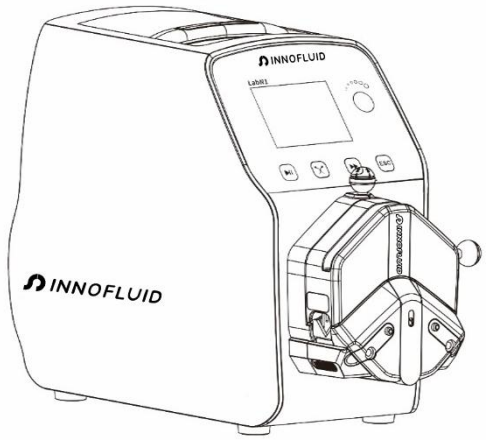
LabN Series

USER'S MANUAL



Innofluid Co., Ltd.

Note:

- Please read the manual carefully before operating the product.

Warning:

- Connect the power cord to the wall socket, and avoid using electric extension cords.
- If the power cord or plug shows wear and/or other damage, please disconnect from socket by pulling the plug, not the wire and contact service.
- In the following circumstances, turn off the power supply and disconnect the plug by holding the plug itself, not the wire:

  1.Fluid has splashed onto the pump.

  2.Pump needs maintenance or repair.
- The power socket should be equipped with a ground wire and properly grounded.

Note: Ensure that the foot pedal switch and other external control plugs are connected or disconnected only when the power is off, to prevent damage

Table of contents

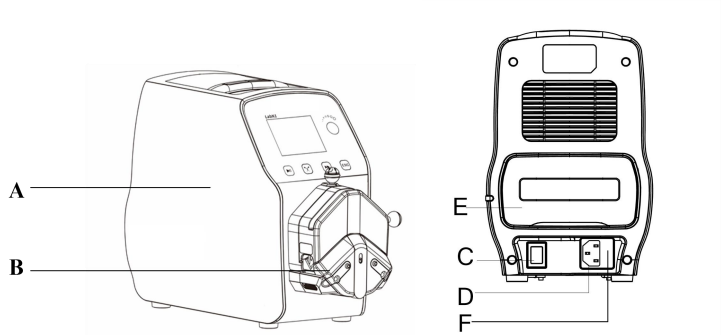
1. Product Overview

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); KD pump head.

2. Product Appearance



A——Drive

B——Pump Head

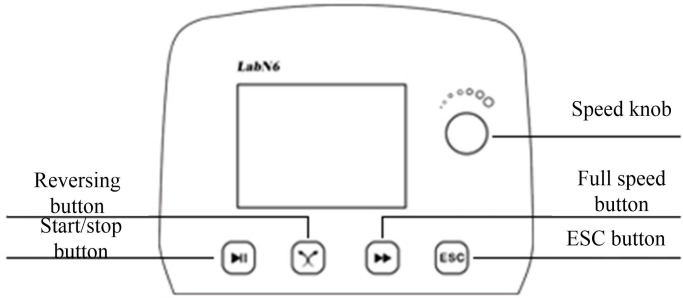
C——Power Switch

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.

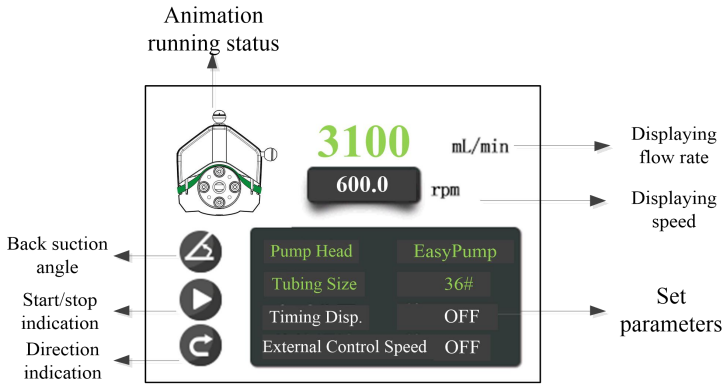
Speed knob: Rotate the [Speed knob] in the main interface to control the speed, the flow follows the change.

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.

