INFUSETEK

SYRINGE PUMP

- Constant Flow Syringe Pump
- Industrial Syringe Pump
- Laboratory Syringe Pump
- Split Type Syringe Pump

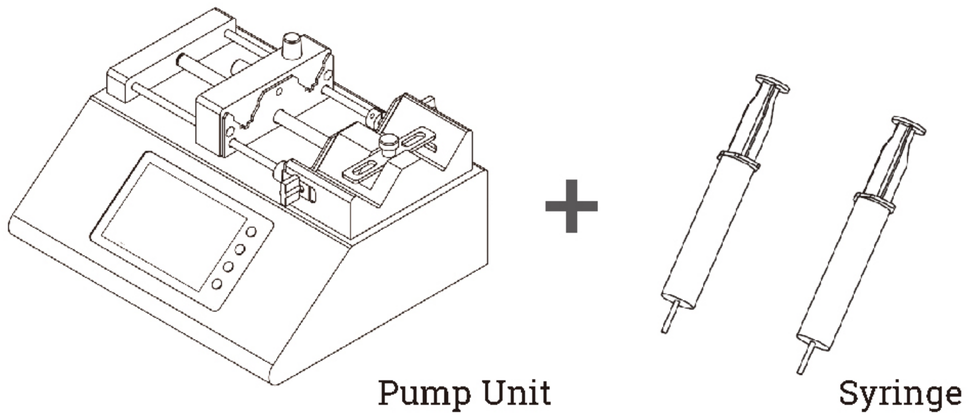
DK INFUSETEK CO. ,LTD

DK INFUSETEK

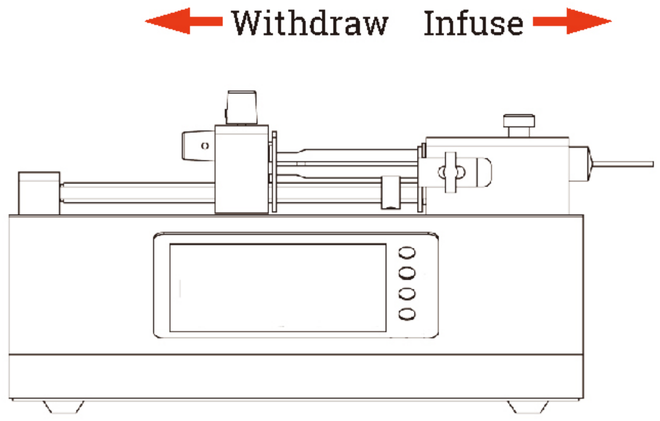
Company Profile

DK Infusetek is a global supplier of laboratory syringe pumps and industrial syringe pumps, providing professional micro-flow control solutions.

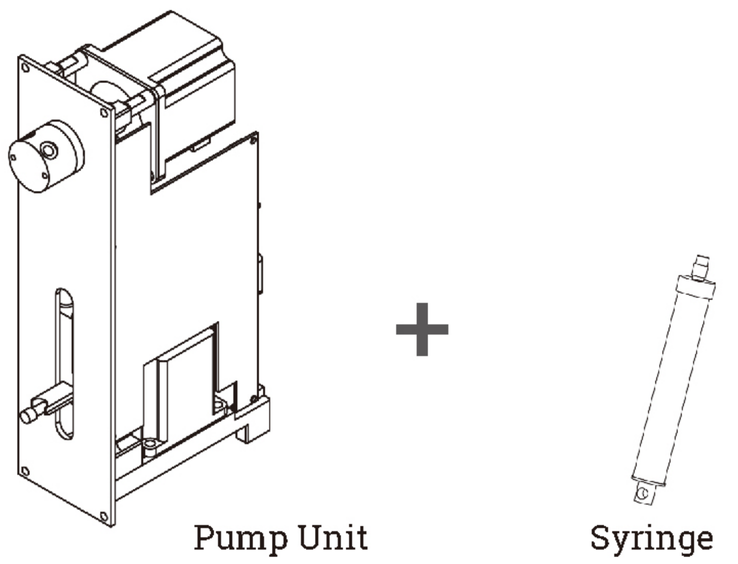
Laboratory Syringe Pump Composition



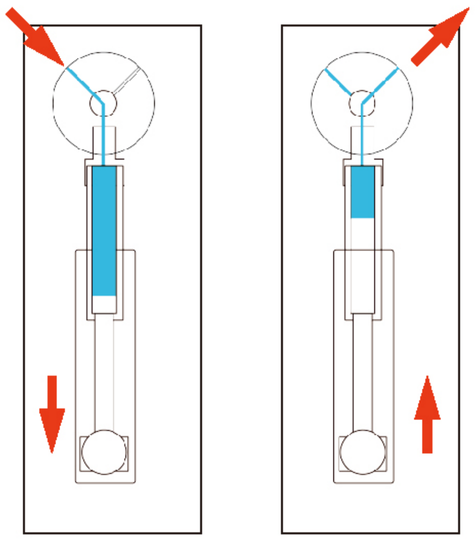
Laboratory Syringe Pump Working Principle



Industrial Syringe Pump Composition



Industrial Syringe Pump Working Principle



DK INFUSETEK

Catalog

Constinfuse®- Constant Flow Syringe Pump

Model No.

CFSP- I

Introduction

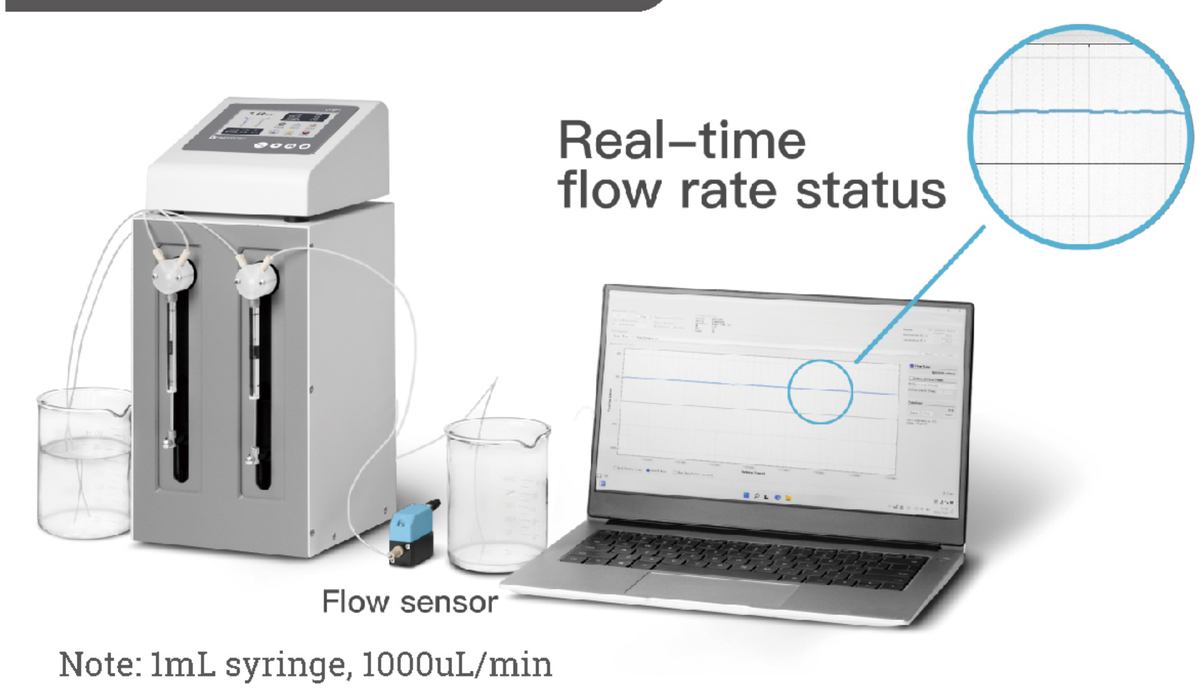
Constinfuse®-constant flow syringe pump, focusing on microliter volume liquids continuous transferring and dispensing. Flow rate range: 0.06uL~70mL/min, continuous flow.

Support RS232 and RS485 communication for external control.

Features

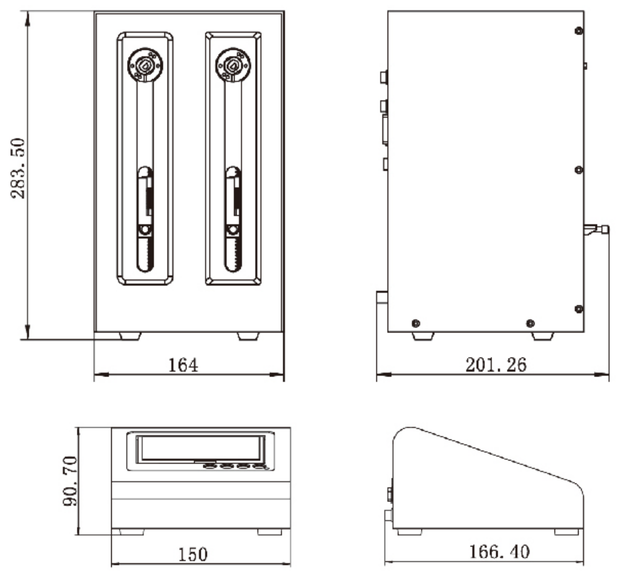
- High precision and uninterrupted transferring of micro-liter liquids.
- Four working modes: Continuous transferring; Fixed volume measurement; Dispensing; Timing start/stop.
  4.3-inch industrial-grade true color LCD screen display, friendly operation interface and synchronous simulation animation, allowing users to operate conveniently.
- Multiple external control interfaces to meet various supporting needs.
- Record the number of times the valve and syringe are used, which is convenient for equipment maintenance.
- The pump unit supports “offline” operation, which enables one controller to s et different parameters for pump units, which is convenient for users to use together with other equipments.
- The controller has offline reminder and parameter synchronization function. Intelligent calibration function.
- Closed-loop control, overload protection function, effectively protect the syringe.
- Quiet design. 304 stainless steel spray shell.

Constant Flow Curve



Note: 1mL syringe, 1000uL/min

Dimension Drawing (Unit: mm)



Constant Flow Syringe Pump

Interface Display

Technical Specifications

Flow rate	0.06μL/min-70mL/min (Pure water, and the length of the tube at the liquid inlet is less than 1 meter, and the inner diameter is 1.6mm)	Maximum pressure of liquid path	0.68MPa(High pressure above 0.68MPa, please contact us)
		Valve material	Valve body: PCTFE Valve element: PTFE
Dispensing volume range	0.1μL-25mL	Valve type	3 port 120° valve
Accuracy	≤±0.05% (Maximum stroke, 500μL or more syringe, pure water at room temperature)	Tube connection interface	1/4-28UNF
Communication	RS232 and RS485, support Modbus protocol, RTU mode	Syringe size	50μL, 100μL, 250μL, 500μL, 1.0mL, 2.5 mL, 5.0 mL, 10 mL, 25 mL
External control	Passive switch signal: Start/pause function. For example: Foot pedal switch; Active switch signal: Start/pause, stop, washing, initialization function 5-24V universal	Syringe material	Barrel material: Borosilicate glass Plunger rod material: Stainless steel Plunger seal material: PTFE
		Power supply	Pump unit: Standard 24V adapter Controller：Standard 5V adapter
Output	Indicates liquid output status (Open collector output)	Power consumption	Controller≤10W, pump unit≤60W
		Environment temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)
Display	4.3 inch industrial-grade true color LCD screen		
Control	Touch screen and keypad	Relative humidity	<80%(RH)

Syringe	Mini. flow rate	Max. flow rate
50μL	0.0625μL/min	608.37μL/min
100μL	0.125μL/min	1.21mL/min
250μL	0.3125μL/min	3.04mL/min
500μL	0.625μL/min	6.08mL/min
1.0mL	1.25μL/min	12.16mL/min
2.5mL	3.125μL/min	30.41mL/min
5.0mL	6.25μL/min	60.83mL/min
10mL	12.5μL/min	70.00mL/min
25mL	31.25μL/min	55.00mL/min

Testing condition:
Outlet and inlet tube size is 3.2mm*1.6mm, Length is 1m, Liquid is pure water.Tube size,length and liquid will affect the flow rate.

Constinfuse® Constant Flow Syringe Pump

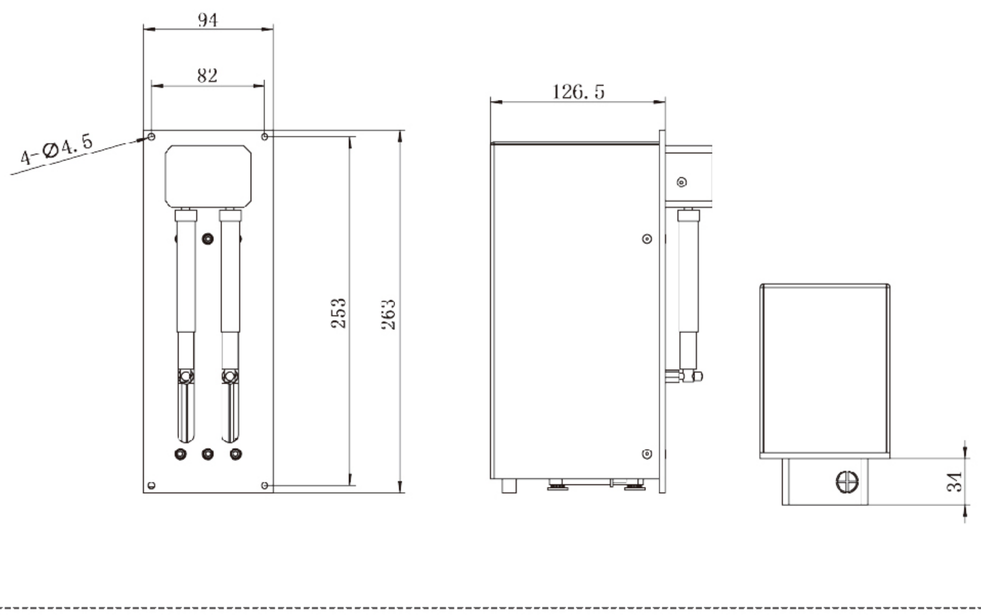
Model No.

CFSP-Ⅱ

Introduction

CFSP-Ⅱ constant flow syringe pump, flow rate range: 0.5uL-70mL/min, special for micro volume liquid continuous transferring or dispensing. Support RS232 and RS485 communication, also support TTL level external control interface, to achieve remote control. Compact design, special for supporting instruments.

Dimension Drawing (Unit: mm)



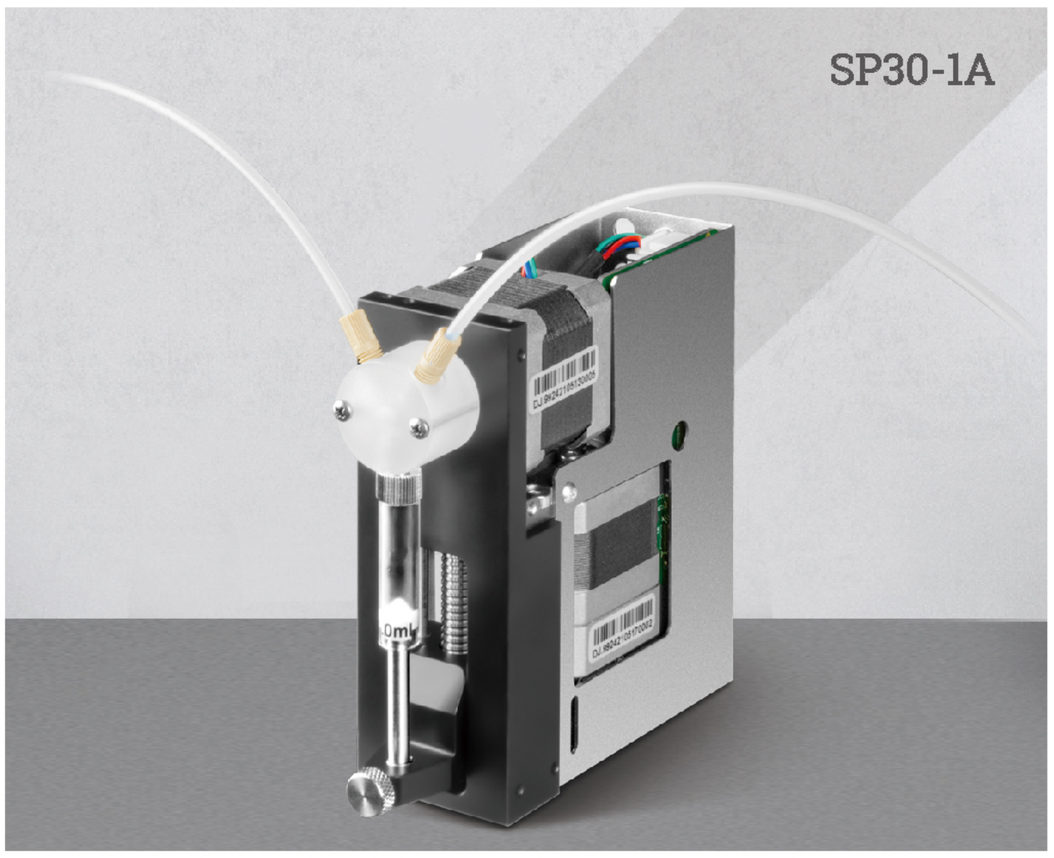
Features

- High accuracy and uninterrupted transferring for micro-liter fluids.
- Three working modes: constant transferring, fixed volume measurement and dispensing.
- Multiple external control interfaces and standard Modbus communication protocol to meet various supporting needs.
- Record the number of times the valve and syringes used, which is convenient for equipment maintenance.
- Closed-loop control, over-load protection function, effectively protect syringe.
- Compact structure, convenient for matching with other equipment.

Technical Specifications

Flow rate	0.5μL/min-70mL/min (Pure water, and the length of the tube at the liquid inlet is less than 1 meter, and the inner diameter is 1.6mm)	Valve material	Valve body: PEEK, Diaphragm: FKM, Sealing ring: FKM
		Tube connection interface	1/4-28UNF
Communication interface	RS232/RS485, Modbus protocol(RTU mode)	Syringe size	50μL, 100μL, 250μL, 500μL, 1.0mL, 2.5mL, 5.0mL, 10mL, 25mL
Input	2 TTL level signal inputs, which can be configured as different external control functions	Syringe material	Barrel material: Borosilicate glass
			Plunger rod material: Stainless steel
			Plunger seal material: PTFE
Output	3 TTL level signal outputs, which can be configured as different status indications	Power supply	DC24V±10%/2.5A(Peak value)
		Power consumption	≤60W
Maximum pressure of liquid path	0.2MPa	Environment temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)
Valves type	Electromagnetic valve	Relative humidity	<80% (RH)

SP30-1A



Introduction

SP30-1A syringe pump is a programmable liquid handling pump module, rated stroke: 30mm. The pump can be controlled by external computer or microcontroller, to realize high precision liquid handling.

Features

Application flexibility:

Programmable, controlled by external computer or microcontroller, suitable for a wide range of sizes syringe and valves.

Reliable performance:

Photoelectric encoder detects out of step; controllable start speed, maximum speed and stop speed;

Programmable acceleration and deceleration slopes;

Can realize planned maintenance and replacement of syringes and valves.

Simple way to integrate:

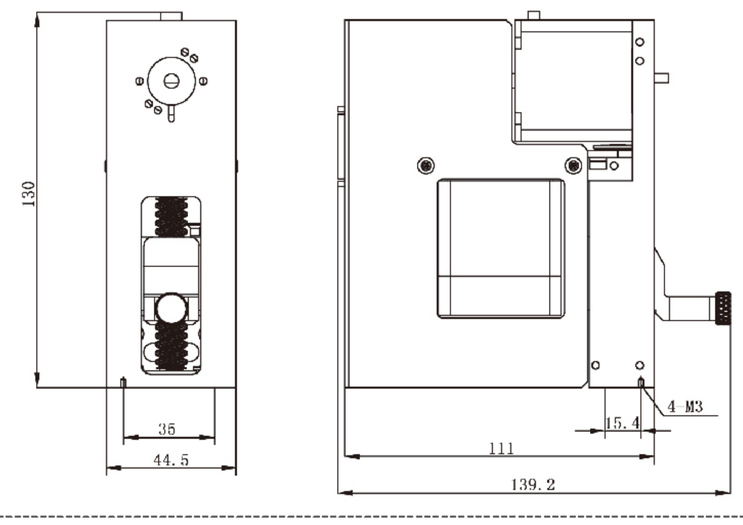
Support RS232/RS485/CAN communication;

Up to 15 sets of SP30-1A syringe pumps can be connected together;

Two digital inputs and three outputs for TTL level signals;

Used for synchronization with other external devices.

