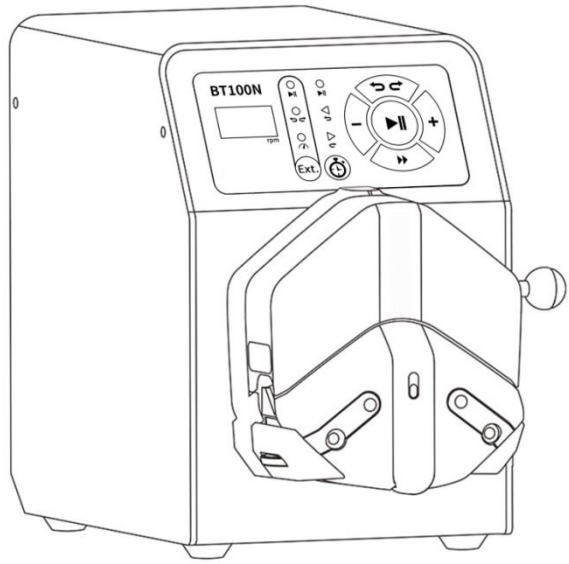
Manual of BT-N Series



⚠ 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.

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1. Product Introduction

As super silent performance, BT-N series standard type peristaltic pump has become the first choice of laboratory application, and usually matched with various analytical instruments, it has won unanimous praise with its excellent cost-effective.

Pump speed can be adjusted manually, also can be controlled automatically by external control interface. With power down memory function, after power-on again, it will continue work according to the status of the last power. Timing test function, it is convenient for users to test the flow rate or calibration. It can support 7 different external control modes. It makes more convenient and flexible to use it.

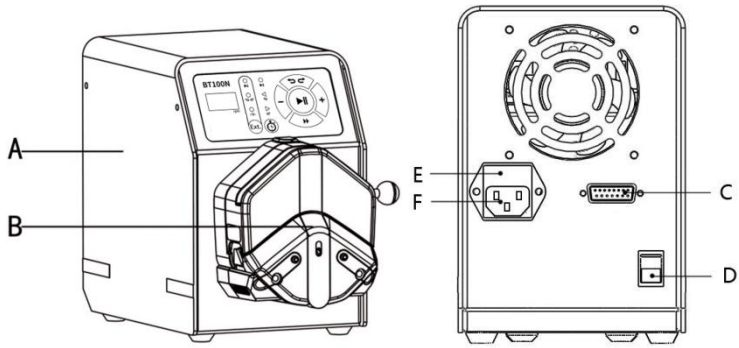
This series include most product types: BT100N, BT300N, BT600N, BT100N-II, BT300N-II.

Can fit for different pump heads:

- EasyPump pump head;
- AMC pump head;
- KD pump head;
- YZ1515x, YZ2515x pump head;
- MC series pump head (MC1-MC12);
- SN series pump head (SN15, SN25).

Typical application: University research institute laboratory dedicated, chromatography of ions, titrator matching, Pilot test, industrial production.

2. Product Appearance

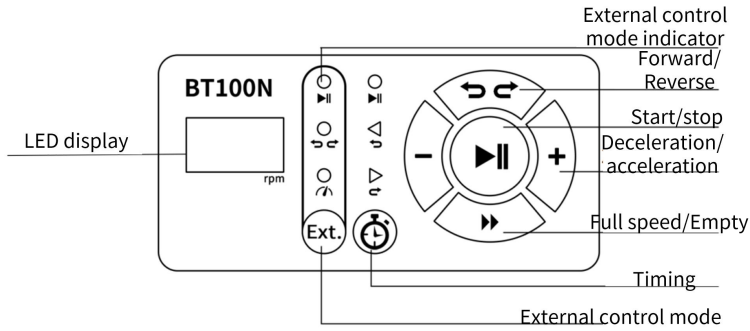


A—— Drive B——Pump head

C—— External control interface D——Power switch

E—— Built-in fuse F—— Power socket

3. Operation Panel Instruction



4. Operation Method

- **Start/stop button**:Control the pump to run or stop. Press start/stop button once, the drive works status change once. When the drive runs, the start/stop indicator light is on; when the drive stops running, the start/stop indicator light is off.

