Flow Controller Systems

FCS KA (SS)

Compact Peristaltic Pump Operation Manual

HandyPump01

HandyPump02

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Note:

- Please read the manual carefully before operating the product.

Warning:

- Connect the power cord to the wall socket directly, and avoid using a power extension cord.
- If the power cord or plug has wear or other damage, please disconnect the plug. (Hold the plug instead of the wire.)
- If following situations happen, 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 needs to be maintained or repaired.
- The user's power socket must have a ground wire with a reliable grounding.

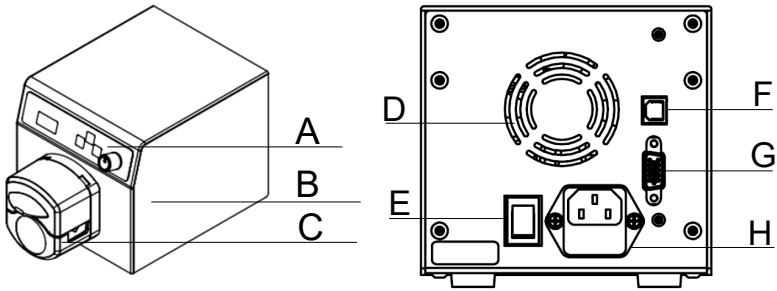
Note: The foot pedal switch and other external control plugs must be connected and disconnected in the power-off status to prevent the external control interface from being burned.

Catalogue

1. Product Introduction

FCS KA (SS), with low noise and stable operation, is driven by an integrated stepper motor with a compact structure. The product adopts OLED blue screen display and has an external control interface, which can realize remote control. It can communicate with a computer through standard Modbus communication protocol (RTU mode).

2. Product Appearance



A—— Operation panel

B—— Drive

C—— Pump head

D—— Fan interface

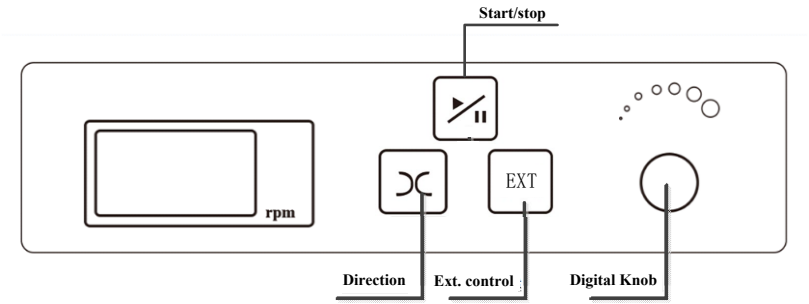
E—— Power supply switch

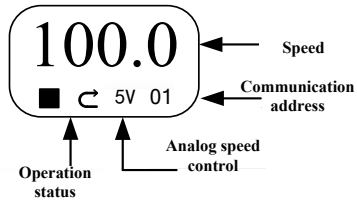
F—— USB interface

G——External control interface

H——Power supply socket

3. Operation Panel





➢ **Start/Stop Button**

Pumps start/stop can be controlled by this button. Press this button once, the pump working status change once. When the drive runs, the screen displays '▶', when the pump stops, the screen displays '■ '.

➢ **Direction**

This button is used to change the motor running direction. Press this button once and the running direction of pump changes once.

➢ **External control button**

This button is used to change the method of analog speed control. Press this button once and that will cycle the display: Empty→5V→10V→mA→Empty. Respectively corresponding to: Turning off analog speed regulation→0-5V→0-10V voltage analog speed regulation→4-20mA analog speed regulation→Turning off analog speed regulation.

Note: If you keep pressing this button and turn on the power supply of this device at

the same time, it will initialize the device and all the parameters will be lost.

➢ **Digital Knob**

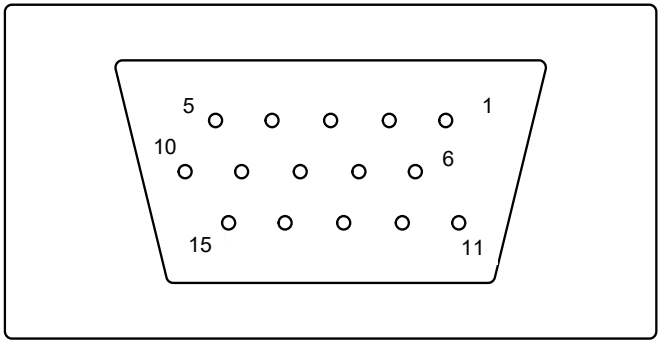
The digital knob used to increase or decrease the motor speed.