Dimension Drawing (Unit: mm)



Technical Specifications

Accuracy	Error ≤±0.1%(stroke≥30%maximum stroke)	Syringe material	Barrel material: Borosilicate glass
Plunger drive	Stepper motor drives ball screw, quadrature encoder detects out-of-step and returns to zero		Plunger rod material: Stainless steel
			Plunger seal material: PTFE
Max. stroke(Steps)	30mm(3000 steps or 24000 steps)	Communication interface	RS232/RS485/CAN
Linear speed range	0.005mm/s-30mm/s	Baud rate	9600 or 38400(RS232/RS485); 100K, 125K, 250K, 500K, 1M(CAN)
Run time per stroke	1.25s-100min		
Speed resolution	0.005mm/s	Addressing	UP to 15 individual addresses available(BCD switch)
Stroke resolution	0.01mm or 0.00125mm		
Valve switch time	≤ 250 ms between adjacent ports	Input	Two TTL level signal inputs, for restart the paused instruct
Valves type	3 port 120° valve, 4 port valve, 3 port distribution valve, 9 port distribution valve	Output	Three TTL level signal outputs, for synchronous external devices
Valve material	Valve body: PCTFE		
	Valve element: PTFE	Condition temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)
Tubing fittings	1/4-28UNF		
Syringe fittings	1/4-28UNF	Storage temperature	-20°C~65°C
Syringes	50μL, 100μL, 250μL, 500μL, 1.0mL,	Max. pressure	0.68MPa(High pressure above 0.68MPa, please contact us)
	2.5mL, 5.0mL		
Power supply	DC24V±10%/1.25A	Dimension(mm)	139.2*44.5*127 (mm)

SP60-1A

Introduction

SP60-1A syringe pump is a programmable liquid handling pump module, rated stroke: 60mm. The pump can be controlled by external computer or microcontroller, to realize high precision liquid handling.

Features

Application flexibility:

Programmable, controlled by external computer or microcontroller, suitable for a wide range of sizes syringe and valves.

Reliable performance:

Photoelectric encoder detects out of step; controllable start speed, maximum speed and stop speed;

Programmable acceleration and deceleration slopes;

Can realize planned maintenance and replacement of syringes and valves.

Simple way to integrate:

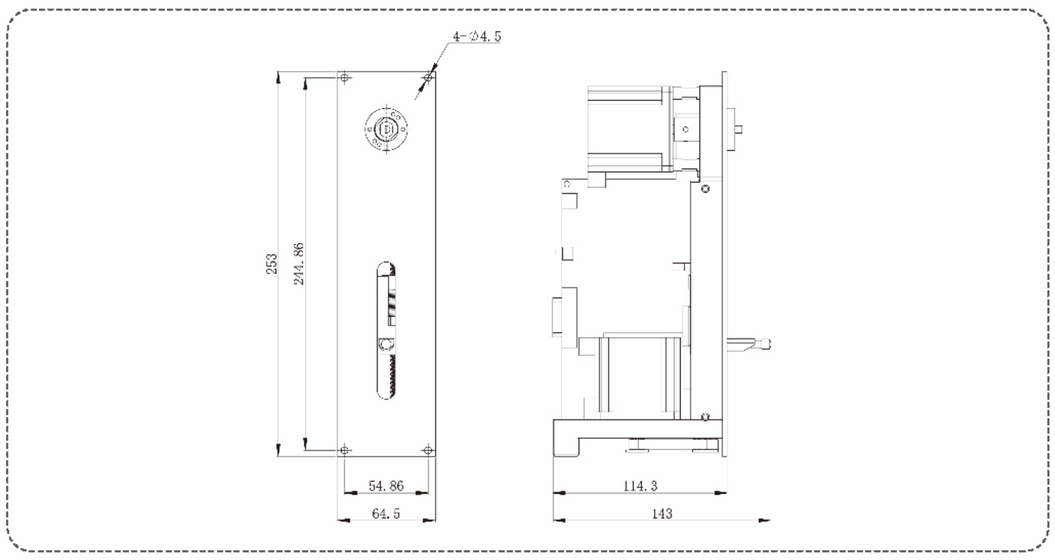
Support RS232/RS485/CAN communication;

Up to 15 sets of SP60-1A syringe pumps can be connected together;

Two digital inputs and three outputs for TTL level signals;

Used for synchronization with other external devices.

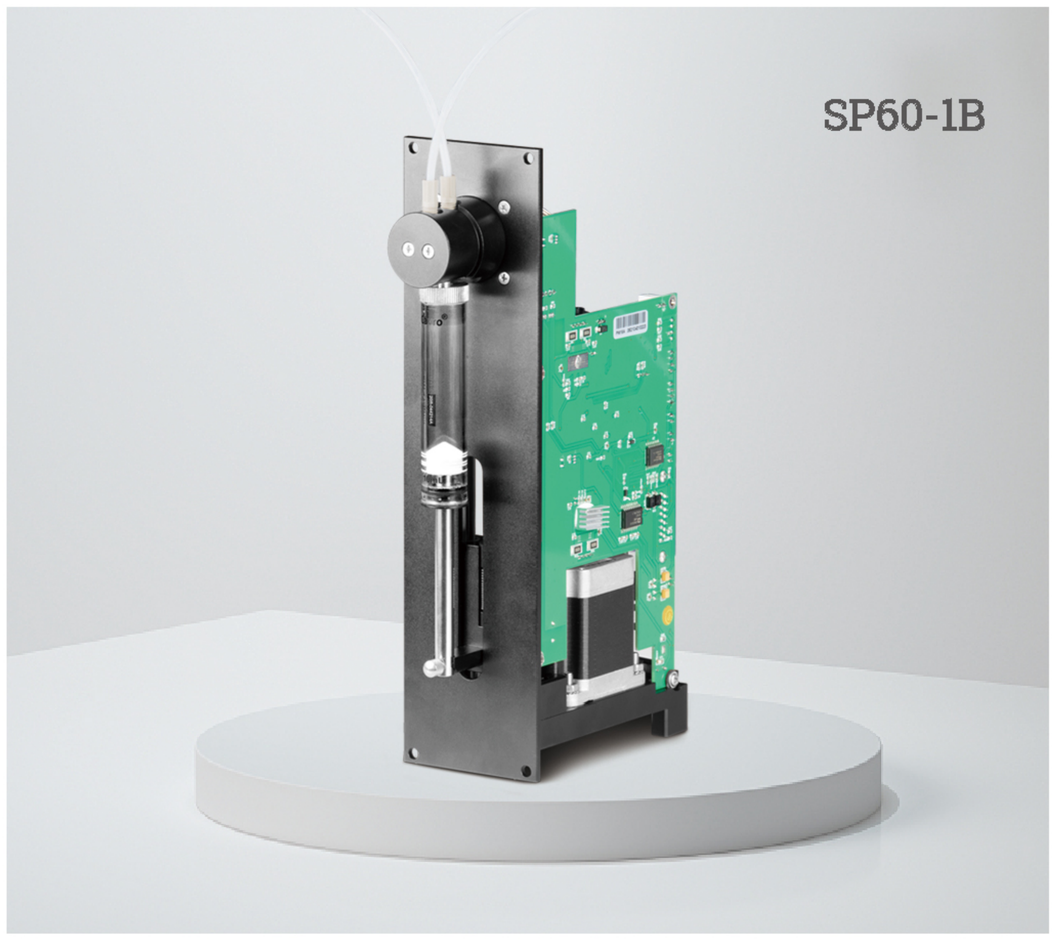
Dimension Drawing (Unit: mm)



Technical Specifications

Accuracy	Error ≤±0.1%(stroke≥30%maximum stroke)	Power supply	DC24V±10%/1.25A(Peak value)
Max. stroke(Steps)	60mm(6000 steps or 48000 steps)	Communication interface	RS232/RS485/CAN
Linear speed range	0.01mm/s-60mm/s	Baud rate	9600 or 38400(RS232/RS485); 100K, 125K, 250K, 500K, 1M(CAN)
Run time per stroke	1.25s-100min		
Speed resolution	0.01mm/s	Addressing	UP to 15 individual addresses available(BCD switch)
Stroke resolution	0.01mm or 0.00125mm		
Valve switch time	≤ 250 ms between adjacent ports	Input	Two TTL level signal inputs, for restart the paused instruct
Valves type	3 port 120° valve, 4 port valve, 3 port distribution valve, 9 port distribution valve	Output	Three TTL level signal outputs, for synchronous external devices
Valve material	Valve body: PCTFE	Max. pressure	0.68MPa(High pressure above 0.68MPa, please contact us)
	Valve element: PTFE		
Tubing fittings	1/4-28UNF		
Syringe fittings	1/4-28UNF	Condition temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)
Syringes	50μL, 100μL, 250μL, 500μL, 1.0mL, 2.5mL, 5.0m, 10mL, 25mL	Storage temperature	-20°C~65°C
Syringe material	Barrel material: Borosilicate glass	Relative humidity	<80% (RH)
	Plunger rod material: Stainless steel	Dimension(mm)	143*64.5*253 (mm)
	Plunger seal material: PTFE	Weight	2.20kg

SP60-1B



Introduction

SP60-1B syringe pump is a programmable liquid handling pump module, rated stroke: 60mm. The pump can be controlled by external computer or microcontroller, to realize high precision liquid handling.

Features

Application flexibility:

Programmable, controlled by external computer or microcontroller, suitable for a wide range of sizes syringe and valves.

Reliable performance:

Photoelectric encoder detects out of step; controllable start speed, maximum speed and stop speed;

Programmable acceleration and deceleration slopes;

Can realize planned maintenance and replacement of syringes and valves.

Simple way to integrate:

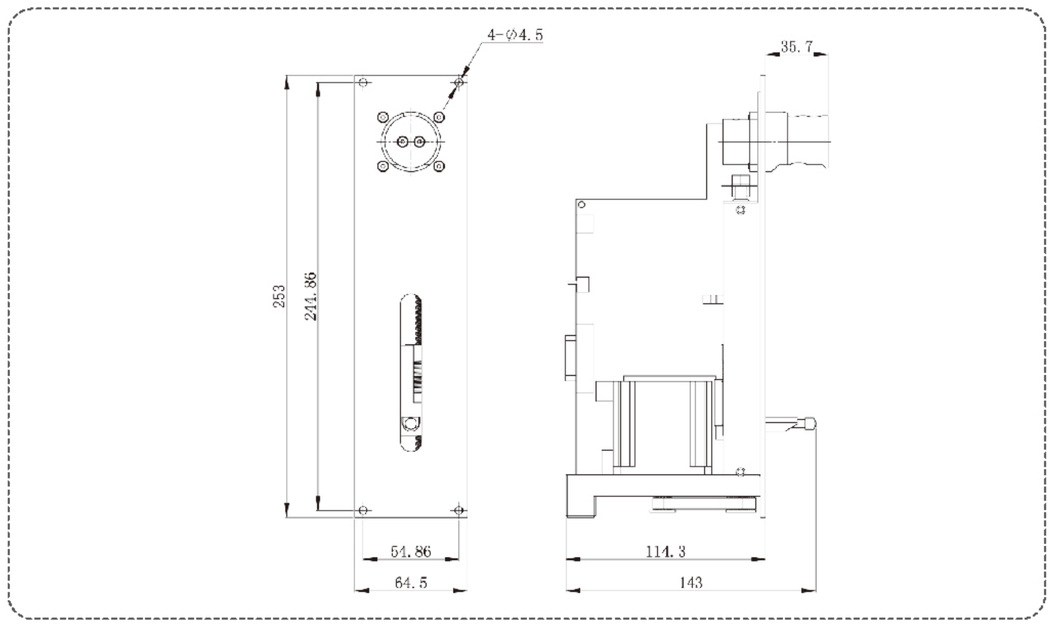
Support RS232/RS485/CAN communication;

Up to 15 sets of SP60-1B syringe pumps can be connected together;

Two digital inputs and three outputs for TTL level signals;

Used for synchronization with other external devices.

Dimension Drawing (Unit: mm)



Technical Specifications

Accuracy	Error ≤±0.1%(stroke≥30%maximum stroke)	Power supply	DC24V±10%/1.25A(Peak value)
Max. stroke(Steps)	60mm(6000 steps or 48000 steps)	Communication interface	RS232/RS485/CAN
Linear speed range	0.01mm/s-60mm/s	Baud rate	9600 or 38400(RS232/RS485); 100K, 125K, 250K, 500K, 1M(CAN)
Run time per stroke	1.25s-100min		
Speed resolution	0.01mm/s	Addressing	UP to 15 individual addresses available(BCD switch)
Stroke resolution	0.01mm or 0.00125mm		
Valve switch time	≤ 250 ms between adjacent ports	Input	Two TTL level signal inputs, for restart thepaused instruct
Valves type	Electromagnetic valve		
Valve material	Valve material touching the liquid:	Output	Three TTL level signal outputs, for synchronous external devices
	PPS, PTFE, FPM		
Tubing fittings	1/4-28UNF	Max. pressure	0.1MPa
Syringe fittings	1/4-28UNF	Condition temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)
Syringes	50μL, 100μL, 250μL, 500μL, 1.0mL,		
	2.5mL, 5.0m, 10mL, 25mL	Storage temperature	-20°C~65°C
Syringe material	Barrel material: Borosilicate glass	Relative humidity	<80% (RH)
	Plunger rod material: Stainless steel	Dimension(mm)	143*64.5*253 (mm)
	Plunger seal material: PTFE	Weight	2.20kg

SP60-nB

Model No.

SP60-2B, SP60-3B, SP60-4B, SP60-6B, SP60-8B

Introduction

It is a programmable, open-architecture, precision liquid handling unit, which is controlled by external computer or microprocessor to realize automatic pipetting, dilution and dispensing functions.

Features

- Simultaneous processing multiple liquids;
- Photoelectric encoder detects of step;
- Controllable start speed, maximum speed and stop speed;
- Programmable acceleration and deceleration slopes;
- Can realize planned maintenance and replacement of syringes.

Technical Specifications

Accuracy	Error ≤±0.1%(stroke≥30%maximum stroke)		Syringe material	Barrel material: Borosilicate glass	
Max. stroke(Steps)	60mm(6000 steps or 48000 steps)			Plunger rod material: Stainless steel	
Linear speed range	0.01mm/s-60mm/s			Plunger seal material: PTFE	
Run time per stroke	1.25s-100min		Baud rate	9600 or 38400(RS232/RS485); 100K, 125K, 250K, 500K, 1M(CAN)	
Speed resolution	0.01mm/s				
Stroke resolution	0.01mm or 0.00125mm		Addressing	UP to 15 individual addresses available(BCD switch)	
Valve switch time	≤ 250 ms between adjacent ports				
Valves type	Electromagnetic valve		Input	Two TTL level signal inputs, for restart thepaused instruct	
Valve material	Valve body: PEEK, Diaphragm: FKM, Sealing ring: FKM		Output	Three TTL level signal outputs, for synchronous external devices	
Tubing fittings	1/4-28UNF				
Syringe fittings	1/4-28UNF		Valve body rated pressure	0.2MPa	
Power supply	DC24V±10%/2.5A(Peak value)		Condition temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)	
Communication interface	RS232/RS485/CAN				
Syringes	50μL, 100μL, 250μL, 500μL, 1.0mL, 2.5mL, 5.0m		Storage temperature	-20°C~65°C	
			Relative humidity	<80% (RH)	
Channel number	2	3	4	6	8
Dimension(L*W*H)	125*94*263	126*94*263	125.5*112*252	150*133*252	125*94*263

SP60-2B

SP60-3B

SP60-4B

SP60-6B

Programmable Syringe Pump

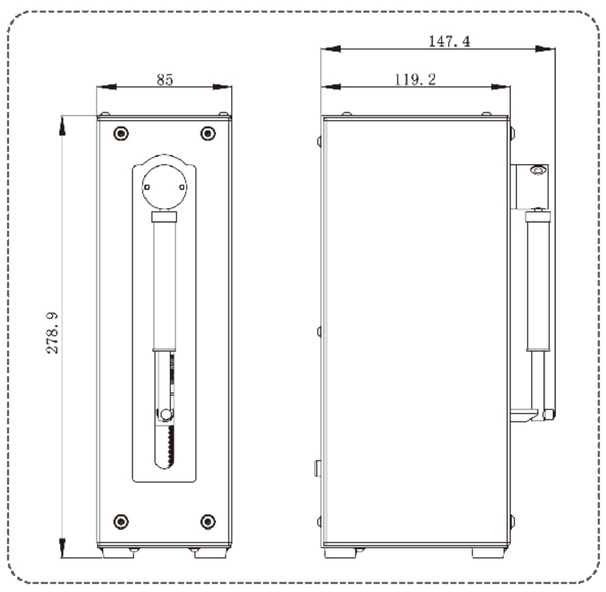
Model No.

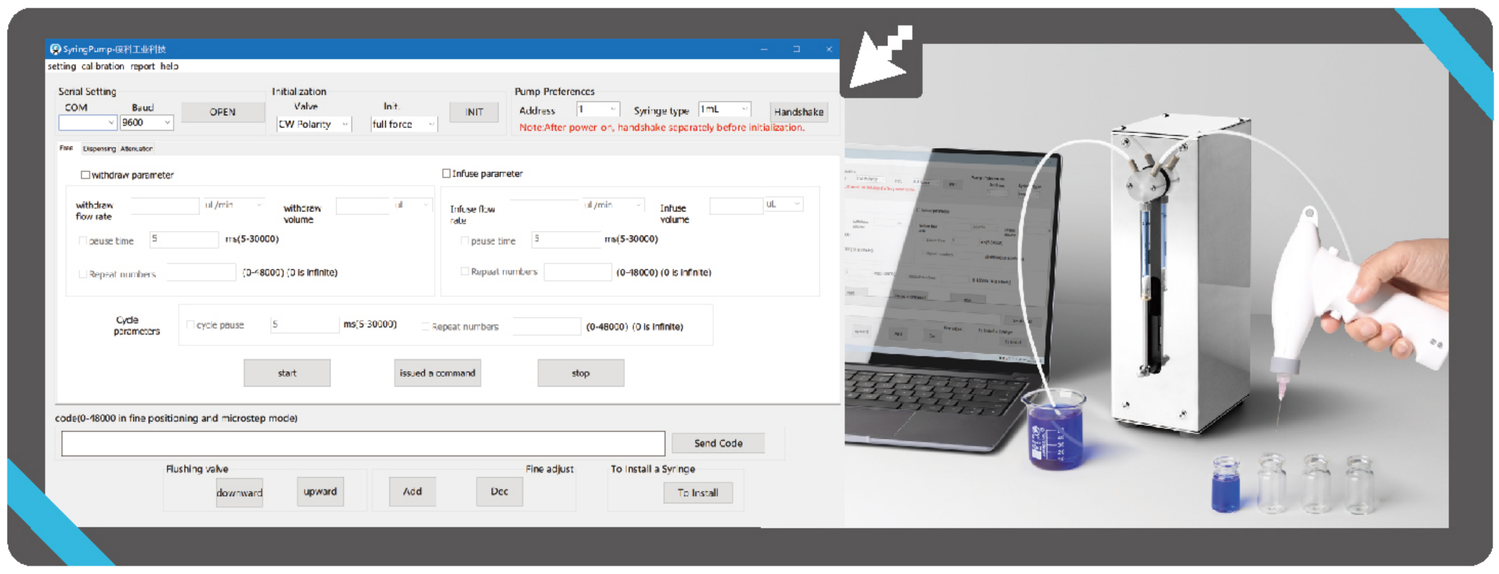
ASD60

Introduction

ASD60 syringe pump is a programmable precision liquid handling device. Linear speed range: 0.01mm/s-60mm/s. Controlled by computer or microcontroller, replace the traditional operation of diluting and dispensing. Widely used in blood, chemistry, food and environment analysis.

