



SYRINGE PUMP

- Constant Flow Syringe Pump
- Industrial Syringe Pump
- Laboratory Syringe Pump
- Syringe and Valves

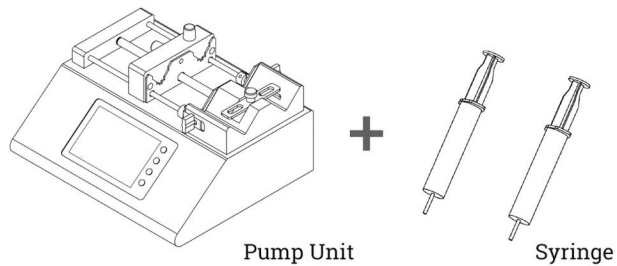


DK INFUSETEK

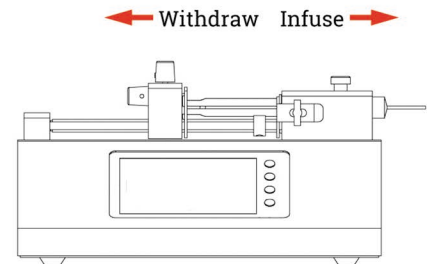
Company Profile

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

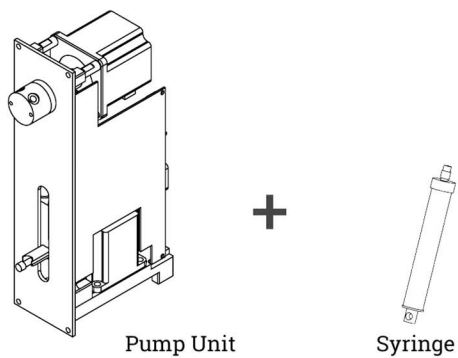
Laboratory Syringe Pump Composition



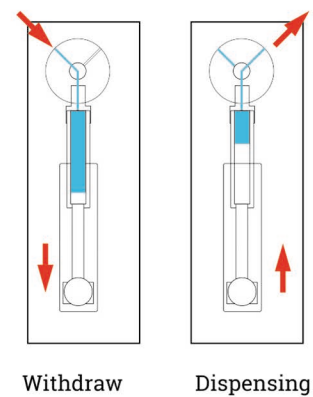
Laboratory Syringe Pump Working Principle



Industrial Syringe Pump Composition



Industrial Syringe Pump Working Principle



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◀◀◀ Constant Flow Syringe Pump

Constinfuse® Constant Flow Syringe Pump



Model

CFSP-I/CU-I

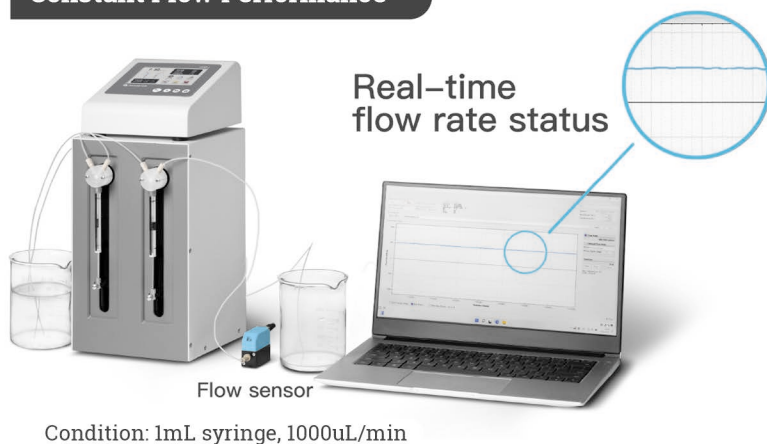
Introduction

Constinfuse®-constant flow syringe pump, focusing on microliter volume liquids continuous transferring and dispensing. Flow rate range: 0.06uL~70mL/min, continuous flow. RS232 and RS485 available for external control.

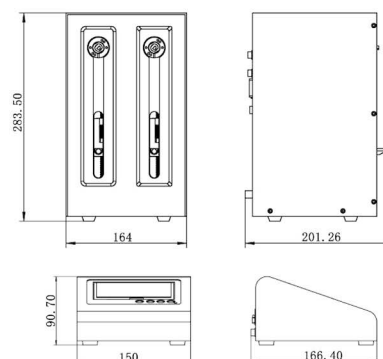
Features

- | 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: RS232/RS485, on-of signal.
- | 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 set 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.
- | Closed-loop control, overload protection, effectively protect the syringe.
- | Quiet design. 304 stainless steel spray shell.

Constant Flow Performance

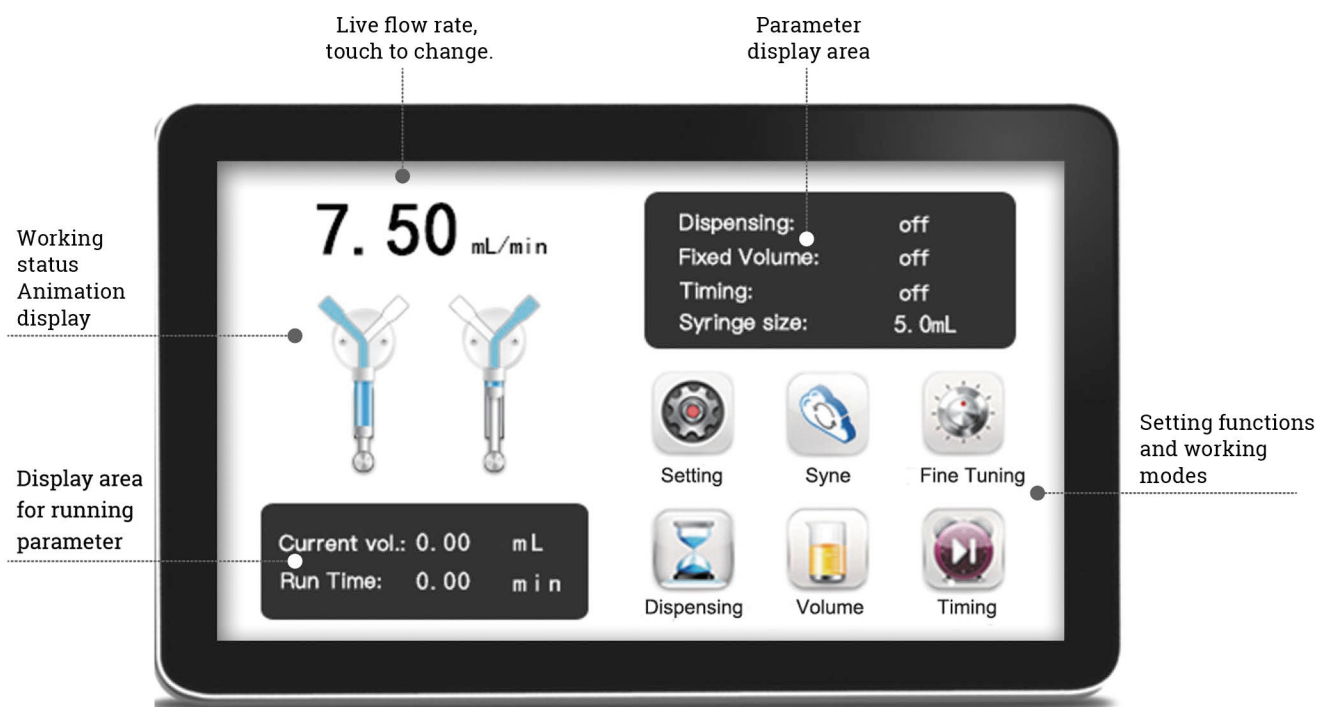


Dimension Drawing (Unit: mm)



◀◀◀ Constant Flow Syringe Pump

Interface Display



Technical Specifications

Flow rate range	0.06μL/min-70mL/min	Maximum pressure of liquid path	0.68MPa/2MPa
		Valve type	3 port valve
Dispensing volume range	0.1μL-25mL	Valve material	Valve body: PCTFE Valve element: PTFE
		Tube connection interface	1/4-28UNF
Accuracy	≤±0.05% (Maximum stroke, 500μL or more syringe, pure water at room temperature)	Syringe size	50μL, 100μL, 250μL, 500μL, 1.0mL, 2.5 mL, 5.0 mL, 10 mL, 25 mL
Communication	RS232 and RS485, support Modbus protocol, RTU mode	Syringe material	Barrel material: Borosilicate glass Plunger rod material: Stainless steel Plunger seal material: PTFE
		Power supply	Pump unit: 24V adapter Controller: 5V adapter
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	Power consumption	Controller≤10W, pump unit≤60W
		Environment temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)
Output	Indicates liquid output status (Open collector output)	Relative humidity	<80%(RH)
Display	4.3 inch industrial-grade true color LCD screen		
Control	Touch screen and buttons		

Syringe	Min. 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.

Continuous Flow Industrial Syringe Pump



Model

SP60-CB

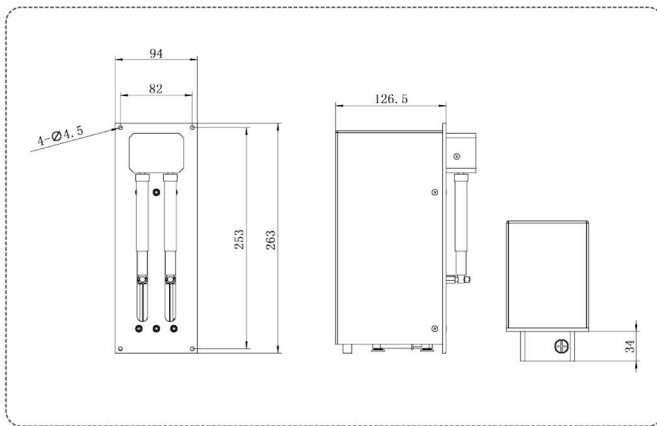
Introduction

SP60-CB constant flow syringe pump, flow rate range: 0.5 μ L-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.

