



FCS KA1 (Rollers)

Compact Peristaltic Pump
Operation Manual



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flowcontrollersystems.com



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.

Catalogue

- 1. Product Introduction.....- 1 -
- 2. Installation Instruction.....- 1 -
- 3. Operation Instruction.....- 2 -
- 4. Dimension Drawing- 5 -
- 5. Specification.....- 5 -
- 6. Maintenance- 6 -
- 7. Warranty and After-sales Service- 6 -

1. Product Introduction

FCS KA1 (Rollers) peristaltic pump has the feature of small size, low noise, compact structure. Driven by stepper motor. It adopts OLED high-definition display and has external control interface for remote control. The pump communicates with the computer to control pump operating status through standard Modbus communication protocol (RTU mode). It usually be used with a variety of analytical instruments, and won the unanimous praise of users with excellent cost performance.

Features:

- Easy installation for pump head, stable flow rate.
- Low power, working in silent.
- OLED high-definition display.
- Digital knob speed control, it is convenient to operate.
- Power down memory function.

2. Installation Instruction

The installation replacement for UD15 head and tubing

- 1) Put KA1 (Rollers) drive on the table and screw the lock knob of the pump head to unlocking position as shown in Figure 1.
- 2) Open the pump head cover, and replace the tubing as shown in Figure 2.
- 3) After replacing the tube, close the pump head cover, and screw the lock knob of the pump head cover to locking position as shown in Figure 3.

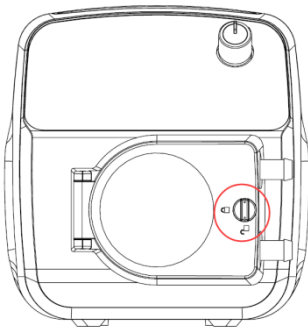


Figure 1

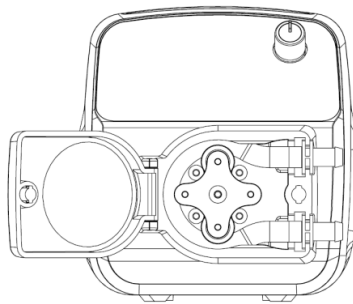


Figure 2

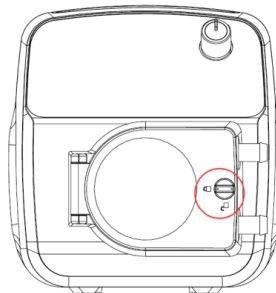


Figure 3

3. Operation Instruction

3.1 Appearance

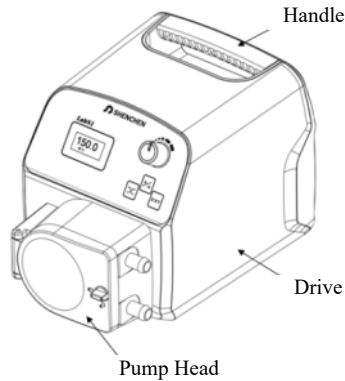


Figure 4 Stereograph

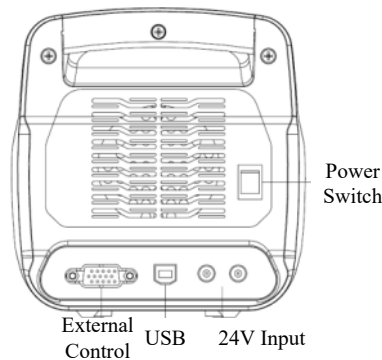


Figure 5 Back

KA1 (Rollers) peristaltic pump (as Figure 4 stereograph) adopts ABS engineering plastic casing to resist corrosion and anti-static. The back has fan, power switch, power interface, USB interface and external control interface etc.

The two power connectors on the back can be cascaded with other KA1 (Rollers) pumps and up to two. Please select the power adapter with power supply greater than or equal to 24V/2A for cascade.

3.2 Screen and Keypad

The KA1 (Rollers) pump adopts pure imported keypad with 300,000 times of service life to fully meet the needs of various environments.