Dimension Drawing (Unit: mm)





Technical Specifications

Accuracy	Error ≤±0.1%(stroke≥30%maximum stroke)	Syringe material	Barrel material: Borosilicate glass
Max. stroke(Steps)	60mm (6000 steps or 48000 steps)		Plunger rod material: Stainless steel
Linear speed range	0.01mm/s-60mm/s		Plunger seal material: PTFE
Run time per stroke	1.25s-100min	Communication interface	RS232/RS485/CAN
Speed resolution	0.01mm/s	Baud rate	9600 or 38400(RS232/RS485); 100K, 125K, 250K, 500K, 1M(CAN)
Stroke resolution	0.01mm or 0.00125mm		
Valve switch time	≤ 250 ms between adjacent ports	Addressing	UP to 15 individual addresses available(BCD switch)
Valves type	3 port 120° valve, 4 port valve, 3 port distribution valve, 9 port distribution valve	Input	Two TTL level signal inputs, for restart the paused instruct
Valve material	Valve body: PCTFE; Valve element: PTFE		
Tubing fittings	1/4-28UNF	Output	Three TTL level signal outputs, for synchronous external devices
Syringe fittings	1/4-28UNF		
Syringes	50μL, 100μL, 250μL, 500μL, 1.0mL, 2.5mL, 5.0m, 10mL, 25mL	Condition temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)
Power supply	DC24V±10%/1.25A(Peak value)	Storage temperature	-20°C~65°C
Dimension(mm)	147.4*85*278.9mm	Max. pressure	0.68MPa(High pressure above 0.68MPa, please contact us)
Weight	3.25kg		

Programmable Syringe Pump

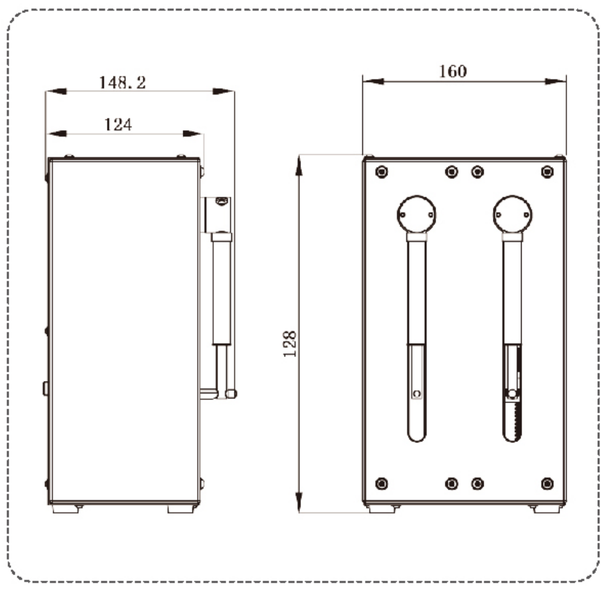
Model No.

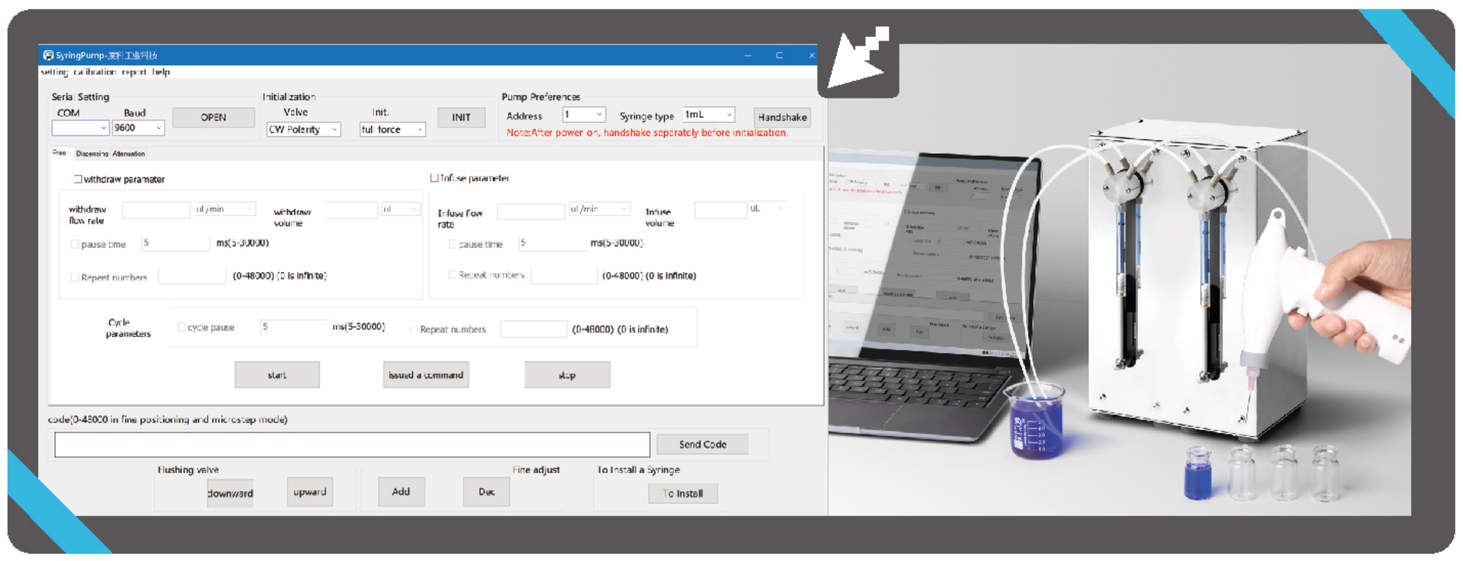
ASD60-Ⅱ

Introduction

ASD60-Ⅱ syringe pump is a programmable precision liquid handling device. Two syringes can work independently or cooperatively to reach continuous flow. The pump come with computer control software.

Dimension Drawing (Unit: mm)





Technical Specifications

Accuracy	Error ≤±0.1%(stroke≥30%maximum stroke)	Syringe material	Barrel material: Borosilicate glass
Max. stroke(Steps)	60mm (6000 steps or 48000 steps)		Plunger rod material: Stainless steel
Linear speed range	0.01mm/s-60mm/s		Plunger seal material: PTFE
Run time per stroke	1.25s-100min	Communication interface	RS232/RS485/CAN
Speed resolution	0.01mm/s	Baud rate	9600 or 38400(RS232/RS485); 100K, 125K, 250K, 500K, 1M(CAN)
Stroke resolution	0.01mm or 0.00125mm		
Valve switch time	≤ 250 ms between adjacent ports	Addressing	UP to 15 individual addresses available(BCD switch)
Valves type	3-port 120°(Standard)		
Valve material	Valve body: PCTFE; Valve element: PTFE	Input	Two TTL level signal inputs, for restart the paused instruct
Tubing fittings	1/4-28UNF	Output	Three TTL level signal outputs, for synchronous external devices
Syringe fittings	1/4-28UNF		
Syringes	50μL, 100μL, 250μL, 500μL, 1.0mL, 2.5mL, 5.0m, 10mL, 25mL	Condition temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)
Power supply	DC24V±10%/2.5A(Peak value)	Storage temperature	-20°C~65°C
Dimension(mm)	160*148.2*281mm	Max. pressure	0.68MPa(High pressure above 0.68MPa, please contact us)
Weight	6.5kg		

Programmable Syringe Pump

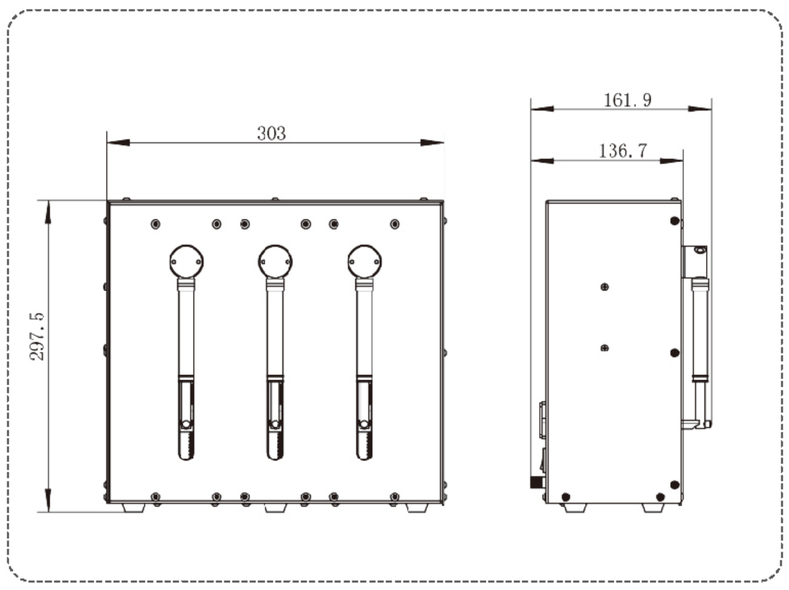
Model No.

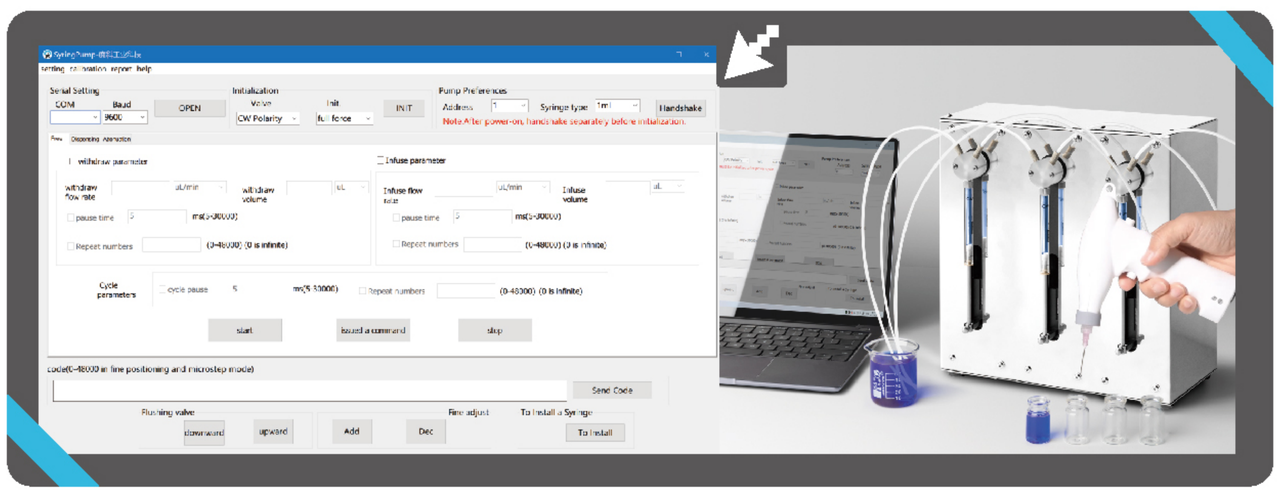
ASD60-Ⅲ

Introduction

ASD60-Ⅲ syringe pump is a programmable precision liquid handling device. Linear speed range: 0.01mm/s-60mm/s. Controlled by computer or microcontroller, replace the traditional operation of diluting and dispensing. Widely used in blood, chemistry, food and environment analysis.

Dimension Drawing (Unit: mm)





Technical Specifications

Accuracy	Error ≤±0.1%(stroke≥30%maximum stroke)	Syringe material	Barrel material: Borosilicate glass
Max. stroke(Steps)	60mm (6000 steps or 48000 steps)		Plunger rod material: Stainless steel
Linear speed range	0.01mm/s-60mm/s		Plunger seal material: PTFE
Run time per stroke	1.25s-100min	Communication interface	RS232/RS485/CAN
Speed resolution	0.01mm/s	Baud rate	9600 or 38400(RS232/RS485); 100K, 125K, 250K, 500K, 1M(CAN)
Stroke resolution	0.01mm or 0.00125mm		
Valve switch time	≤ 250 ms between adjacent ports	Addressing	UP to 15 individual addresses available(BCD switch)
Valves type	3 port 120° valve, 4 port valve, 3 port distribution valve, 9 port distribution valve	Input	Two TTL level signal inputs, for restart the paused instruct
Valve material	Valve body: PCTFE; Valve element: PTFE		
Tubing fittings	1/4-28UNF	Output	Three TTL level signal outputs, for synchronous external devices
Syringe fittings	1/4-28UNF		
Syringes	50μL, 100μL, 250μL, 500μL, 1.0mL, 2.5mL, 5.0m, 10mL, 25mL	Condition temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)
Power supply	DC24V±10%/1.25A(Peak value)	Storage temperature	-20°C~65°C
Dimension(mm)	303*161.9*297.5mm	Max. pressure	0.68MPa(High pressure above 0.68MPa, please contact us)
Weight	7.0kg		

Intelligent Syringe Pump

Model No.

ISPLab01,ISPLab02, ISPLab04, ISPLab06, ISPLab08, ISPLab10, ISPLab12
ISPLab01-G1, ISPLab01-G2, ISPLab02-G1, ISPLab02-G2

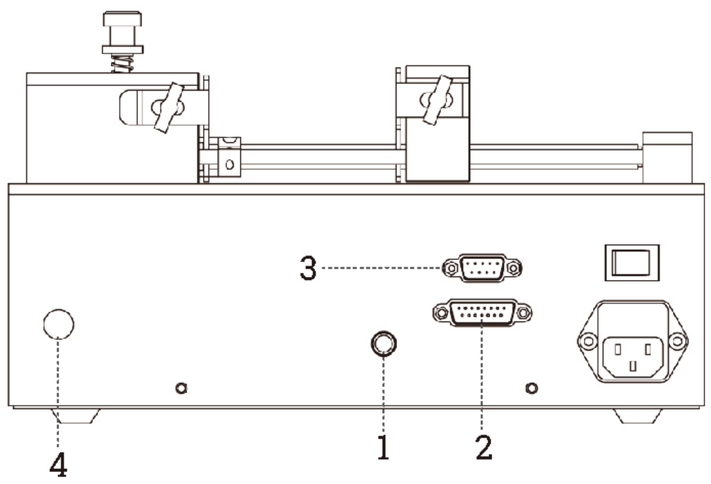
Introduction

The intelligent syringe pump with infusion/withdrawal mode, stainless steel body, and 4.3" color LCD screen is easy to operate. It can install and fix different types of injectors or syringes in the same time, and it is suitable for transferring micro flow rates with high precision (non-medical).

Features

- **Online flow rate modification function:**
  The pump is running, without stopping, adjust the flow rate at any time to meet complex application.
- Colorful LCD display:
  Friendly interface, 4.3 inch LCD display every technical parameter in real time.
- Input syringe inner diameter function:
  Can choose the injector from the list or input the injector inner diameter directly.
- Two measurement mode for selection:
  Infusion volume --- Infusion flow rate, Infusion volume --- Infusion time.
- 4 different working modes:
  Infusion, withdrawal, infusion/withdrawal, withdrawal/infusion. The parameters of each working mode saving separately. Each working mode can be changed to continuous mode by setting repeat parameters.
- Alarm function:
  The pump will stall and give an alarm when the drive structure of the pump is blocked.

Syringe Pump External Control Schematic



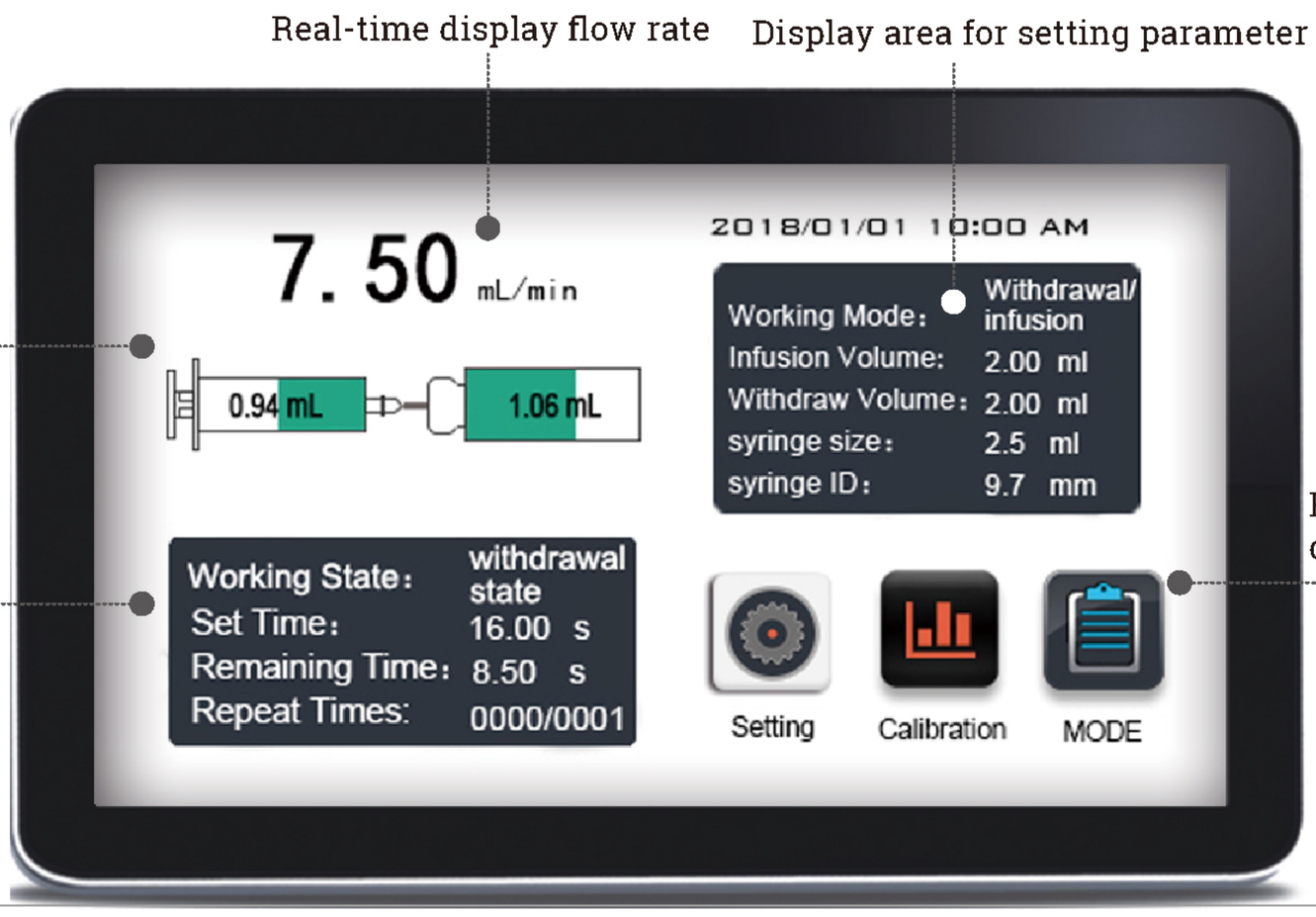
1-Foot pedal connector: Connect with foot pedal switch

2-15 Pin connector: External input and output

3-9 pin connector: RS232 and RS485

4-Ground pole

Interface display



Laboratory Syringe Pump

Technical Specifications

Working mode	Infusion, withdrawal, infusion/withdrawal, withdrawal/infusion						
Channel number	1	2	4	6	8	10	12
Syringe size	0.5μL-150mL		10μL-10mL				
Syringe selection	ISPLab01-G1/ISPLab02-G1: 250μL-25mL; ISPLab01-G2/ISPLab02-G2: 50mL, 100mL(Glass syringe)						
	Syringe size and customized diameter						
Linear speed range	1μm/min-132mm/min(Flow rate=Linear speed* syringe inner cut area)						
Min. linear rate	1μm/min						
Linear force	8-20kgf, online adjust						
Max. stroke	140mm						
Stoke resolution	0.078μm/μstep						
Accuracy	Error ≤±0.3% (Stoke ≥30% of maximum stroke)						
Back distance	0.01-10mm						
Stored modes	Can save at most 60 common modes						
Display	Industrial grade 4.3"LCD color display						
Control method	Touch screen and Mechanical keypad						
Power-off memory	Display the previous data parameter after power supply again						
Output	OC gate signal output,used to indicate running status and direction						
External control	Start/stop signal, withdrawal and infusion signal, active switch signal: (5-24V)						
	Start/stop signal, passive switch signal, such as foot pedal switch						
Communication interface	RS232/RS485, Modbus protocol(RTU mode)						
Power supply	AC100-240V/65W						
Condition temperature	0~40°C						
Relative humidity	<80%						
IP rate	IP31						
Dimension(mm)	282*215*165	282*242*157	280*209*175		280*235*175	282*280*175	282*325*175
Weight	4.44kg	4.62kg	4.56kg	4.78kg	4.96kg	5.18kg	5.38kg

ISPLab02

ISPLab04

ISPLab06

ISPLab10

Technical Specifications

Plastic syringe	Inside Diameter(mm)	Flow Rate(μL/min-mL/min)	
		ISPLab01/ISPLab02	ISPLab04-ISPLab12
1mL	4.70	0.0174-2.29	0.0174-2.29
2.5mL	9.70	0.0739-9.755	0.0739-9.755
5mL	12.48	0.1223-16.147	0.1223-16.147
10mL	15.89	0.1983-26.177	0.1983-26.177
20mL	20.00	0.3142-41.469	—
30mL	22.50	0.3976-52.484	—
50mL	28.90	0.6560-86.588	—
100mL	32.00	0.8042-106.154	—
150mL	40.00	1.2566-165.871	—

Glass syringe	Inside Diameter(mm)	Flow Rate(μL/min-mL/min)
		ISPLab01-G1/ISPLab02-G1/ISPLab02-G1/ISPLab02-G2
250μL	2.31	0.0042-0.5532
500μL	3.25	0.0083-1.095
1mL	4.61	0.0416-0.5494
2.5mL	7.28	0.0833-1.0998
5mL	10.30	0.1667-2.2008
25mL	14.57	0.4166-5.4985
50mL	23.03	0.8321-10.9976
100mL	46.06	1.6662-21.9938

