JIHPUMP®

Manual

for

BT-100CA series

BT-600CA series

WT-600CA series

重庆杰恒蠕动泵有限公司

CHONGQING JIEHENG PERISTALTIC PUMPS CO., LTD.

Contents

1. Safety Precautions

⚠ Please read this manual carefully before operation.

· To avoid fire or electric shock, please do not use this product outdoors or in a humid environment.

· To reduce the risk of electric shock and the possibility of damage to the pump, you should use a standard socket with a ground wire.

· During installation, first plug the AC power cord into the socket at the rear of the pump, and then connect the power supply.

· Do not place heavy objects on the pump or let liquid flow into the pump driver.

· Since some electrical components of the pump are in working state after the power is turned on, please turn off the power switch behind the driver after stopping the pump, and unplug the power cord if not used for a long time.

· The tubing is the only consumable part of this pump. Due to wear, the tubing may rupture, causing liquid to overflow from the tubing, which may cause harm to the human body or equipment. This depends on your understanding and control of the liquid being transported, and has no legal causal relationship with this pump.

2. About peristaltic pumps

Peristaltic pump, also known as hose pump, constant flow pump, is a new type of industrial pump. It is the product of modern industrial development. The liquid only passes through the hose and does not contact any other parts of the pump body. It can be cleaned online and the flow rate can be accurately controlled. Therefore, it is widely used in pharmaceutical, food, fine chemical, medical, environmental protection, laboratory and other industries to transport some sensitive, viscous, highly corrosive, grinding shearing, high purity and certain particulate materials.

As a volumetric pump, the hose has a linear constant relationship between its flow rate and speed, that is, the flow rate corresponding to the speed output by the drive device is a certain value. Due to the limitations of the pump in structure and materials, the speed of the pump should not be too high and the pressure will not be too large. Therefore, it is particularly important to configure different hoses according to different media and process requirements.

The medium pumped by the peristaltic pump only passes through the high-elastic hose and does not contact the pump body. Therefore, the various parts of the pump are not corroded by the fluid material, and the fluid material does not leak and pollute the surrounding environment. The hose meets the "GMP" standard for drug production and the "FDA" standard for food production.

BT-CA series peristaltic pump is an intelligent pump with flow, timing and distribution canning functions. It can be operated by buttons, or controlled by external signals or foot switches. It has full-speed emptying function and can set the back suction angle. The high-definition LCD screen displays a lot of information such as the pump's speed, flow, and operating parameters. It is a multifunctional intelligent product with the advantages of convenient operation, stable and reliable performance, long-term continuous operation, and the ability to maintain input working parameters. It is suitable for bioengineering, chemical industry, pharmaceuticals, hospitals, small-scale food supporting production, and laboratories of scientific research units, etc. It is an essential product for fluid pilot and scientific research.

A complete peristaltic pump consists of three parts: driver + pump head + tubing.

The driver provides power, additional programming and external control functions.

The pump head is the key actuator, squeezing the hose.

The tubing is the only part in contact with the liquid.

Features of peristaltic pumps:

A standard driver can be adapted to several pump heads, and each pump head can be equipped with serialized tubes (same wall thickness but different calibers).

Advantages of peristaltic pumps:

High cleanliness and no pollution: the liquid only contacts the tube, which is easy to clean and only takes a few seconds to replace the tube.

High efficiency and low energy consumption: it has self-priming and one-way valve capabilities.

High precision: the filling and reproducibility accuracy can reach 1% to 0.5%.

Low shear: it can pump shear-sensitive liquids and organic solvents, and can transport solid-containing fluids (particles do not exceed 1/3 of the tube diameter).

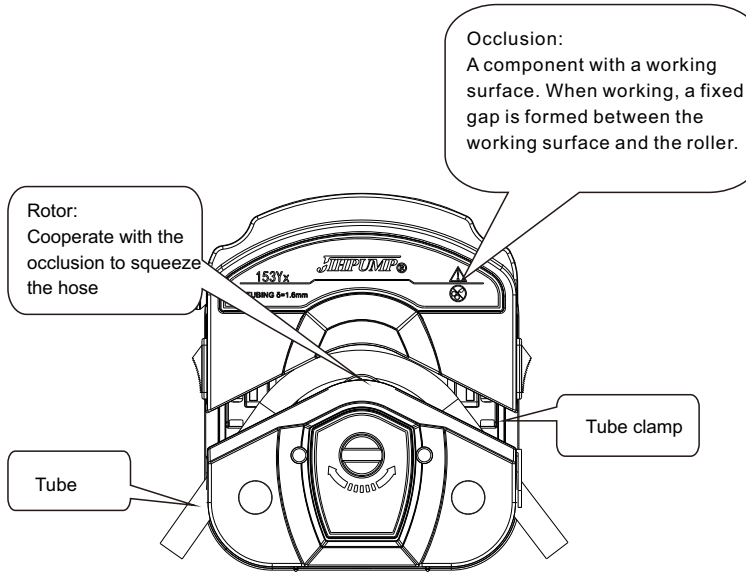
Low maintenance: quick plug-in, no valves and seals.