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.

Dimension Drawing (Unit: mm)



Technical Specifications

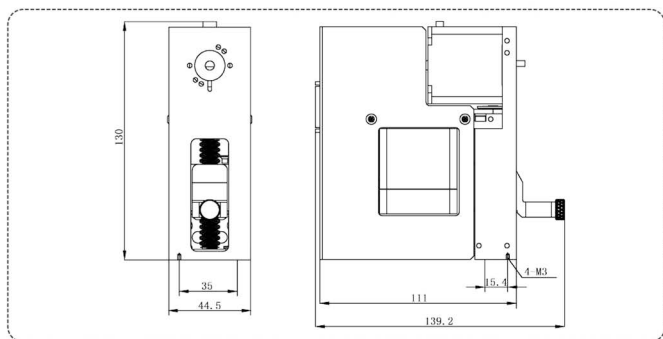
Flow rate	0.5 μ L/min-70mL/min (Pure water, and the length of the tube at the liquid inlet is less than 1 meter, and the inner diameter is 1.6mm)	Valve material	Valve body: PEEK, Diaphragm: FKM, Sealing ring: FKM
		Tube connection interface	1/4-28UNF
Communication interface	RS232/RS485, Modbus protocol(RTU mode)	Syringe size	50 μ L, 100 μ L, 250 μ L, 500 μ L, 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 $\pm$ 10%/2.5A(Peak value)
		Power consumption	$\leq$ 60W
Maximum pressure of liquid path	0.2MPa	Environment temperature	15 $^{\circ}$ C~40 $^{\circ}$ C(Low temperature operation requires a low temperature syringe)
Valves type	Electromagnetic valve	Relative humidity	<80% (RH)

Industrial Syringe Pump

SP30-1A/SP30-1A12_5



Dimension Drawing (Unit: mm)



Model

SP30-1A/SP30-1A12_5

Introduction

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

Features

- Application flexibility:
Programmable, controlled by or microcontroller, suitable for a wide range of syringe sizes and valves.
- Reliable performance:
Photoelectric encoder detects out of step; controllable start speed, maximum speed and stop speed;
Programmable acceleration and deceleration slopes;
Planned maintenance and replacement of syringes and valves allowed.
- Simple way to be integrated:
Support RS232/RS485/CAN communication;
Up to 15 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.

Technical Specifications

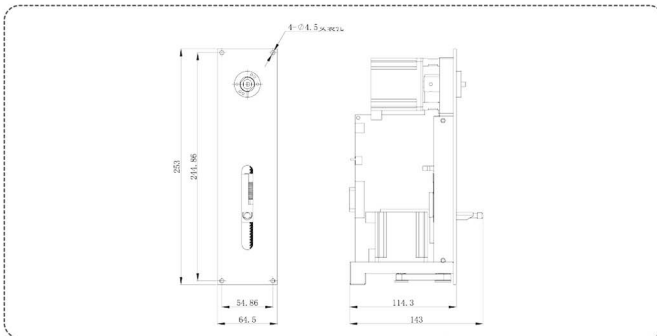
Accuracy	Error $\leq \pm 0.1\%$ (stroke $\geq 30\%$ maximum stroke)	Syringe material	Barrel material: Borosilicate glass Plunger rod material: Stainless steel Plunger seal material: PTFE
Plunger drive	Stepper motor drives ball screw, quadrature encoder detects out-of-step and returns to zero	Communication interface	RS232/RS485/CAN
Max. stroke(Steps)	30mm(3000 steps or 24000 steps)	Baud rate	9600 or 38400(RS232/RS485); 100K, 125K, 250K, 500K, 1M(CAN)
Linear speed range	0.005mm/s-30mm/s	Addressing	BCD switch(UP to 15 individual addresses available)
Run time per stroke	1.25s-100min	Input	Two TTL level signal inputs, for restart the paused instruct
Speed resolution	0.005mm/s	Output	Three TTL level signal outputs, for synchronous external devices
Stroke resolution	0.01mm or 0.00125mm	Condition temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)
Valve switch time	≤ 250 ms between adjacent ports	Storage temperature	-20°C~65°C
Valves type	3 port valve, 4 port valve, 3/4/6/9 port distribution valve	Max. pressure	0.68MPa(High pressure above 0.68MPa, please contact us)
Valve material	Valve body: PCTFE, Valve element: PTFE	Dimension(mm)	139.2*44.5*130 (mm)
Tubing fittings	1/4-28UNF		
Syringe fittings	1/4-28UNF		
Syringes	50 μ L, 100 μ L, 250 μ L, 500 μ L, 1.0mL, 2.5mL, 5.0mL, 12.5mL(SP30-1A12_5)		
Power supply	DC24V $\pm 10\%$ /1.25A		
Weight	1.2kg		

Industrial Syringe Pump

SP60-1A/SP60-1A50



Dimension Drawing (Unit: mm)



Introduction

SP60-1A syringe pump is a programmable liquid handling pump module, with 60mm stroke and rotary valve. The pump can be controlled by external computer or microcontroller, to perform high precision liquid handling.

Features

- Application flexibility:
Programmable, controlled by external computer or microcontroller, suitable for a wide range of syringe sizes and valves.
- Reliable performance:
Photoelectric encoder detects out of step; controllable start speed, maximum speed and stop speed;
Programmable acceleration and deceleration slopes;
Planned maintenance and replacement of syringes and valves allowed.
- Simple way to integrate:
Support RS232/RS485/CAN communication;
Up to 15 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.

Technical Specifications

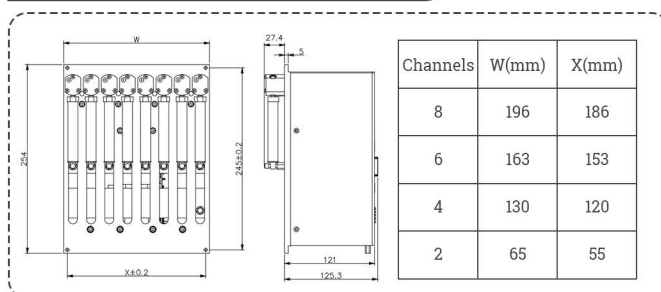
Accuracy	Error $\leq \pm 0.1\%$ (stroke $\geq 30\%$ maximum stroke)	Power supply	DC24V $\pm 10\%$ /1.25A(Peak value)
Plunger drive	Stepper motor drives ball screw, quadrature encoder detects out-of-step and returns to zero	Communication interface	RS232/RS485/CAN
Max. stroke(Steps)	60mm(6000 steps or 48000 steps)	Baud rate	9600 or 38400(RS232/RS485); 100K, 125K, 250K, 500K, 1M(CAN)
Linear speed range	0.01mm/s-60mm/s	Addressing	BCD switch(UP to 15 individual addresses available)
Run time per stroke	1.25s-100min	Input	Two TTL level signal inputs, for restart the paused instruct
Speed resolution	0.01mm/s	Output	Three TTL level signal outputs, for synchronous external devices
Stroke resolution	0.01mm or 0.00125mm	Max. pressure	0.68MPa(High pressure above 0.68MPa, please contact us)
Valve switch time	≤ 250 ms between adjacent ports	Condition temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)
Valves type	3 port valve, 4 port valve, 3/4/6/9 port distribution valve	Storage temperature	-20°C~65°C
Valve material	Valve body: PCTFE; Valve element: PTFE	Relative humidity	<80% (RH)
Tubing fittings	1/4-28UNF	Dimension(mm)	143*64.5*253
Syringe fittings	1/4-28UNF	Weight	2.20kg
Syringes	50 μ L, 100 μ L, 250 μ L, 500 μ L, 1.0mL, 2.5mL, 5.0mL, 10mL, 25mL, 50mL(SP60-1A50)		
Syringe material	Barrel material: Borosilicate glass Plunger rod material: Stainless steel Plunger seal material: PTFE		

Industrial Syringe Pump

SP60-nA



Dimension Drawing (Unit: mm)



Introduction

SP60-nA is a programmable liquid handling device. The rated stroke is 60mm, all channels work at the same time, can be controlled by an external computer or microprocessor to realize automated pipetting, dilution and dispensing functions.

Features

- Flexible: This syringe pump is programmable and it can be controlled by external controller; Suitable syringes range is 50uL ~ 10mL.
- Reliable: Uses photoelectric sensor for lost-step detection; Configures speed and acceleration; Reads the number of syringe and valve movements, enabling planned maintenance.
- Simple integration method: Supports RS232/RS485 communication; Connect up to 15 SP60-nA syringe pumps simultaneously; TTL level digital signal: two input and three outputs; Can be synchronized with other external devices.

