DIP 1500 V2

intelligent peristaltic pump

User Manual

2023/02/13 V1.0

Kamoer Fluid Tech (Shanghai) Co., Ltd.

www.kamoer.com

Warranty service

1. Warranty Conditions

The warranty service is only valid for users who have correctly installed, used and maintained in accordance with the manual, and all man-made faults or damages are not covered by the warranty.

2. Warranty coverage

Within one year from the date of purchase, if there is any damage caused by the manufacturing process or components, the company will provide free warranty service. The free maintenance service provided during the warranty period includes free repair, free replacement of faulty spare parts, and replacement of products that cannot be repaired with products of the same model. Free service does not include shipping costs incurred for product repairs.

3. Non-warranty coverage

The following factors are not covered by the free warranty, and customer repairs are subject to fees.

1) Product appearance (please confirm when purchasing);

2) Improper use, maintenance, or storage (please use, maintain and store correctly according to the user manual);

3) Access to inappropriate power supply;

4) Damage to the components caused by the short circuit of the circuit board caused by the entry of various insects into the machine;

5) Losses caused by accidents;

6) Use inappropriate spare parts (non-company spare parts are not applicable);

7) Persons not authorized by the company negligently handle, modify or repair (please do not dismantle or repair without authorization);

8) Failure or damage caused by use outside the applicable occasion;

9) Damage caused by force majeure, etc.;

10) Consumable and wearing parts (pump tube, connector, connecting tube, etc.);

11) The warranty period has expired.

1. Main features

Speed range	0.1- 400RPM
Speed adjustment resolution	0.1RPM
Flow range	⩽1500ml/min
Direction control	Support clockwise and counterclockwise operation
Display mode	LED 4-digit digital tube
Control mode	Encoder, toggle switch, external analog signal control, RS485 communication control, foot switch control
External analog signal control	0-5V, 0-10V and 4-20mA
Power failure parameter memory	support
Working mode	speed mode, flow mode
Way of working	Fully automatic cycle, semi-automatic cycle, manual
Support function	Start and stop, forward and reverse, speed adjustment, etc.
Power supply mode	External power adapter
Power	＜50W

2. Working conditions

- **Working Environment:** Temperature 0°C～60°C, relative humidity <80%RH without condensation
- **Rated voltage:** DC24V
- **Maximum current:** 2A

3. Appearance description

● Digital display

Used to display information such as speed, addition amount, flow rate, time, etc.

The first digit shows the upper half : The last three digits indicate the set working hours or the added amount

The first digit shows the lower half : The last three digits indicate the set stop duration

When the first digit shows : menu function

● Rotary encoder

Used to adjust speed and time. Clockwise increases, counterclockwise decreases; the faster the rotation speed, the larger the adjustment increment; the speed can be adjusted during the pump operation.

● Direction control switch

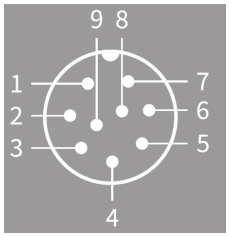
Used to control the direction of rotation of the peristaltic pump; When dialed to the up, the pump rotates counterclockwise; when it is dialed to the down, the pump rotates clockwise. The switch is ineffective during the operation of the peristaltic pump, and will only switch to the post-switching state when the peristaltic pump stops running and runs again.

● Power socket

External DC power, 24VDC 2A.

● Combination control port

The combined control port has 9 pins, including 485 communication, external start-stop control, analog signal control 0-5V/0-10V, analog signal control 4-20mA functions. The interface definition is shown in the figure below:



Pin 1: Reserved Pin 2: 485B Pin 3: 485 A

Pin 4: Foot switch + Pin 5: Foot switch-

Pin 6: Analog signal 5V-/10V- Pin 7: Analog signal 5V+/10V+

Pin 8: Analog signal mA- Pin 9: Analog signal mA+

4. Working mode - speed mode

Set the working mode to speed mode through the function menu, and the factory default is speed mode. The parameters set in speed mode include speed (unit is rev/min), running time (unit is second), stop time (unit is second).