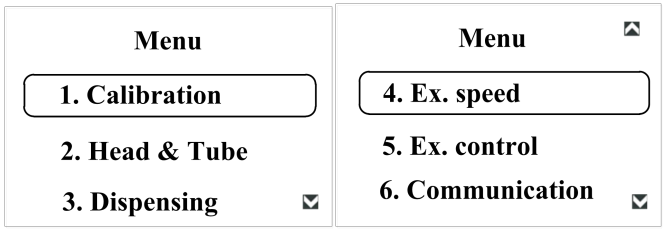
ESC button: When set parameters in menu interface, this button is the button of back to previous page menu. Keep pressing this button and turn on the pump power supply in the same time. That will be initialize the pump and all the parameters will be lost.

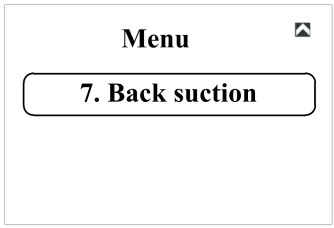
4. Operation Interface Instruction

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

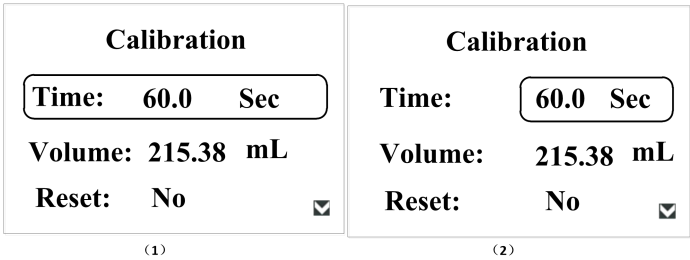
needed to be set.

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



(1) (2)

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.

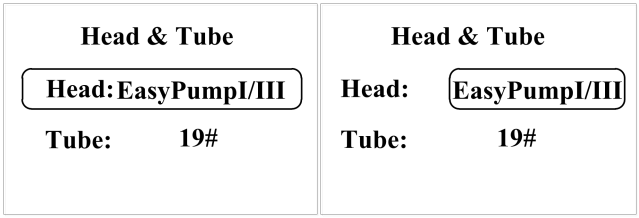
f. After entering, press the [Speed knob] button, confirm it, the " Calibration OK " dialog will pop up, that means the calibration is complete. Press [Speed knob] button again, back to calibration interface.

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.

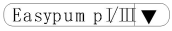
b. In the status of (1), press [Speed knob] button to change to status of (2).

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

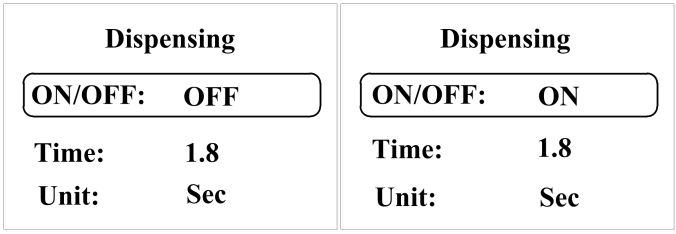
d. In the status of (2), press [Speed knob] or [ESC] button back to status of (1), and confirm the input values.

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).

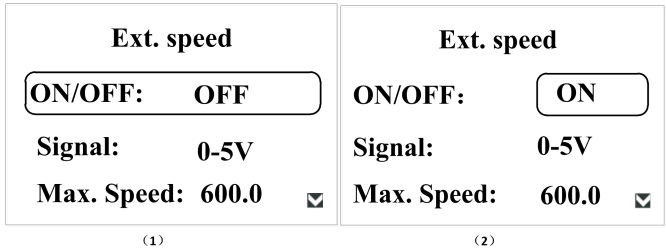
c. In status of (1), press [ESC] button back to [Menu selection interface].

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 0.1-9999), 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).

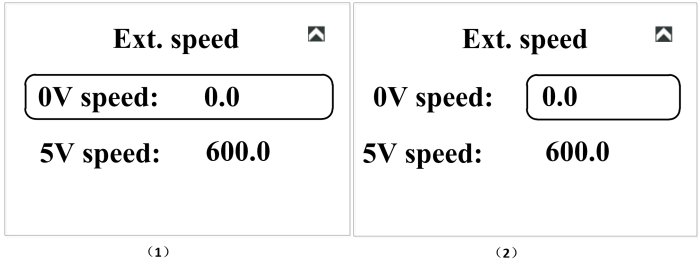
b. In the status of (1), press [Speed knob] button change to status of (2).