Technical Specifications

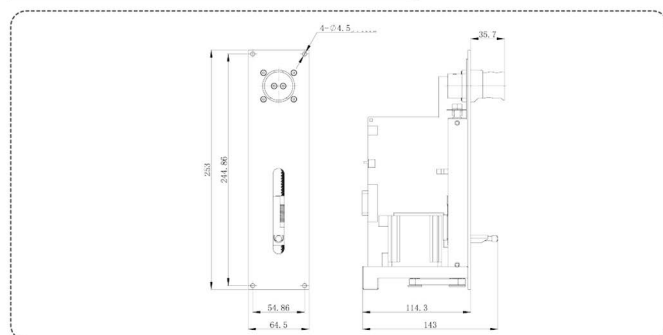
Rated stroke	60mm		Rotary valve switching time	≤450ms ms between adjacent ports	
Resolution	Standard Mode: 6000 steps per stroke		Type of rotary valve	3 port 120°	
	Micro Step Mode: 48000 steps per stroke		Valve material	Valve body: PCTFE Valve core: PTFE	
Running time per stroke	1.45s-100min				
Syringe model	50uL, 100uL, 250uL, 500uL, 1mL, 2.5mL, 5mL, 10mL		Valve interface	1/4-28UNF internal thread	
			Liquid path Max. pressure	0.68MPa	
Syringe material	Barrel Material: High borosilicate glass		Applicable power supply	DC24V±10%/5A(Peak)	
	Push rod material: Stainless steel		Communication interface	RS232/RS485	
	Sealing material of push rod: PTFE		Baud rate	9600bps or 38400bps	
Liquid Volume Precision	Repeatability error <0.2% (full stroke, deionized water)		Device address	BCD DIP switch(Up to 15 independent addresses can be set)	
Liquid Volume Accuracy	Error <1.0% (full stroke, deionized water)		Signal input	2 channels TTL level input	
Syringe interface	1/4-28UNF external thread		Signal output	3 channels TTL level output	
Storage Temperature	-20°C~65°C		Working temperature	15°C~40°C	
Channels	2	4		6	8
Dimension drawing (Unit: mm)	65x153x254	130x153x254		163x153x254	196x153x254

Industrial Syringe Pump

SP60-1B



Dimension Drawing (Unit: mm)



Introduction

SP60-1B syringe pump is a programmable liquid handling pump module with 60mm stroke and solenoid valve. The pump can be controlled by external computer or microcontroller, to perform high precision liquid handling.

Features

- Application flexibility:
Programmable, controlled by computer or microcontroller, suitable for a wide range of syringe sizes and valves.
Reliable performance:
Photoelectric encoder detects out of step; controllable start speed, maximum speed and stop speed;
Programmable acceleration and deceleration slopes;
Planned maintenance and replacement of syringes and valves allowed.
- Simple to integrate:
Support RS232/RS485/CAN communication;
Up to 15 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.

Technical Specifications

Accuracy	Error $\leq \pm 0.1\%$ (stroke $\geq 30\%$ maximum stroke)	Power supply	DC24V $\pm 10\%$ /1.25A(Peak value)
Plunger drive	Stepper motor drives ball screw, quadrature encoder detects out-of-step and returns to zero	Communication interface	RS232/RS485/CAN
Max. stroke(Steps)	60mm(6000 steps or 48000 steps)	Baud rate	9600 or 38400(RS232/RS485); 100K, 125K, 250K, 500K, 1M(CAN)
Linear speed range	0.01mm/s-60mm/s	Addressing	BCD switch(UP to 15 individual addresses available)
Run time per stroke	1.25s-100min	Input	Two TTL level signal inputs, for restart the paused instruct
Speed resolution	0.01mm/s	Output	Three TTL level signal outputs, for synchronous external devices
Stroke resolution	0.01mm or 0.00125mm	Max. pressure	0.1MPa
Valve switch time	≤ 250 ms between adjacent ports	Condition temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)
Valves type	Solenoid valve	Storage temperature	-20°C~65°C
Valve material	Valve material touching the liquid: PPS, PTFE, FPM	Relative humidity	<80% (RH)
Tubing fittings	1/4-28UNF	Dimension(mm)	143*64.5*253
Syringe fittings	1/4-28UNF	Weight	1.56kg
Syringes	50 μ L, 100 μ L, 250 μ L, 500 μ L, 1.0mL, 2.5mL, 5.0mL, 10mL, 25mL		
Syringe material	Barrel material: Borosilicate glass Plunger rod material: Stainless steel Plunger seal material: PTFE		

Industrial Syringe Pump

SP60-nB



SP60-8B

Model

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

Introduction

It is a programmable, open-architecture, precision liquid handling unit, with solenoid valves 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 $\leq \pm 0.1\%$ (stroke $\geq 30\%$ 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	Addressing	BCD switch(UP to 15 individual addresses available)		
Stroke resolution	0.01mm or 0.00125mm	Input	Two TTL level signal inputs, for restart the paused instruct		
Valve switch time	≤ 250 ms between adjacent ports	Output	Three TTL level signal outputs, for synchronous external devices		
Valves type	Solenoid valve	Valve body rated pressure	0.2MPa		
Valve material	Valve body: PEEK, Diaphragm: FKM, Sealing ring: FKM	Condition temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)		
Tubing fittings	1/4-28UNF	Storage temperature	-20°C~65°C		
Syringe fittings	1/4-28UNF	Relative humidity	<80% (RH)		
Power supply	DC24V $\pm 10\%$ /2.5A(Peak value)	Syringes	50 μ L, 100 μ L, 250 μ L, 500 μ L, 1.0mL, 2.5mL, 5.0mL (10mL, 25mL customizable)		
Communication interface	RS232/RS485/CAN				
Channel number	2	3	4	6	8
Dimension(L*W*H)	94*147*263	94*147*263	112*146*252	154*147*252	196*140.5*252



SP60-2B



SP60-3B



SP60-4B



SP60-6B

Industrial Syringe Pump

Programmable Syringe Pump



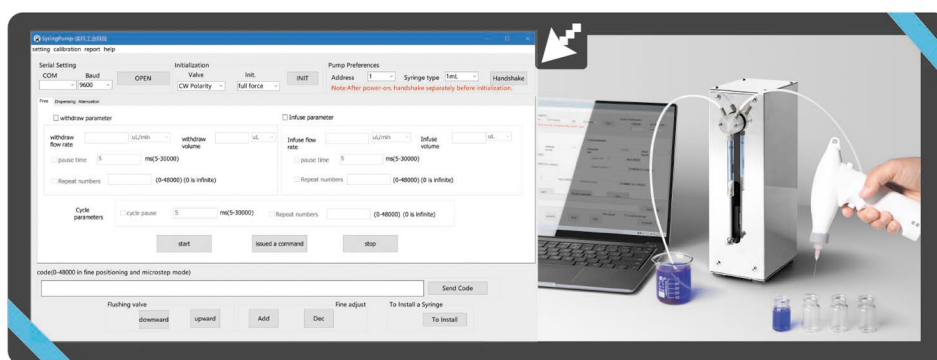
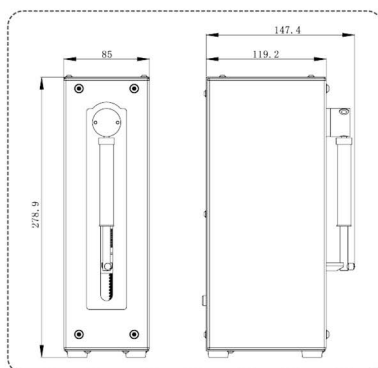
Model

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, to replace manual diluting and dispensing. Widely used in blood, chemistry, food and environment analysis.

Dimension Drawing (Unit: mm)



Technical Specifications

Accuracy	Error $\leq \pm 0.1\%$ (stroke $\geq 30\%$ maximum stroke)	Syringe material	Barrel material: Borosilicate glass Plunger rod material: Stainless steel Plunger seal material: PTFE
Plunger drive	Stepper motor drives ball screw, quadrature encoder detects out-of-step and returns to zero	Communication interface	RS232/RS485/CAN
Max. stroke(Steps)	60mm (6000 steps or 48000 steps)	Baud rate	9600 or 38400(RS232/RS485); 100K, 125K, 250K, 500K, 1M(CAN)
Linear speed range	0.01mm/s-60mm/s	Addressing	BCD switch(UP to 15 individual addresses available)
Run time per stroke	1.25s-100min	Input	Two TTL level signal inputs, for restart the paused instruct
Speed resolution	0.01mm/s	Output	Three TTL level signal outputs, for synchronous external devices
Stroke resolution	0.01mm or 0.00125mm	Condition temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)
Valve switch time	≤ 250 ms between adjacent ports	Storage temperature	-20°C~65°C
Valves type	3 port valve, 4 port valve, 3/4/6/9 port distribution valve	Max. pressure	0.68MPa(High pressure above 0.68MPa, please contact us)
Valve material	Valve body: PCTFE; Valve element: PTFE	Weight	3.25kg
Tubing fittings	1/4-28UNF		
Syringe fittings	1/4-28UNF		
Syringes	50 μ L, 100 μ L, 250 μ L, 500 μ L, 1.0mL, 2.5mL, 5.0mL, 10mL, 25mL		
Power supply	DC24V $\pm 10\%$ /1.25A(Peak value)		
Dimension	147.4*85*278.9mm		

Industrial Syringe Pump

Programmable Syringe Pump



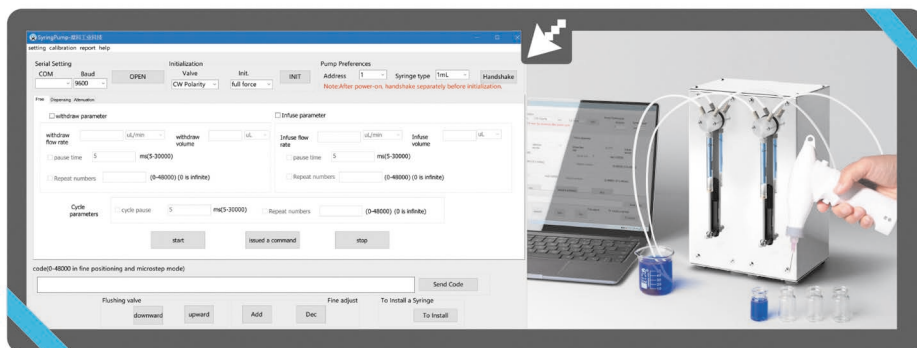
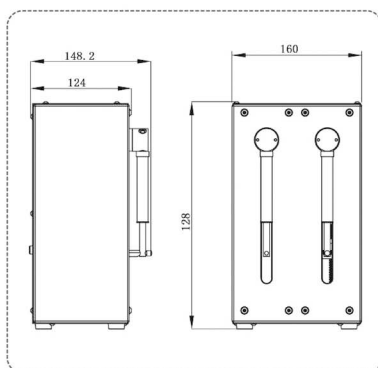
Model

ASD60-II

Introduction

ASD60-II syringe pump is a programmable precision liquid handling device. Two syringes can work independently or cooperatively to provide continuous flow. The pump comes with computer control software, can be use as dispenser or diluter.