Easy to control: it can achieve timing, constant, variable and reverse delivery.

3. Working principle

The working principle of the peristaltic pump: through the high-elastic hose of the pump body, under the rotation and extrusion of the roller, a partial negative pressure is formed at the suction end of the hose, and the fluid material is sucked into the hose. Under the rotation and extrusion of the roller, the fluid material is squeezed to the discharge end of the hose, thereby achieving the purpose of pumping the fluid material, just like your fingers squeezing a hose full of liquid. As your fingers slide forward, the liquid in the tube will move forward. In our pump, the squeezing of the roller replaces the work of your fingers.

Pump head working diagram



4. Compatible pump heads and tubes

Pump head	Tube (ID x Wall)	Reference flow rate (ml/min)
 DG	1.0×1.0 2.0×1.0 3.0×1.0	Single channel 0~65
 DT	1.0×1.0 2.0×1.0 3.0×1.0	Single channel 0~50
 153Yx	14# (1.6×1.6) 16# (3.2×1.6) 25# (4.8×1.6) 17# (6.4×1.6) 18# (7.9×1.6)	Single channel 0~2135
 253Yx	15# (4.8×2.4) 24# (6.4×2.4) 35# (7.9×2.4) 36# (9.6×2.4)	Single channel 0~3365
 314D	14# (1.6×1.6) 16# (3.2×1.6) 25# (4.8×1.6) 17# (6.4×1.6) 18# (7.9×1.6)	0~1250
 DGx	14# (1.6×1.6) 16# (3.2×1.6) 25# (4.8×1.6)	Single channel 0~940

5. Technical parameters

① Pump head

Pump head	Tube #	Max flow rate (ml/min)	
		100r	600r
DG	1*1 2*1 3*1	44	——
DT	1*1 2*1 3*1	32	——
DGx	14# 16# 25#	155	940
153Yx	14# 16# 25# 17# 18#	425	2135
253Yx	15# 24# 35# 36#	500	3365
314D	14# 16# 25# 17# 18#	390	1250

② Driver

Item	BT-100CA	BT-600CA	WT-600CA
Speed range	0.1~100r	0.1~600r	30~600r
Full speed	100r	600r	600r
Speed resolution	0. 1rpm		1rpm
Max suction vacuum	0. 17MPa		
Max discharge pressure	0.17MPa		
Control method	Membrane button + coding switch		
Main function	Manual control, automatic, appointment timing, filling, external control		
External control	0~5V, 0~10V, 4~20mA, RS485		
Display	LCD		
Power supply	AC 100~240V,50Hz/60Hz		
Power consumption	≤48W	≤54W	≤54W
Working ambience	Temperature 0～40℃, relative humidity＜85%RH		
Driver size	L242*W166*H178		
Driver weight	3.2KG	3.8KG	4.55KG
IP rating	IP31		
Pump head	DG, DT, DGx, 153Yx, 253Yx, 314D		

6. Instructions

1) Pump head installation method （153Yx, 253Yx）

a

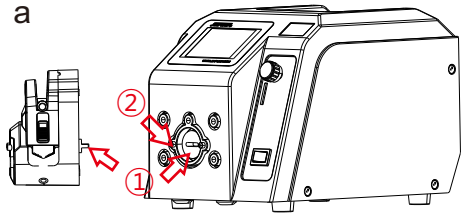


Figure a, ① Adjust the position of the pump head main shaft flat square so that it is opposite to the coupling slot position;
② Install the positioning hole on the back of the pump head onto the driver positioning column.

b

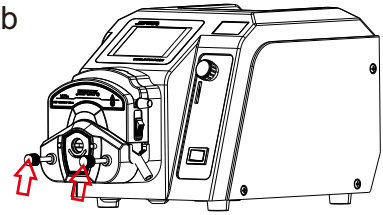


Figure b: Fasten the two thumb screws.