Keep pressing this button can set the address of RS485. At the status of internal control mode and the drive stops, keep pressing this button more than 5 seconds, a certain number will flash, press +/- button to set the required address, then press the start/stop button again, the address is effective.

- **Forward/Reverse**: Control the drive running direction. Press the left/right button one time, the drive running direction change one time. When the drive rotate left, the left indicator light is on; when the drive rotate right, the right indicator light is on.
- **Acceleration/ deceleration**: This button is used to accelerate/decelerate the motor running speed. Press this button one time, the motor working speed will increase or decrease 0.1rpm (When the rotation speed is greater than 100rpm, the motor speed increases/decreases by 1rpm). Keep pressing this button, the drive rotation speed will increase or decrease quickly to save setting time.
- **Full speed/empty button**: In the internal control mode, press the full speed/empty button, pump runs at the highest speed, displays "Full", to complete quick emptying, filling or cleaning operations; press the full speed/empty button again, the pump is back to the state, it was in before going to full speed. (In full speed mode, pressing the start/stop button can also stop the pump.)
- **External control mode button**: The external control mode button is enable only when the pump stops working. It used for changing between different external control modes that is 7 different modes in total.

In internal control mode (the external control mode indicators all light off).

① Only external control start/stop mode: the external control start/stop indicator light is on, external control direction and speed indicators light is off.

② Only external control direction mode: the external control direction indicator light is on, external control start/stop and speed indicators light is off.

③ Only external control speed mode: the external control speed indicator light is on, external control start/stop and direction indicators light is off.

④ External control start/stop and direction mode: the external control start/stop and direction indicator light is on, external control speed indicator light is off.

⑤ External control start/stop and speed mode: the external control start/stop and speed indicator light is on, external control direction indicator light is off.

⑥ External control direction and speed mode: the external control direction and speed indicator light is on, external control start/stop indicator light is off.

⑦ External control start/stop, direction and speed mode: the external control start/stop, direction and speed indicators all light is on.

Note: When external control indicator light on, the relative internal control buttons can not be used.

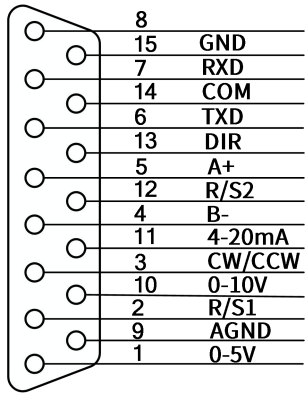
- **Timing button**: When drive is in internal control mode and stops running. Press Timing test button, the drive will run at the current speed for 60s (the default time is 60s), and stop automatically. This button is used to flow calibration and test (if press start/stop button during test process, the pump will stop, and when test again, the drive will re-time)

When in the status of at internal control mode and the drive stops working, you can set the timing time, keep pressing time button for more than 5 seconds then a certain number will flash, press "+" ,"-" button to increase or decrease the timing time (keep pressing"+" or"-"button to increase or decrease quickly), time range is 0.5s to 999s, after setting, press the "**timing button**" again to back to motor speed display interface.

In external control speed mode, press the Timing test button to switch external control speed analog signal 0-5V, 0-10V, 4-20mA. (Analog signal distinguished according to different flashing frequency of external control speed control indicator: 0-5V always on, 0-10V flashes once every 1 second, 4-20mA flashes once every 0.3 seconds.)

5. External Control Interface Instruction

The 15 pin connector on the back of pump is for external control, the wiring definition as below:



① External control interface (general)

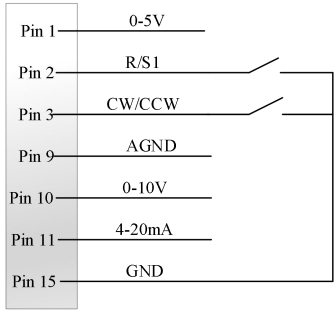
1) **Pin 1, 0-5V**: The positive terminal for an external control signal to adjust the motor speed. This is the terminal where a 0-5V control signal is connected.
2) **Pin 2, R/S1**: An external control input terminal for start/stop signals. (For passive signals: the motor runs when the circuit is normally closed, and the motor stops when the circuit is open). (This is used with our company's handheld dispenser and footswitch interfaces).
3) **Pin 3, CW/CCW**: An external control input terminal for direction signals, (For passive signals: the motor runs right when the circuit is normally closed, and the motor runs left when the circuit is open).
4) **Pin 9, AGND**: The negative terminal for an external control signal to adjust the motor speed.
5) **Pin 10, 0-10V**: The positive terminal for an external control signal to adjust the motor speed. This is the terminal where a 0-10V control signal is connected.
6) **Pin 11, 4-20mA**: The positive terminal for an external control signal to adjust the motor speed. This is the terminal where a 4-20mA control signal is connected.