Dimension Drawing (Unit: mm)

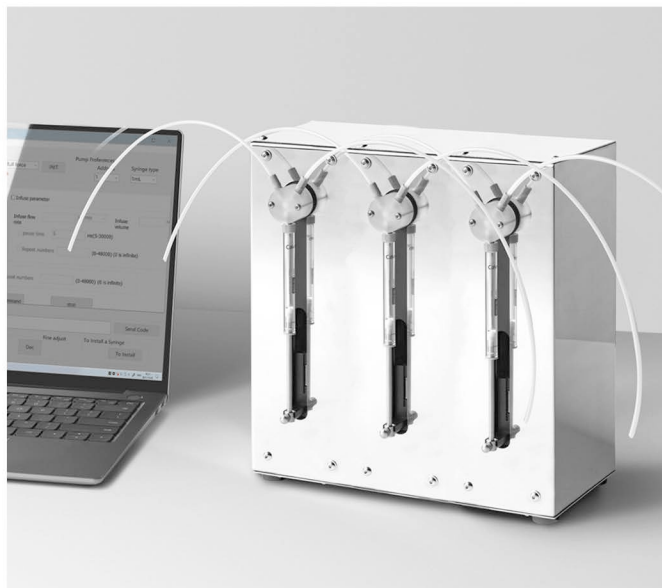


Technical Specifications

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

Industrial Syringe Pump

Programmable Syringe Pump



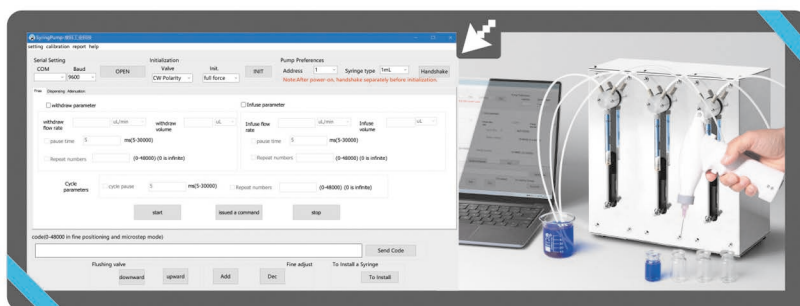
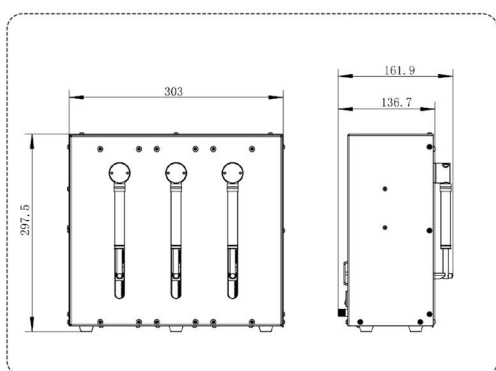
Model

ASD60-III

Introduction

Three channels, controlled by computer, each channel working independently, in same or different parameters.

Dimension Drawing (Unit: mm)



Technical Specifications

Accuracy	Error $\leq \pm 0.1\%$ (stroke $\geq 30\%$ maximum stroke)	Syringe material	Barrel material: Borosilicate glass Plunger rod material: Stainless steel Plunger seal material: PTFE
Plunger drive	Stepper motor drives ball screw, quadrature encoder detects out-of-step and returns to zero	Communication interface	RS232/RS485/CAN
Max. stroke(Steps)	60mm (6000 steps or 48000 steps)	Baud rate	9600 or 38400(RS232/RS485); 100K, 125K, 250K, 500K, 1M(CAN)
Linear speed range	0.01mm/s-60mm/s	Addressing	BCD switch(UP to 15 individual addresses available)
Run time per stroke	1.25s-100min	Input	Two TTL level signal inputs, for restart the paused instruct
Speed resolution	0.01mm/s	Output	Three TTL level signal outputs, for synchronous external devices
Stroke resolution	0.01mm or 0.00125mm	Condition temperature	15°C~40°C(Low temperature operation requires a low temperature syringe)
Valve switch time	≤ 250 ms between adjacent ports	Storage temperature	-20°C~65°C
Valves type	3 port 120° valve, 4 port valve, 3 port distribution valve, 9 port distribution valve	Max. pressure	0.68MPa(High pressure above 0.68MPa, please contact us)
Valve material	Valve body: PCTFE; Valve element: PTFE	Weight	9.75kg
Tubing fittings	1/4-28UNF		
Syringe fittings	1/4-28UNF		
Syringes	50 μ L, 100 μ L, 250 μ L, 500 μ L, 1.0mL, 2.5mL, 5.0mL, 10mL, 25mL		
Power supply	DC24V $\pm 10\%$ /1.25A(Peak value)		
Dimension(mm)	303*161.9*297.5		

◀◀◀ Laboratory Syringe Pump

Intelligent Syringe Pump



Model

ISPLab01-Pro

Introduction

ISPLab01-Pro syringe pump with infusion/withdrawal mode, durable and available for various environments with stainless steel housing. Easy and intuitive operation with 4.3" full colour touch screen. Multiple external controls like RS232/485 (Modbus) supported. Capable of handling more types of liquids with stronger linear force. All materials and sizes of syringes supported, especially applicable for transferring micro liquids. (Non-medical use)

Features

| Most Advanced Syringe Loading System:

- Accurate and effortless slider position adjustment with a knob.
- Special structure design to minimizing the impact on the properties of solution inside the syringe.
- Loading and replacement of syringe are super fast and convenient, can be operated with one hand.
- Unique adaptive structure, fitting various syringe barrel shapes, syringe protectable and accuracy guaranteed.
- Featured syringe plunger mounting design, secured syringe installation and stable operation.
- All materials, models, and sizes of syringe from 0.5uL-150mL adapted.

| Real Time Flow Rate Modification: Flow rate adjustable at any time without stopping, meeting the requirements of complex applications.

| 4.3-inch full color LCD touch screen, intuitive interface, real-time display of various technical data.

| Built-in Syringe Model List: Syringe model selectable or syringe inner diameter directly inputted.

| Three metering methods to choose from: liquid volume-flow rate, liquid volume-time, and flow rate-time.

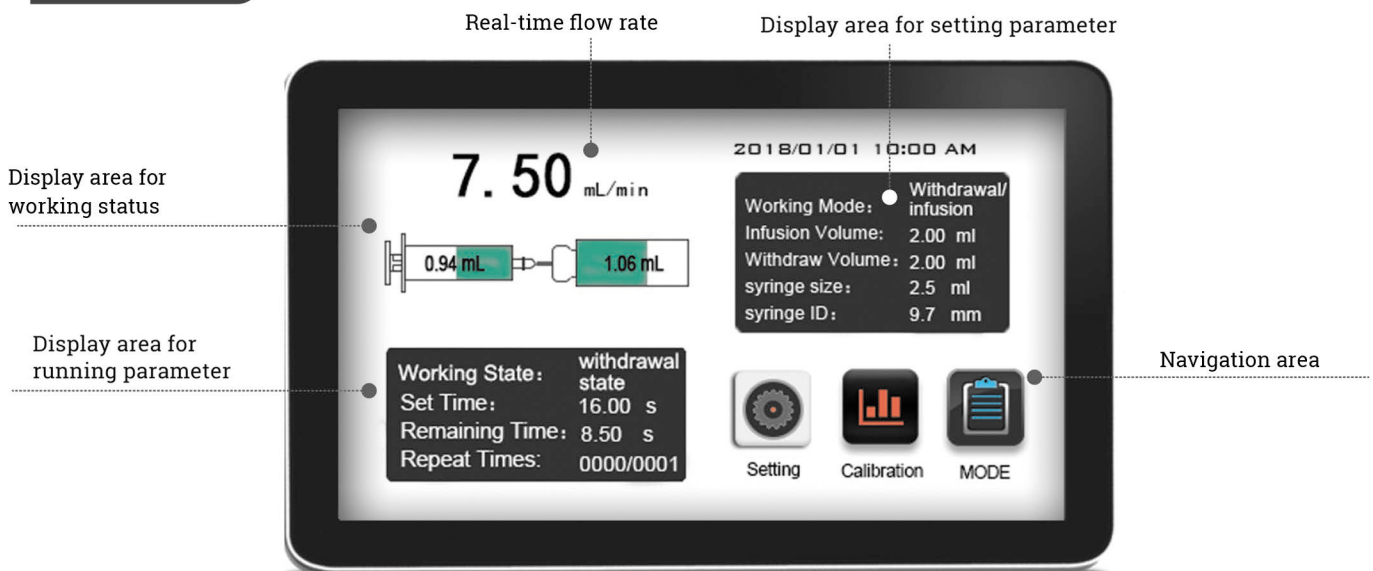
The volume can be displayed in real time and can be calibrated.

| Up to 45kgf linear force, more kinds of liquids handleable and a wider range of applications available.

| Blockage Protection: During operation, if propulsion mechanism blocked, pump will stop operating and sound alarm signal.