2) Exchange tube method (153Yx, 253Yx)

a

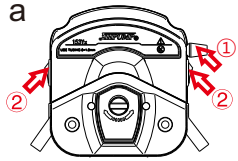


Figure a: ① Rotate the handle counterclockwise to open the occlusion; ② Pull up the clips on both sides upward to remove the tube to be replaced.

b

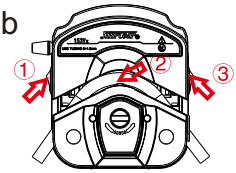


Figure b: ① Pull up the left clip and insert the tube into the left tube clamp; ② Pass the tube around the rotor assembly;
③ Pull up the right clamp and insert the tube into the right tube clamp.

c

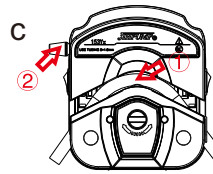
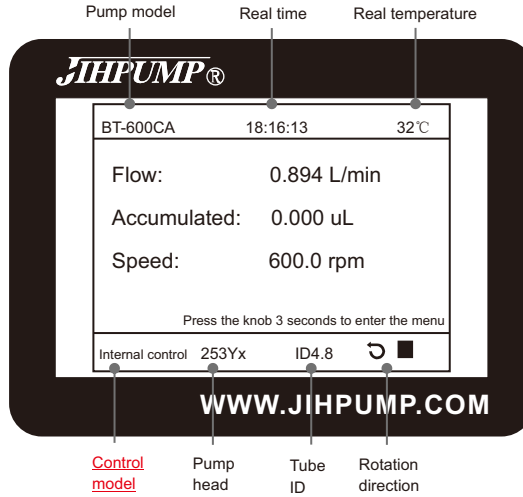


Figure c, ① Adjust the tube so that it is in the middle of the rotor, and the tube is straight and not twisted;
② Turn the handle clockwise to close the occlusion.

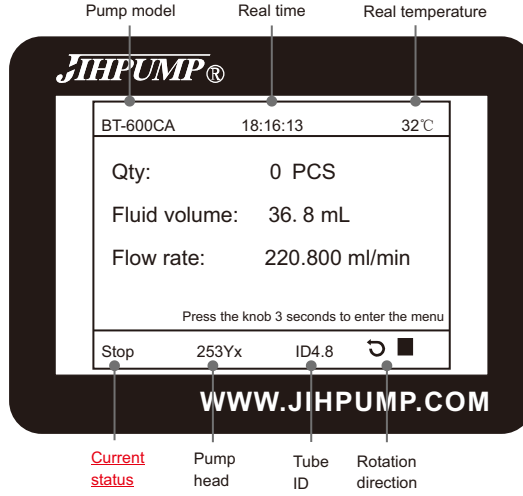
Tips: ①Disassemble only when replacing the tube or cleaning the pump head. Please follow the above steps when installing; ②Do not pull the tube during assembly, as there is a risk of shortening the tube life and inconsistent flow; ③If the tube is found to be broken, please clean the inside of the pump head in time; ④Apply grease regularly to extend the life of the tube and pump head.

3) Panel and Button Introduction

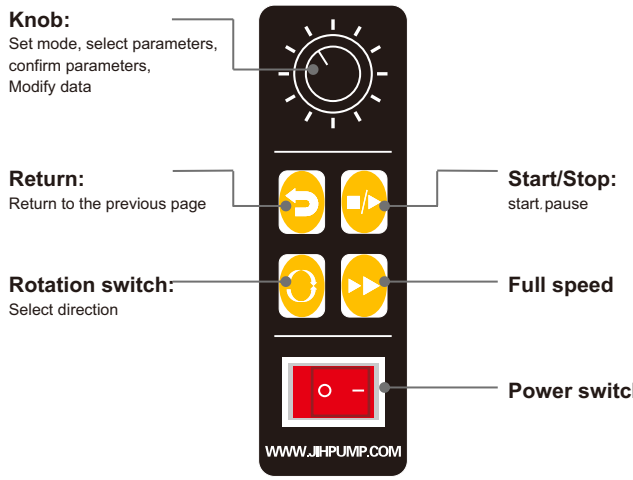
Flow mode main interface



Timing/filling mode main interface



Buttons



Knob: In the timing/flow/filling main interface or external control standby state, press and hold this button for 3s to enter the setting interface; press this button in the setting interface to determine the parameters; rotate this button in the setting interface to select parameters or modify data; (Note: in the flow main interface, rotating this button can adjust the speed in real time).