● Fully automatic cycle mode setting

1. When the pump is stopped, the working interface displays the current speed (rev/min);
2. Press and hold the encoder to enter the pump running time setting interface. At this time, the first digit of the digital tube only displays the upper half  ; rotate the encoder to set the running time, and the setting range is 0 to 999 seconds;
3. Short press the encoder to switch to the pump stop time setting interface. At this time, the first digit of the digital tube only displays the lower half  ;
4. Rotate the encoder to set the stop time, the setting range is 0-999 seconds;
5. Long press the encoder to return to the speed display interface, and the running time and stop time will be saved automatically;
6. Short press the encoder, the pump will start to cycle according to the set running time and stop time;
7. Short press the encoder, the pump stops, and the digital tube switches to the speed display interface.

● Semi-automatic cycle mode setting

Just set the pump stop time to 0 in step 4 of the fully automatic circulation mode setting. At this time, after the pump stops running according to the set running time, it will not start automatically again; if you want to start again, short press the encoder.

● Manual mode setting

In the fully automatic cycle mode setting, the second step sets the pump running time to 0, and the fourth step sets the pump stop time to 0. At this time, the start and stop of the pump are controlled by an encoder or a foot switch, and the encoder can be rotated to adjust the speed during operation.

5. Working mode - flow mode

Set the working mode to the flow mode through the function menu, and the parameters set in the flow mode include the flow rate (in milliliters per minute), the amount added (in milliliters), and the stop time (in seconds).

● Fully automatic cycle mode setting

1. When the pump is stopped, the working interface displays the current flow rate (ml/min);
2. Press and hold the encoder to enter the pump addition setting interface;
3. Rotate the encoder to set the amount added, the setting range is 0-9999ml;
4. Short press the encoder to switch to the pump stop time setting interface. At this time, the first digit of the digital tube only displays the lower half  ;
5. Rotate the encoder to set the stop time, the setting range is 0~999 seconds;
6. Long press the encoder to return to the flow display interface, and the added amount and stop time will be automatically saved;
7. Short press the encoder, the pump starts to cycle according to the set addition amount and stop time;
8. Short press the encoder, the pump stops, and the digital tube switches to the flow display interface.

● Semi-automatic cycle mode setting

Just set the pump stop time to 0 in step 4 of the fully automatic circulation mode setting. At this time, the pump stops running according to the set amount of addition, and will not start automatically again; if you need to start again, short press the encoder.

● Manual mode setting

In the setting of fully automatic cycle mode, set the pump addition amount to 0 in the second step, and set the pump stop time to 0 in the fourth step. At this time, the start and stop of the pump are all controlled by the encoder or foot switch, and during the operation The flow can be adjusted with a rotary encoder.

6. Function menu introduction

Parameters can be customized through the menu, which includes the following functions:

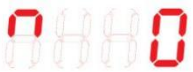
C001. Running mode C002. Running direction C003. Foot switch setting

C004. Calibration C005. Running state saving C006. Analog selection

C007. Suction back function C008. Maximum speed setting C011. Factory reset

C012. Set communication address C013. Set baud rate

The following are the steps to enter the menu:

Function	Display	Setting Description
working interface		When the pump is stopped, press and hold the rotary encoder for 2 seconds on the working interface to enter the running time setting interface
runtime setting interface		On the running time setting interface, press and hold the rotary encoder for 2 seconds to enter the function menu selection interface
menu selection interface		The last 2 digits of the function menu selection interface are the function item index, adjust the function options through the rotary encoder, short press to enter the function setting interface, long press to save and return to the working interface

Note: The setting can only be saved by long pressing the rotary encoder, and the setting will not be saved by short pressing the rotary encoder.