Microsyringe	Inside Diameter(mm)	Flow Rate(nL/min-μL/min)
		ISPLab01/ISPLab02
0.5μL	0.10	0.008-1.0296
1μL	0.15	0.018-2.3232
2μL	0.20	0.031-4.1448
5μL	0.35	0.096-12.6984
10μL	0.50	0.2-25.8
25μL	0.80	0.5-66.4
50μL	1.10	1-125.4
100μL	1.60	2-256.4

Programmable Syringe Pump

Model Number

SPC/ZU-I

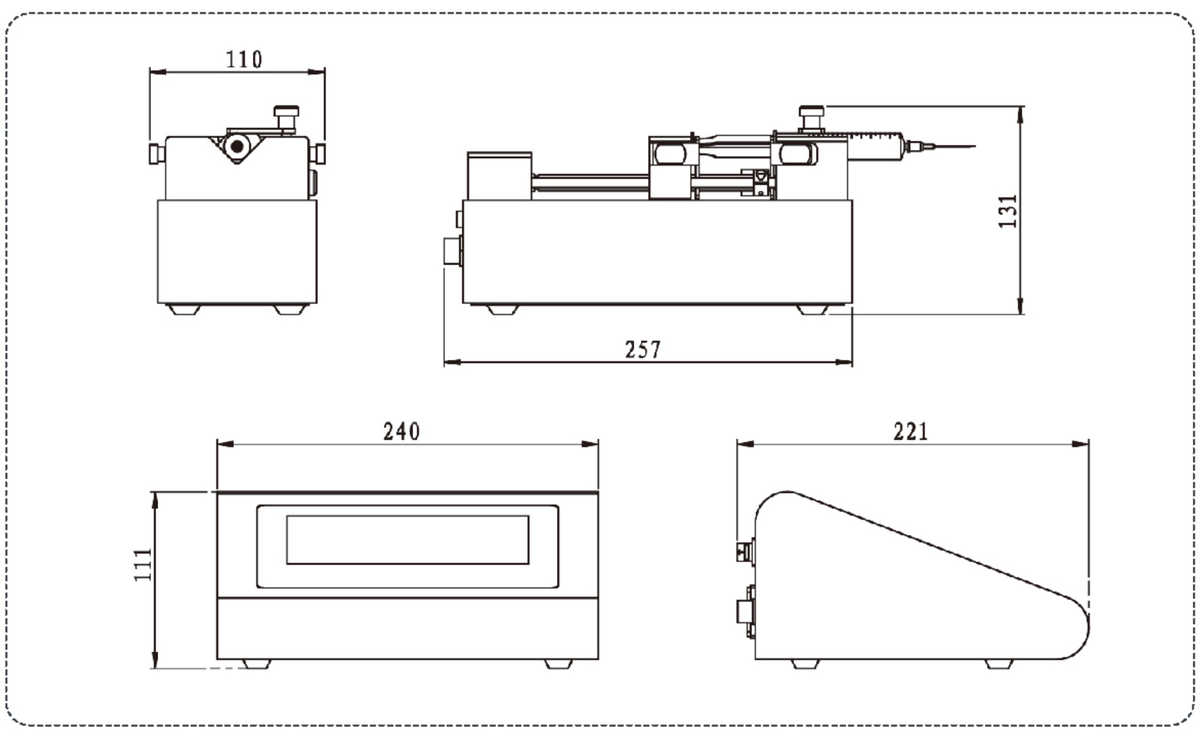
Introduction

7 inch touch screen control, display 8 pump units working parameters and working state. Friendly interface, easy operation. Split type design, mainly for laboratory.

Features

- **Online flow rate modification function:**
  The pump is running, without stopping, adjust the flow rate at any time to meet complex application.
- Two working mode: Independent working mode, each unit working independently, can infuse or withdraw with different speed in same time or different time. Logic working mode, each unit working with time relationship, with different proportion infuse or withdraw.Users can choose each unit to be independent or logic working mode.
- Intelligent calibration, ensure infuse volume accuracy. Online micro adjusting function, convenient to adjust the volume of one units, decrease volume error.
- Real time monitor, animate diaply monitor result. Controller can receive traffic alarm of each unit.
- Back distance setting, can exclude bubbles inside syringe, improve volume accuracy.
- Fast forward and backward function used for loading syringe, washing and unlock traffic protection.

Dimension Drawing (Unit: mm)



Interface Display

Technical Specifications

Working mode(Five)	Infusion,withdrawal,infusion/ withdrawal,withdrawal/infusion	Display	Industrial grade 7"LCD color display
		Control method	Touch screen
Pump unit	1-8 for option	Power-off memory	Display the previous data parameter after power supply again
Syringe size	0.5μL-50mL		
Syringe selection	Syringe size and customized diameter	External control signal	Start/stop signal, active switch signal (5-24V universal) All start/stop signal, passive switch signal, such as foot pedal switch
Linear speed range	1μm/min-132mm/min (Flow rate=Linear speed* syringe inner cut area)	Communication interface	RS232/RS485, Modbus protocol (RTU mode)
Min. linear rate	1μm/min		
Linear force	≥16Kgf	Controller power supply	DC5V/10W
Max. stroke	90mm	Pump unit power supply	DC24V/30W
Stoke resolution	0.078μm/μStep	Condition temperature	0~40℃
Accuracy	Stroke≥30% maximum stroke, Error≤ ±0.5%	Relative humidity	＜80%
		IP rate	IP31
Back distance	0.01-5mm	Controller dimension	240×221×111 (mm)
Working mode	Independent running mode and Logic running mode	Controller weight	2.0kg
		Pump unit dimension	257×110×131 (mm)
Stored modes	5 group data of each running mode	Pump unit weight	3.0kg

Programmable Syringe Pump

Model No.

SPM/ZU-I

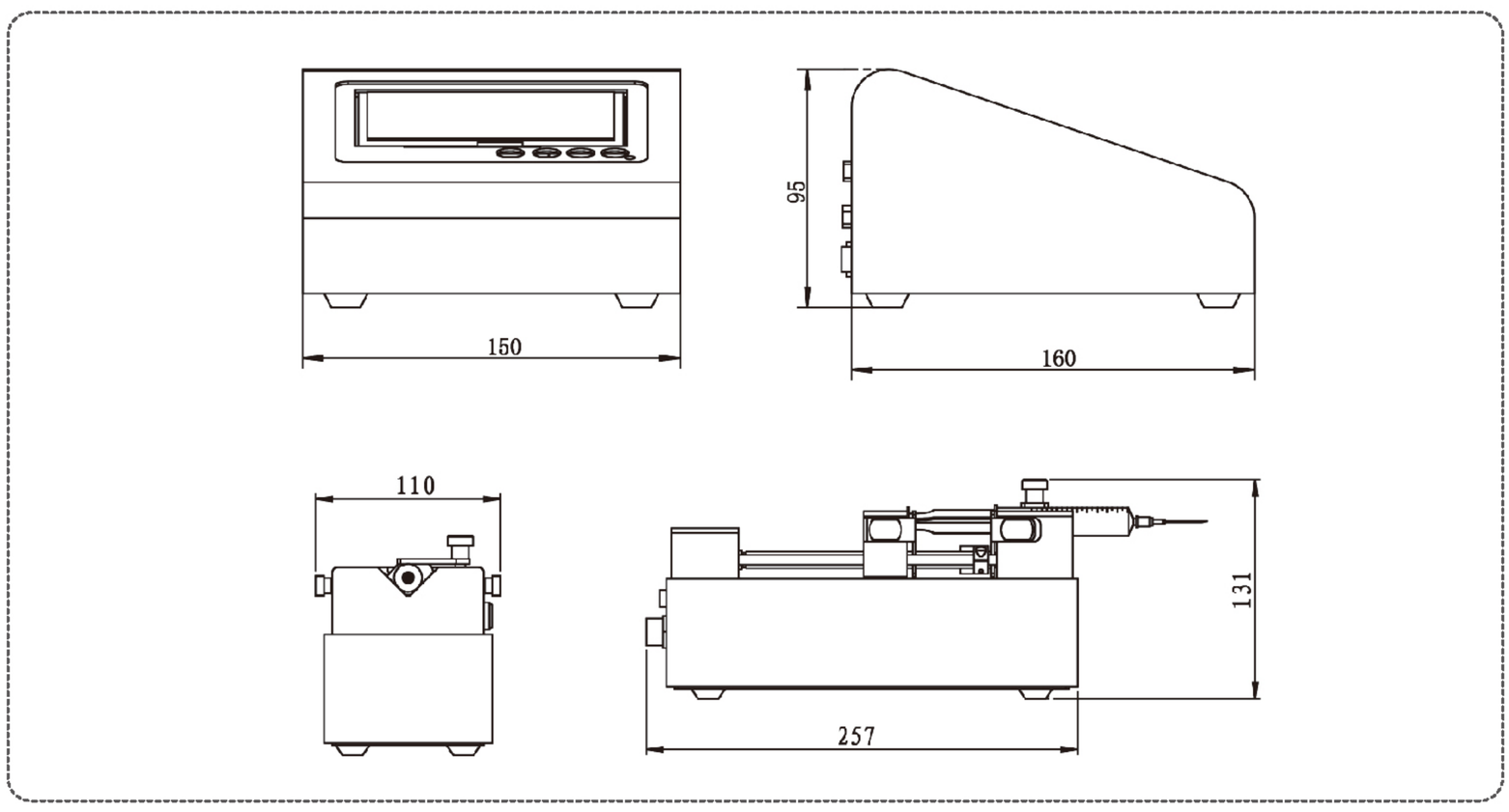
Introduction

4.3 inch touch screen control, compact design. Display 8 pump units working parameters and working state in samescreen. Friendly interface, easy operation. Split design, mainly for laboratory.

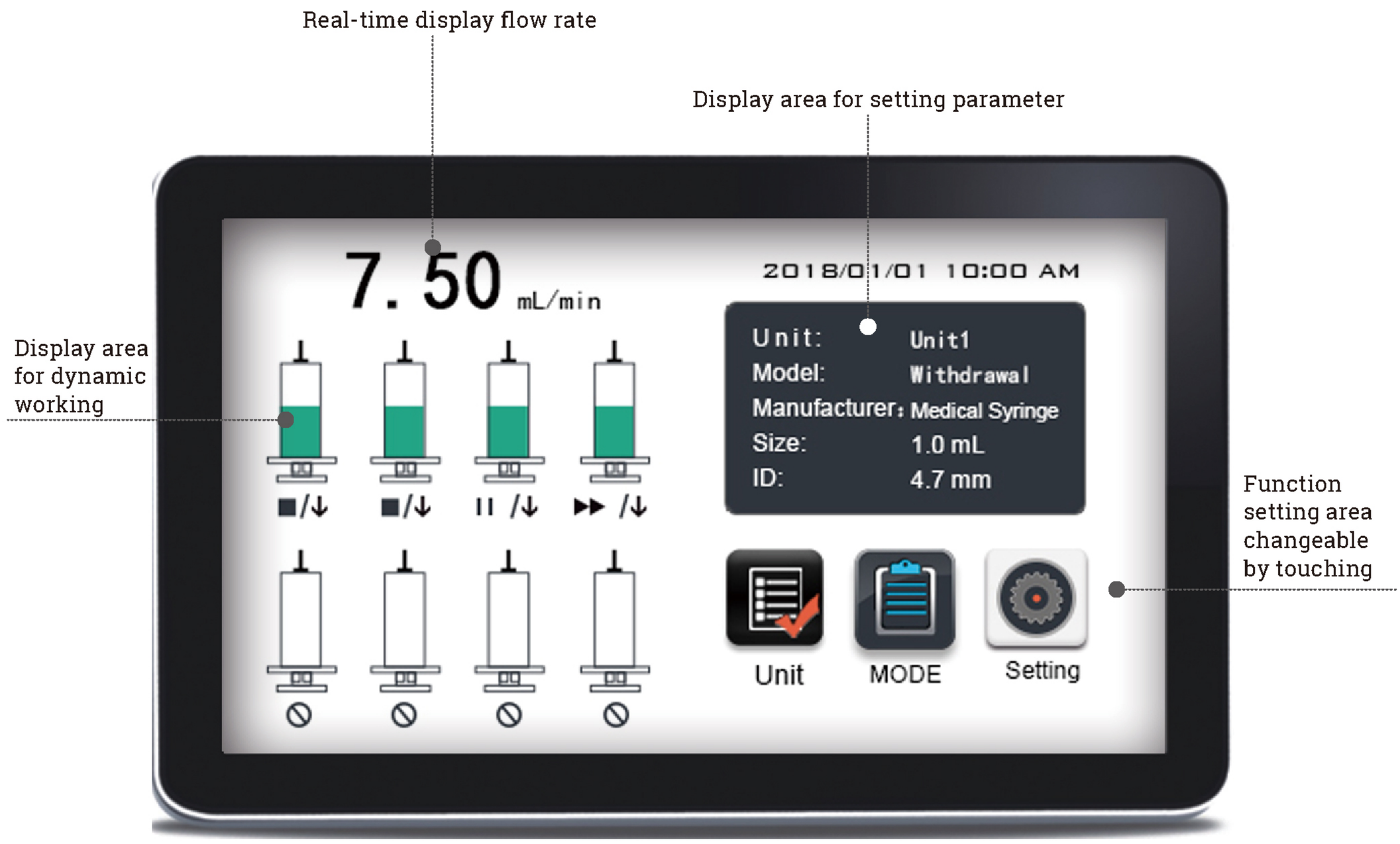
Features

- **Online flow rate modification function:**
- **The pump is running, without stopping, adjust the flow rate at any time to meet complex application.**
- Each unit working independently, can set one or some units freely.
- Each unit can infuse or withdraw different volume in same time or different time.
- Intelligent calibration, ensure infuse volume accuracy. Online micro adjusting function, convenient to adjust the volume of one units, decrease volume error.
- Real time monitor, animate display monitor result. Controller can receive traffic alarm of each unit.
- Back distance setting, can exclude bubbles inside syringe, improve volume accuracy.
- Fast forward and backward function used for loading syringe, washing and unlock traffic protection.

Dimension Drawing (Unit: mm)



Interface Display



Technical Specifications

Working mode(Five)	Infusion,withdrawal,infusion/ withdrawal,withdrawal/infusion	Display	Industrial grade 4.3"LCD color display
		Control method	Touch screen and Mechanical keypad
Pump unit	1-8 optional	Power-off memory	Display the previous data parameter after power on again
Syringe size	0.5μL-50mL		
Syringe selection	Syringe size and customized diameter	External control signal	Start/stop signal,active switch signal:(5-24V)
Linear speed range	1μm/min-132mm/min(Flow rate=Linear speed* syringe inner cut area)	Communication interface	RS232/RS485 (Modbus protocol, RTU mode)
Min. linear rate	1μm/min	Controller power supply	DC5V/10W
Linear force	≥16Kgf	Pump unit power supply	DC24V/30W
Max.stroke	90mm	Condition temperature	0~40°C
Stoke resolution	0.078μm/μStep	Relative humidity	＜80%
Accuracy	Stroke≥30% maximum stroke, Error≤ ±0.5%	IP rate	IP31
		Controller dimension	160×150×95 (mm)
Back distance	0.01-5mm	Controller weight	1.0kg
Working mode	Independent working mode	Pump unit dimension	257×110×131 (mm)
Stored modes	Can save 10 group working modes	Pump unit weight	3.0kg

Basic Syringe Pump

Model No.

SPLab01, SPLab02, SPLab04, SPLab06, SPLab08, SPLab10, SPLab12, SPLab01-G1, SPLab01-G2, SPLab02-G1, SPLab02-G2

Introduction

The syringe pump with infusion/withdrawal mode.**Online flow rate modification function: the pump is running, without stopping, adjust the flow rate at any time to meet complex application.** stainless steel body, and large-screen chromatic LCD is easy to operate. It can install and fix different types of injectors or syringes in the same time, and it is suitable for transferring micro flow rates with high precision (non-medical).

Technical Specifications

Working mode(Six)	Infusion, withdrawal, infusion/withdrawal, withdrawal/infusion, continuous, additional mode (infusion/withdrawal, then exclude bubble)						
Channel number	1	2	4	6	8	10	12
Syringe size	10μL-150mL		10μL-10mL				
	SPLab01-G1/SPLab02-G1: 250μL-25mL; SPLab01-G2/ISPLab02-G2: 50mL, 100mL(Glass syringe)						
Syringe selection	Syringe size and customized diameter						
Linear speed range	5μm/min-132mm/min(Flow rate=Linear speed* syringe inner cut area)						
Min. linear rate	5μm/min						
Linear force	≥16kgf						
Max. stroke	140mm						
Stoke resolution	0.078μm/μstep						
Accuracy	Error≤ ±0.5%, Stroke≥30% of maximum stroke						
Display mode	320×240TFT-LCD						
Control method	Rotary encoded switch and imported membrane keypad						
Power-off memory	Display the previous data parameter after power supply again						
External control	Active switch signal: 5V						
Communication interface	RS485, Modbus protocol(RTU mode)						
Power supply	AC 220V±10%(standard), AC 110V±10%(option)						
Condition temperature	0~40°C						
Relative humidity	<80%						
IP rate	IP31						
Dimension(mm)	282*213*150	282*241*157	282*241*157		282*241*157	282*241*157	282*241*157
Weight	5.26kg	5.40kg	5.40kg	5.66kg	5.78kg	5.96kg	6.16kg

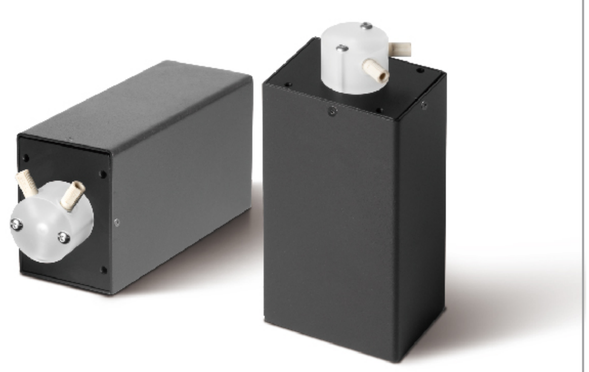
Technical Specifications

Plastic syringe	Inside Diameter(mm)	Flow Rate(μL/min-mL/min)	
		SPLab01/SPLab02	SPLab04-SPLab12
1mL	4.70	0.087-2.29	0.087-2.29
2.5mL	9.70	0.370-9.755	0.370-9.755
5mL	12.48	0.612-16.147	0.612-16.147
10mL	15.89	0.992-26.177	0.992-26.177
20mL	20.00	1.571-41.469	
30mL	22.50	1.988-52.484	
50mL	28.90	3.280-86.588	
100mL	32.00	4.021-106.154	
150mL	40.00	6.283-165.871	

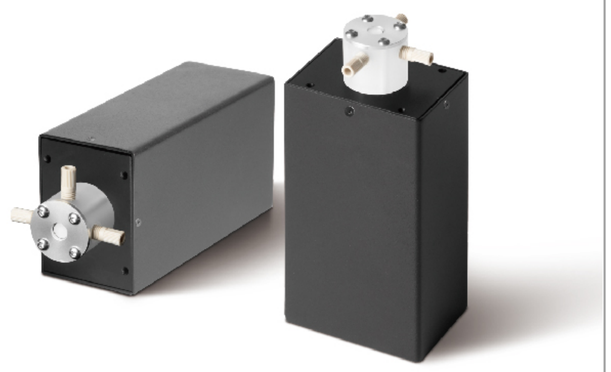
Glass syringe	Inside Diameter(mm)	Flow Rate(μL/min-mL/min)
		SPLab01-G1/SPLab01-G2/SPLab02-G1/SPLab02-G2
250μL	2.31	0.021-0.5532
500μL	3.25	0.0415-1.095
1mL	4.61	0.208-0.5494
2.5mL	7.28	0.4165-1.0998
5mL	10.30	4.1605-2.2008
25mL	14.57	2.083-5.4985
50mL	23.03	4.1605-10.9976
100mL	46.06	8.331-21.9938

Microsyringe	Inside Diameter(mm)	Flow Rate(μL/min-μL/min)
		SPLab01/SPLab02
10μL	0.50	1-25.8
25μL	0.80	2.5-66.4
50μL	1.10	5-125.4
100μL	1.60	10-265.4

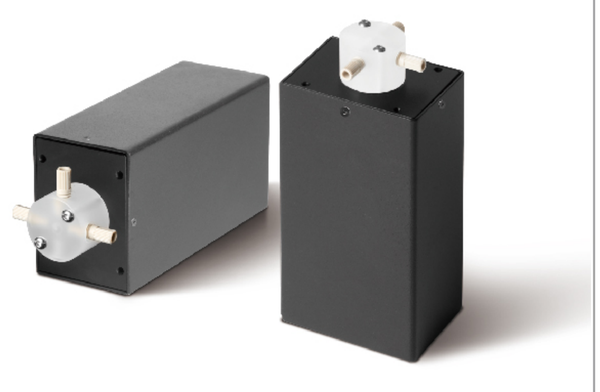
Rotary Switching Valve



Model No.: DKV-03Y
Valve: 3 port non-distribution valve



Model No.: DKV-03F
Valve: 3 port distribution valve

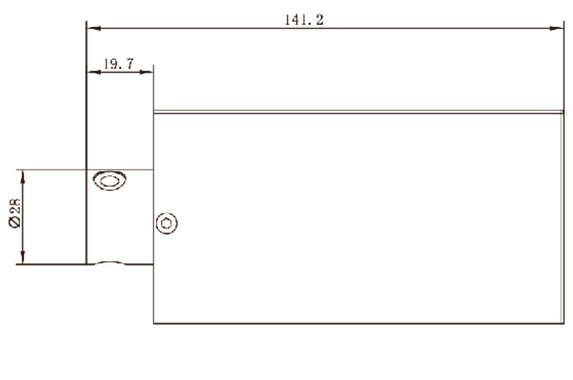


Model No.: DKV-04
Valve: 4 port non-distribution valve

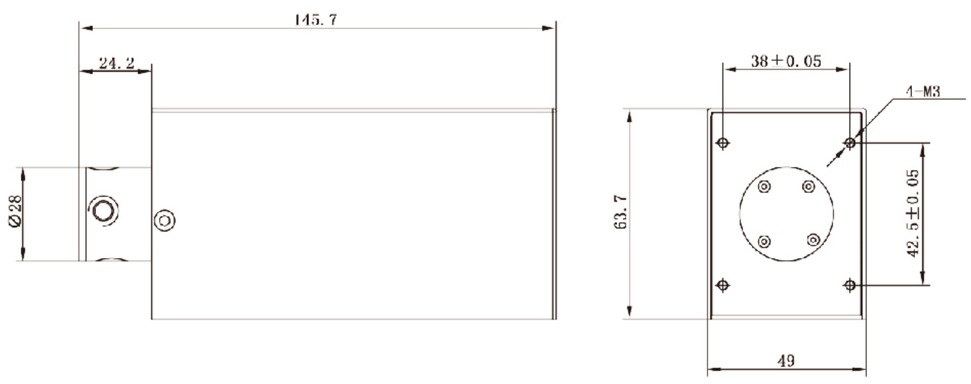
Introduction

The rotatory switching valve is a programmable liquid path unit, support 3 port valve, 4 port valve and 3 port distribution valve. It is controlled by external controller to realize connection between valve body and the ports, controller can check the location of the port at any time.