(1) In the running state, the digital knob is used to adjust the speed. Turn clockwise to increase the speed, turn counterclockwise to decrease the speed. If you keep pressing the digital knob, the motor will run at the highest speed (full speed), and release it to return to normal speed.

(2) In the stop state, press the digital knob, the lower right corner of the OLED flashes and the value is RS485 communication address (1~32). At this time, you can rotate the digital knob to change the value. After setting, press the digital knob to save the data and the screen no longer flashes.

4. External Control Instruction

FCS KA (SS) series has a 15-pin interface for the external control interface, as the below figure shows. That includes the function of external control start/stop, direction, analog speed regulation, communication, and status output.



Pin 1, port of external control start/stop

Pin2, port of external control direction

Pin3, external control level mode switching

Pin4, RS485B-

Pin5, RS485A+

Pin6, analog speed regulation 0-5V signal terminal

Pin7, analog speed regulation 0-10V signal terminal

Pin8, analog speed regulation 4-20mA signal terminal

Pin9, analog speed regulation common terminal AGND

Pin10, active external control isolated signal common terminal, factory defaults passive external control signal, and this pin is empty

Pin11, status output negative terminal (POWER_GND)

Pin12, status output terminal (OUT_RUN)

Pin13, status output active terminal (POWER_VDD)

Pin14, internal isolated 5V output active terminal

Pin15, internal isolated 5V output negative terminal

(1) Passive external control start/stop, direction

Pulse mode:

Pin1 to Pin14, short circuit break (pulse mode) is start, short circuit break again is stop.

Pin2 to Pin14, short circuit break (pulse mode) is direction.

Level mode:

Pin3 is external control level mode switching. Short circuited Pin3 and Pin14 to switch to external control level mode.

Pin1 to Pin14, short circuit is start, breaking them is stop.

Pin2 to Pin14, short circuited, motor is counterclockwise, breaking them, motor is clockwise.

Note: External start/stop and direction is defaulted to passive signal when leaving factory. This interface could be connected with a foot pedal equipped by our company.

(2) Active external control start/stop, direction

Pulse mode:

Pin10 connects with negative pole of active external control signal.

Pin1 connects positive pole of active external control signal, short circuit and then disconnect, the motor will start. Do it again, the motor will stop.

Pin2 connects positive pole of active external control signal, short circuit and then disconnect, the motor will change direction. Do it again, the motor will change direction again.

Level mode:

Pin10 connects with negative pole of active external control signal.

Pin3 is the pin of external control level mode switching. Short circuited Pin3 and positive pole of active external control signal switches to external control level mode.

Short circuited Pin1 and positive pole of active external control signal is start, breaking them is stop.

Short circuited Pin2 and positive pole of active external control signal, the motor is counterclockwise, break them, the motor is clockwise.

Note: The active external control isolated signal is 5V, 12V, 24V (Universal)

(3) Analog speed regulation

0-5V voltage signal speed regulation

Choose the analog speed regulation signal of the pump to 0-5V voltage signal by external control button. The analog signal is displayed “5V” in the screen.

Voltage 0-5V speed regulation, Pin6 connects to the positive pole of voltage analog 0-5V signal. Pin9 to the connects negative pole. Change the voltage value of the analog signal and the speed changes linearly. 0V corresponds to speed 0rpm, 5V corresponds to maximum speed.

0-10V voltage signal speed regulation

Choose the analog speed regulation signal of the pump to 0-10V voltage signal by external control button. The analog signal is displayed “10V” in the screen.

Voltage 0-10V speed regulation, Pin7 connects to the positive pole of voltage analog 0-10V signal. Pin9 connects to the negative pole. Change the voltage value of the analog signal and the speed changes linearly. 0V corresponds to speed 0rpm, 10V corresponds to maximum speed.