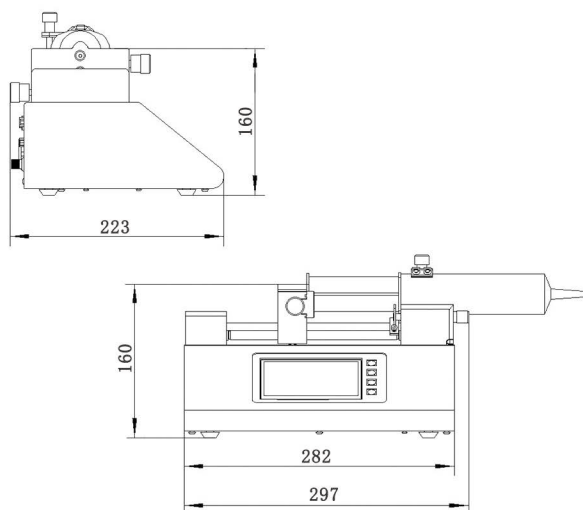
| Power Off Memory: The pump remains running or stop according to the setting parameters when power returns after an interruption.

Interface display

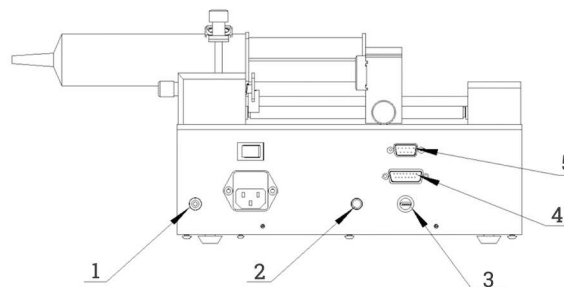


◀◀◀ Laboratory Syringe Pump

Dimension Drawing (Unit: mm)



Syringe Pump External Control Schematic



- 1-Grounding Post
- 2-Foot Pedal Interface
- 3-Type-C Interface
- 4-External control Interface
- 5-Communication Interface

Technical Specifications

Working Mode	Infusion, Withdrawal, Infusion-Withdrawal, Withdrawal-Infusion, Continuous
Channel Number	Single
Applicable Syringe	0.5μL-150mL of all materials
Syringe Selection	Built in syringe model and customizable syringe inner diameter
Linear Speed Range	1μm/min-132mm/min(Flow rate=linear speed *internal cross-sectional area of syringe)
Linear Speed Resolution	1μm/min
Linear Force	12-45kgf
Max. Stroke	140mm
Stroke Resolution	0.078μm/μstep
Accuracy	Error≤±0.3%(Stroke≥30% of Max. stroke)
Reverse Distance	0.01-10mm
Common Modes	Up to 60 commonly used modes can be saved
Display	4.3" full colour LCD screen
Control	Touch screen and keypads
Power Off Memory	The pump remains running or stop according to the setting parameters when power returns after an interruption.
Output	OC gate signal output, indicating operating status and direction
External Control	Start/stop signal, fast extraction and infusion signal, active switch signal 5V-24V
	Start/stop signal, passive switch signal, e.g. foot pedal switch
Communication Interface	RS232/RS485 (Modbus, RTU)
Power Supply	AC 90-264V/65W
Condition Temperature	0-40℃
Relative Humidity	<80%
IP Rate	IP31
Dimension	282x223x160(mm)
Weight	4.85kg

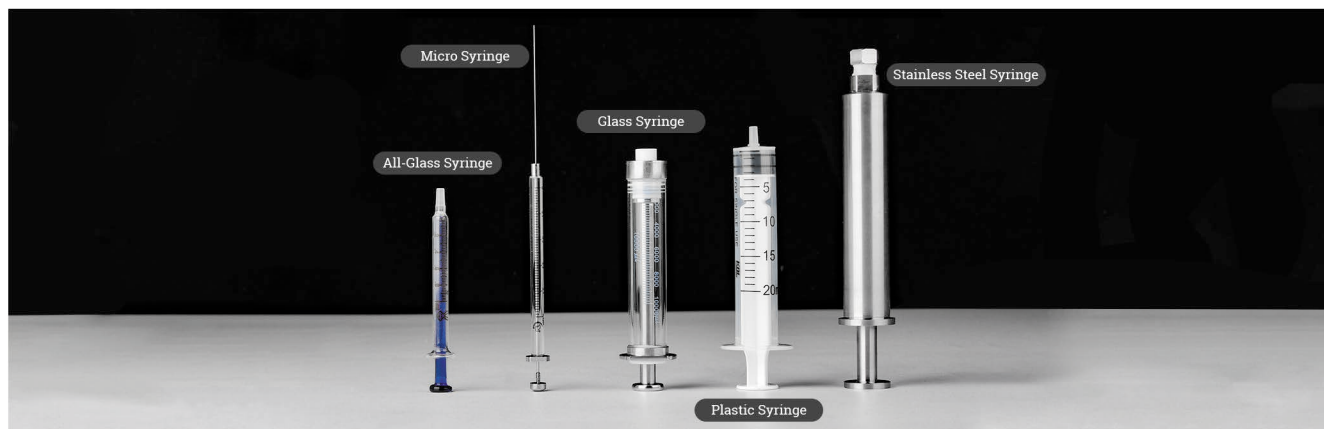
◀◀◀ Laboratory Syringe Pump

Applicable Syringes

Plastic Syringe	Internal Diameter(mm)	Reference Flow Rate (μL/min-mL/min)
1mL	4.70	0.0173-2.2889
2mL	8.95	0.0628-8.3002
5mL	12.36	0.1199-15.8299
10mL	14.90	0.1742-23.0046
20mL	19.20	0.2893-38.1984
30mL	22.00	0.3799-50.1520
50mL	29.20	0.6693-88.3505
60mL	29.20	0.6693-88.3505
100mL	32.00	0.8042-106.1544
150mL	40.00	1.2566-165.8712

Glass Syringe	Internal Diameter(mm)	Reference Flow Rate (μL/min-mL/min)
250μL	2.30	0.0042-0.5484
500μL	3.25	0.0083-1.095
1mL	4.60	0.0167-2.2033
2.5mL	7.28	0.0416-5.4944
5mL	10.30	0.0833-10.9986
10mL	14.57	0.1667-22.0081
25mL	23.00	0.4166-54.9859
50mL	32.57	0.8321-109.976
100mL	32.57	0.8321-109.976

Micro Syringe	Internal Diameter(mm)	Reference Flow Rate (nL/min-mL/min)
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	2-265.4



◀◀ Laboratory Syringe Pump

Intelligent Syringe Pump



Model

ISPLab01, ISPLab02, ISPLab04, ISPLab06, ISPLab08, ISPLab10, ISPLab12

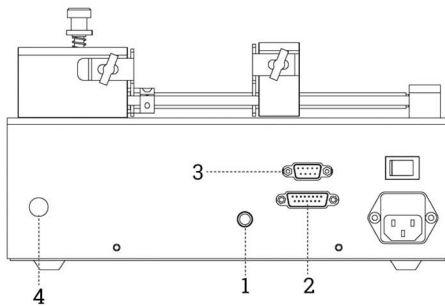
Introduction

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 volume flow with high precision (non-medical).

Features

- | Read time flow rate modification:
The flow rate can be modified during operation.
- | Colorful LCD display:
Friendly interface, 4.3 inch LCD shows every technical parameter in real time.
- | Commonly used syringe sizes:
Selectable syringes or input the inner diameter directly.
- | Two measurement mode for selection:
Volume mode and flow rate mode.
- | 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.
- | Screen lock function:
Enter password to unlock.

Syringe Pump External Control Schematic



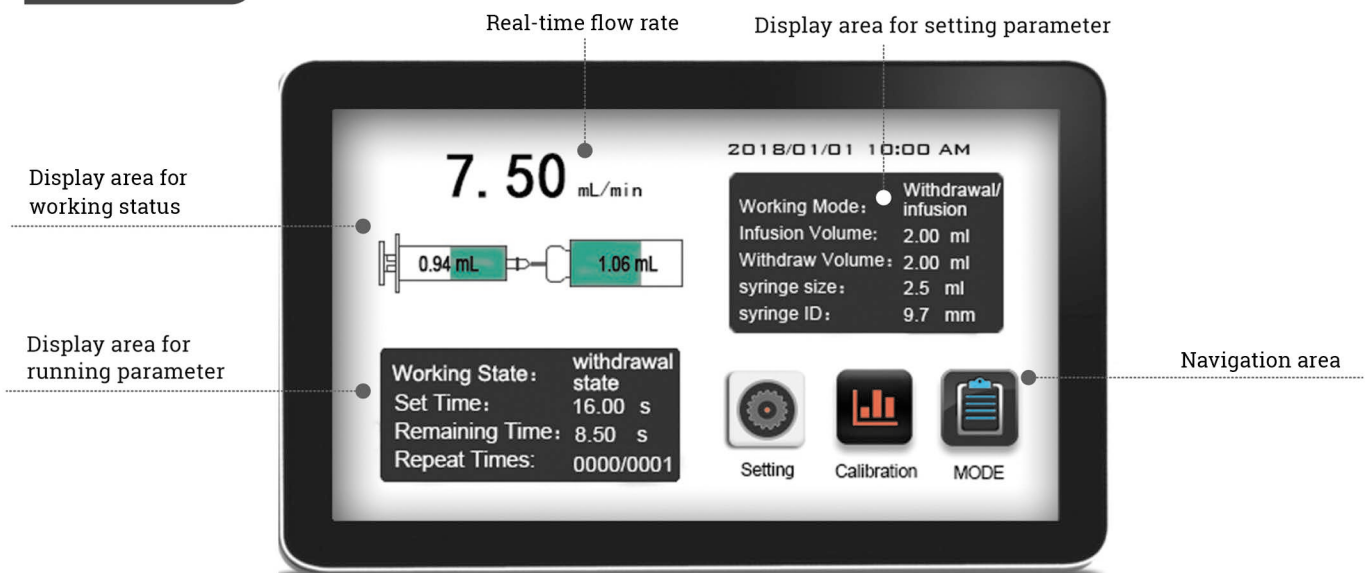
1-Foot pedal connector: Connect with foot pedal switch