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].

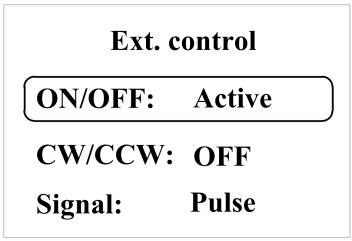
j. In the status of (2), rotary the [Speed knob] button to set the speed of corresponding prats.

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

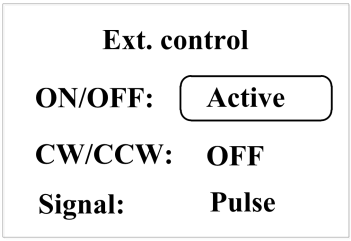
Choose the analog speed signal: 0-5V, 0-10V or 4-20mA according to input signal of external terminal. The external control speed can set the pump maximum speed, when the maximum speed is 600rpm, there are a liner ship between analog signal voltage range and motor speed.

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 0V correspond 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



（1）



（2）

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.

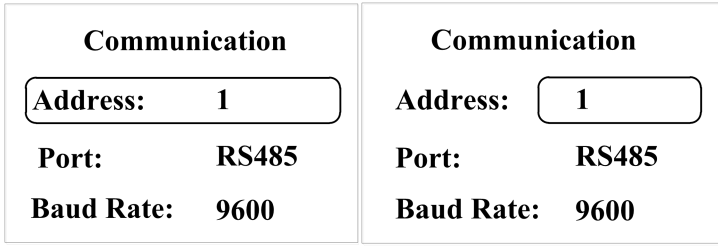
External control motor start and stop, direction signal is divided into active signal and passive signal.

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



（1） （2）

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].

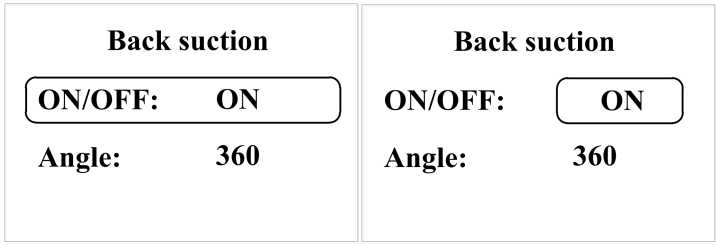
d. In the status of (2), rotary [Speed knob] to choose local address(01-32) or port selection is RS232/RS485 or baud rate selection is 2400/4800/9600/19200.

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].

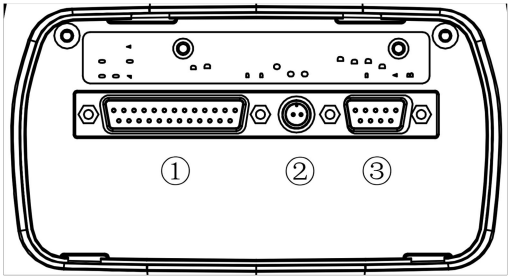
d. In status of (2), rotary [Speed knob] to choose back suction angle is on/ off or set back suction angle(the angle range is 0-360°).

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

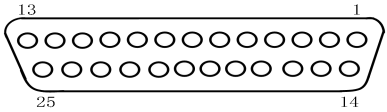
Note: When the back suction angle is off, the main interface do not display back suction angle mark, only the back suction angle is on, the main interface display the mark.