External control button for current signal speed regulation

Choose the analog speed regulation signal of the pump to current signal and the analog

signal is displayed “mA” in the screen.

Current 4-20mA speed regulation, Pin8 connects to the positive pole of current analog 4-20mA signal. Pin9 connects to the negative pole. Change the current value of the analog signal and the speed changes linearly. 4mA corresponds to speed 0rpm, 20mA corresponds to maximum speed.

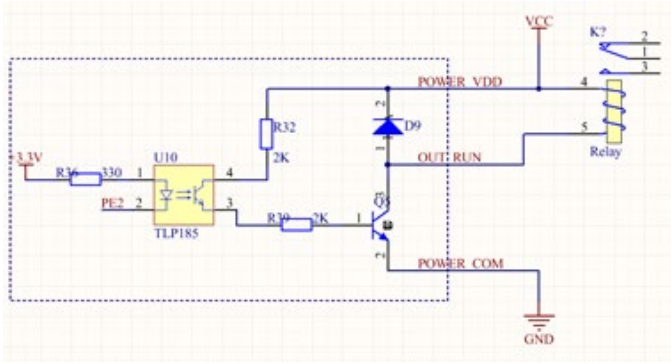
Note: DO NOT connect the 0-5V/0-10V signal with 4-20mA input terminal. Wrong connections may cause damage to the device. The external control plugs must be connected and disconnected in the power-off status to prevent the external control interface from being burned.

(4) Output signal

1) Connect Power-VDD with the positive pole of external connection power supply 5V.

2) Connect Power-GND with the negative pole of external connection power supply 5V.

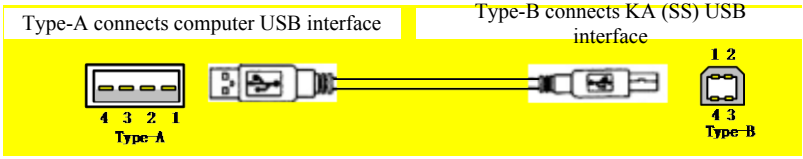
3) Start motor, relay pull-in; Motor stops, relay breaks.



5. Communication Function Instruction

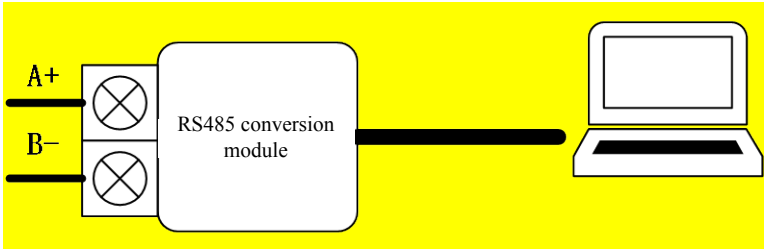
The pump supports standard modbus protocol (RTUmode), communication modes are RS485 and USB. It can control the pump start/stop, direction and motor speed, and can read the current running status.

USB communication mode: A USB cable is needed (one side is USB-A and the other side is USB-B). Connect the pump with a computer through the USB interface.



Type	Type-A	Type-B
Plug(male) USB2.0	4 3 2 1 Type-A	1 2 4 3 Type-B
	Connect with computer	Connect with external control USB interface

RS485 communication: Connect A+ (pin5) from external control interface (as shown in Picture) to T/R+ of RS485 module; and connect B- (pin4) to T/R- of RS485 module. Users can control the pump working according with the communication protocol.