7. Function setting

● "C001" working mode

On the function selection interface, when the rotary encoder displays "C001" and the corresponding function is "running mode", short press the rotary encoder to enter the setting interface, and the "speed mode" and "flow mode" can be switched. The last digit represents mode, rotate the encoder to select. Short press the rotary encoder to return to the function selection interface; long press the rotary encoder (the setting takes effect) and return to the working interface.

Function	Display	Setting Description
		0 means speed mode
		1 means flow mode

● "C002" running direction

On the function selection interface, rotate the encoder, when the corresponding function of "C002" is displayed as "direction level mode setting", short press the rotary encoder to enter the setting interface, the first digit of the digital tube displays 2, the middle two spaces, and the last digit Representative mode, adjust the last 1 option through the rotary encoder to correspond to the low-level running direction. Short press the rotary encoder to return to the function selection interface; long press the rotary encoder (the setting takes effect) and return to the working interface.

Function	Display	Setting Description
		0 means low level corresponds to clockwise
		1 means high level corresponds to counterclockwise

● "C003" foot switch trigger mode

On the function selection interface, rotate the encoder, when the corresponding function of "C003" is displayed as "foot switch setting", short press the rotary encoder to enter the setting interface, and you can set the usage mode of the foot switch. The last digit represents how the foot switch is used. Short press the rotary encoder to return to the function selection interface; long press the rotary encoder (the setting takes effect) and return to the working interface.

Function	Display	Setting Description
C003	3H0	0 means trigger mode (press the foot switch once, the pump starts to work, press it again, the pump stops working)
	3H1	1 means low level trigger (long press the foot switch, the pump works, release the foot switch, the pump stops working)
	3H2	2 stands for high level trigger (release the foot switch, the pump works, long press the foot switch, the pump stops working)

● "C004" flow calibration

1) On the function selection interface, rotate the encoder, when the corresponding function of "C004" is displayed as "Flow Calibration", short press the rotary encoder to enter the setting interface, and the flow of the pump head can be calibrated.
2) After entering the setting interface, the first digit of the digital tube displays 4, a space in the middle, and the last 2 digits represent time seconds.
3) When the pump is stopped, it will switch to display "speed (RPM)" and "4 time" every 2 seconds. When the speed is displayed, the rotary encoder can be rotated to change the speed. When the time is displayed, the rotary encoder can be rotated to change the time.
4) After completing the setting, short press the rotary encoder to start the flow calibration work, and the display interface will display "4 countdown time" during operation.
5) After the countdown is over, the screen displays the volume input interface. You can input the actual volume by rotating the rotary encoder. After completing the input, you can long press the rotary encoder to save and return to the working interface.

Short press the rotary encoder to return to the function selection interface; long press the rotary encoder (the setting takes effect) and return to the working interface.

Function	Display	Setting Description
C004	100.0	set calibration speed
	4 60	set calibration time
	063.5	enter actual volume

● "C005" running state save

On the function selection interface, rotate the encoder, when the corresponding function of "C005" is displayed as "Save Running State", short press the rotary encoder to enter the setting interface, and you can set whether to save the current running state. The last digit represents whether to save or not. The running state is saved as follows:

1) If it was running before power off, it will keep running after power on again;
2) If it was in stop state before power off, it will still stop after power on again.

Short press the rotary encoder to return to the function selection interface; long press the rotary encoder (the setting takes effect) and return to the working interface.

Function	Display	Setting Description
C005	S00	0 means do not save
	S01	1 means save

● "C006" analog selection

On the function selection interface, rotate the encoder, when the corresponding function of "C006" is displayed as "analog selection", short press the rotary encoder to enter the setting interface, and the analog selection can be set. Short press the rotary encoder to return to the function selection interface; long press the rotary encoder (the setting takes effect) and return to the working interface.

Function	Display	Setting Description
C006	600	0-5V
	601	0-10V
	602	4-20mA
	605	encoder mode
	607	RS485 mode

● "C007" suction function

On the function selection interface, rotate the encoder, when "C007" is displayed, the corresponding function is "back suction setting". Short press the rotary encoder to enter the setting interface.