5. External Control Interface Instruction

The external control interface as the below picture shows:



① DB25 external control connector instruction

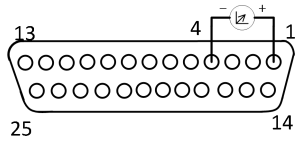
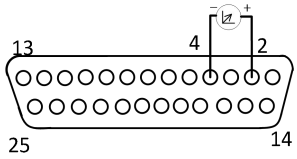
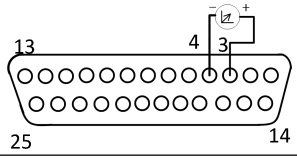


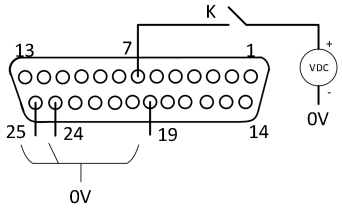
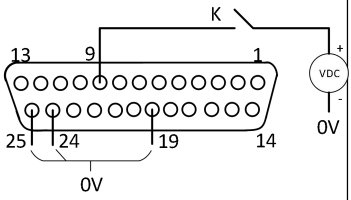
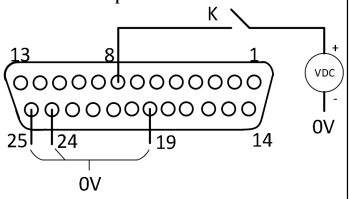
Pin	Pin Definition	Explanation	Note
1	0-5V	0V to 5V voltage signal input terminal	Analog signal input terminal
2	0-10V	0V to 10V voltage signal input terminal	
3	4-20mA	4-20mA current signal input terminal	
4	I_/V_	Analog signal negative	

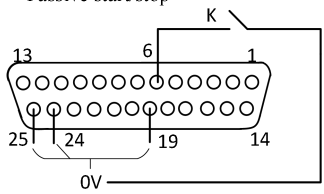
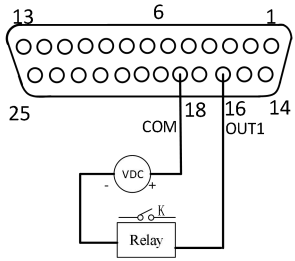
		terminal	
5	/	/	/
6	R/S1	External control start/stop signal with passive signal input	The passive switch or foot pedal switch can be connected with the terminal. Set the validity of this input in external setting interface--external control start/stop (passive) switch option.
7	R/S2	External start/stop signal input	Active signal 5-24VDC input
8	NC	External full speed signal input	Active signal 5-24VDC input
9	CW/CCW	External direction signal input	Active signal 5-24VDC input
10	/	/	/
11	/	/	/
12	/	/	/
13	/	/	/
14	/	/	/
15	/	/	/
16	OUT1	Operating status output terminal 1	Open collector output
17	OUT2	Operating status output terminal 2	/
18	COM	Provides voltage for logic outputs	External power supply positive

19	GD2	Connected to the internal GD1	
20	/	/	/
21	/	/	/
22	/	/	/
23	+5V	Internal 5V output positive terminal	Internal 5V output
24	GD1	Internal 5V output negative terminal	
25	0V	Connected internally to GD1 and GD2	

External control wiring and function description

Signal and wiring	Function description
Analog: 0-5V 	Analog signal input terminal: Choose the External speed control signal and turn on the Ext. Speed in external control setting interface, control the motor speed from 0 rpm to maximum speed through analog signal. Notice: Please do not connect 0-10V signal to 0-5V terminal or 4-20mA input terminal. This is forbidden. Wrong connection may damage the pump.
Analog: 0-10V 	
Analog: 4-20mA 	

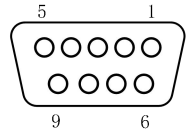
<table>
<tr>
<td>Active start/stop
 
</td>
<td>In Pulse mode: Short circuited K then disconnect, the motor starts running. Short circuited and disconnect again, motor stops running.
In Level mode: Short circuited K, the motor starts running, disconnect K, motor stops running.</td>
<td rowspan="3">Note: Setting external control mode in the external control setting interface, to turn on the corresponding external control functions. And the external control signal input port is valid.
The wiring here is an external active signal, and customers can choose to use the+5V output from pin 23 for their own use.</td>
</tr>
<tr>
<td>Active direction
 
</td>
<td>In Pulse mode: Short circuited and then disconnect K once, the motor changes working direction once.
In Level mode: Short circuited K, motor runs clockwise, disconnect K, motor runs anticlockwise.</td>
</tr>
<tr>
<td>Active full speed
 
</td>
<td>After short-circuited K, the motor runs with full speed, and disconnect K, the motor restores to the state before full speed operation. (The external control full-speed signal defaults to level mode, short-circuit starts and disconnects to stop. There is no need to turn on it in the setting interface.)</td>
</tr>
</table>

Passive start/stop 	In Pulse mode: Short circuited K then disconnect, the motor starts running; short circuited K and disconnect again, motor stops running. In Level mode: short circuited K, motor starts running, disconnect K, motor stops running.
Operation status output 	If connect with relays, when the motor runs, K connect; when the motor stops running, the K disconnect.