6. Technical Specification

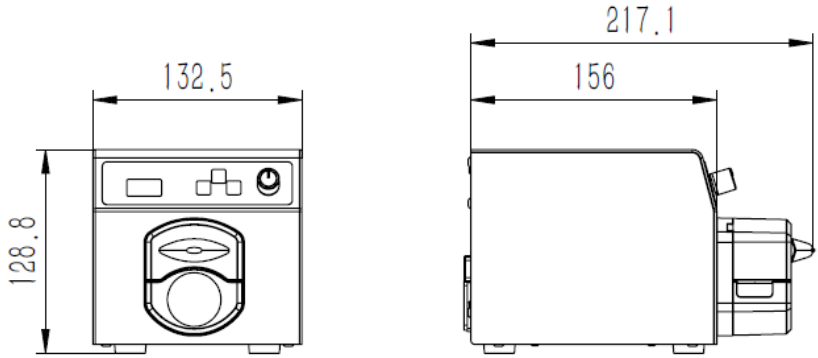
Flow rate	0.0033~365.69 mL/min	Power supply	AC100V~240V(50HZ/60HZ)
Speed range	0.1~300rpm	External control	Start/stop: Switch signal Speed control: 0-5V, 0-10V, 4-20mA for option
Speed resolution	0.1rpm	Communication	RS485
Control	Digital knob/ pure imported keypad	Temperature	0-40℃
Motor	57 closed -loop stepper motor	Relative humidity	<80%
Display	OLED	Output interface	Output motor working status
Power consumption	≤75W	IP rate	IP31

7. Main Function and Feature

- Suitable Pump Head: FCS KA (SS) easy load pump head.
- Digital knob control speed, control speed manually or by external control interface automatically.
- Multiple pumps can be controlled by one controller at the same time, RS485 address cannot be repetitive.
- The circuit has excellent performance, good heat dissipation conditions, low working noise, stable operation, and has power-off memory function.
- RS485 standard Modbus protocol, that is more convenient to connect with PLC.
- 304 stainless steel shell, anti-corrosion, no rust, conforms to GMP requirements.
- OLED displays motor speed and working status.

8. Dimension Drawing

Unit: (mm)



9. Maintenance

9.1 Check the running status of the machine before starting it, ensure that the power supply of the device is reliably grounded. Normal operation can be put into use. The external wiring of the equipment must be operated in the power-off state to prevent burning the equipment.

9.2 Check to see if the tubing is damaged or the equipment is leaking and ensure that the liquid in the tubing is discharged to the container or discharge pipe. Wipe any leaked liquid around the pump quickly and correct any possible faults promptly. Keep the rollers of the pump head clean and dry, otherwise it can hasten tubing wear (it can also damage the tubing causing solid substances in the liquid), reduce the useful life of tubing, and lead to quicker damage and wear to the rollers. If the pump head gets water on it accidently, use a soft, absorbent cloth to wipe it dry to prevent damage to the pump head. If liquid splashes on the pump, please turn off the power supply and unplug the power wiring. Check to see if there is liquid in the inner part of the equipment, if so please contact the manufacturer.

9.3 The factors affecting the flow are as follows:

1) The inner diameter and wall thickness of tubing may have some deviations due to its tolerance and different bathes.
2) Different liquid properties
3) It will decrease flow rate when input port and output port change incrementally or there are suction and lift.
4) The speed of DC/AC motor will change according to load, temperature and humidity.

This may influence product flow accuracy, please leave a margin when choose tubing.

9.4 This product has no waterproof measures. Please take protective measures when using in a wet environment. When the product will not be in use for a long time, please clean it and keep it in a dry and ventilated environment.

9.5 Pump head is not resistant to organic solvent (Except for special indication) and strong corrosive liquids, please be attentive when using either near it.

9.6 The data used for testing in this manual is all short duration and may change for longer duration use.

9.7 The current will raise over the rated running current when DC/AC motor starts or blocks, it may be about 3-5 times the rated operating current.

9.8 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. Load changes will also cause changes in operating current. Therefore, please conduct margin design for power supply power.

9.9 The company shall not bear the direct and indirect losses caused by the malfunction or improper operation of this product.

10. Warranty & After-Sales Service

We support 3 years warranty for the pumps, subject to the exceptions below. Our company shall not be liable for any loss, damage, or expense directly or indirectly related to or arising out of the use of its products. This warranty does not obligate our company to bear any costs of removal, installation, transportation, or other charges which may arise in connection with a warranty claim.

If the pump fails during the warranty period, after confirmation by our technical department, we will provide spare parts free of charge. Customers will need to bear the shipping cost.

Exceptions:

- The warranty shall not apply to repairs or service necessitated by normal wear and tear or for lack of reasonable and proper maintenance.
- All tubing and pumping accessories as consumable items are excluded.
- Electrical surge as a cause of failure is excluded.
- Chemical attack is excluded.
- Improper operation or man-made damage as a cause of failure is excluded

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