, 5V correspond 600rpm(2.5Vshold correspond 300rpm), set highest speed 300rpm, if external input analog signal is 2.5V, then motor speed is 300rpm, if input signal beyond 2.5V, motor speed keeps 300rpm not change.

4.7 External control start/stop, reversing interface



Operation steps:

a. In external control start/stop, direction interface, press [**Speed knob**] to choose External control start/stop in status of (1); press [**Speed knob**] to choose external start/stop, external control direction or signals.

b. In the status of (1), press [**Speed knob**] back to status of (2).

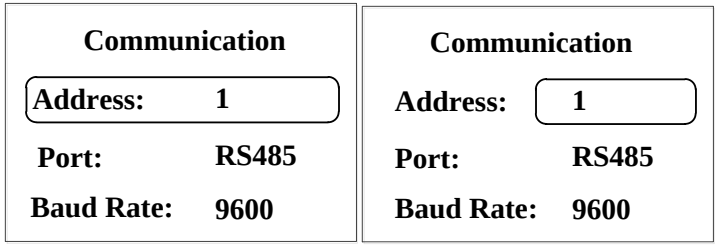
c. In the status of (1), press [**ESC**] button back to [**Menu selection interface**]

d. In the status of (2), rotary [**Speed knob**] to choose external control start/stop is active/ negative/ off or external control direction is on/ off or signal type is level or pulse. (The corresponding internal control button does not work in level mode)

e. In the status of (2), press [**ESC**] or [**Speed knob**] button back to status of (1), and confirm selection items.

- External control motor start and stop, direction signal is divided into active signal and passive signal.
- External control motor start and stop, direction method is divided into two kinds: level and pulse. See the description of external control interface for details
- When timing dispensing is on, the external control start/stop is valid in pulse mode, and invalid in level mode.
- Each external control mode sets the switch independently, only after the corresponding external control function is opened.

4.8 Communication setting interface



Operation steps:

The serial port communication is always on. The on/off option is not set.

a. In communication setting interface, press [**Speed knob**] to choose Local address: 1, in status of (1), rotary [**Speed knob**] to choose local address, port selection or baud rate.

b. In the status of (1), press [**Speed knob**] back to status of (2).

c. In the status of (1), press [**ESC**] back to [**Menu selection interface**].

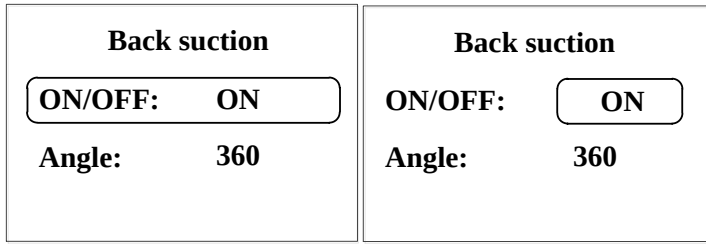
d. In the status of (2), rotary [**Speed knob**] to choose local address(01-32) or port selection is RS232/RS485 or baud rate selection is 2400/4800/9600/19200.

e. In status of (2), press [**ESC**] or [**Speed knob**] back to status of (1), and confirm selection items.

This product supports Modbus communication protocol-RTU mode, communication port RS485 or RS232.

Note: After finishing setting, only in main interface, the pump can receive communication signal control, the communication control is invalid in other setting interface.

4.9 Back suction angle interface



(1) (2)

Operation steps:

a. In back suction angle interface, press [**Speed knob**] to choose Back suction angle, in status of (1), rotary [**Speed knob**] to choose back suction angle or setting angle.

b. In status of (1), press [**Speed knob**] back to status of (2).

c. In status of (1), press [**ESC**] back to [menu selection interface].

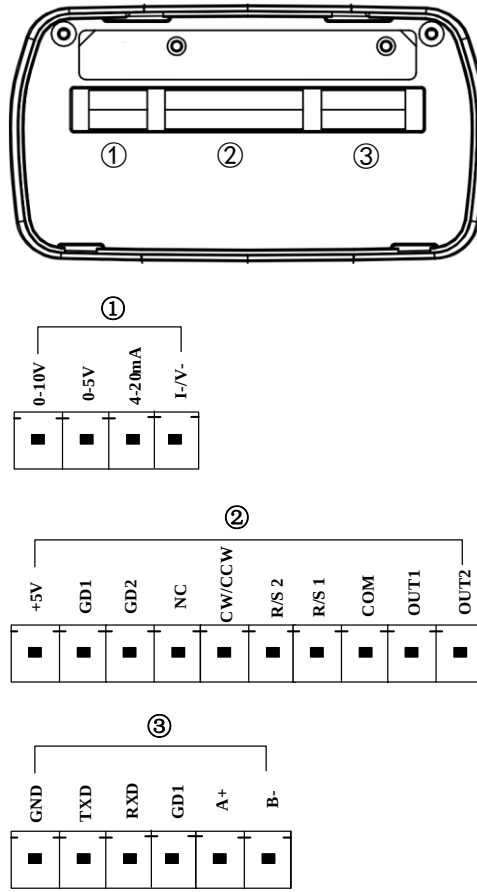
d. In status of (2), rotary [**Speed knob**] to choose back suction angle is on/ off or set back suction angle(the angle range is 0-360°).

e. In status of (2), press [**ESC**] button or [**Speed knob**] back to status of (1), and confirm input values.