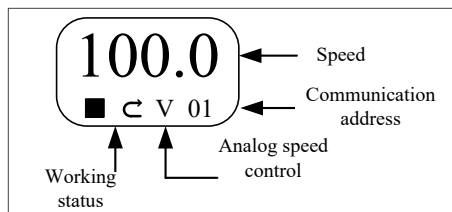


Figure 6 Screen Instruction

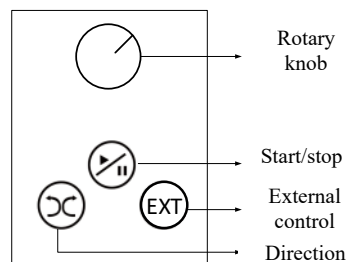


Figure 7 Keypad Instruction

- 1) **Digital knob:** Turn the speed control knob to the left or right to decrease or increase the speed. The speed range is 0.1-150/350 rpm.
- 2) Keep pressing the knob, motor will run at full speed at the highest speed in the current direction. The corresponding screen shows the full speed and maximum speed. Release the button to stop, the screen displays the stop state and the original speed.
- 3) Press the knob in the stop state to enter the 485 communication address adjustment. Two digits flash in the bottom right corner of the screen, turn the knob left or right to decrease or increase the communication address. The address adjustment range is 1-32. After adjusting, press the knob again to exit the address adjustment state.
- 4) **Start/stop button:** change the motor working status. Press once, pump will start running with the setting speed, press again, pump will stop.
- 5) **External control button:** Change the analog speed control mode, change the button once, and the loop display is empty → V → mA → empty. Corresponding to close analog speed control→0-5V/0-10V voltage analog speed regulation→4-20mA analog speed regulation→turn off analog speed regulation.
- 6) **Reverse direction:** Change the running direction of the motor, change the button once, and change the running direction of the pump

once.

3.3 External Port

KA1 (Rollers) external port has 15 pins. As showed in figure 8. Including external start/stop, direction changing, analog signal control speed, communicating and status output functions.

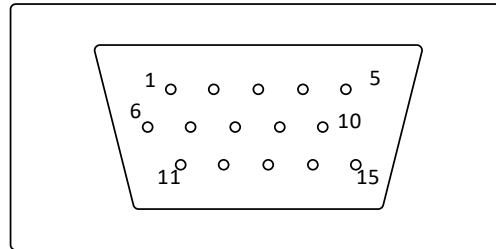


Figure 8 External control interface

1) (Passive) External start/stop, direction changing

Pin 1 to Pin 10, breaking short circuited (pulse mode) is start, do it again is stop.

Pin 2 to Pin 10, breaking short circuited (pulse mode) is to change direction.

Note: The factory default is passive signal for external control start/stop, direction.

2) (Active) External control start/stop, direction

Pin 8 is connected to the negative pole of the active external control signal.

Pin 1 is connected to the positive pole of the active external control signal, short circuited and then disconnect, the motor will start. And do it again, the motor stops.

Pin 2 is connected to the positive pole of the active external control signal, short circuited and then disconnect, the motor will reverse direction. And do it again, the motor changes direction again.

3) Analog signal speed control

Voltage signal: Press the external control button, select analog speed signal to voltage signal, the screen display “V”.

The voltage is 0-5V/0-10V, the Pin 6 is connected to the positive pole of the analog signal voltage, and the Pin 7 is connected to the negative pole. Change the voltage value of the analog signal, and the speed changes linearly. 0V corresponds to the 0rpm, 5V/10V corresponds to the maximum speed.

Current signal: Press the external control button, select analog speed signal to current signal, the screen display “mA”.

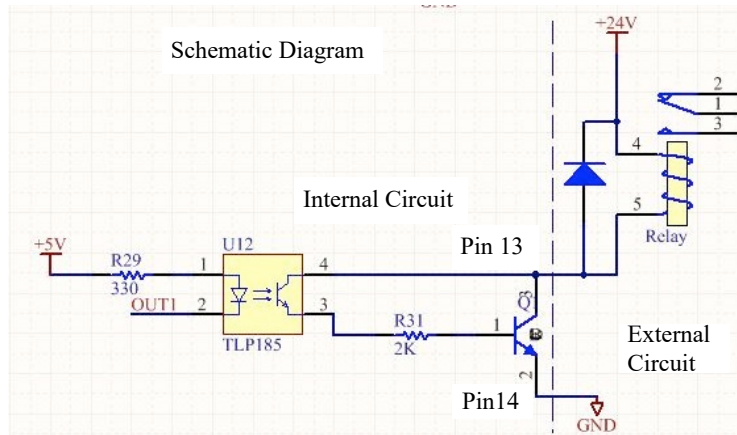
The current flow is 4-20 mA, the Pin 11 is connected to the positive pole of the analog speed-regulating signal current of 4-20 mA, and the Pin 7 is connected to the negative pole. Change the current value of the analog signal, and the speed changes linearly. 4mA corresponds to 0rpm, 20mA corresponds to the maximum speed.