Dimension Drawing (Unit: mm)



DKV-03Y/DKV04



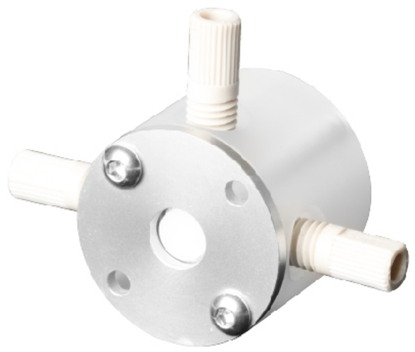
DKV-03F

Technical Specifications

Valve type	3 port non-distribution valve, 4 port non-distribution valve, 3 port distribution valve	Port switching time	≤250ms (Between two adjacent ports)
		Communication	RS485 (standard), RS232/CAN (for option)
Path diameter	1.4mm	Address setting	BCD dip switch set up the address, can set maximum 15 addresses
Material	Valve body: PCTFE; Valve element: PTFE	Baud rate (bps)	Baud rate (b9600 or 38400 (RS485/RS232) 100K, 125K, 250K, 500K, 1M (CAN)
Maximum pressure	0.68MPa(High pressure above 0.68MPa, please contact us)	Power supply	DC24V/1.25A
Condition temperature	15°C~40°C	Dimension(mm)	140.4 x 47.4 x 62.9
Connection	1/4-28UNF	Weight	625g

Valve

Name：3-port non-distribution valve
Model No.：HXF3YB1 (1/4-28UNF)



Name：3-port distribution valve
Model No.：HXF3F1(1/4-28)

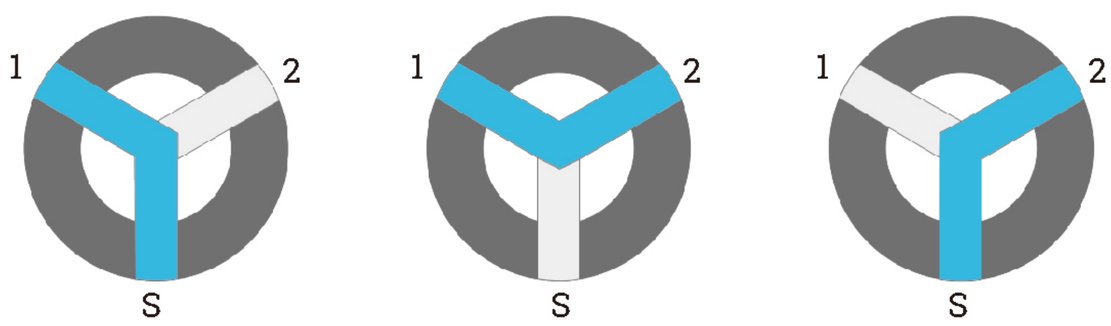
Name： 4-port non-distribution valve
Model No.： HXF4B1 (1/4-28)

Technical Specifications

Tubing fitting	1/4-28 UNF	Material	PTFE, PCTFE
Path diameter	1.4mm	Working temperature	15°C~40°C
Maximum pressure	0.68MPa(High pressure above 0.68MPa, please contact us)	Storage temperature	-20°C~65°C
Media compatibility	Compatible with most reagents (PTFE, PCTFE compatible media)	Compatible Industrial Syringe Pump Model No.	SP60-1A, SP30-1A, ASD60, ASD60-Ⅱ, ASD60-Ⅲ

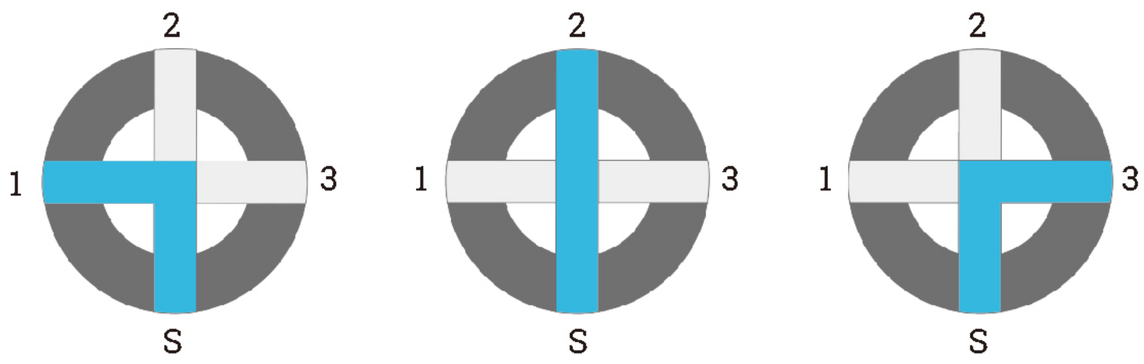
3-port non-distribution valve (S-1, 1-2, S-2)

HXF3YB1 (1/4-28UNF)



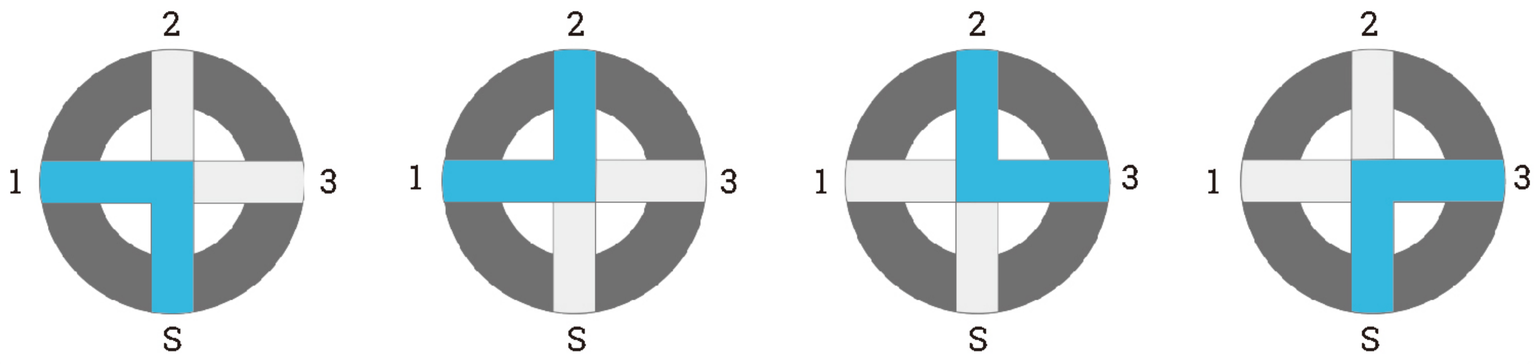
3-port distribution valve (S-1, S-2, S-3)

HXF4B1 (1/4-28)



4-port non-distribution valve(S-1, 1-2, 2-3, S-3)

HXF3F1(1/4-28)



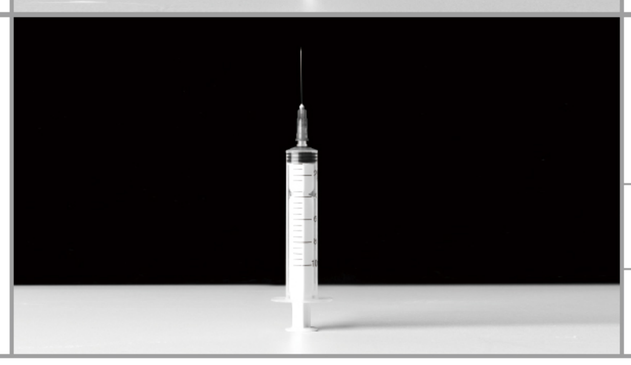
Accessories

Technical Specifications

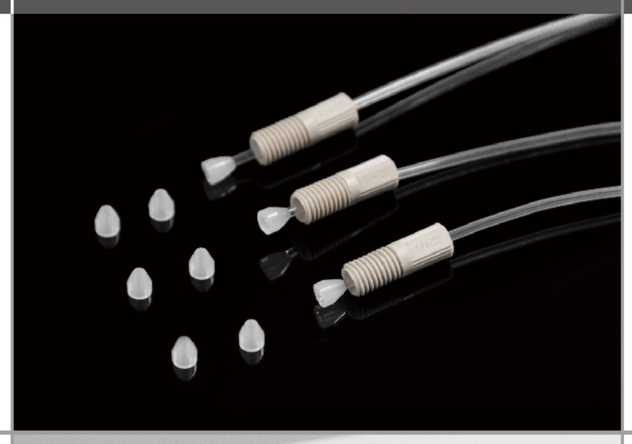
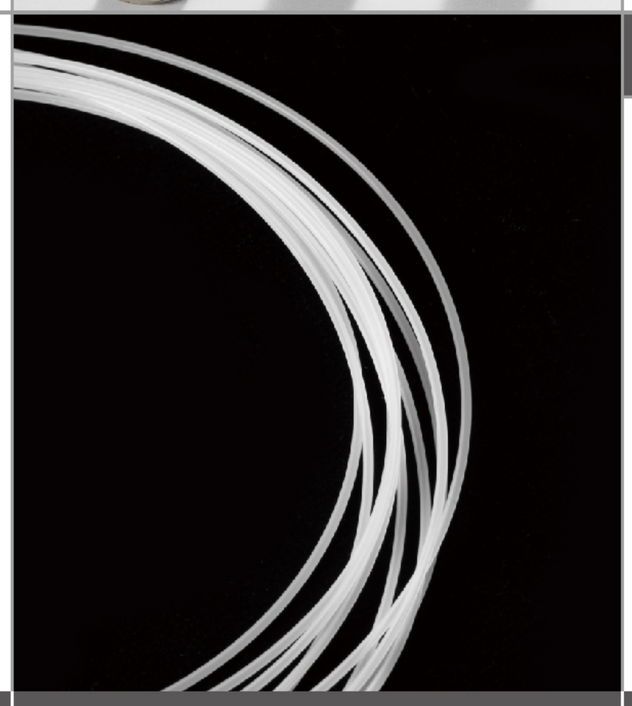
Syringe size	1ml, 2.5ml, 5ml, 10ml, 25ml	Liquid path materil	Zirconia, PTFE
Stroke	60mm	Liquid temperature	0°C～40°C
Plunger rod, barrel material	Zirconia	Lifetime	2,000,000 times
		Max. pressure	0.68MPa

Name	Picture	Model No.	Material	Suitable Product
60mm Syringe		50µl	Barrel material: Borosilicate glass Plunger rod; material: Stainless steel; Plunger seal material: PTFE	SP60-1A, SP60-nB, ASD60 Series, CFSP-Ⅰ, CFSP-Ⅱ
		100µl		
		250µl		
		500µl		
		1.0ml		
		2.5ml		
		5.0ml		
		10ml		SP60-1A, SP60-1B, ASD60 Series, CFSP-Ⅰ,CFSP-Ⅱ
		25ml		
30mm Syringe		50µl	Barrel material: Borosilicate glass Plunger rod; material: Stainless steel; Plunger seal material: PTFE	SP30-1A
		100µl		
		250µl		
		500µl		
		1.0ml		
		2.5ml		
		5.0ml		

Accessories

Name	Picture	Model No.	Material	Suitable Product
Microsyringe		0.5µl 1µl 2µl 5µl 10µl 25µl 50µl 100µl	Barrel material: Borosilicate glass Plunger rod; material: Stainless steel; Plunger seal material: PTFE	SPLab series, ISPLab series, ZU-I(SPC, SPM)
Gastight glass syringe with Luer-lock		250µl 500µl 1ml 2.5ml 5ml 10ml 25ml 50ml 100ml	Barrel material: Borosilicate glass Plunger rod; material: Stainless steel; Plunger seal material: PTFE	SPLab-G1, ISPLab-G1, ZU-I-G1(SPC, SPM)
				SPLab-G2, ISPLab-G2, ZU-I-G2(SPC, SPM)
Gastight glass syringe with Internal thread		250µl 500µl 1ml 2.5ml 5ml 10ml 25ml 50ml 100ml	Barrel material: Borosilicate glass Plunger rod; material: Stainless steel; Plunger seal material: PTFE	SPLab-G1, ISPLab-G1, ZU-I-G1(SPC, SPC)
				SPLab-G2, ISPLab-G2, ZU-I-G2(SPC, SPM)
Plastic syringe		1ml, 2ml, 5ml, 10ml, 20ml, 30ml, 50ml	Barrel material: PP; Seal plug: Rubber	SPLab series, ISPLab series, ZU-I(SPC, SPC)
		100ml		SPLab series, ISPLab series
		150ml		

Accessories

Name	Picture	Material	Model No.
Inverted Cone		Use together with connector, ETFE material	CC-16ET CC-20ET CC-25ET CC-30ET CC-32ET
Connector		Used for rotary valve, 1/4-28 thread, PP material	CC-1601-GY-PP CC-3201-GY-PP
PTFE Tubing		Material: PTFE	Model No.(ID*ODmm): 0.3*1.6, 0.5*1.6, 0.8*1.6, 1.0*2.0, 1.5*2.5, 1.6*3.2, 2.0*3.0

Model No.	Picture	Material	ID(mm)	OD(mm)
14G		Luer connector: PP, Needle: Stainless steel	1.55	2.1
15G			1.36	1.8
16G			1.2	1.58
18G			0.84	1.26
19G			0.65	0.98
20G			0.62	0.9
21G			0.51	0.82
22G			0.41	0.73
23G			0.33	0.63
24G			0.26	0.55
25G			0.25	0.51
27G			0.21	0.4
30G			0.16	0.3
32G			0.11	0.23
34G			0.08	0.2

Industrial Syringe Pump Chemical Compatibility

Appendix-Chemical Resistance Chart

This information provided in the below table is to be used only as a guideline. Before permanent installation, test the equipment with the chemicals under the specific conditions of your application.

Ratings of chemical behavior listed in this chart apply to a 48 hours exposure period; we do not have knowledge of possible effects beyond this period.

Warning:

Failure to test chemicals used in individual applications with pump may result in damage to the pump and/or test results.

Danger:

Variations in chemical behavior during handling due to factors such as temperature, pressure and concentration can cause equipment to fail, even though it passed an initial test. Serious injury may result. Use suitable guards and personal protection when handling chemicals.

The table below lists the 4 plastic materials used in industrial syringe pumps:

Rotary valve	
Valve element	PTFE
Valve body	PCTFE
Rotary valve(surface seal)	
Rotor	UHMWPE
Stator	PPS

Ratings - Chemical Effect

A = Excellent

B = Good, minor effect, slight corrosion or discoloration.

C = Fair, moderate effect, not recommended for continuous use. Softening, loss of strength or swelling may occur.

D = Severe effect, not recommended for any use.

N/A = Information not available.

Notes

1. Satisfactory to 22°C (72°F)

2. Satisfactory to 48°C (120°F)

Industrial Syringe Pump Chemical Compatibility

Solvent	PCTFE	Teflon	PPS	UHMWPE
Acetaldehyde	A	A	A	D
Acetamide	A	A	A	N/A
Acetate Solvent	A1	A	A	A1
Acetic Acid	A	A	A	B1
Acetic Acid 20%	A	A	A	A2
Acetic Acid 80%	A	A	A	A2
Acetic Acid, Glacial	A2	A	A	A1
Acetic Anhydride	A	A	A	A1
Acetone	A	A	A	A2
Acetyl Chloride (dry)	A	A	A	N/A
Acetylene	A	A	A	N/A
Acrylonitrile	N/A	A	N/A	N/A
Adipic Acid	N/A	A	N/A	N/A
Alcohols:Amyl	A	A	A	A
Alcohols:Benzyl	A	A	A	A
Alcohols:Butyl	N/A	A	A	A
Alcohols:Diacetone	B1	A	N/A	N/A
Alcohols:Ethyl	A	A	N/A	A
Alcohols:Hexyl	N/A	A	N/A	N/A
Alcohols:Isobutyl	N/A	A2	N/A	N/A
Alcohols:Isopropyl	N/A	A2	N/A	A
Alcohols:Methyl	A1t	A	A	A1
Alcohols:Octyl	N/A	N/A	N/A	N/A
Alcohols:Propyl	N/A	A	A	A
Aluminum Chloride	A	A	A	A2
AluminumChloride 20%	A	A	A	A2
Aluminum Fluoride	N/A	A	A	A2
Aluminum Hydroxide	A1	A	N/A	A2
Aluminum Nitrate	A1	A	N/A	N/A
Aluminum Potassium Sulfate 100%	A	A	N/A	A2
Aluminum Sulfate	A	A	A	A2
Amines (General)	A	A2	B	A2
Ammonia, anhydrous	A	A	A1	A2
Ammonia, Aqueous	A	A	N/A	N/A
Ammonia Nitrate	N/A	A	A	N/A
Ammonium Acetate	N/A	A	N/A	N/A
Ammonium Bifluoride	N/A	A	N/A	N/A
Ammonium Carbonate	N/A	A	A	C1
Ammonium Chloride	A	A	A	A2
Ammonium Hydroxide	A	A	A	A2
Ammonium Nitrate	A	A	A	A2
Ammonium Oxalate	N/A	N/A	N/A	N/A
Ammonium Persulfate	A	A	N/A	A2
Ammonium Phosphate, Dibasic	A	A2	A	A1
Ammonium Phosphate,Monobasic	N/A	A	N/A	A1
Ammonium Phosphate,Tribasic	N/A	A	N/A	A1
Ammonium Sulfate	A	A	A	A2
Ammonium Thiosulfate	N/A	N/A	N/A	N/A
Amyl Acetate	A1	A	A	A1
Amyl Alcohol	A	A	A	A2
Amyl Chloride	A	A	N/A	D
Aniline	A2	A	A	A1
Aniline Hydrochloride	N/A	A	N/A	N/A
Antifreeze	N/A	A	N/A	A2