Note: When the back suction angle is off, the main interface do not display back suction angle mark, only the back suction angle is on, the main interface display the mark.

5. External Control Interface Instruction

The external control interface as the below picture shows:



① **Analog signal input port**: In the external control setting interface to select external control speed signal then turn on the function of external control speed. Control the motor speed from 0rpm to the highest speed through analog signal.

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

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

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

I_/V_: Analog signal negative terminal**.**

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

② External control signal input terminal (hand-held dispenser and foot pedal interface equipped by our company)

a. Internal isolation 5VDC output.

+5V: Internal 5V output positive pole.

GD1: Internal 5V output negative pole.

b. External control start/stop, direction, full speed signal input terminal: Active signal input, 5-24VDC.

GD2: External control signal common input terminal.

NC: External control full speed input terminal.

CW/CCW: External control direction signal input.

R/S 2: External control start/stop signal input.

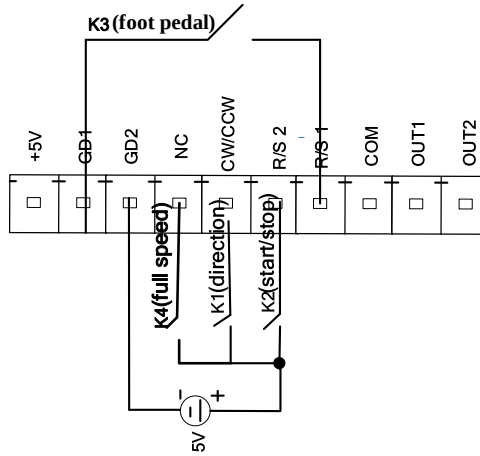
Note: Set up the external control mode in the setting interface, turn on the correspond external control function, external control signal is active.(The external control full speed is default level mode, short-circuit is on, disconnecting is off, it does not need to be opened in the Settings interface)

c. External control start/stop signal input terminal: Passive signal input

R/S 1: External control start/stop signal.

This terminal can connect with passive switch and foot pedal. In the external control setting interface to set the active of this terminal, external control start/stop (passive) the switch option.

External control wiring:



a. **In pulse mode**, disconnect K2 after short circuited, the motor starts working. Disconnect again after short circuited, the motor stops working.

In level mode, short circuited K2, the motor starts working. Disconnect K2, the motor stops working.

b. **In pulse mode**, every time disconnect the K1 after short circuited, the motor changes working direction.

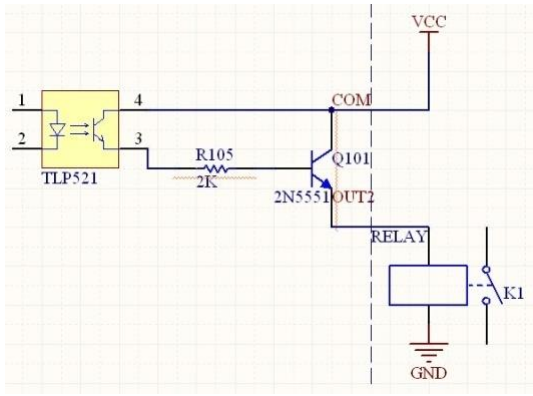
In level mode, short circuited K1, the motor runs in clockwise. Disconnect K1, the motor runs in counterclockwise.

c. **In pulse mode**, disconnect K3 after short circuited, the motor starts working. Disconnect again after short circuited, the motor stops working.

In level mode, short connect K3, the motor starts working. Disconnect K3, the motor stops working.

d. Short circuited K4, the motor will run with full speed, disconnect K4, the motor is restored to the state before full speed operation.

The motor working status output terminal: Output motor working status as below:



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

③ **Communication port**

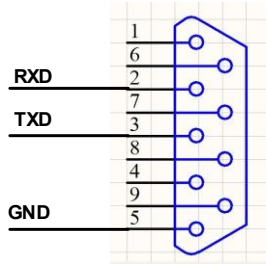
RS232 Communication: Choose RS232 in the Communication setting interface, this terminal is active.

GND: Communication ground terminal.

TXD: Master sends, peristaltic pump receives signal terminal.