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, continuous						
Channel number	1	2	4	6	8	10	12
Syringe size	0.5μL-150mL		10μL-10mL				
Syringe selection	Syringe model and customized diameter						
Linear speed range	1μm/min-132mm/min(Flow rate=Linear speed* syringe internal section)						
Min. linear rate	1μm/min						
Linear force	≤25kgf						
Max. stroke	140mm						
Stoke resolution	0.078μm/μstep						
Accuracy	Error ≤±0.3% (Stoke ≥30% of maximum stroke)						
Back distance	0.01-10mm						
Stored modes	Maximum 60 common modes						
Display	Industrial grade 4.3"LCD color display						
Control method	Touch screen and Mechanical keypad						
Power-off memory	Keep the previous parameters 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	AC 90-264V/65W						
Condition temperature	0~40℃						
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



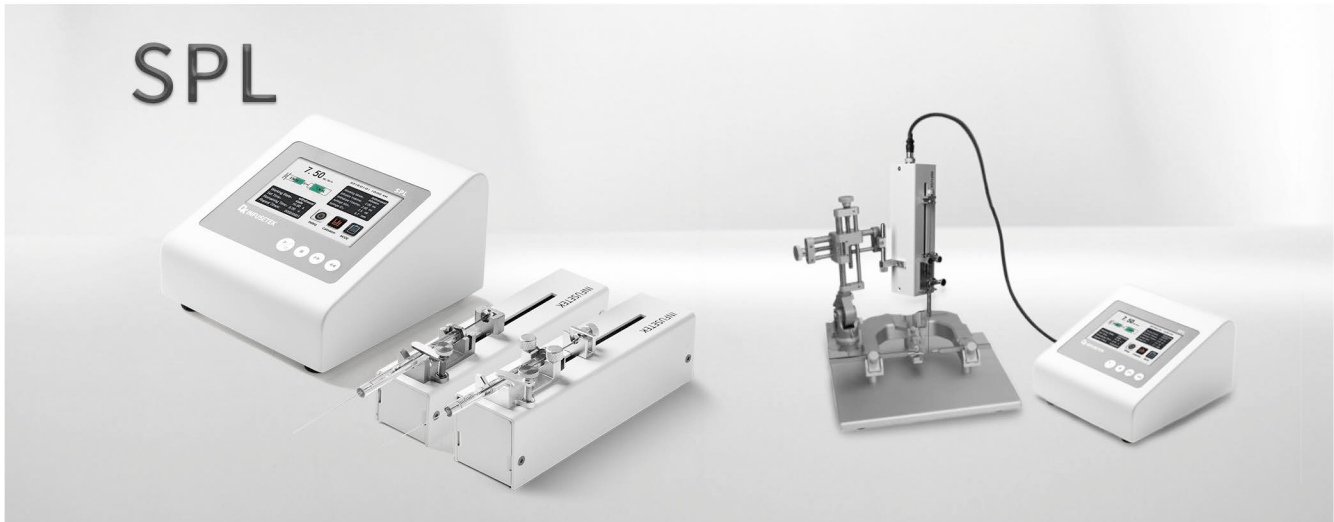
Laboratory Syringe Pump

Technical Specifications

Plastic syringe	Inside Diameter(mm)	Flow Rate($\mu\text{L}/\text{min}$ - mL/min)	
		ISPLab01/ISPLab02	ISPLab04-ISPLab12
1.0mL	4.70	0.0173-2.2889	0.0173-2.2889
2.0mL	8.95	0.0628-8.3002	0.0628-8.3002
5.0mL	12.36	0.1199-15.8299	0.1199-15.8299
10mL	14.90	0.1742-23.0046	0.1742-23.0046
20mL	19.20	0.2893-38.1984	—————
30mL	22.00	0.3799-50.1520	—————
50mL	29.20	0.6693-88.3505	—————
100mL	32.00	0.8042-106.1544	—————
150mL	40.00	1.2566-165.8712	—————

Microsyringe	Inside Diameter(mm)	Flow Rate(nL/min - mL/min)	
		ISPLab01/ISPLab02	ISPLab04-ISPLab12
0.5 μL	0.10	0.008-1.0296	—————
1 μL	0.15	0.018-2.3232	—————
2 μL	0.20	0.031-4.1448	—————
5 μL	0.35	0.096-12.6984	—————
10 μL	0.50	0.2-25.8	0.2-25.8
25 μL	0.80	0.5-66.4	0.5-66.4
50 μL	1.10	1-125.4	1-125.4
100 μL	1.60	2-265.4	2-265.4

Intelligent Syringe Pump



Model

SPL

Introduction

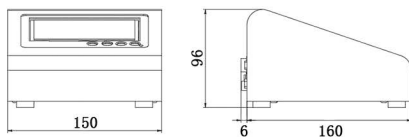
SPL series, with 4.3" full color touch screen and mechanical keypad control, easy and convenient operation. Support RS232 and RS485 communication, multiple external control interfaces, convenient for users to remotely control under different conditions.

N70/N70S push-pull pump unit, stable flow rate, compact structure and small size, convenient to be integrated. Stereotaxic compatible.

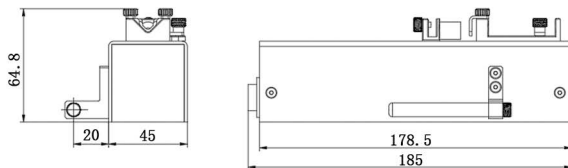
Features

- | Compact structure and light weight makes it ideal for hand-held or stereotaxic injection.
- | Stable flow rate, suitable for high precision transferring of micro volume.
- | Adjustable linear force.
- | 4 working modes: Infusion, withdrawal, infusion-withdrawal, withdrawal-infusion. The parameters of different working modes are saved independently without affecting each other.
- | Built-in multiple syringe models, also can set customized syringe inner diameter.
- | 4.3" full color LCD screen display, touch screen control. Friendly operating interface, the LCD screen displays technical datas in real time.
- | Two metering methods are available for selection: Infusion volume-infusion flow rate; infusion volume-infusion time. The infusion volume displayed in real time, also support calibration function.

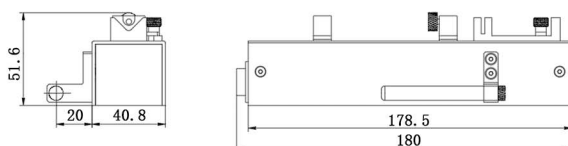
Dimension Drawing (Unit: mm)



Controller Dimension Drawing

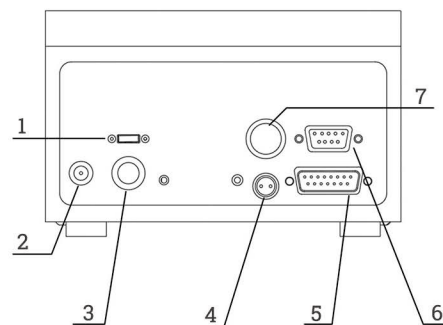


N70 Dimension Drawing



N70S Dimension Drawing

External Control Interface



- 1-TypeC Interface
- 2-Power socket
- 3-Power switch
- 4-Foot pedal interface
- 5-15 Pin interface
- 6-9 Pin interface
- 7-Aviation plug interface

Laboratory Syringe Pump

Technical Specifications

Working Mode	Infusion, Withdrawal, Infusion-Withdrawal, Withdrawal-Infusion, Continuous	
Syringe Size	N70S(0.5uL-100uL)	N70(5uL-1000uL)
Syringe Selection	Built in syringe model and customizable syringe inner diameter	
Linear Speed Range	0.6096um/min-152.4m/min	0.8um/min-200mm/min
Linear Speed Resolution	0.6096um/min	0.8um/min
Linear Force	≤13N (Adjustable)	≤40N (Adjustable)
Stroke Resolution	0.19um/μstep	0.25um/μstep
Max. Stroke	70mm	
Accuracy	Error≤±0.3%(Stroke≥30% of Max. stroke)	
Back Distance	0.01-10mm	
Common Mode	Up to 60 commonly used modes can be saved	
Display	4.3" full colour LCD screen	
Control	Touch screen and keypads	
External Control Signal	Start/stop signal, active switch signal: 5-24V.	
	Start/stop signal, passive switch signal, such as foot pedal.	
Communication Interface	RS232/RS485(Modbus protocol, RTU mode)	
Power Supply	DC24V/1.25A	
Condition Temperature	0-40℃	
Relative Humidity	<80%	
IP Rate	IP31	
Dimension	150*166*96mm (Controller) , 185*65*64.8mm (N70 Pump unit) , 185*60.8*51.6mm (N70s Pump Unit)	
Weight	1.062kg (Controller) , 0.469kg (N70 Pump unit) , 0.355kg (N70s Pump unit)	

N70S Flow Rate Chart

GAUGE	Inner Diameter(mm)	Flow Rate (nL/min-uL/min)
0.5	0.1	0.005 - 1.1975
1	0.15	0.011- 2.6925
2	0.2	0.019- 4.7875
5	0.35	0.059- 14.6625
10	0.5	0.119- 29.9225
25	0.8	0.306- 76.605
50	1.1	0.579- 144.83
100	1.6	1.225- 306.4175

N70 Flow Rate Chart

GAUGE	Inner Diameter(mm)	Flow Rate (nL/min-uL/min)
5	0.35	0.077- 19.2425
10	0.5	0.157- 39.270
25	0.8	0.402- 100.530
50	1.1	0.76- 190.067
100	1.6	1.608- 402.125
250	2.31	3.353- 838.192
500	3.25	6.636- 1659.15
1000	4.61	13.353- 3338.27

◀◀◀ Laboratory Syringe Pump

Modular Syringe Pump



Model

SPC/ZU-I

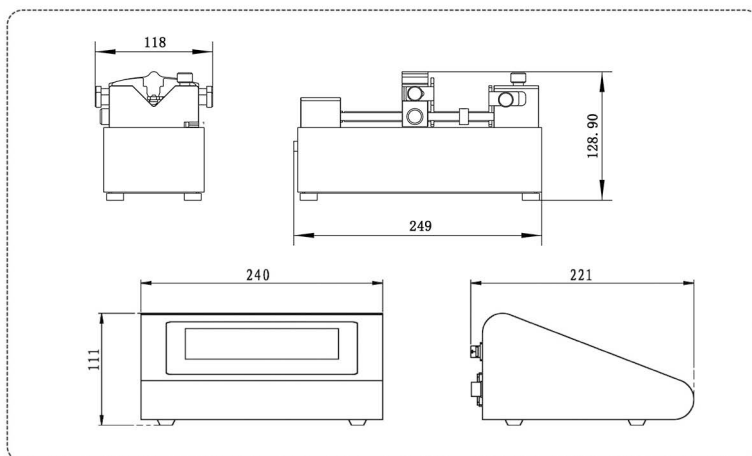
Introduction

7 inch touch screen controller, max 8 pump units available user-friendly interface, easy operation. Split type design, mainly for laboratory.