Return: Press this button in the setting interface to return to the previous interface.

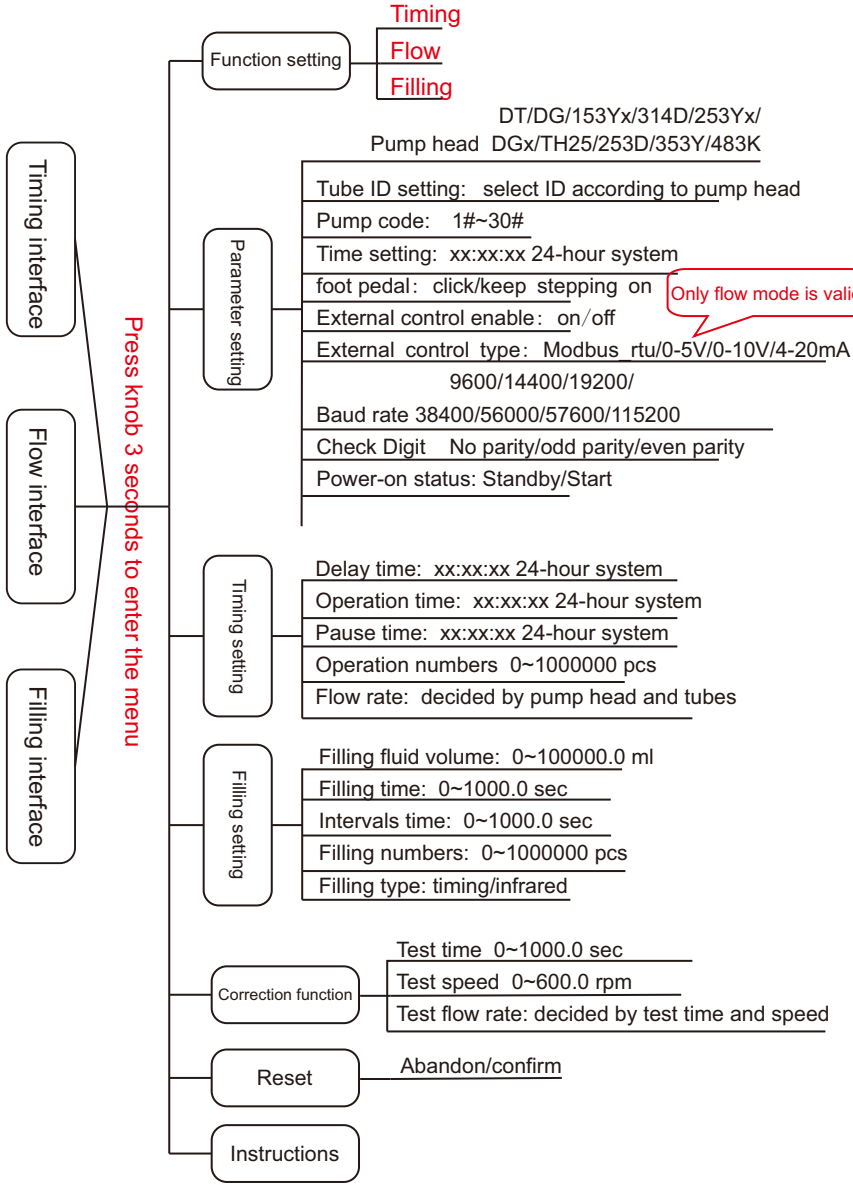
Rotation switch: Only in the main interface state, you can press this button to change the rotation direction in the running or standby state.

Start/stop: Only in the main interface state, as a running command button.

Full speed: The maximum speed of the pump; only in the main interface standby state, press this button to run at full speed; or in the flow main interface running state, press this button to run at full speed.

Power supply: Control the peristaltic pump on and off.