RXD: Peristaltic pump sends, master receives signal terminal.

RS232 Communication Interface Connection Diagram as below:



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

GD1: RS485 signal ground

A+: Connect RS485 A+ terminal

B-: Connect RS485 B- terminal

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

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

6. Technical Specification

<table>
<tr><td rowspan="2">Power supply</td><td>AC220V±10%, 50Hz/60Hz(Standard)</td><td rowspan="2">Start/stop,direction signal</td><td rowspan="2">Passive switch signal: for example foot pedal switch
Active switch signal: 5-24V input</td></tr>
<tr><td>AC110V±10%, 50Hz/60Hz(Optional)</td></tr>
<tr><td>Speed resolution</td><td>0. 1rpm</td><td>Display method</td><td>3.2 inch HD LCD screen</td></tr>
<tr><td>Operation method</td><td>Imported keypad+digital speed knob</td><td>Size(L*W*H)</td><td>315.2*157.3*236.9mm</td></tr>
<tr><td rowspan="3">Speed range</td><td colspan="2">LabN1, LabN1-II, LabN1-III</td><td>0.1-150rpm</td></tr>
<tr><td colspan="2">LabN3, LabN3-II, LabN3-III</td><td>0.1-350rpm</td></tr>
<tr><td colspan="2">LabN6, LabN6-III</td><td>0.1-600rpm</td></tr>
<tr><td rowspan="2">Power consumption</td><td colspan="2">LabN1, LabN3, LabN6, LabN1-II, LabN3-II</td><td><50W</td></tr>
<tr><td colspan="2">LabN1-III, LabN3-III, LabN6-III</td><td><80W</td></tr>
<tr><td rowspan="2">Motor type</td><td colspan="2">LabN1, LabN3, LabN6, LabN1-II, LabN3-II</td><td>Stepper motor</td></tr>
<tr><td colspan="2">LabN1-III, LabN3-III, LabN6-III</td><td>Closed-loop stepper motor</td></tr>
<tr><td>External</td><td>0-5V, 0-10V, 4-20mA</td><td>Communication</td><td>RS232, RS485</td></tr>
</table>

control speed signal	for optional	interface	support Modbus communication protocol (RTU mode)
IP rate	IP31	Temperature	0-40℃
Relative humidity	<80%	Driver weight	4.4Kg

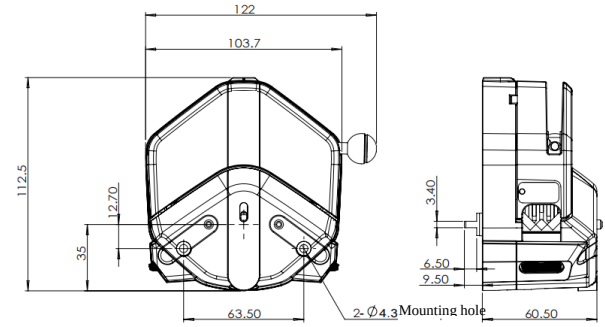
7. Main Functions and Features

- 3.2 inch color LCD screen display.
- Super silent drive setting, precise control, low vibration and low noise.
- Touch keypad control, menu interface, convenient for users setting the parameters.
- Digital rotary knob.
- Timing function, the time range is 0.1s-9999 hours.
- Various external control functions, support 0-5V, 0-10V, 4-20mA analog signal control speed.
- Power down memory function, store parameters in time, safe and reliable.
- Strong anti-jamming feature, wide voltage design, suitable for complex power supply environment.
- Fast fluid-filled function, not only can clean the tubing, but also fill liquid into the tubing.
- High torque and low power loss, it can load several pump heads or multichannel pump head, meet different application requests.

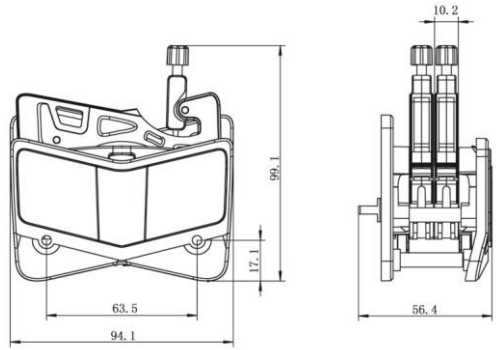
8. Dimension Drawing

Unit: (mm)