Features

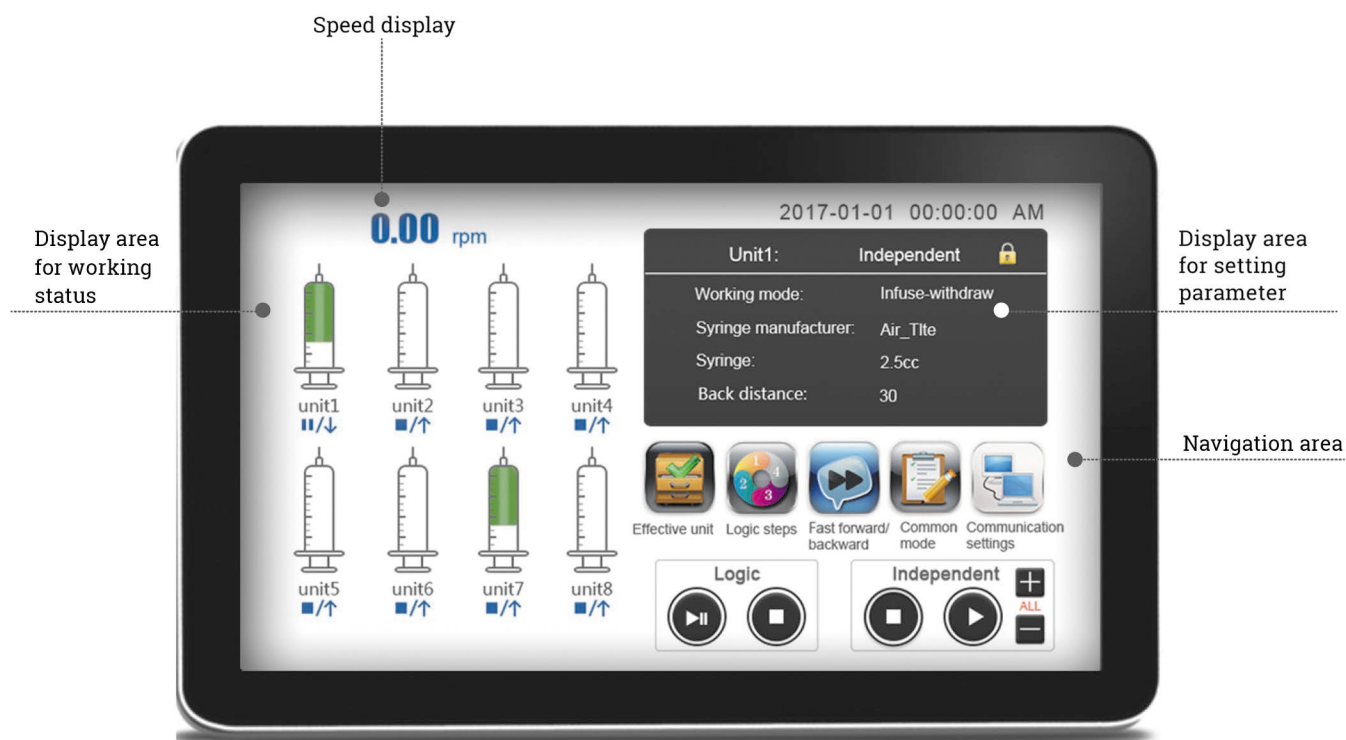
- | Real time flow rate modification function:
Flow rate can be modified during operation.
- | Two working modes: Independent working mode, each unit working independently, to infuse or withdraw with different speed synchronized or unsynchronized. Logic working mode, each unit works in order, with different proportion infuse or withdraw. Users may choose each unit to be independent or logic working mode.
- | Intelligent calibration, ensuring transfer volume accuracy. Online fine-tuning function, easy to adjust the volume of a certain unit, decrease the volume error.
- | Real time monitoring, animate display monitoring result. Controller can receive blockage alarm of each unit.
- | Reverse distance setting, excludes bubbles inside syringe, improve volume accuracy.
- | Fast forward and backward function used for loading syringe, syringe washing and releasing blockage protection.

Dimension Drawing (Unit: mm)



◀◀◀ Laboratory Syringe Pump

Interface Display



Technical Specifications

Working mode	Infusion,withdrawal,infusion/ withdrawal,withdrawal/infusion	Display	Industrial grade 7"LCD color display
Pump unit	1-8 optional	Control method	Touch screen
Syringe size	1mL-50mL plastic syringe 0.5μL-50mL glass syringe	Power-off memory	Keep the previous parameters after power supply again
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 internal section)	Communication interface	BCD switch(UP to 15 individual addresses available)
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	Error≤ ±0.5% (Stroke≥30% of maximum stroke)	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
Common modes	5 groups data for each running mode	Pump unit dimension	257×110×131 (mm)
		Pump unit weight	3.0kg

◀◀◀ Laboratory Syringe Pump

Modular Syringe Pump



Model

SPM/ZU-I

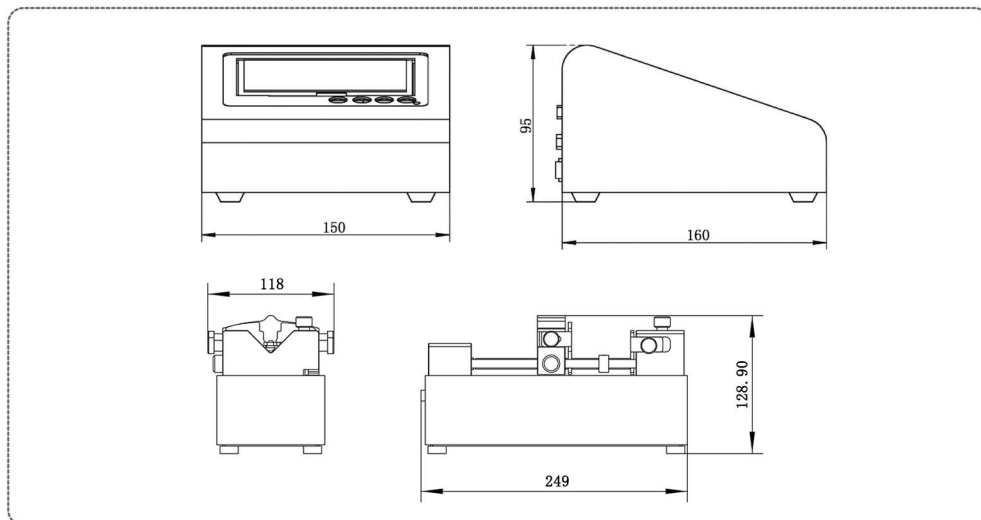
Introduction

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

Features

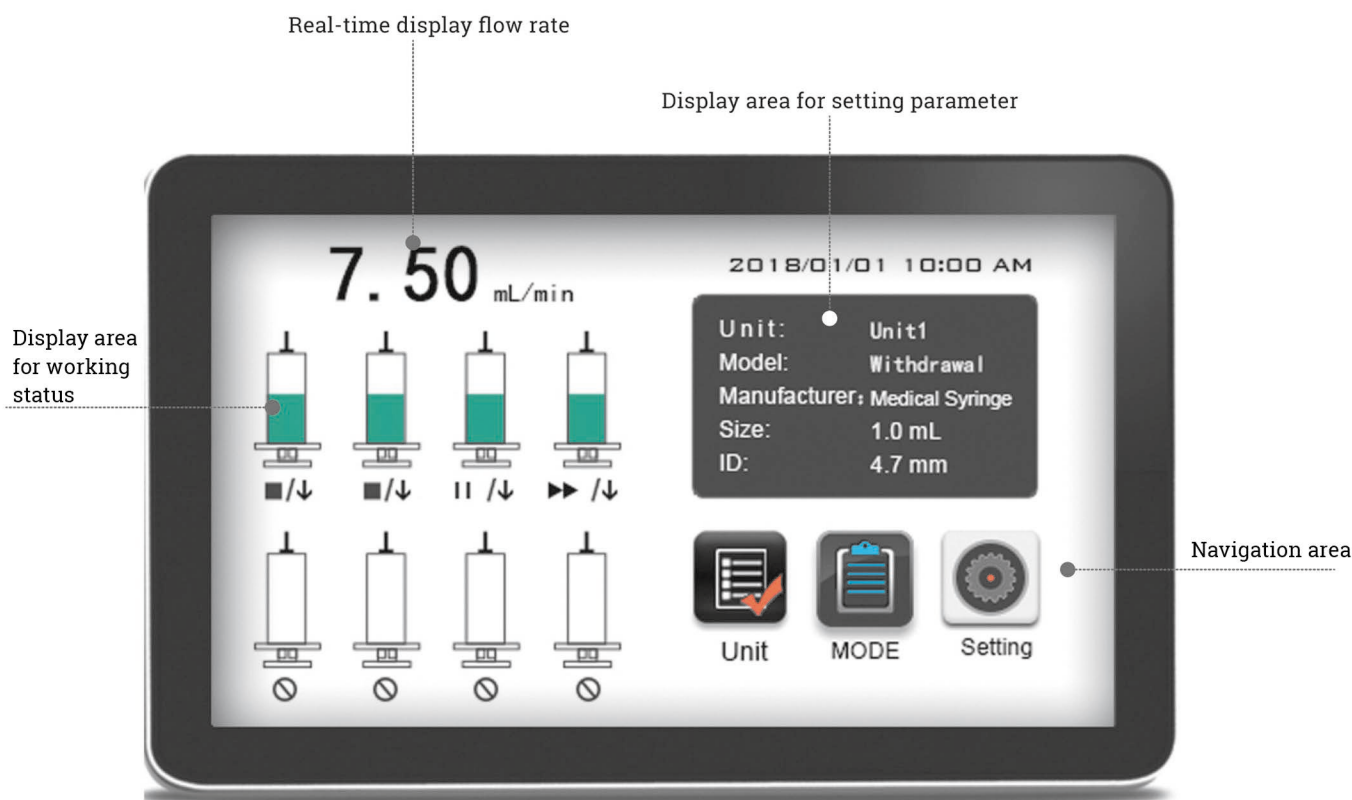
- | Real time flow rate modification function:
Flow rate can be modified during operation.
- | Each unit works independently, single or multiple units can be set up.
- | Each unit can infuse or withdraw liquid synchronously or asynchronously.
- | Intelligent calibration, ensuring transfer volume accuracy. Online fine-tuning function, easy to adjust the volume of a certain unit to decrease volume error.
- | Real time monitoring, animate display monitoring result. Controller can receive blockage alarm of each unit.
- | Reverse distance setting, excludes bubbles inside syringe, improve volume accuracy.
- | Fast forward and backward function used for loading syringe, syringe washing and release blockage protection.