② XS6 Connector

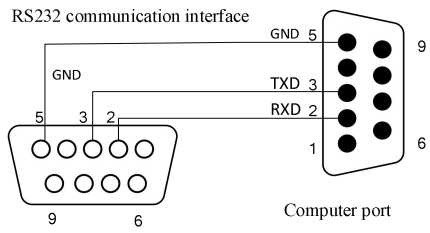
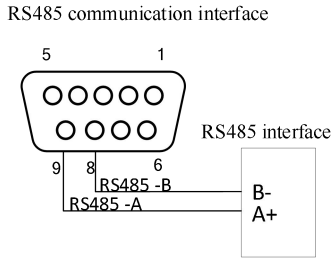
Pin	Pin Definition	Explanation	Note
1	R/S1	External control start/stop signal with passive signal input	The passive switch or foot pedal switch can be connected with the terminal. Set the validity of this input in external setting interface--External control start/stop (passive) switch option.
2	GD1	Internal 5V output negative terminal	/

③ DB9 Connector



Pin	Pin Definition	Explanation	Note
1	/	/	/
2	RS232-TXD	Signal transmitted by peristaltic pump, received by upper computer	Choose RS232 in the communication setting interface, this terminal is active.
3	RS232-RXD	Signal received by peristaltic pump, transmitted by upper computer	
4	/	/	/
5	GND	Communication ground port	
6	/	/	/
7	GND1	RS485 signal ground	
8	RS485-B	Connect RS485 B- terminal	Choose RS485 in the communication setting interface, this terminal is active.
9	RS485-A	Connect RS485 A+ terminal	

Communication wiring and function description

Signal and wiring	Function description
	RS232 communication interface: Choose RS232 in the Communication setting interface, this terminal is active.
	RS485 Communication Interface: Choose RS485 in the Communication setting interface, this terminal is active.

Note: Whether to choose RS232 or RS485, the communication protocol is standard MODBUS protocol.

6. Technical Specification

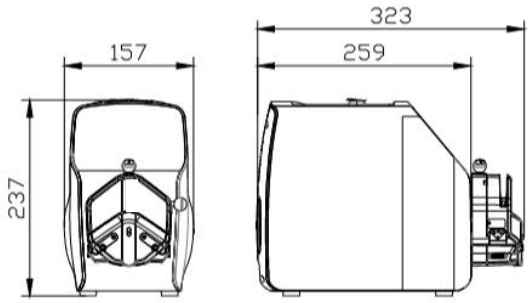
Power supply	AC220V±10%, 50Hz/60Hz(Standard) AC110V±10%, 50Hz/60Hz(Optional)	Start/stop,direction signal	Passive switch signal: for example foot pedal switch Active switch signal: 5-24V input
Speed resolution	0. 1rpm	Display method	3.2 inch HD LCD screen
Operation method	Imported keypad+digital speed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

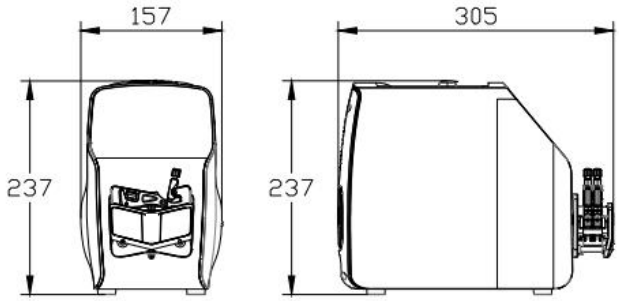
8. Dimension Drawing

Unit: (mm)