1) The back-suction function means that after the pump stops working, it will suck back for a certain amount of time (in seconds) to prevent the liquid from dripping at the outlet of the pump tube.
2) Enter the setting interface, the first digit of the digital tube displays 7, a space in the middle, and the last 2 digits represent the suction time. Adjust the last 2 options by rotating the rotary encoder, and the number represents the number of seconds of suction.
3) In the suck-back function setting interface, it displayed as "back suction time" and "back suction speed" every 2 seconds.
4) Rotate the rotary encoder when the "back suction time" is displayed to adjust the back suction time (0-99 seconds);
5) When the "back suction speed" is displayed, there is a decimal point between the third and fourth digits on the interface. At this time, rotate the rotary encoder to adjust the back suction speed (0-400rpm).

Short press the rotary encoder to return to the function selection interface; long press the rotary encoder (the setting takes effect) and return to the working interface.

Function	Display	Setting Description
C007	705	suction time
	100.0	suction speed

● "C008" maximum speed setting

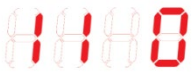
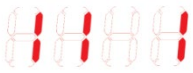
On the function selection interface, rotate the encoder, when the corresponding function of "C008" is displayed as "maximum speed setting", short press the rotary encoder to enter the setting interface. Enter the setting interface, the interface displays the max speed, adjust the max speed by rotating the rotary encoder. Short press the rotary encoder to return to the function selection interface; long press the rotary encoder (the setting takes effect) and return to the working interface.

Function	Display	Setting Description
C008	350	Maximum speed setting, adjustable via rotary encoder

● "C011" restore factory settings

On the function selection interface, rotate the encoder, when the corresponding function of "C011" is displayed as "restore factory settings", short press the rotary encoder to enter the setting interface.

Enter the setting interface, the first digit of the digital tube displays 11, the middle space is 1 space, and the last digit is a confirmation digit. Adjust the last digit option by rotating the rotary encoder, adjust it to 1, click OK, restore the factory settings, and restart the program. Short press the rotary encoder to return to the function selection interface; long press the rotary encoder (the setting takes effect) and return to the working interface.

Function interface	interface display	setting description
		cancel restore
		Restore Factory Defaults

● "C012" communication address setting

On the function selection interface, rotate the encoder, when the corresponding function of "C012" is displayed as "communication address setting", short press the rotary encoder to enter the setting interface.

Enter the setting interface, the last 3 digits represent the address, adjust the communication address of the last 3 digits by rotating the rotary encoder, the address selection range is from 1 to 247, short press the rotary encoder to return to the function selection interface; long press the rotary encoder (the setting takes effect) and return to the working interface.

The communication address here is the same address as the address setting in the 485 Modbus communication protocol.

Function interface	interface display	setting description
		The default address is 192 (0xC0), adjust the address through the rotary encoder

● "C013" baud rate setting

On the function selection interface, rotate the encoder, when the display "C013" corresponds to the function of "baud rate setting", short press the rotary encoder to enter the setting interface.

Enter the setting interface, the first digit displays 13, the middle space is 1 space, and the last digit

indicates the baud rate index, the index is as follows: (the baud rate set here is the same as the baud rate set in 485 Modbus)

0: 1200 1: 2400 2: 4800 3: 9600

4: 19200 5: 38400 6: 57600 7: 115200

Short press the rotary encoder to return to the function selection interface; long press the rotary encoder (the setting takes effect) and return to the working interface.