Please Note:

- (1) The voltage analog speed control of the pump defaults to 0-5V. If the customer needs 0-10V speed regulation, please contact Flow Controller Systems.
- (2) It is forbidden to connect the 0-5V signal to the 4-20mA input. Improper connection may result in equipment damage. The external control port plug must be plugged and unplugged in the power-off state to prevent the external control interface from being burned out.

4) Signal output

Pin 13 is the output signal positive (+), Pin 14 is the output signal negative (-).



If it connects with relay (as show above), when the motor ran, the switch 1-3 connected; When the motor stopped, the switch 1-3 disconnected.

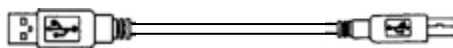
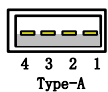
3.4 Communication Interface

We use standard Modbus protocol (RTU mode), communication modes are 485 and USB to control the start/stop, direction and motor speed. You can read the current running status.

- USB communication mode, equipped with USB cable (one end is A head and the other end is B head), is connected to the computer through the pump USB interface.

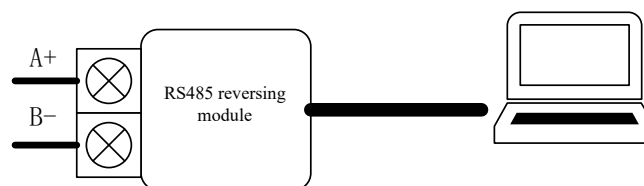
Type -A is connected to computer USB interface

Type -B is connected to USB interface on the back of LabS



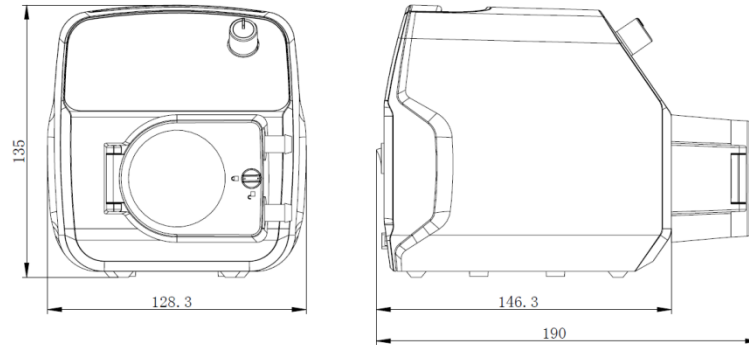
Category	Type-A	Type-B
Plug (male) USB2.0	<p>Type-A</p>	<p>Type-B</p>
	Connect to computer	Connect to USB interface of KA1 (Rollers) external control

- RS485 communication mode is that connect the external control interface Pin A+(Pin 5) as show in the figure 8 to RS485 module T/R+. Connect the Pin B-(Pin 4) to RS485 T/R- pin. The user can control the operation of the pump according to the content of the product agreement.



4. Dimension Drawing

Unit: (mm)



5. Specification

Model	FCS KA1 (Rollers)	
Adaptor	Input: AC100-240V 50/60Hz Output: DC24V/1A	
Power	<30W	
Display	OLED screen	
Operation mode	Long-life imported buttons	
Speed range	KA1 (Rollers): 0.1-150 RPM KA1 (Rollers): 0.1-350 RPM	
Working environment	Temperature	0-40°C
	Relative humidity	<80%
Dimension (Length*Width*Height)	190*128*135mm	
Weight	1100g	

Flow rate range

Pump Head Model	Housing Material		Tubing		Speed Range (rpm)	Flow Rate(mL/min)
	Base	Protective Cover	Tubing	ID×Wall (mm)		
UD15	PSF	Transparent PC	16#	3.1×1.6	0.1~350	0.08~280
			25#	4.8×1.6		0.16~580
			17#	6.4×1.6		0.26~930

6. 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.

7. Warranty and 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.



Flow Controller Systems

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