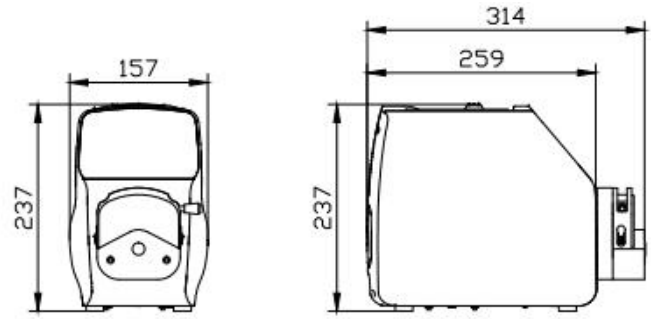
LabN+EasyPump Pump Head

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



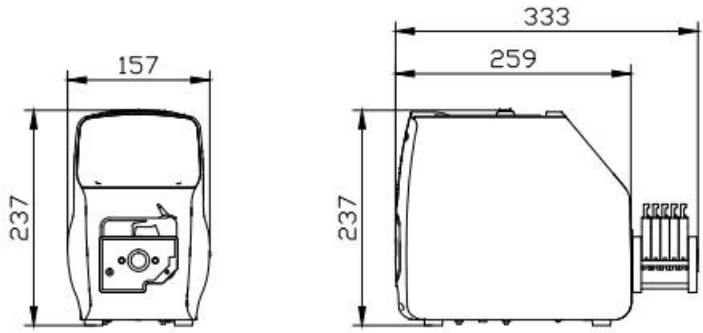
LabN+AMC Pump Head

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



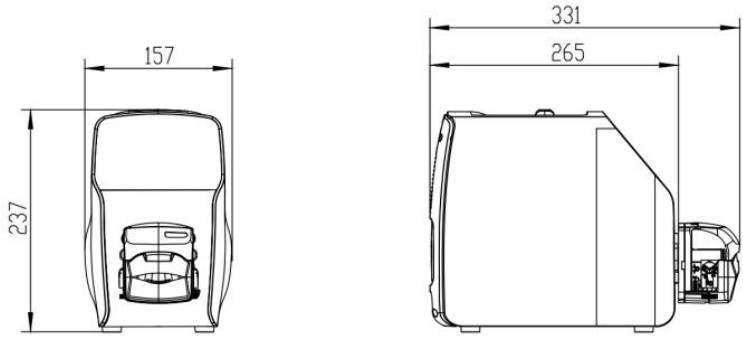
LabN+YZ15/25 Pump Head

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.



LabN+KD Pump Head

Note: For each additional channel, the longitudinal dimension will be increased by 63mm.

9. Maintenance

- Verify the pump current operational status before turning on power. Operate only under normal conditions.
- Inspect for fluid leakage and promptly address any potential faults.
- Clean any spilled liquid around the pump promptly.
- If liquid splashes on the pump, turn off and unplug the power supply, check for internal leakage, and contact the manufacturer if liquid has entered the equipment
- Ensure that the foot pedal switch and other external control plugs are connected or disconnected only when the power is off, to prevent damage.
- The power socket should be equipped with a ground wire and properly grounded.
- This product is not designed to be waterproof. Operators are advised to implement appropriate protective measures when operating in wet environments.
- This product is not equipped with special certifications, such as medical certification. For applications in specialized fields like medical or military, users are responsible for conducting their own certification/validation.
- If the product will not be used for an extended period of time, please clean it thoroughly and store it in a dry, well-ventilated area.
- The company is not liable for any losses resulting from product malfunctions or misuse of the product.

10. Warranty and After-Sales Service

A three-year warranty is provided for the pumps, with certain exceptions outlined below. The company is not responsible for any loss, damage, or expenses that are directly or indirectly associated with the use of its products. The warranty does not require the company to cover costs related to removal, installation, transportation, or other charges incurred in connection with a warranty claim.

If a pump fails within the warranty period, and the issue is confirmed by the company's technical department, spare parts will be supplied at no additional charge. Shipping costs must be covered by the customer.

Warranty Exceptions:

- The warranty does not cover repairs or service needed due to normal wear and tear, or insufficient maintenance.
- Tubing and pumping accessories, classified as consumable items, are not included under warranty.
- Failures caused by electrical surges are excluded from coverage.
- Damage resulting from chemical exposure is excluded.
- Failures due to improper operation or intentional damage are not covered.

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