4. Buttons operation logic diagram



5. Operating procedures

Main interface

Timing main interface

BT-600CA 18:16:13 32℃

Delay remaining: 0: 0: 0
Operation remaining: 0: 0: 0
Remaining numbers: 0 PCS
Flow rate: 0. 000 ul/min

Press the knob 3 seconds to enter the menu

Stop 253Yx ID4.8

Flow main interface

BT-600CA 18:16:13 32℃

Flow rate: 0.894 L/min
Accumulated: 0.000 uL
Speed: 600.0 rpm

Press the knob 3 seconds to enter the menu

Internal control 253Yx ID4.8

Filling main interface

BT-600CA 18:16:13 32℃

Qty: 0 PCS
Fluid volume: 36.8 mL
Flow rate: 220.800 ml/min

Press the knob 3 seconds to enter the menu

Stop 253Yx ID4.8

Press 3s

Setting interface

BT-600CA 18:16:13 32℃

1.Function setting 2. Parameter setting
3. Timing setting 4. Filling setting
5. Correction function 6. Reset
7. Instruction

Turn the knob to select Press the knob to enter

Internal control 253Yx ID4.8

Press

Function setting

BT-600CA 18:16:13 32℃

1.Function setting

Timing Flow Filling

After turning on external control, can receive external signal control.

Turn the knob to select Press the knob to enter

Internal control 253Yx ID4.8

Parameter setting

Flow mode setting

BT-600CA 18:16:13 32℃

2. Parameter setting
2. 1. Pump head model: 253YX
2.2. Tube ID setting: ID4. 8
2. 3. Pump no.: 0 #
2. 4. Suction Angle: 0 °
2. 5. Time setting: 18:16:13
2.6. Foot pedal: click/stepping on
2.7. External control enable: on/off
2.8. External control type: Modbus_rtu
2.9. Baud rate: 9600
2.10. Check digit: No parity
2.11. Power-on status: standby/start

Turn the knob to select Press the knob to enter

Internal control 253Yx ID4.8

Timing mode setting

BT-600CA 18:16:13 32℃

3. Timing settting
3.1. Delay time: 0: 0: 3
3.2. Operation time: 0: 5: 0
3.3. Pause time: 0: 1: 0
3.4. Operation numbers: 50 pcs
3.5. Flow rate: 149. 062ml/min

Turn the knob to select Press the knob to enter

Stop 253Yx ID4.8

Filling mode setting

BT-600CA 18:16:13 32℃

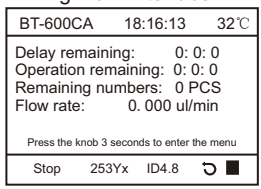
4. Filling setting
4.1. Filling fluid volume: 36. 8 ml
4.2. Filling time: 10. 0 sec
4. 3. Intervals time: 10. 0 sec
4.4. Filling numbers: 6 pcs
4.5. Filling type: timing/infrared

Turn the knob to select Press the knob to enter

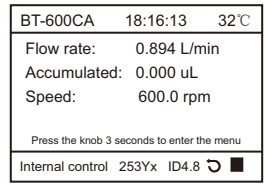
Stop 253Yx ID4.8

Press 2 times to return to the corresponding home page

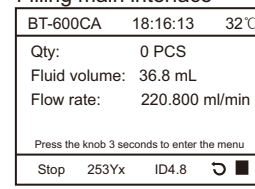
Timing main interface



Flow main interface

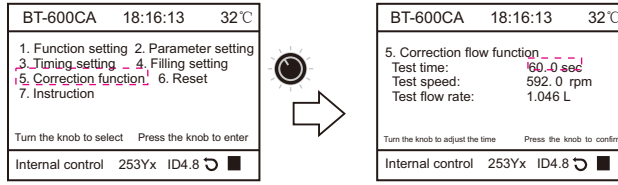


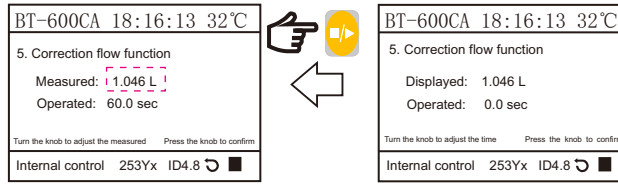
Filling main interface



The pump will work in each state

Correction function





Turn to adjust the displayed flow rate into the actual measured flow rate, then press to save, press exit.

Friendly reminder: ①The correction function needs to be calibrated 3-5 times continuously to be more accurate;
②The correction function is to change the displayed flow data to make the displayed flow closer to the measured flow, so that the user can accurately control the flow, which is especially important in filling operations.