Industrial Syringe Pump Chemical Compatibility

Solvent	PCTFE	Teflon	PPS	UHMWPE
Antimony Trichloride	A	A	N/A	D
Aqua Regia (80% HCl, 20% HNO3)	A	A	D	B1
Arochlor 1248	A1	A	N/A	N/A
Aromatic Hydrocarbons	N/A	N/A	N/A	B1
Arsenic Acid	N/A	A	A	A1
Arsenic Salts	N/A	N/A	N/A	N/A
Asphalt	A	A1	A	A1
Barium Carbonate	A	A	A2	N/A
Barium Chloride	A	A	A	A1
Barium Cyanide	N/A	A1	N/A	N/A
Barium Hydroxide	A	A	A	A2
Barium Nitrate	A	A	N/A	N/A
Barium Sulfate	A	A	A	A1
Barium Sulfide	N/A	A	N/A	A2
Benzaldehyde	A	A1	A	A1
Benzene	B	A	A	B1
Benzene Sulfonic Acid	N/A	A	A	A2
Benzoic Acid	A	A2	A1	A2
Benzol	A	A	N/A	N/A
Benzonitrile	A2	A2	N/A	N/A
Benzyl Chloride	N/A	N/A	N/A	N/A
Bleach Solutions	A	A	N/A	N/A
Borax (Sodium Borate)	A	A	A	A2
Boric Acid	A	A	A	A2
Bromine Water	A	A	D	D
Butadiene	A	A2	A1	D
Butane	A	A	A	A1
Butanol (Butyl Alcohol)	A1	A2	A	A
Butyl Amine	D	A2	D	N/A
Butyl Ether	A1	A1	A2	N/A
Butyl Phthalate	A1	A2	A	A2
Butylacetate	A1	A	A	A1
Butylene	B1	A	A	A1
Butyric Acid	A	A	A	A2
Calcium Bisulfate	N/A	N/A	N/A	N/A
Calcium Bisulfide	A	A	N/A	N/A
Calcium Bisulfite	A	A	A	A1
Calcium Carbonate	N/A	A	N/A	N/A
Calcium Chloride	A	A	A	A
Calcium Hydroxide	A	A	A	A
Calcium Hypochlorite	B1	A	A	A
Calcium Nitrate	A1	A2	A	N/A
Calcium Oxide	N/A	A	A	N/A
Calcium Sulfate	A	A	A	A
Carbon Bisulfide	N/A	N/A	N/A	D
Carbon Tetrachloride	A1	A	A	C1
Carbon Tetrachloride (dry)	D	A	N/A	N/A
Carbon Tetrachloride(wet)	A1	A	N/A	N/A
Carbonated Water	N/A	A	N/A	N/A
Carbonic Acid	A	A	A	A1
Chloric Acid	A	A	N/A	N/A
Chlorine Water	A	A	D	A
Chlorine,Anhydrous Liquid	B2	A	D	B1
Chloroacetic Acid	A2	A	A	D

Industrial Syringe Pump Chemical Compatibility

Solvent	PCTFE	Teflon	PPS	UHMWPE
Chlorobenzene (Mono)	A1	B	A	C1
Chlorobromomethane	N/A	A	N/A	N/A
Chloroform	A1	A1	A	B1
Chlorosulfonic Acid	A2	A	D	D
Chromic Acid 10%	A	A	A	D
Chromic Acid 30%	A	A	B	A
Chromic Acid 5%	A	A	A	A
Chromic Acid 50%	A2	A	A1	A
Citric Acid	A2	A	A	A
Citric Oils	N/A	N/A	N/A	N/A
Clorox® (Bleach)	A	A	D	A
Copper Chloride	A	A	A	A1
Copper Cyanide	N/A	A	A	A1
Copper Nitrate	A	A	A	A1
Copper Sulfate >5%	A	A	A	A
Copper Sulfate 5%	A	A	A	A
Cresols	A1	A	A	N/A
Cresylic Acid	N/A	A	N/A	B1
Cupric Acid	A2	A	A	N/A
Cyanic Acid	N/A	A	N/A	N/A
Cyclohexane	A	A	A	A2
Cyclohexanone	A1	A	A	A1
Detergents	A	A	A	A
Diacetone Alcohol	B1	A	N/A	N/A
Dichlorobenzene	N/A	A	N/A	N/A
Dichloroethane	A2	A1	N/A	C1
Diesel Fuel	A1	A	A	A1
Diethyl Ether	C- Fair	A	A	C1
Diethylamine	A1	A	N/A	N/A
Diethylene Glycol	N/A	A	N/A	N/A
Dimethyl Aniline	A	A	A	N/A
Dimethyl Formamide	A2	A	A	A1
Diphenyl	B1	A	N/A	N/A
Diphenyl Oxide	N/A	A	A	N/A
Epsom Salts (Magnesium Sulfate)	A	A	A	N/A
Ethane	A1	A	N/A	A1
Ethanol	A	A	N/A	A
Ethanolamine	D	A1	A	N/A
Ether	B1	A	A	B1
Ethyl Acetate	A1	A	A	A2
Ethyl Benzoate	A1	A	N/A	N/A
Ethyl Ether	A1	A	A	C1
Ethyl Sulfate	A	A	N/A	N/A
Ethylene Bromide	B	A	N/A	N/A
Ethylene Chloride	A1	A	A	C1
Ethylene Chlorohydrin	A	A	N/A	N/A
Ethylene Diamine	D	A	A	A1
Ethylene Dichloride	A1	A	A	C1
Ethylene Glycol	A	A	A	A
Ethylene Oxide	A2	A	D	A1
Fatty Acids	A	A	N/A	A
Ferric Chloride	A2	A	A	A
Ferric Nitrate	A1	A	A	A1
Ferric Sulfate	A1	A	A	A1

Industrial Syringe Pump Chemical Compatibility

Solvent	PCTFE	Teflon	PPS	UHMWPE
Ferrous Chloride	B1	A	A	A1
Ferrous Sulfate	N/A	A	A	A1
Fluoboric Acid	B1	A	A	A
Fluorine Liquid	N/A	N/A	D	C1
Fluorosilicic Acid	A1	A	N/A	N/A
Formaldehyde 100%	N/A	A	B	A
Formaldehyde 40%	A	A	A	A
Formic Acid	A	A	A	A
Freon 113	A1	A	A	A1
Freon 12	A1	A	A	A1
Freon 22	A1	A	A	N/A
Freon® 11	A1	A	A	N/A
Fuel Oils	A	A	A	A1
Furan Resin	A1	A	A	N/A
Furfural	D	A	A	A1
Gallic Acid	A1	A	A	A
Gasoline(high-aromatic)	A1	A	A	N/A
Glucose	N/A	A	B	A1
Glycerin	A	A	A	A
Glycolic Acid	A1	A	A	N/A
Heptane	A	A	A	A2
Hexane	A	A	A	A1
Hydraulic Oil (Petro)	N/A	A	D	B1
Hydrazine	N/A	A	N/A	N/A
Hydrobromic Acid 100%	A	A	A1	A
Hydrobromic Acid 20%	A	A	N/A	A
Hydrochloric Acid 100%	A	A	D	A
Hydrochloric Acid 20%	A	A	D	A
Hydrochloric Acid 37%	A	A	D	A
Hydrofluoric Acid 100%	B	A	D	A2
Hydrofluoric Acid 20%	A	A	A	A2
Hydrofluosilicic Acid 100%	B	A	A1	B1
Hydrofluosilicic Acid 20%	A	A	A	A1
Hydrogen Peroxide 10%	A	A	A	A
Hydrogen Peroxide 100%	B	A	C	A1
Hydrogen Peroxide 30%	B	A	A1	A
Hydrogen Peroxide 50%	A	A	N/A	B2
Hydrogen Sulfide(Aqueous)	A1	A	A	A1
HydroxyaceticAcid 70%	A1	A	N/A	N/A
Iodine	A1	A	D	A1
Iodine (in alcohol)	NA	A	N/A	A1
Isooctane	A1	A	A	A1
Isopropyl Acetate	NA	A	NA	N/A
Isopropyl Ether	A1	A	NA	A1
Kerosene	A	A	A	A1
Ketones	A1	A	A	D
Lacquer Thinners	A2	A	N/A	A1
Lacquers	A1	A	N/A	N/A
Lactic Acid	A	A	A	A
Lead Acetate	A	A	N/A	N/A
Lead Nitrate	N/A	A	N/A	N/A
Lead Sulfamate	N/A	B	N/A	N/A
Ligroin	N/A	A	N/A	N/A
Linoleic Acid	N/A	A	N/A	N/A

Industrial Syringe Pump Chemical Compatibility

Solvent	PCTFE	Teflon	PPS	UHMWPE
Lithium Chloride	N/A	A	N/A	D
Lithium Hydroxide	N/A	A	N/A	D
Lye: $Ca(OH)_2$ Calcium Hydroxide	A2	A	A	A
Magnesium Bisulfate	N/A	A	N/A	N/A
Magnesium Carbonate	N/A	A	N/A	N/A
Magnesium Chloride	A	A	A1	A2
Magnesium Hydroxide	A1	A	A	A
Magnesium Nitrate	N/A	A	A	A1
Magnesium Oxide	N/A	A	N/A	N/A
Magnesium Sulfate (Epsom Salts)	A	A	A	A1
Maleic Acid	N/A	A	B	A
Maleic Anhydride	N/A	A	N/A	N/A
Malic Acid	N/A	A	N/A	N/A
Manganese Sulfate	A1	A	A2	N/A
Mercury	A1	A	N/A	A
Methanol (Methyl Alcohol)	A2	A	A	A1
Methyl Acetate	A1	A	N/A	A1
Methyl Acetone	N/A	A	N/A	N/A
Methyl Acrylate	A1	A	N/A	N/A
Methyl Bromide	A1	A	N/A	N/A
Methyl Butyl Ketone	N/A	A	N/A	N/A
Methyl Cellosolve	N/A	A	N/A	N/A
Methyl Chloride	A1	A	B	B1
Methyl Dichloride	N/A	A	N/A	N/A
Methyl Ethyl Ketone	A1	A	A	D
Methyl Isobutyl Ketone	A	A	A	D
Methyl Isopropyl Ketone	N/A	A	N/A	N/A
Methyl Methacrylate	N/A	A	N/A	N/A
Methylamine	A1	A	N/A	N/A
Methylene Chloride	A1	A	A	D
Mineral Spirits	A1	A	A	N/A
Monochloroacetic acid	A2	A	N/A	D
Monoethanolamine	D	A	A	N/A
Morpholine	A1	A	C	N/A
Motor oil	A	A	A	A1
Naphthalene	A	A	A	A1
Nickel Chloride	A2	A	A	A2
Nickel Nitrate	A2	A	N/A	A1
Nickel Sulfate	A	A	A	A1
Nitric Acid (20%)	A1	A	C	A
Nitric Acid (50%)	A1	A	C	A2
Nitric Acid (5-10%)	A1	A	B1	A
Nitric Acid (concentrated)	A1	A	C	D
Nitrobenzene	A	A	A2	A1
Nitrous Acid	B	A	N/A	N/A
Oil Crude, Sour	A	A	N/A	N/A
Oil Crude, Sweet	A	A	N/A	N/A
Oil Mineral	A	A	A	A
Oleic Acid	A1	A	A	A2
Oleum 100%	A1	A	A1	D
Oxalic Acid (cold)	A	A	A	A
Ozone	A1	A	N/A	B1
Palmitic Acid	N/A	A	N/A	N/A
Perchloroethylene	A1	A	A	B1

Industrial Syringe Pump Chemical Compatibility

Solvent	PCTFE	Teflon	PPS	UHMWPE
Petrolatum	N/A	A	N/A	A1
Petroleum	A	A	N/A	A2
Phenol (10%)	A	A	A	B1
Phosphoric Acid (>40%)	A	A	A	A
Phosphoric Acid (40%)	A	A	A	A
Phosphoric Acid (crude)	A2	A	A	A
Phosphoric Acid Anhydride	N/A	A	D	N/A
Phosphorus	N/A	A	N/A	N/A
Phosphorus Trichloride	A	A	A	A
Photographic Developer	A	A	N/A	A
Photographic Solutions	A	A	A2	A
Phthalic Acid	N/A	A	N/A	A
Phthalic Anhydride	A	A	N/A	N/A
Picric Acid	A1	A	A	N/A
Potash (Potassium Carbonate)	A1	A	N/A	A1
Potassium Bicarbonate	A2	A	A	A1
Potassium Bromide	A1	A	A	A1
Potassium Chlorate	A2	A	A	A
Potassium Chloride	A2	A	A	A1
Potassium Chromate	N/A	A	N/A	A1
Potassium Cyanide Solutions	A1	A	A	A1
Potassium Ferricyanide	A1	A	N/A	A1
Potassium Ferrocyanide	A1	A	N/A	A1
Potassium Hydroxide (Caustic Potash)	A1	A	A	A
Potassium Hypochlorite	A1	A	A	B1
Potassium Iodide	N/A	A	A2	B1
Potassium Nitrate	A1	A	A	A1
Potassium Oxalate	N/A	A	N/A	A1
Potassium Permanganate	A1	A	A	A
Potassium Sulfate	A1	A	A	A1
Potassium Sulfide	A1	A	A	A1
Propane (liquefied)	A1	A	N/A	N/A
Pyridine	A1	A	A	A1
Pyrogallic Acid	A1	A	N/A	N/A
Resorcinol	A1	A	N/A	N/A
Salicylic Acid	A1	A2	N/A	N/A
Salt Brine (NaCl saturated)	A	A2	A	A
Sea Water	A	A	A	A
Silver Bromide	A	A2	N/A	N/A
Silver Nitrate	A1	A	A	A
Soap Solutions	N/A	A	A	A
Sodium Acetate	A1	A	A	A
Sodium Aluminate	N/A	A	A	N/A
Sodium Benzoate	N/A	A	N/A	A1
Sodium Bicarbonate	A	A	A	A1
Sodium Bisulfate	A2	A	A	A1
Sodium Bisulfite	A1	A	A	A1
Sodium Borate (Borax)	A	A	A	A
Sodium Bromide	A1	A	N/A	N/A
Sodium Carbonate	A	A	A	A
Sodium Chlorate	A1	A	A	A
Sodium Chloride	A1	A	A	A
Sodium Chromate	A1	A	A	N/A
Sodium Cyanide	A1	A	A	A1
Sodium Ferrocyanide	N/A	A	N/A	N/A
Sodium Fluoride	A1	A1	N/A	N/A
Sodium Hydrosulfite	N/A	A	N/A	N/A

Industrial Syringe Pump Chemical Compatibility

Solvent	PCTFE	Teflon	PPS	UHMWPE
Sodium Hydroxide (20%)	A	A	A	A
Sodium Hydroxide(50%)	A	A	A	A
Sodium Hydroxide（80%）	A	A	A	A
Sodium Hypochlorite (<20%)	A	A	A	A1
Sodium Hypochlorite (100%)	A	A	A	A1
Sodium Hyposufite	A	A	N/A	A
Sodium Metaphosphate	N/A	A	N/A	A1
Sodium Metasilicate	N/A	A	N/A	A
Sodium Nitrate	A1	A	A	A1
Sodium Perborate	A1	A	N/A	A1
Sodium Peroxide	A1	A	N/A	A
Sodium Polyphosphate	N/A	A	N/A	N/A
Sodium Silicate	A1	A	A	A1
Sodium Sulfate	A	A	A	A1
Sodium Sulfide	A1	A	A	A1
Sodium Sulfite	N/A	N/A	N/A	A1
Sodium Tetraborate	A	A	N/A	A
Sodium Thiosulfate (hypo)	A	A	A	A
Stannic Chloride	A	A	A	N/A
Stannous Chloride	A1	A	A1	N/A
Starch	A1	A	N/A	N/A
Stearic Acid	N/A	A	N/A	A1
Styrene	N/A	A	N/A	N/A
Sulfur Chloride	A1	A	N/A	N/A
Sulfur Dioxide	N/A	A	A	A
Sulfur Trioxide	A1	A	N/A	N/A
Sulfuric Acid (10-75%)	A	A	A	A1
Sulfuric Acid (75-100%)	A	A	A1	A1
Sulfurous Acid	A1	A	A	B1
Sulfuryl Chloride	N/A	A	N/A	N/A
Tartaric Acid	A2	A	A	A1
Tetrachloroethane	A1	A	N/A	N/A
Tetrachloroethylene	A1	A	N/A	B1
Tetrahydrofuran	A1	A	A	D
Toluene (Toluol)	B2	A	A	A1
Trichloroacetic Acid	A1	A	A	N/A
Trichloroethane	A1	A	N/A	C1
Trichloroethylene	B2	A	A1	D
Trichloropropane	A1	A1	N/A	N/A
Tricresylphosphate	N/A	A	N/A	A1
Triethylamine	A1	A	N/A	N/A
Trisodium Phosphate	N/A	A	A	A
Turpentine	A	A	A	A1
Urea	N/A	A	A	A
Uric Acid	N/A	A	N/A	N/A
Urine	N/A	A	N/A	N/A
Varnish	A	A	N/A	N/A
Vinyl Acetate	N/A	A2	N/A	N/A
Vinyl Chloride	N/A	A2	N/A	C1
Water, Deionized	A1	A2	A	A
Water, Distilled	A	A	A	A
Water, Fresh	A	A	A	A
Water, Salt	A	A	A	A
Xylene	A	A	A	C1
Zinc Chloride	A1	A	A	A
Zinc Hydrosulfite	N/A	A1	A	N/A
Zinc Sulfate	A	A	A	A1

D K I N F U S E T E K

D K I N F U S E T E K C O . , L T D

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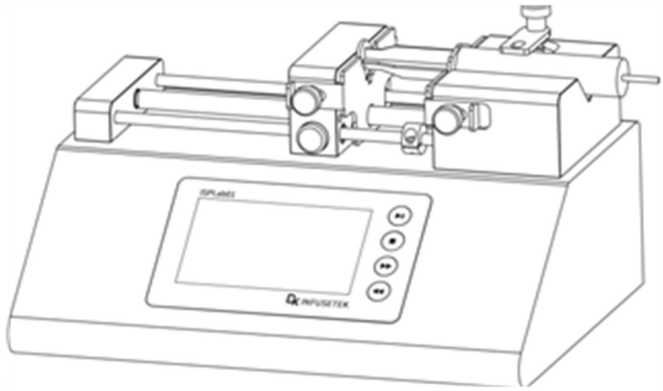
Website

2023

DK Infusetek Syringe Pump
Manual of ISPLab Series



DK INFUSETEK CO., LTD.

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.

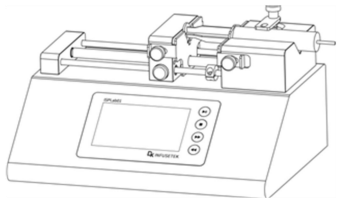
Catalogue

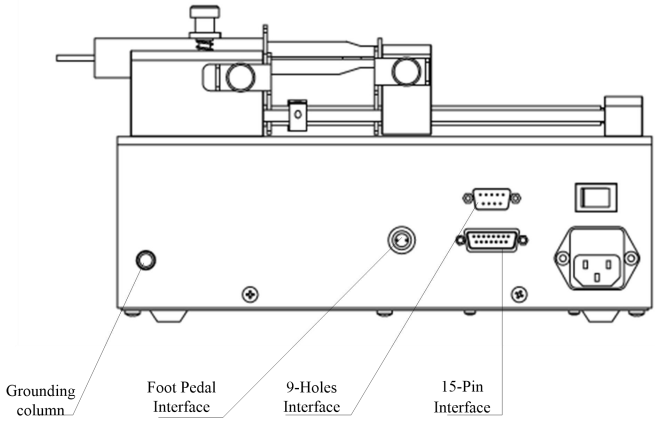
1. Product Introduction

ISPLab series syringe pump is push-pull type with stainless steel mirror housing, 4.3 inch color LCD touch screen and imported mechanical keys control, graphical interface, animation shows the working status. The filling parameters and running status are displayed in same screen. Support RS232 and RS485 communication and it is convenient for users to remote control under different conditions with rich external control interface.

The series includes: ISPLab01, ISPLab02, ISPLab04, ISPLab06, ISPLab08, ISPLab10, ISPLab12.

2. Product Appearance and Interface Instruction





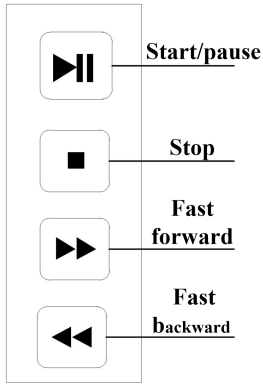
(1) Foot Pedal Interface: Connect with foot pedal switch

(2) 9-Holes Interface: RS232 and RS485

(3) 15 Pin Interface: External input and output

(4) Grounding Column: Connect with ground wire.