7) **Pin 15, GND**: Ground wire.

Note:

1) External control start/stop, direction signals all are passive signal.
2) The external control plug must be connected or disconnected when the power is off to prevent the external control board from being burned.

DB15 external control port regular wire sequence as below:



External control interface of DB15

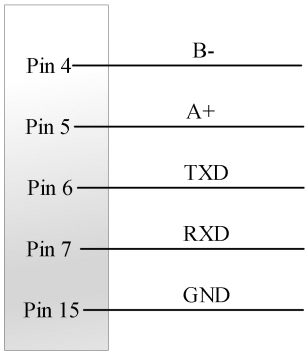
② **RS232 Communication Pin Definition**

1) **Pin 6, TXD**: The host sends data port, connects to Pin3 of DB-9 connector.
2) **Pin 7, RXD**: The host receives data port, connects to Pin2 of DB-9 connector.
3) **Pin 15, GND**: Ground wire, connects to Pin5 of DB-9 connector.

③ **RS485 Communication Pin Definition**

1) **Pin 4, B-**: 485 communication signal port, connects with RS485 B- terminal.
2) **Pin 5, A+**: 485 communication signal port, connects with RS485 A+ terminal.

The communication interface wiring diagram as below:

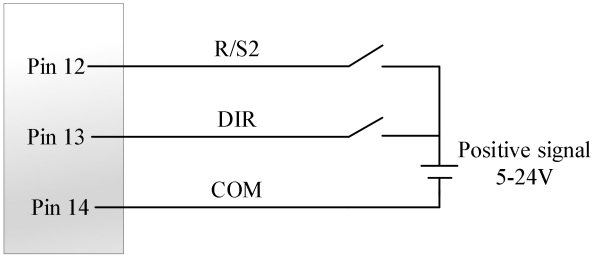


External control interface of DB15

④ **Isolated Type External Control Pin Definition**

1) **Pin 12, R/S2**: Isolated external control start/stop signal input port (Active signal: 5-24V).
2) **Pin 13, DIR**: Isolated external control direction signal input port (Active signal: 5-24V).
3) **Pin 14, COM**: Isolated external control signal input ground wire.

Isolated external control wiring diagram:



External control interface of DB15

Note: BT-N series pump could be equipped with foot pedal , please contact with us if needed.

6. Technical Specification

Speed range	BT100N: 0.1~150rpm	Power supply	AC220V±10%,50Hz/60Hz (Standard) AC110V±10%,50Hz/60Hz (Optional)
	BT300N: 0.1~350rpm		
	BT600N: 0.1~600rpm		
Drive weight	4.20KG	Speed control method	Imported keypad
External control speed	0-5V, 0-10V, 4-20mA for option	Start/stop, direction signal	Passive switching signal, like foot pedal switch; Active switching signal: 5-24Vuniversal
Communication method	RS232, RS485 (Modbus RTU protocol)	Speed resolution	0.1rpm (0.1~100rpm) 1rpm (100~600rpm)
Power consumption	<50W	Environment temperature	0~40℃
Relative humidity	<80%	IP rate	IP31
Display method	3-bit LED	Drive size (L*W*H)	BT100N/ BT300N: 183*131*194mm BT600N: 208*131*194mm

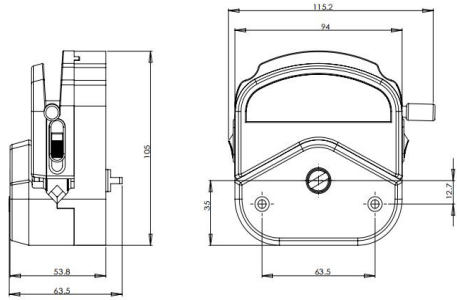
7. Main Functions and Features

- It is easy to control the speed, you can adjust it by keypad, manually control or control it automatically by external control interface.
- Full and empty key owns filling and emptying function
- High torque, low power consumption and good adaptability.
- Drive circuit has excellent performance, good radiating condition, low working noise and stable running. Have power down memory function.
- Good cost-effective.