Special instructions:

1. Please set the "Function Settings" and its "Parameters" before use, then return to the main interface and press the start/stop button to run; in the flow main interface, rotate the "rotary button" to adjust the speed in real time;

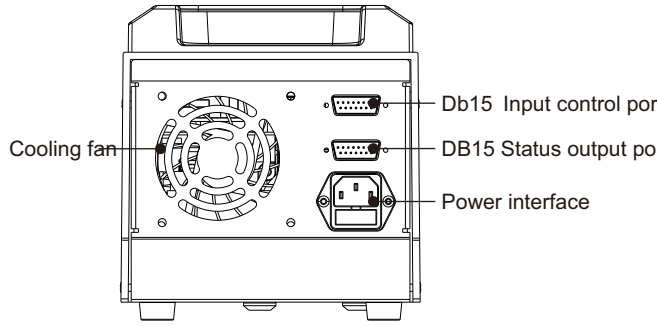
2. External control: In the flow mode state,→select "Parameter Settings" → set the external control enable to "On" (conversely, "Off" the external control enable, that is internal control);

3. Reset default: flow mode (maximum speed 600rpm, pump head model: DT/DG; tube diameter setting: ID0.8; machine number: 0#; back suction angle: 0°; foot switch: continuous; external control enable: off; power-on state: standby);

4. Our company has set the pump head model and tube diameter at the factory. If the user restores the default data by himself, please set the actual "pump head model" and "tube diameter setting" before use, and then proceed to the above "1" step;

5. For the setting range of each parameter, please refer to page 10 of this manual.

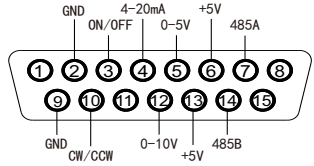
Figure 1 Driver interface introduction



MODBUS Communication Protocol Control Parameters List		
No.	Item	Presentation
1	Communication data format	MODBUS_rtu standard communication protocol, Baud rate 9600, 8 bit data bits, 1 stop bit, even parity.
2	Implementation of the command code	MODBUS_rtu communication command code is 02,04,06,15, the starting address is 999.
3	02 discrete signal input	02 command bit address 999 for the start/stop signal, 1 for the start, 0 for the stop. 1000 for the cw/ccw signal, 1 for cw, 0 for ccw.
4	04 register input	1) 04 command word address 999 for the speed signal, 1000 for the temperature signal, the data are the number of plastic. 2) 1001 and 1002 for the flow coefficient signal, 1001 for the high number of data for the long integer, the flow data is that the speed multiplies flow coefficient. 3) 1003 and 1004 for the cumulative flow signal, 1003 is high, the data is long integer.
5	06 register output	06 command word address 999 for the speed control, the data is the integer number.
6	15 discrete information output	15 command bit address 999 for start and stop control, 1000 for the cw/ccw control.
7	MODBUS output control	MODBUS output control speed, start/stop and cw/ccw, only achieve in the external control MODBUX_RTU.
8	MODBUS input acquisition	In any mode can be collected speed, start/stop and cw/ccw signals. At flow mode can also collect flow and cumulative flow data.
9	Communication machine address	The communication machine address is set in the parameter and re-initialized.
10	Multi - machine communication	The machine can be multi-machine communication, the max number of machines 30.

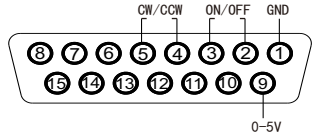
Figure 2 DB15 external control port definition

Input control



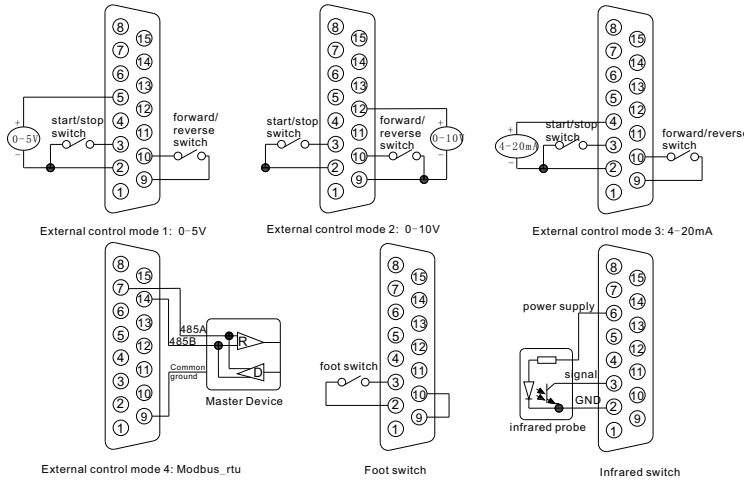
"2/9": GND,external control input signal ground;
"3": start/stop input control;
"10": forward-reverse input control;
"4": external control input 4-20mA;
"5": External control input 0-5V;
"12": External control input 0-10V;
"7/14": 485 communication input interface;
"6/13": Power input +5V

Status output



"9": 0-5V external control output voltage signal;
"2/3": Start-stop relay output contacts;
"4/5": Directional relay output contacts.