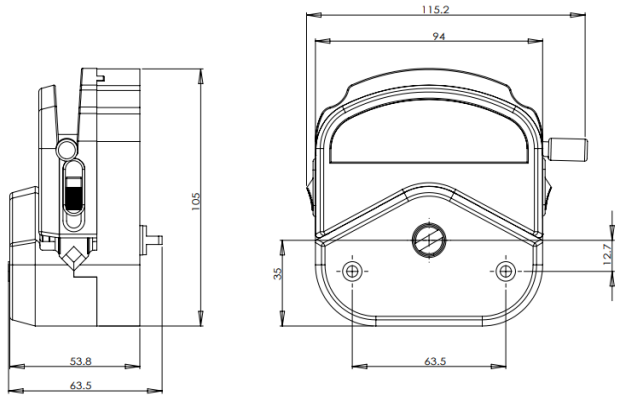
8.1 Single pump head



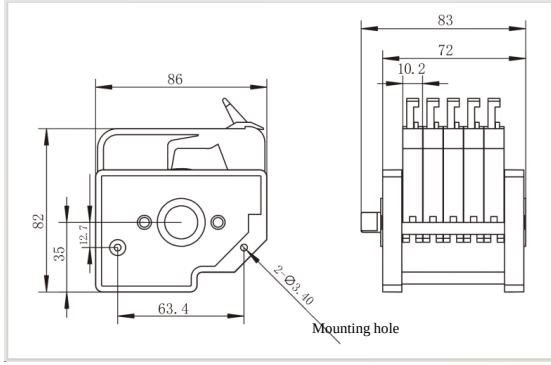
EasyPump Pump Head



AMC2 Pump Head

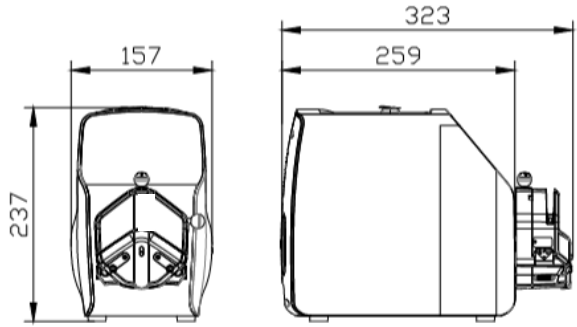


YZ1515x/2515x Pump Head



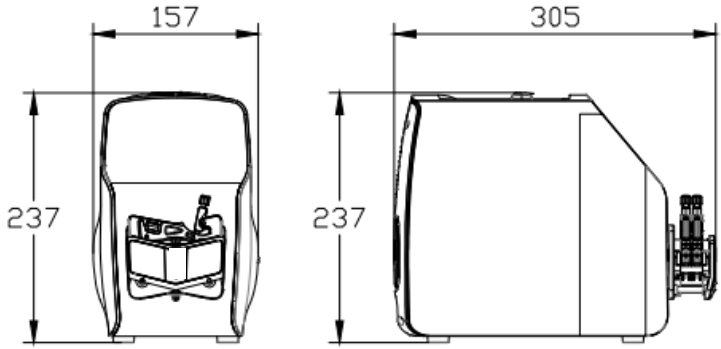
MC Pump Head

8.2 Product Appearance



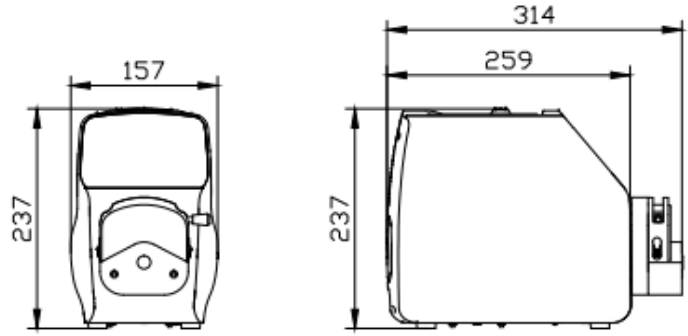
LabN+EasyPump Pump Head

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



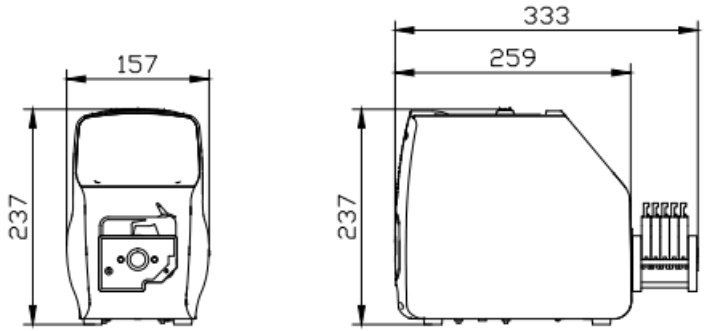
LabN+AMC Pump Head

Note: For each additional channel, the longitudinal dimension will be increased by 10mm.



LabN+YZ15/25 Pump Head

Note: For each additional pump head in series, the longitudinal dimension will be increased by 55mm.



LabN+MC Pump Head

Note: For each additional channel, the longitudinal dimension will be increased by 10mm.

9. 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.

10. 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.

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