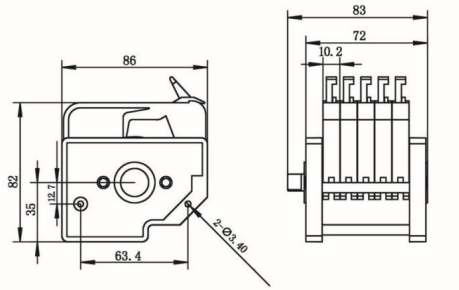
8. Dimension Drawing

(Unit: mm)

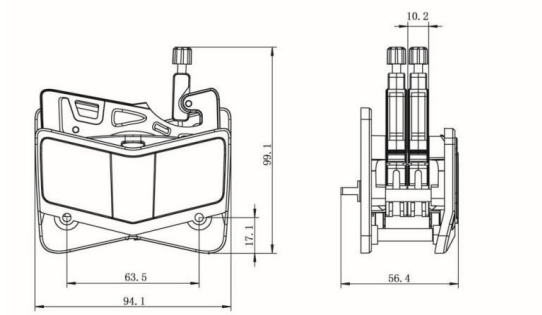
8.1 Single Pump Head



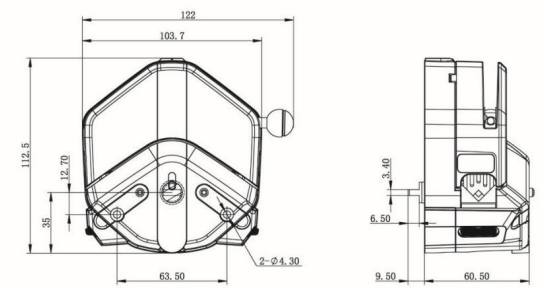
YZ15/25x Pump Head



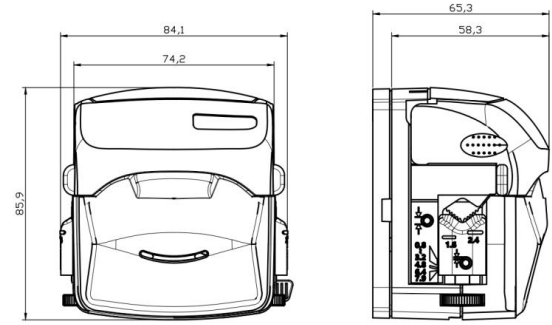
MC5 Pump Head



AMC2 Pump Head

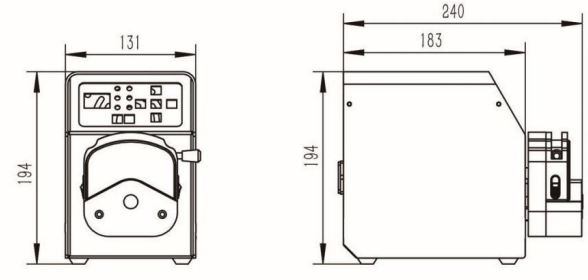


EasyPump Pump Head



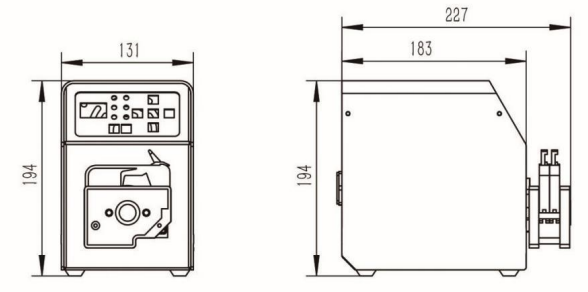
KD Pump Head

8.2 BT-N Series Product Appearance Dimension



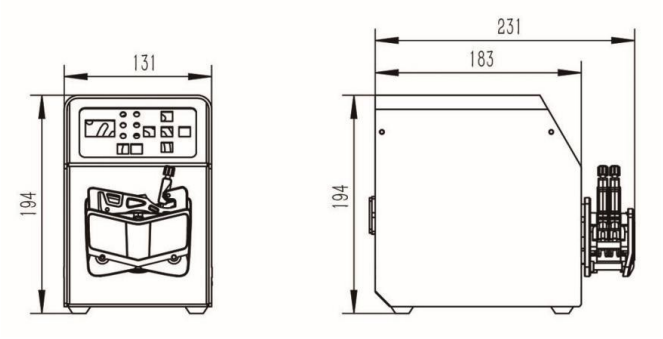
BT100N/BT300N+YZ15

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



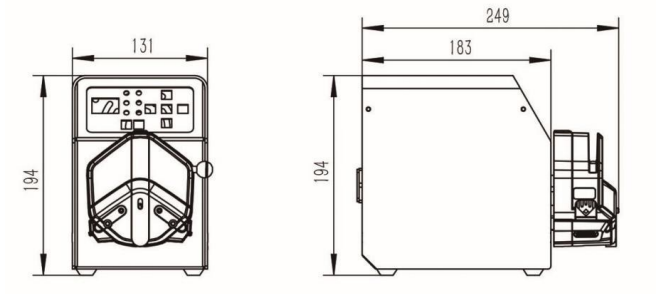
BT100N/BT300N+MC2

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



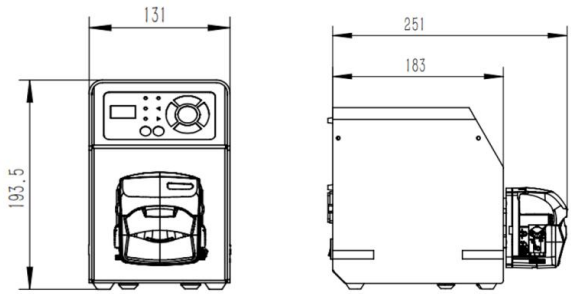
BT100N/BT300N+AMC2