Figure 3: DB15 external wiring diagram (based on the definition in Figure 2)



Note:
1. To use external control modes 1-4, you need to turn on the external control enable and select the corresponding external control mode;
2. When using switch quantities such as foot switches or infrared rays, you must ensure that the external control enable is in the off state;
3. The start-stop switch, forward and reverse switch, foot switch and infrared sensor should be dry contact switches or collector pull-down output type interfaces;
4. The foot switch provides pulse or level signals in flow mode, and only pulse signals in timing and filling modes.

7. Daily Maintenance Summary

1) Before starting the peristaltic pump each time, carefully check whether the tube is damaged. Before stopping the machine, clean water should be sucked to clean the hose.

2) Silicone tubes are not resistant to strong acids, strong alkalis, and organic solvents. Before use, it is best to soak a small section of the tube in the solution used for testing to prevent the tube from corroding and breaking during use, causing liquid to seep out and corrode the pump head and flow into the pump body to damage the machine.

3) Frequently check the squeezed parts of the silicone tube to prevent the tube from aging and breaking, and to prevent liquid from flowing into the pump body and damaging the motor and circuit. When the silicone tube is found to be aging, it should be replaced in time. In order to extend the service life of the silicone tube, the squeezed parts of the silicone tube should be replaced frequently. The silicone tube should be removed when not in use for a long time, and a proper amount of grease can be applied to the friction parts of the hose if necessary.

4) Since the roller is rolling friction, the rolling groove needs to be kept clean.

5) The tube used in the peristaltic pump is a special silicone high-elastic tube. During the use of the pump, it cannot be replaced by other tubes (if you need to pump strong acids, strong alkalis, organic solvents or long-life tubes, please contact Jieheng Company for purchase).

8. Fault retrieval

Item	Description	Check	Process	Remark
1	After switch on, LCD screen no display	Check power socket available or not	Check wire	Socket built-in insurance
2	After switch on, LCD display normal,but pump does not work.	Check control mode right or wrong	Enter setting interface to check and re-set	
		Check pump head upper block squeeze tubing too tight or not	Adjust squeeze gap	
		Check tubing no. suitable for pump head or not	Choose proper tubing	
		Check wiring loose or not	Check and resume	
		Check driver or motor damaged or not	Check and replace	
3	After switch on, pump works normally, but can not pump liquid.	Check pump head upper block squeeze tubing too loose to hold tubing well	Adjust squeeze gap	
		Check tubing cracked or not	Replace tubing	
4	While operation,tubing moves along with rollers.	Check tubing clip loose or not	Adjust tuing clip	
5	Stop during operation	Function setting	Re-set	
6	Tubing worn prematurely	Roller flexibility	Maintenance	

9. Standard equipment list

Item	Name	Unit	Quantity	Remark
1	Driver	pc	1	
2	153Yx	pc	1 of them	1m silicone tube
	253Yx			1m silicone tube
	314D			1m silicone tube
	DGx			silicone tube inside pump
	DT			silicone tube inside pump
	DG			silicone tube inside pump
3	power cable	pc	1	
4	instruction	pc	1	
5	warranty card	pc	1	

10. After-sales service

The work of Jieheng Company does not end with the sale of products. The company provides a service commitment of "seven-day replacement, one-year warranty, and lifelong maintenance" for the products it produces. At the same time, it provides humanized after-sales tracking, technical support and other services to ensure that you can use the peristaltic pump products in your hands conveniently and happily.

After you receive the product, if you have any comments or dissatisfaction with the product, please contact Jieheng Company's after-sales service center directly. We are happy to solve relevant problems for you at any time. You can also contact Jieheng Company's marketing department, and sales specialists can also provide you with support in various aspects such as product application and maintenance.

Thank you again for using the new peristaltic pump products produced by our company! Your feedback information is an important source and motivation for us to improve our innovation capabilities. We will cherish every suggestion and opinion of yours!

202406翻印

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