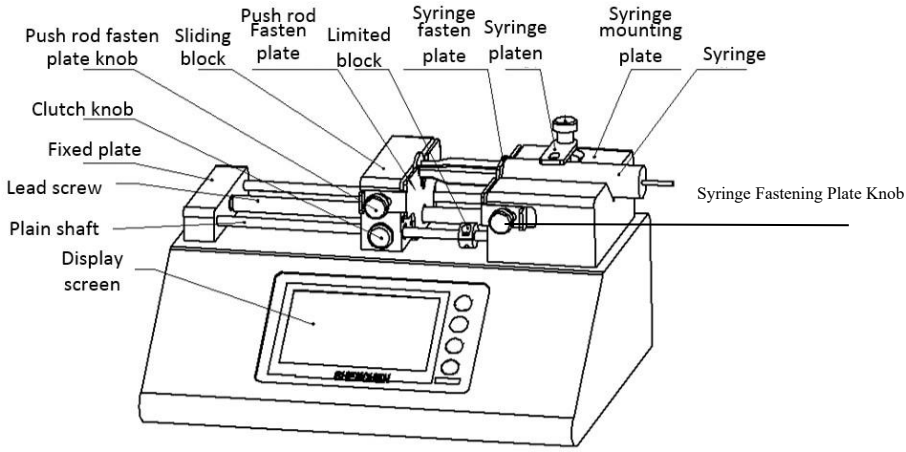
3. Mechanical Keypad Instruction



- **Start/pause**: After setting the running parameters, click the start/pause button, the syringe pump will start running according to the set parameter, and click the button again to pause the current running. After click the button, the common mode turns gray (disabled), the others turns colorful (available) in the main interface.
- **Stop**: Click the button to stop running. Main interface disabled status button becomes available. Keep pressing this button and turn on the machine power supply at the same time that will initialize the pump and all the parameters will be lost.
- **Fast forward**: Press this button when the pump stops, the syringe pump will run to right with the highest speed, press this button again, pump stops running.
- **Fast backward**: Press this button when the pump stops, the pump will run to left with the highest speed, press this button again, pump stops running.

4. Syringe Installation

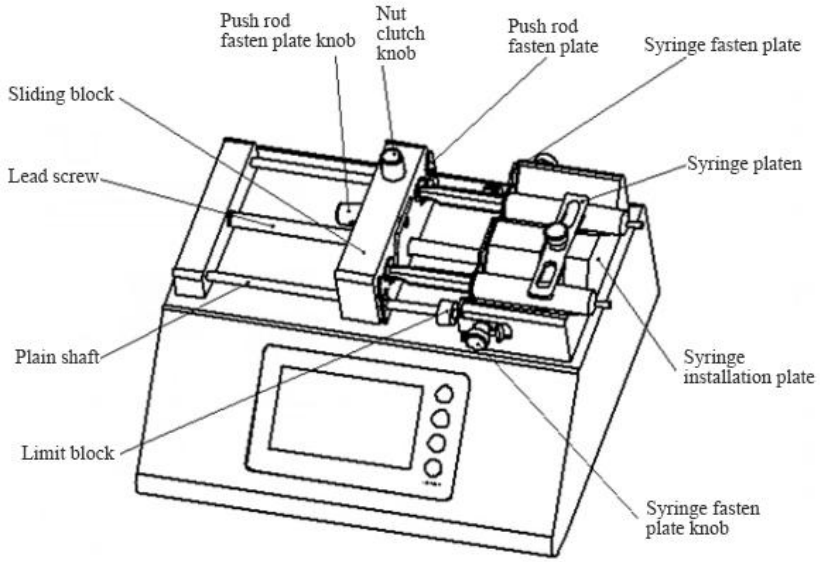
4.1 Single Channel Syringe Installation



1) Hold down [Clutch knob] to disengage [Sliding block] from [Lead screw] and move to other positions manually (or use the fast forward and rewind buttons to move [Sliding block]).
2) Rotate two [Push rod fasten plate knob] on the side of the [Sliding block] to open the [Push rod fasten plate]. Rotate the [Syringe fasten plate knob] on the side of the [Syringe mounting plate] respectively forward and reversely to open the [Syringe fasten plate].
3) Lift and rotate the [Syringe platen], place the syringe, adjust the syringe to the appropriate position, and rotate the [Syringe platen] to hold the syringe.
4) Tighten the knobs to secure the syringe.

Note: If need to install glass syringe, please consult the technical department of the company.

4.2 Dual Channel Syringe Installation

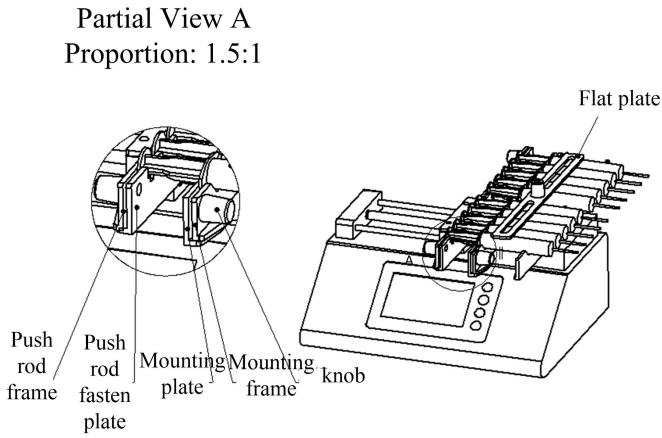


1) Rotate [Clutch knob], separate the [Sliding block] and [lead screw] and move [Sliding block] by hand (or use ◄◄/►► to move [Sliding block].
2) Rotate [Push rod fasten plate knob] on the side of [sliding block] to open [Push rod fasten plate]. Rotate the two [Syringe fasten plate knob] on the side of [Syringe installation plate] respectively forward and reversely to open [Syringe fasten plate]. Lift and rotate [Syringe platen], interpose syringe, and adjust the syringe to a suitable position, turn [Syringe platen] to hold the syringe.
3) Tighten the knob fixing syringe, and rotate [clutch knob], make [Sliding block] engage with [lead screw] into working state.

Note: If need to install glass syringe, please consult the technical department of the company.

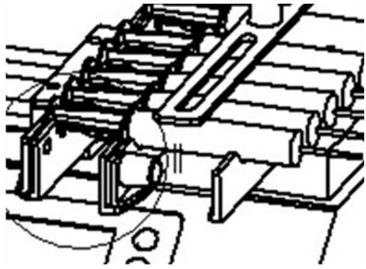
4.3 Multichannel Syringe Installation

Multichannel syringe pump include ISPLab02, ISPLab04, ISPLab06, ISPLab08, ISPLab10, ISPLab12, we take ISPLab 10 for example.

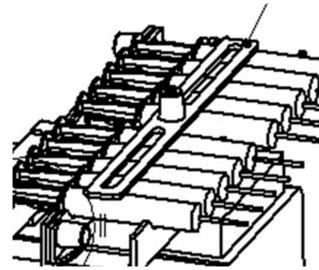


1) Loosen the knob for [mounting plate] and [push rod fasten plate], move the push plate to suitable position, put the syringes on [mounting frame].
2) Put on the [flat plate], fasten the [knob]. Don't use too much force.
3) Fasten the [mounting plate] and middle of [mounting frame] by hand, make the plate press the syringes tightly. In the same time, tighten one knob, then tighten the other knob.
4) Fasten the [push rod fasten plate] by the same way.

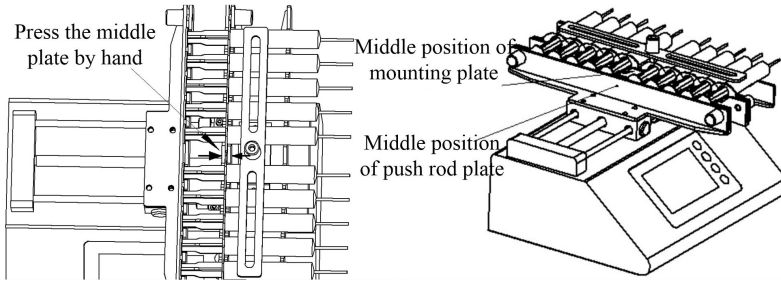
Note: Fasten the middle of fasten plate with hand to avoid fasten plate incline, and avoid fasten plate curve.



(1)



(2)

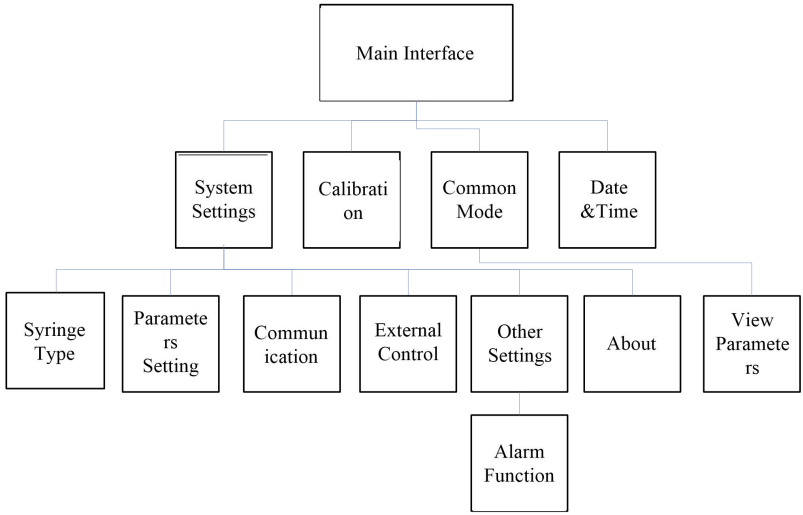


(3) (4)

Note: If only use 1 syringe, please put another empty syringe in the symmetrical position, do not put on the middle position. When using a small amount of syringe, please also install on the both side with symmetrical position. Do not install in the middle, to avoid the fasten plate deformation**.**

5. Operation Interface Structure

The function of operation panel for every channel syringe pump are same, and the operation panel appearance is similar, now take the single channel as example:



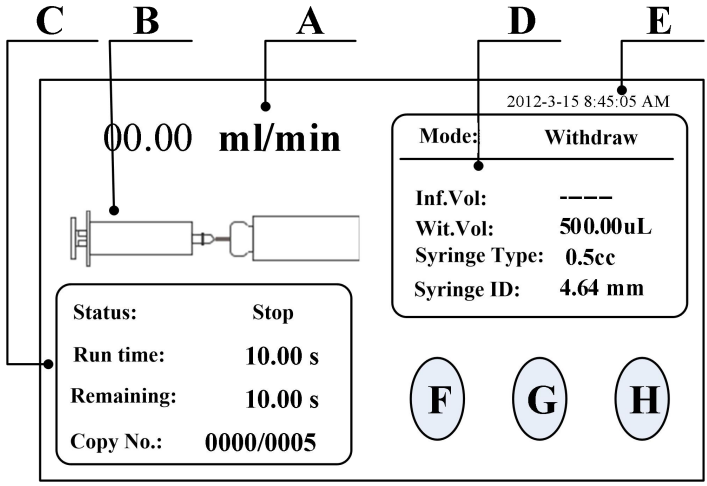
ISPLab Series Controller Operation Interface Instruction

5.1 Booting Interface

Display welcome interface when power is turned on. Click any place or wait 2.5 seconds enter English main interface automatically.

5.2 Main Interface

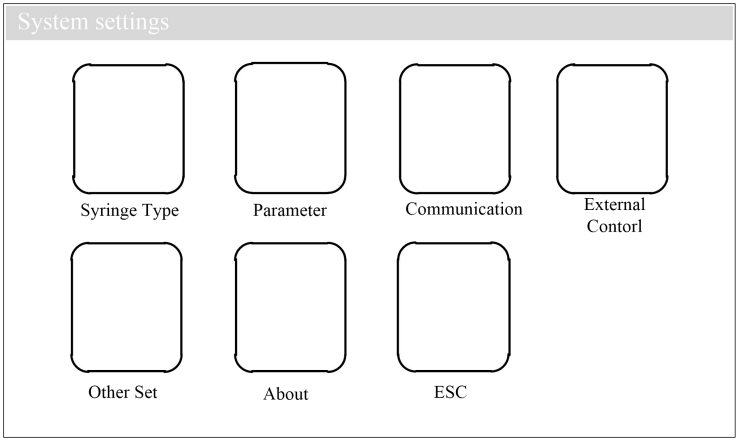
Main interface structure as follow:



- **Real-time flow rate display:** Display the current flow rate after starting running, click this area to change the flow rate in real time.
- **Real-time Dynamic Display:** Display the filling unit running state in real time and animation displays monitoring results.
- **Real-time Parameter Display:** Display the current running state, setting time, remaining time, repeat count.
- **Set Parameter Display:** Display the current working mode, infusion volume, withdraw volume, syringe size and syringe ID.
- **Date and Time Display:** Display the current data and time in real time, you can change it by clicking this area.
- **System Settings:** Click this button, enter system settings interface, set up syringe size, running parameters, communication setting, external control, other settings, parameter view.
- **Calibration:** Click this button enter the flow rate calibration interface.
- **Common Mode:** Click this button enter the common mode interface.

5.3 System Settings Interface

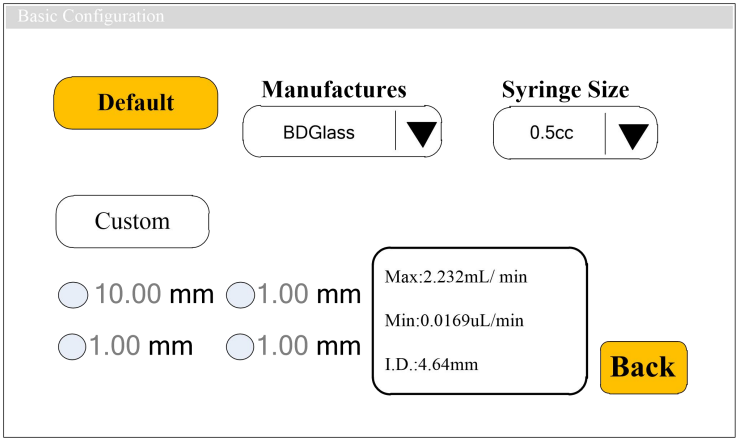
System settings is shown as follow picture



Click **System settings** button, enter system settings interface

5.4 Syringe Type Interface

Syringe type interface is shown as follow picture



In the main interface clicks **System settings** button, click **Syringe** button, enter

syringe size set interface.

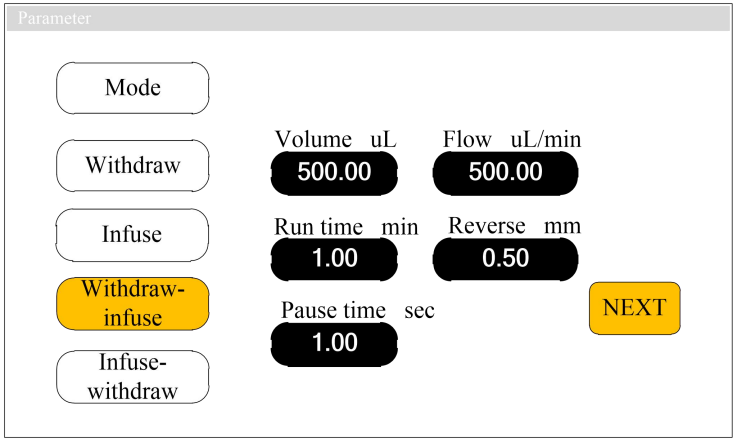
In this interface, click **Default** to choose manufacture's built-in syringe. Select Manufacturers and size from **Manufacturers** list and **Syringe** list. After click Default, the Custom is forbidden to use.

Click **Custom** in Syringe interface, select customized syringe size. Can set 4 groups of customized syringes. After select the syringe, you can change the syringe ID (ID range is 0.1mm-50mm). After select **Custom**, the **Default** part is forbidden to operating.

At the right side of the interface, display the maximum and minimum flow rate and syringe ID.

Click **Back** , back to system settings interface.

5.5 Parameter Set Interface

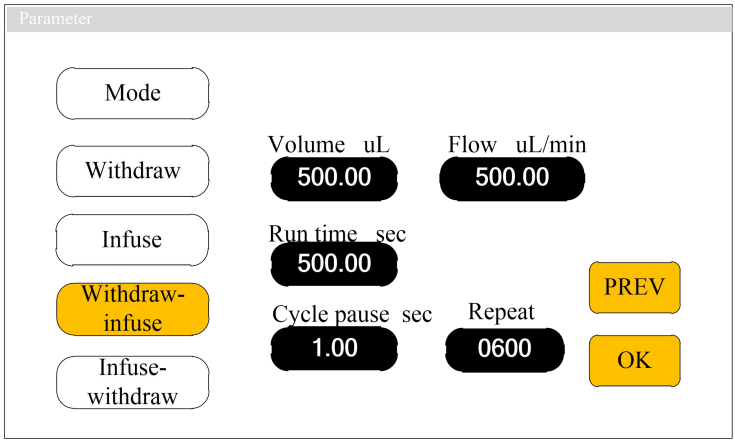


In main interface, click **System Settings** button, then click **Parameter** enter parameter setting interface.

Select working **Mode** (take Withdraw-infuse for example), set the working parameters of withdrawal (**Volume, Run time** and **Flow**) and **Reverse** (After withdrawal, the pump run with opposite direction with set distance, this function

used for exhaust bubbles. The Reverse range is 0.01mm-10mm), and **Pause time**. Click **NEXT**, enter next interface to set the infusion parameters.

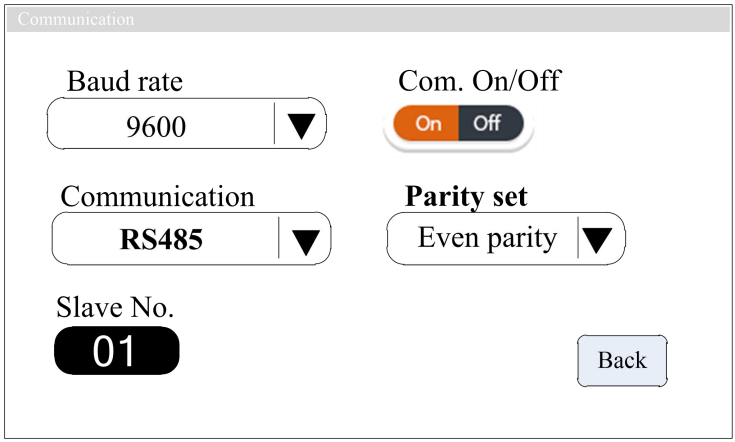
Note: Reverse can be set only in withdraw action.



In this interface, set the parameters of infuse data of Withdraw-Infuse working mode. Set the **Cycle Pause** and **Repeat** (Repeat number between 1-9999, 0 means infinite repeat). Click **PREV**, back to check and edit the parameters of withdrawal. Click **OK** to save the working parameters and back to System Settings interface.

Note: Users can enter this interface to change the operating parameters while the pump is running, but cannot change the working mode.

5.6 Communication Interface



The interface is setting communication between pump controller and HMI, if there is multiple syringe pumps, need to change slave (syringe pump) address.

In main interface click **System Settings** button, click **Communication** button, enter communication setting interface.

The syringe pump support Modbus communication protocol-RTU mode. First need to select **Baud Rate and** communication interface **RS485** (or **RS232**). Click **Slave No.** to enter pump address number (between 1-32). Click **Com. ON/OFF** to On, select **Parity**, then the pump controller can communicate with HMI, receive signal control from HMI.

When the button displays 

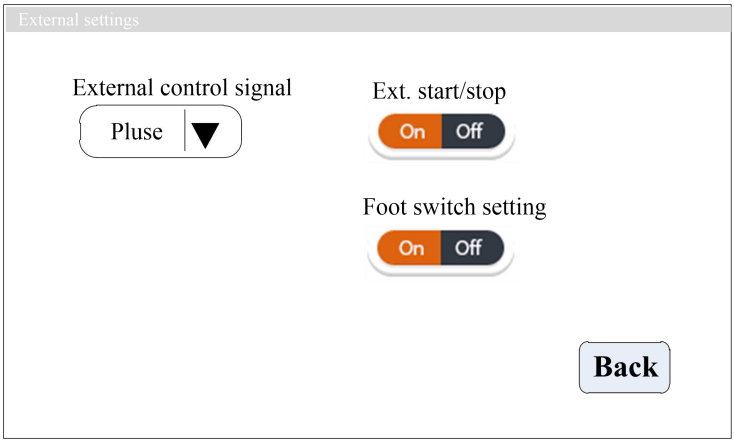
, it means the communication function is turned on, otherwise turned off.

Note:

(1) After the setting, the syringe pump only receives communication signals on the main interface, and other setting interfaces are invalid.

(2) One HMI can cascade connect up to 32 pumps.

5.7 External Control Setting Interface



In this interface to set the external control signal, external control signal include: Pulse signal and Level signal.

Please note: Level mode is not supported for fast withdraw and fast.

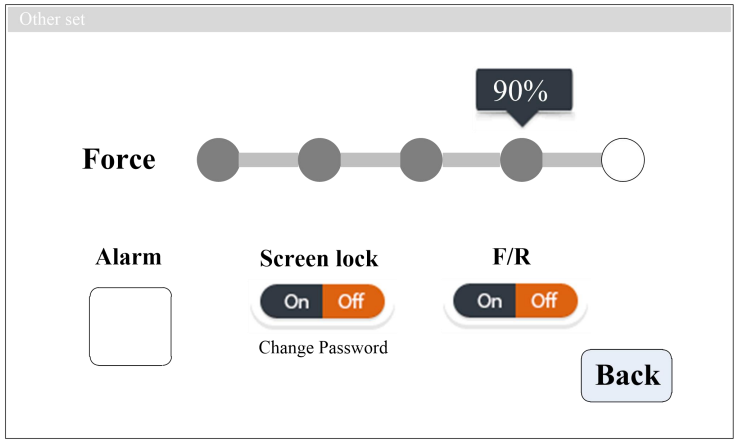
In level mode, external control start/stop and foot pedal switches can not be turned on in same time.