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



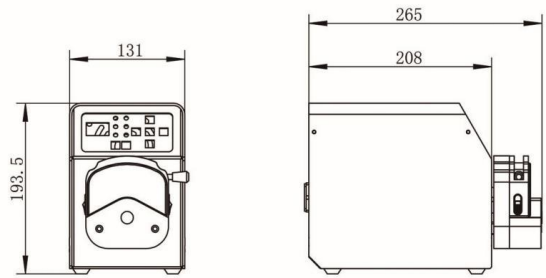
BT100N/BT300N+EasyPump

Note: For each additional pump head in series, the longitudinal dimension is increased by 61mm.



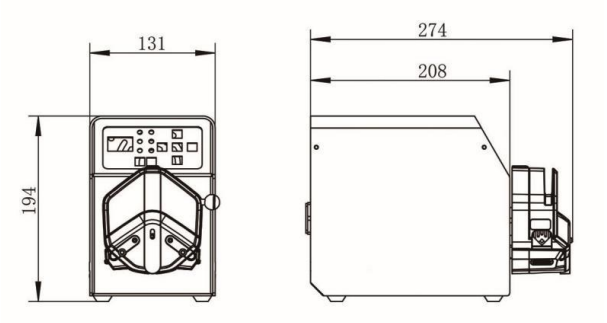
BT100N/BT300N+KD Pump Head

Note: For each additional pump head in series, the longitudinal dimension is increased by 63mm.



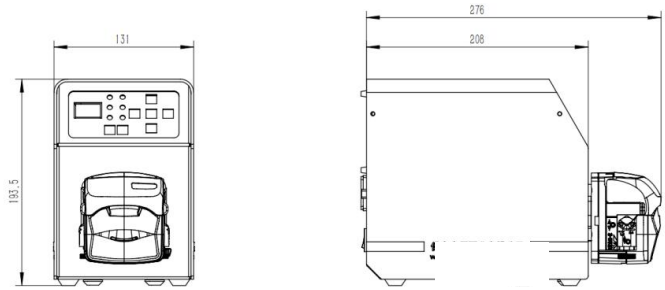
BT600N+YZ15

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



BT600N+EasyPump

Note: For each additional pump head in series, the longitudinal dimension is increased by 61mm.



BT600N+KD Pump Head

Note: For each additional pump head in series, the longitudinal dimension is increased by 63mm.

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.