Function	Display	Setting Description
		13 is the menu number, 3 is the baud rate index, which can be selected by the rotary encoder

8. External control

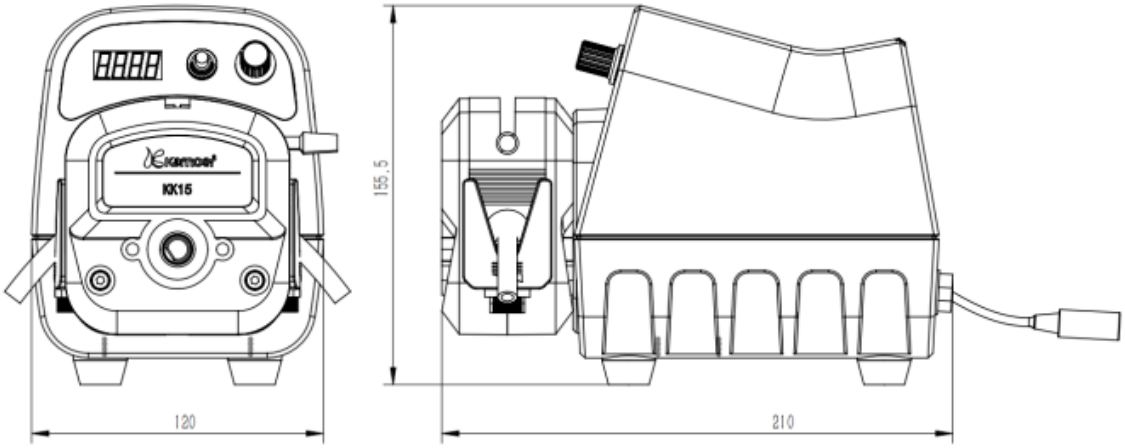
● 485 communication control

Control the device through 485 communication, please connect the 485-communication cable.

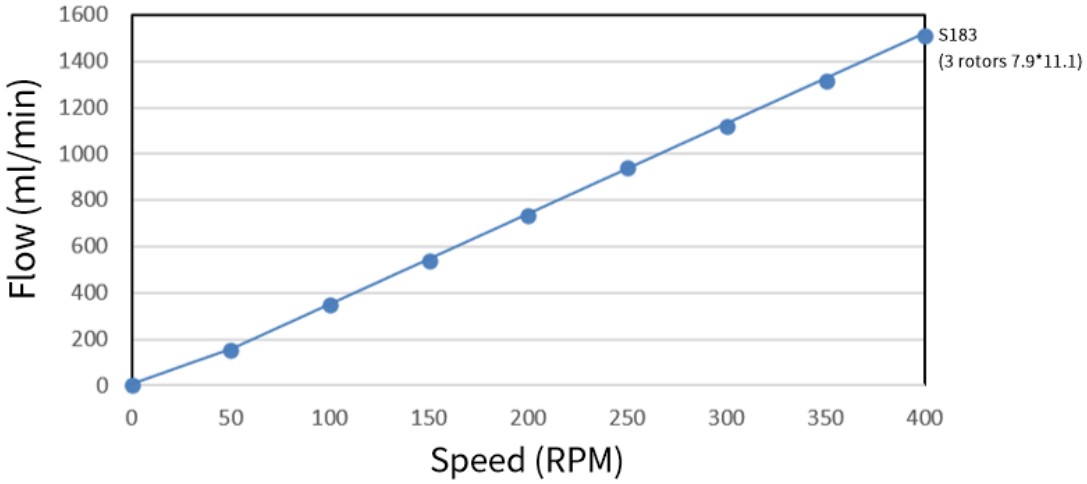
● Analog control

Control the device by analog signal (0-5V, 0-10V or 4-20mA), please connect the signal line according to the actual control method.

9. Dimensions



10. Flow rate reference



Note: The maximum flow rate in the above chart is obtained at room temperature (about 25°C), using a new pump tube that has been aged for 30 minutes and tested water at 400 rpm, for reference only. Ambient temperature, the material and elasticity of the pump tube, the viscosity of the test liquid and other factors will affect the actual flow rate. The thickness of the pump tubing will affect the actual maximum speed for stable operation.

Make it smart to pump fluid

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