In level mode, the relative internal buttons can not be used.

When the button displays 

, it means that the corresponding external control function is turned on, otherwise is turned off.

5.8 Other Setting Interface



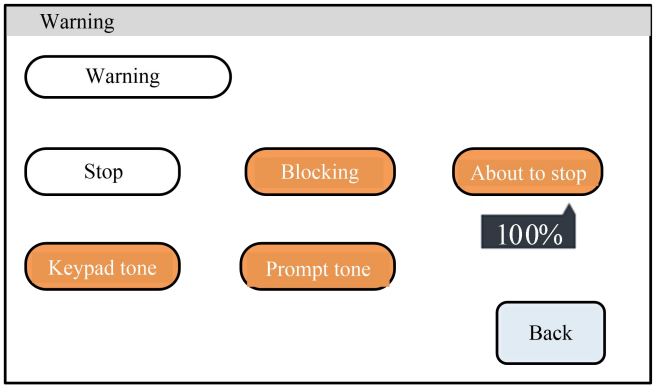
In the main interface clicks **System Settings** button, click **Other set**, enter other set interface.

In this interface, click **Alarm** to enter warning function setting interface; Click **Force** buttons to adjust the pump torque online. (**Note: Please set the suitable torque force according with actual situation. Not suitable torque force may cause the pump working abnormally. The pump torque force is divided into 5 stages: 40%, 60%, 70%, 90%, 100%**).

Click **Screen lock** button to turn on or turn off the screen lock function. Turn on or turn off the screen lock function both need to input password, the default password is 12345678. Click '**Change password**' to change the password freely.

In this interface, click **F/R** button to turn on the jog function of fast forward/rewind jog mode.

Warning Set Interface as below:



In this interface, we can turn on or turn off the warning function. Include:

Stop: After the function is turned on, the buzzer warns after pump stop working, and indicate the current status with red words in main interface.

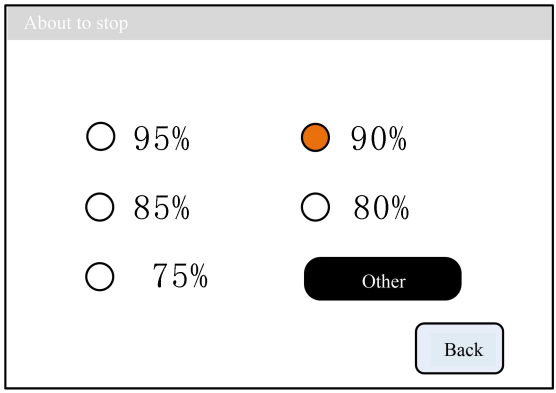
About to stop: After the function is turned on, when the operation reaches the specified percentage, the buzzer will give an alarm, and there is a red font on the main interface to indicate the current state. Click the percent number to enter percent set interface. Note: The percent number should be between 0-100 integer.

Blocking: After Turn on this function, the buzzer warns when the pump blocked, and indicate the current status with red words in main interface.

Keypad tone: After turn on this function, when click mechanical keypad, the buzzer will give 'beep' sound.

Prompt tone: Turn on this function, the buzzer warns when the prompt interface or warning interface come out.

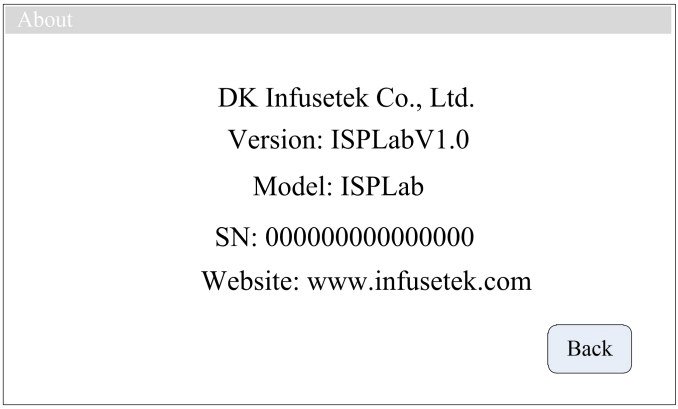
Percent Set interface as below:



In warning set interface click the **percentage number** under 'About to stop' button, enter percentage set interface.

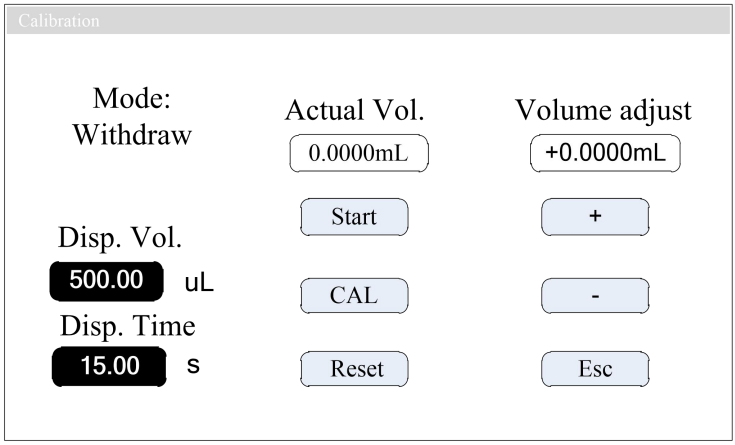
Several commonly used values are preset in this interface. Click the radio button in front of the commonly used value to set the value. Click '**Other**' button to input other percentage value.

5.9 About



In the main interface click **System settings**, click **About**, enter About interface. Can check syringe pump and company information.

5.10 Calibration Interface



The process of calibration data before operation is as follows:

A. If the working mode is withdraw/infuse or infuse/withdraw, firstly need to choose calibrate for withdraw or Infuse.

B. Click Test to start the test. Disp. Time count-down display, the pump stop running automatically when finish the Disp. Time. The digital keyboard for inputting the actual volume is automatically popped up. After inputting the actual volume, click the confirmation button, ask if the test should continue (more than three times recommended), select 'Yes', to continue. Select' No', back to calibration interface.

C. After several tests, the actual volume display area shows the average value of the actual volume of the tests, then click **CAL,** indicate calibration success.

D. Test again, check whether it meets the volume requirement or not. If need high precision, can click the button **"+"** or **"--"** at the '**volume adjust**' to achieve high-precision volume.

E. Click **Reset**, back to factory default calibration data.

Online micro adjusting process as below:

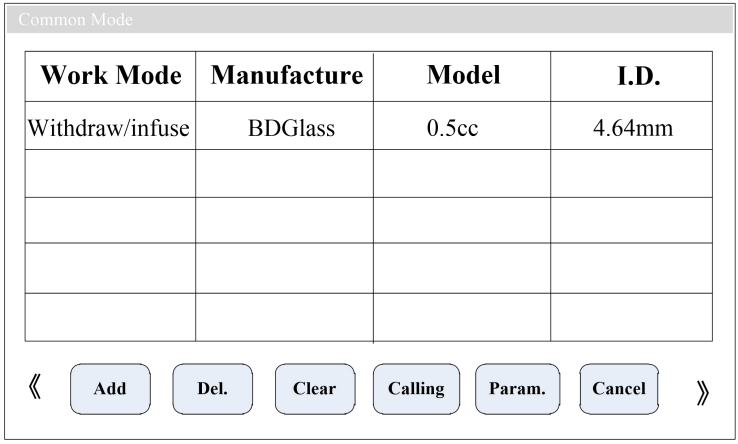
(1) If the volume is larger or smaller in the production process, it can be micro adjust online without affecting the production line.

(2) In the main interface click **Calibration**, enter calibration interface.

(3) Now only the mode button (withdraw/infuse, infuse/withdraw), **increase** (+), **decrease** (-) and **ESC** button are valid. Other buttons are forbidden.

(4) Click "+" or "--" to micro adjust online.

5.11 Common Mode Interface

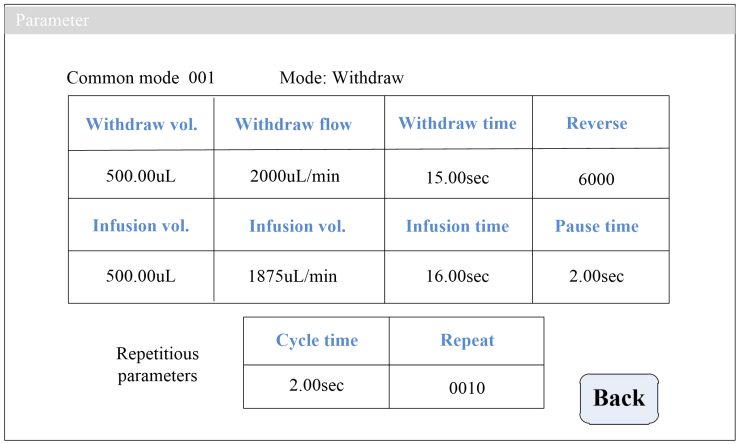


In the main interface click **Common mode**, enter common mode interface.

- **Add:** Click it to save current parameters as common mode. In this function, up to 60 modes can be stored.
- **Del.:** Select one common mode, click **Del.**, a dialog box asking whether to delete will come out. Click 'OK' to delete this mode.
- **Clear:** Click this button, a dialog box asking whether to confirm clear all or not. Click 'OK' delete all common modes.
- **Calling**: Select one common mode, click **Calling**, a dialog box asking whether to call common mode or not, click 'OK', back to the main interface, running parameters are selected common mode data.

- **Param.**: Select one common mode, click **Param.**, can check detailed parameters.
- **Cancel**: Click the button to back to main interface.
- **"<","">"**: View the common mode on the previous or next page.

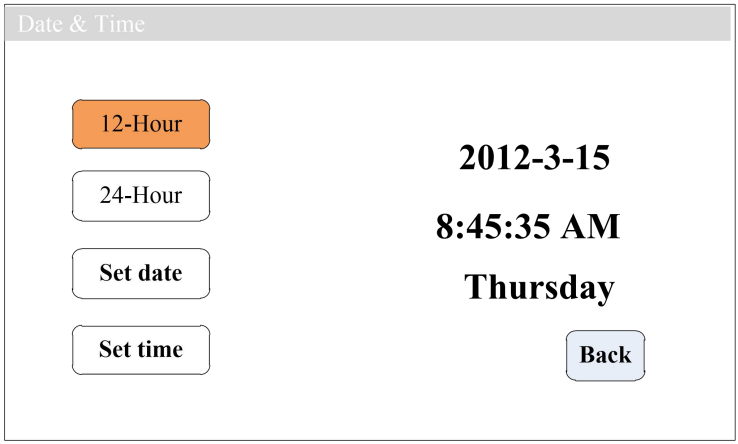
Detailed parameters view interface as follows:



In common mode interface, select one common mode, click **View** button, enter to parameter viewing interface.

In this interface, you can view the detailed running parameters and repetitious parameters of selected common mode.

5.12 Date &Time



In the main interface clicks the time and date in the upper right corner to enter the time and date setting interface.

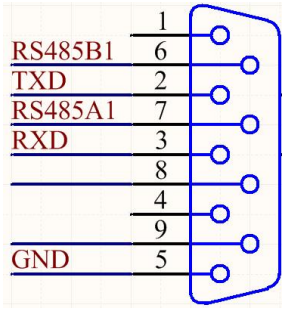
Click the **Set Date** button, come out keyboard to Set Year Number. Set the year from 1970 to 2099. After set up the year, click the **ENT** to enter the Set Month Number Keyboard, and then set the Day Number Keyboard.

Click the **Set Time** button come out the digital keyboard and set the time, minutes and seconds in turn.

6. External Control Interface Instruction

6.1 Communication Interface

The communication interface is located in the DB9 pin plug on the back of the syringe pump, as shown in the below picture.



(1) RS232 interface, in the external control setting interface, select RS232, the port is valid.

GND: Communication ground terminal

TXD: Master sends, syringe pump receives signal terminal

RXD: Syringe pump sends, master receives signal terminal

(2) RS485 interface, in the external control setting interface, select RS485, the port is valid.

RS485A1: connect RS485 A+.

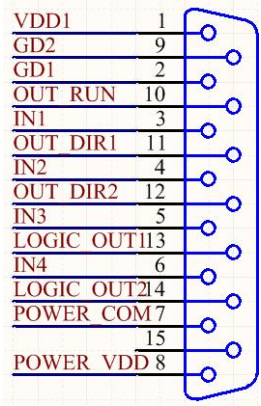
RS485B1: connect RS485 B-.

Note: No matter select RS232 or RS485, the communication protocol is MODBUS protocol standard.

Note: The syringe pump only can support communication when the pump is in main interface.

6.2 External Control Interface Instruction

The external control interface is located in the DB15 pin plug on the back of the syringe pump, as shown in the below picture:



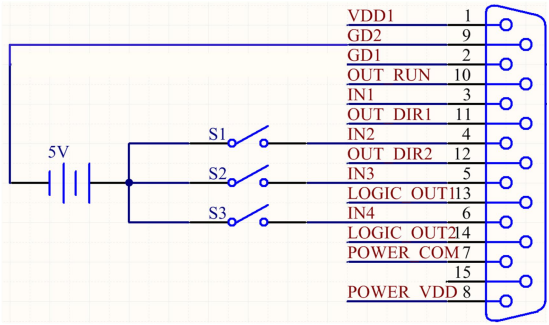
(1) VDD1 and GD1: internal 5V output.

(2) IN2, quickly start withdrawal (active signal)

(3) IN3, quickly start infusion (active signal)

(4) IN4, active start and stop

Wiring diagram as below:



Function Instruction:

In Pulse Mode:

Disconnect S1 after short-circuit, the syringe pump starts running according with the parameters in withdraw mode (repeat number is 1), disconnect again after short-circuit, the pump stop running.

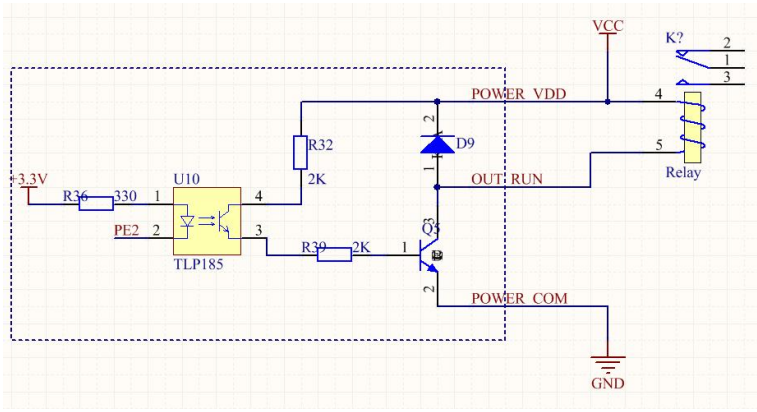
Disconnect S2 after short-circuit, the syringe pumps starts running according with the parameters in infusion mode (repeat number is 1), disconnect again after short-circuit, the pump stop running.

Disconnect S3 after short-circuit, the syringe pump starts running according with current setting working mode, disconnect again after short-circuit, the pump stop running.

In Level Mode:

Short-circuit S3, the syringe pump starts running with current setting working mode; after disconnect, the pump stop running.

(5) OUT_RUN motor working status output, OUT_DIR1 and OUT_DIR2 motor running direction output, wiring diagram as below:



If it is an external relay, when the motor runs, K1 closed; when it stops, K1 disconnect.

(6) Foot Pedal Interface

Foot pedal interface is located in the aviation plug on the back of the syringe pump.

In Pulse mode: Step on the foot pedal switch and then lift it up, the syringe pump will start running according with the current setting working mode; step on it and lift up again, the syringe pump will stop running.

In Level mode: Step on the foot pedal switch, the syringe pump will start running according with the current setting working mode; lift it up, the syringe pump will stop running.

7. Technical Specification

Working mode	Infusion, withdrawal ,infusion/withdrawal, withdrawal/infusion						
Channel No.	1	2	4	6	8	10	12
Syringe size	10μL-150mL		10μL-10mL				
Flow rate	0.001μL/min-165mL/min		0.001μL/min-21.997mL/min				
Route resolution	0.078μm/μstep						
Linear speed range	1μm/min-132mm/min						
Min. step rate	0.035ms/Micro step						
Max. step rate	0.937sec/Micro step						
Linear force range	8—20kgf, it can online adjust						
Distance of each step	0.078μm						
Accuracy	Error≤±0.3% (Stroke≥30% of the maximum stroke)						
Syringe selection	Inner syringe size and custom syringe ID						
Display	Industrial grade 4.3’’LCD color display						
Control method	Touch screen and Mechanical keypad						
Power-off memory	Display the previous data parameter after power on again						
Output state	OC gate signal output, used to indicate running status and direction.						
External control signal	Active switch signal: 5V-24V Passive switch signal: foot pedal switch						
Communication interface	RS232/RS485 (Modbus protocol, RTU mode)						

Power supply	AC 90-264V/64W
Condition temperature	0-40℃
Relative humidity	<80%
IP rate	IP31

8. Function & Features

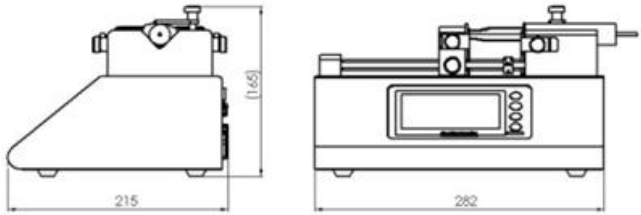
- **Input syringe ID function**: Users can choose syringe from menu or input the syringe ID directly.
- **Choose working mode**: Syringe pump has 4 working mode--Infusion, withdrawal, infusion/withdrawal, withdrawal/infusion. Each working mode technical data save separately, do not influence each other.
- **Calibration and online micro adjusting function**: Users can control the flow volume more precisely with this function.
- **Memory function**: After power on the pump again, no need to re-set up the parameters.
- **Block protection function**: The pump will stall and give an alarm when the drive structure of the pump is blocked.
- **External control function**: Input/Output control function.
- **Syringe protection function**: Prevent syringe damage by adjusting the position of the limit block.
- **Online adjusting linear force**: The linear force can be adjusted on the interface, 8-20kgf for option.
- **Common mode**: It can save up to 60 common modes and reduce the input time of customers.
- **Communication interface**: Support RS232 and RS485 communication port, Modbus protocol RTU mode.

9. Dimension Drawing

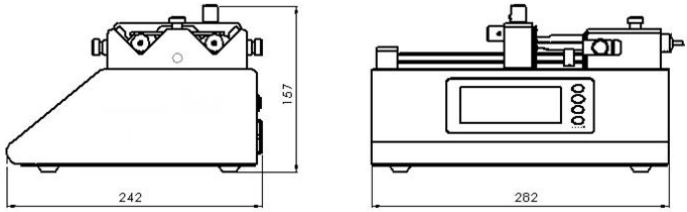
Channel number	4	6	8	10	12
L (mm)	145	190	235	280	325

(Unit: mm)

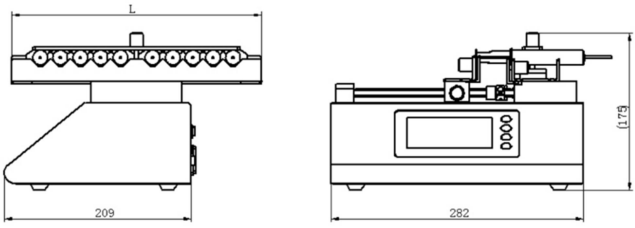
ISPLab01



ISPLab02



ISPLabn



Channel	4	6	8	10	12
L value	145	190	235	280	325

10. Maintenance

- **Lead screw lubrication**: Before first use the syringe pump, please coat lubrication oil on the lead screw to ensure the lead screw can work normally. To extend the lifetime of lead screw, we suggest to coat lubrication oil every 3 or 5 days. Before coating lubrication oil, please clean the lead screw.
- 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.
- If liquid splash on the machine, 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.
- Cleaning and maintenance: during operation or after the completion of the operation, please keep the equipment clean, with a soft cloth to wipe the liquid splashing into the syringe pump.
- Cleaning note:

  1. In the cleaning process, please disconnect the power to avoid electric shock.
  2. Do not immerse the pump in the water
  3. Do not heat or high pressure treatment to the syringe pump.
  4. Do not lift the pump with the syringe and push seat.
- The edge must be inserted into the syringe pump side ring fixing groove, and pay attention to clean syringes.
- Regular check the parts and screws of syringe pump.
- 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 coat lubrication oil on the lead screw, 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.
- Please be attention that the outlet of high-voltage static electricity shall not form tip discharge to the pump body if using in electrospinning.

11. 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.

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