

## Mini SY-04 Syringe Pump



- Runze patented product, compact size, can transfer liquid as microliters with extraordinary accuracy and precision
- Equipped with Japan imported NMB step motor, KSS ball screw, OMRON optocouplers, high stability and maintenance-free
- Imported fluorine material as the wetted part, resist to corrosion & high temperature, suitable for various special media.
- Equipped with special drive control or user's self-control available
- Widely used in environmental analyzers, medical analysis equipment and other high-precision analysis instruments

**ZSB-LS - 0.9 - 1 - 5 - 1 - Q**

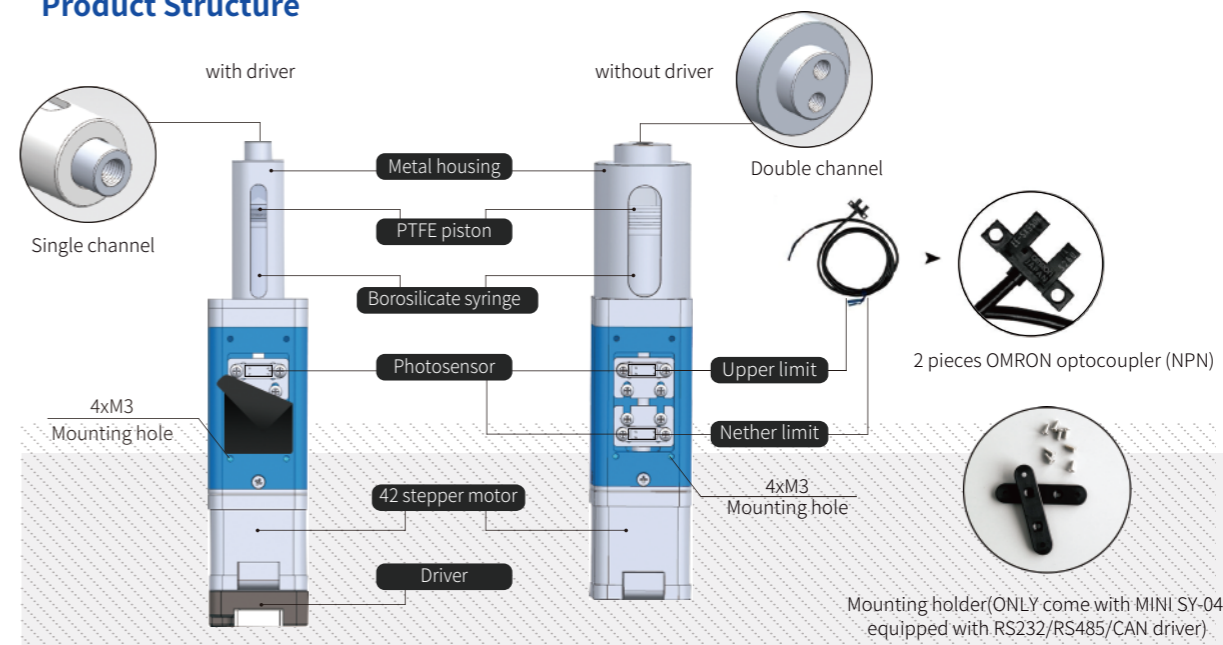
Model No.    0.9°Step motor    Lead 1mm    Volume    Channel    Driver

①	5 5ml	②	1 Single channel	③	Q With driver
	10 10ml		2 Double channel		- Without driver
	20 20ml				

### Technical Parameters

Accuracy	≤1%@100% rated stroke		
Precision (Repeatability)	0.3%~0.7%@100% stroke		
Pressure rating	0~1.2Mpa (water)/ 0~1.0Mpa (air)		
Service life	3 million times no leakage (media: water ; 1 rated stroke=one time)		
Initial position detection	Photosensor detect original piston position		
	<b>5ml</b>	<b>10ml</b>	<b>20ml</b>
Rated stroke (control steps)	30mm(12000 steps)	24.08mm(9632 steps)	24mm(9600 steps)
Maximum speed	300rpm	300rpm	250rpm
Linear speed	0.017~5mm/s	0.017~5mm/s	0.017~4.167mm/s
Running time (per rated stroke)	6~1765s	4.82~1416s	5.76~1412s
Resolution	0.0025mm/0.4154μl	0.0025mm/1.0382μl	0.0025mm/2.0833μl
Syringe ID	14.55mm	23.03mm	32.57mm
Actuator	Ball screw (Lead 1mm)		
Max. piston drive	≥100N		
Sub. piston drive	≥45N		
Wetted material	Borosilicate glass, PTFE		
Connection	1/4-28UNF		
Communication	RS232/RS485/CAN		
Baud rate	RS232/RS485: 9600bps, 19200bps, 38400bps, 57600bps, 115200bps CAN: 100Kbps, 200Kbps, 500Kbps, 1Mbps		
Address & Parameter setting	Via communication		
Power supply	DC24V/1.5A		
Operating temperature	5°C~55°C		
Operating humidity	<80% relative humidity, non-condensing		
Dimension (L*W*H)	42*42*191mm (without driver)		42*42*206.2mm (with driver)
Net weight	0.72kg		

### Product Structure



### Product Function

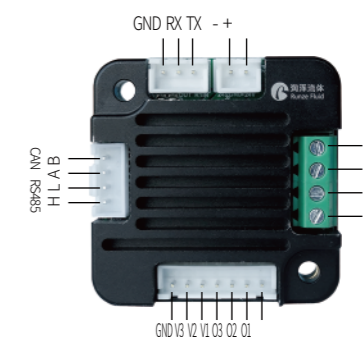
Address setting	Address settable via serial port
Baud rate setting	RS232/RS485/CAN baud rate settable
CAN destination address setting	When multiple devices controlled in paralleling, any device can be set with priority address
Speed setting	1rpm - 300 rpm (air and liquid maybe different)
Subdivision setting	When speed at 1rpm, motor subdivision must be 256
Reset interior data	Factory reset
Parameter query	Query address, speed, subdivision, baud rate etc.
Version query	Query firmware version
Motor direction	CW/CCW settable
Reset	Return piston to the origin
Strong stop	Strong stop the running motor
Motor status query	Detect current motor status
Power memory	When motor suddenly stops, current position can be queried from the distance between current position with the origin
Collision protection	Upper and nether optocoupler to limit the piston position

### Motor Parameter

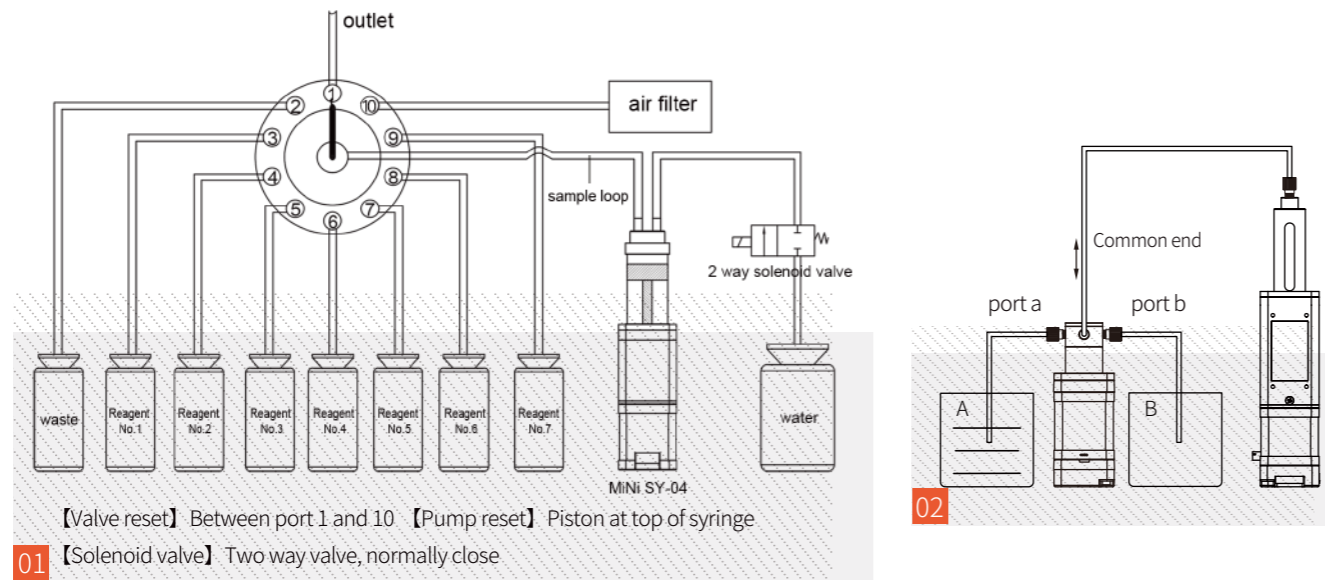
Max. power	9.2W
Step angle	0.9°
Phase	2
Phase voltage	4.6V
Phase current	1.0A
Resistance	4.6Ω±0.48
Inductance	18.6mH REF
Insulation	100m Ω MIN
Max. temperature	80°C MAX
Insulation grade	B

### Driver Port

Port	Description	Port	Description
H	CANH	B+/B-	Phase B wiring
L	CANL	A+/A-	Phase A wiring
A	RS485 A	O <sub>1</sub>	Photosensor wiring port
B	RS485 B	O <sub>2</sub>	
GND	GND	O <sub>3</sub>	
RX	RS232 data output	V <sub>1</sub>	
TX	RS232 data input	V <sub>2</sub>	
-	DC24V negative	V <sub>3</sub>	
+	DC24V positive	GND	



### Cross Contamination Free System



**01** Perfusion steps Tubing shown in 01

1. Reset selector valve, open two way solenoid valve, syringe pump suction water (suction volume must be little more than liquid in the storage loop)
2. After water suction, close two way solenoid valve, selector valve switch to port 2, syringe pump reset and empty
3. Selector valve switch to port 3, reagent 1 was suctioned into storage loop through selector valve (suction volume depends on tubing length and inner diameter)
4. Selector valve switch to port 2, syringe pump reset and empty
5. Selector valve switch to port 10 (air port), syringe pump suction 1ml air and switch to port 3 to discharge 100 $\mu$ l air, then switch to port 2 to empty

**01** Sampling steps Tubing shown in 01

1. Reset selector valve, open two way solenoid valve, syringe pump suction water
2. After water suction, close two way solenoid valve, selector valve switch to port 2, syringe pump reset and empty
3. Selector valve switch to port 3, syringe pump suction certain volume of reagent (suction volume more than target volume to ensure the accuracy)
4. Selector valve switch to port 2, syringe pump discharge 200 $\mu$ l, after 2s delayed, selector valve switch to port 1, syringe pump discharge target volume, then discharge and empty the rest liquid to port 2.
5. Selector valve switch to port 10, syringe pump suction 1ml air and discharge 0.5ml air to port 1, discharge 100 $\mu$ l air to port 3, then switch to port 2 to empty

**02** Tubing shown in 02

1. To make syringe pump suction liquid, power on solenoid valve, NO (normally open) and common port of solenoid valve connected, pump suction liquid from box A into syringe pump;
2. To make syringe pump discharge liquid, power on solenoid valve, NO (normally open) closed, NC (normally close) opened and connected with common port, pump discharge liquid from syringe into box B.

### Dimension (unit: mm)