Dimension Drawing (Unit: mm)



◀◀◀ Laboratory Syringe Pump

Interface Display



Technical Specifications

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

Classic Syringe Pump

Model

SPLab01, SPLab02, SPLab04, SPLab06, SPLab08, SPLab10, SPLab12

Introduction

The syringe pump with infusion/withdrawal mode. Real time flow rate modification function:
Can adjust the flow rate during the pump is running.
Stainless steel housing, and large-screen chromatic LCD is easy to operate. It can install different types of syringes, and it is suitable for transferring small flow volume with high precision (non-medical).

SPLab Series



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				
Syringe selection	Syringe size and customized diameter						
Linear speed range	5μm/min-132mm/min(Flow rate=Linear speed* syringe internal section)						
Min. linear rate	5μm/min						
Linear force	≤25kgf						
Max. stroke	140mm						
Stoke resolution	0.078μm/μstep						
Accuracy	Error≤ ±0.5%, (Stroke≥30% of maximum stroke)						
Display mode	320×240TFT-LCD						
Control method	Digital knob and 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℃						
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

◀◀◀ Laboratory Syringe Pump

Technical Specifications

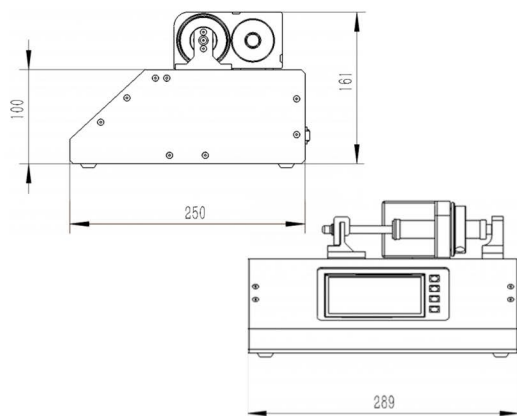
Plastic syringe	Inside Diameter(mm)	Flow Rate($\mu\text{L}/\text{min}$ - mL/min)	
		SPLab01/SPLab02	SPLab04-SPLab12
1.0mL	4.70	0.0867-2.2889	0.0173-2.2889
2.0mL	8.95	0.3144-8.3002	0.0628-8.3002
5.0mL	12.36	0.5996-15.8299	0.1199-15.8299
10mL	14.90	0.8713-23.0046	0.1742-23.0046
20mL	19.20	1.4469-38.1984	_____
30mL	22.00	1.8997-50.1520	_____
50mL	29.20	3.3466-88.3505	_____
100mL	32.00	4.021-106.1544	_____
150mL	40.00	6.283-165.8712	_____

Microsyringe	Inside Diameter(mm)	Flow Rate(nL/min - $\mu\text{L}/\text{min}$)	
		SPLab01/SPLab02	SPLab04-SPLab12
10 μL	0.50	1-25.91	1-25.91
25 μL	0.80	2.5-66.34	2.5-66.34
50 μL	1.10	4.75-125.4	4.75-125.4
100 μL	1.60	10-256.3	10-256.3

◀◀◀ Laboratory Syringe Pump

MIX60

Dimension Drawing (Unit: mm)



Introduction

The MIX60 stirring syringe pump is equipped with a magnetic stirring system that can rotate and move linearly, which can drive the stirrer inside the syringe to rotate and move reciprocally, thereby uniformly stirring the fluid inside the syringe.

The pump is suitable for transferring various suspensions in various fields, such as pharmacy, biology, chemistry, energy, etc.

-10ml glass syringe available, flow rate range 0.66uL/min-22mL/min

-Simple programming available, up to 15 steps configurable

-Syringe and stirring system can be controlled independently

-With limit protection to prevent system damage

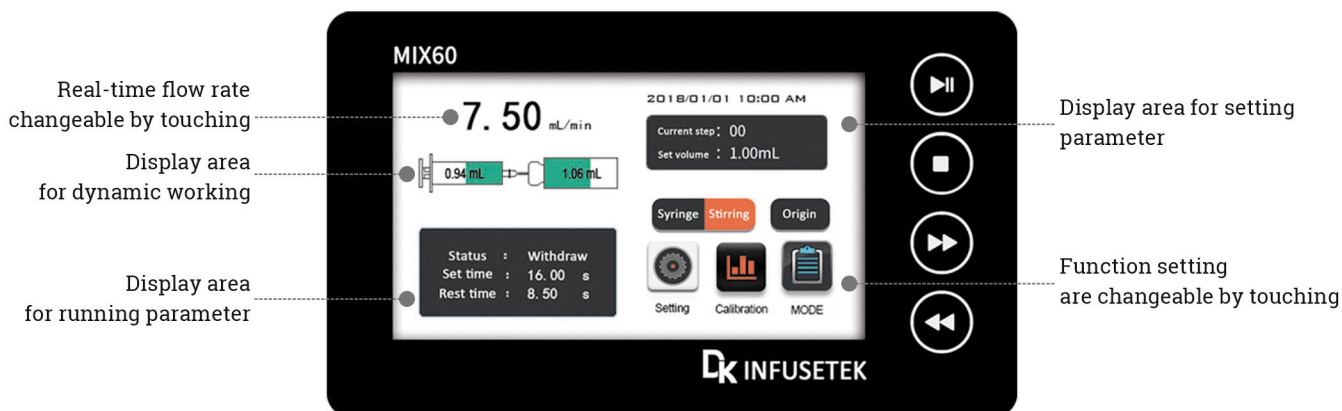
-Stirring speed adjustable, for stirring different media

-Automatically change reciprocating distance as the amount of liquid in syringe decreases

Technical Specifications

Working mode	Infusion	Linear force	≤25kgf, online adjusting
Syringe size	10mL	Max. stroke	60mm
Syringe linear speed range	4um/min-132mm/min	Input voltage	DC24V/2.5A
Stirring rotation speed	25rpm-460rpm	Accuracy	Error ≤±0.3% (Stroke ≥ 30% of maximum stroke)
Stirring pushing speed	1.6mm/s-40mm/s	Max steps	20 Steps
Stirring mode	Fixed position stirring, reciprocating stirring	Display	Industrial grade 4.3"LCD color display
Flow rate	0.66uL/min-22mL/min	Control method	Touch screen and mechanical keypad

Interface Display



Rotary Switching Valve

Rotary Switching Valve



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



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

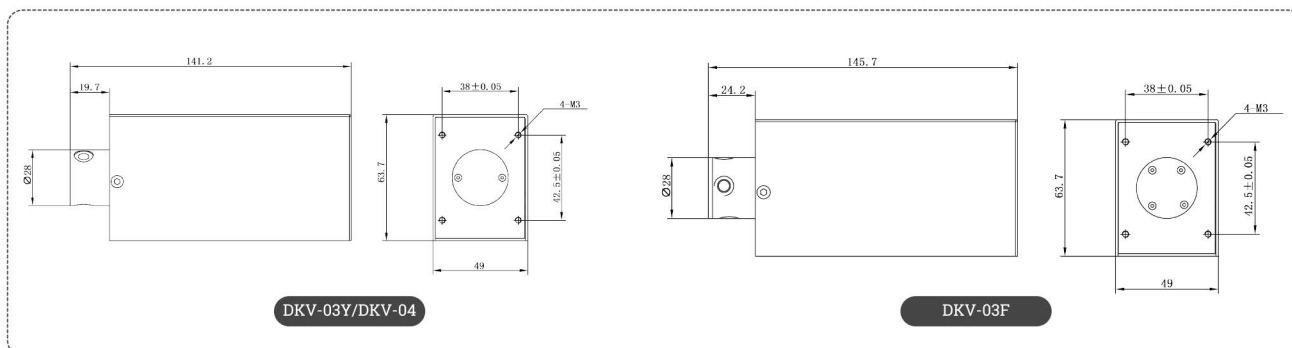


Model No.: DKV-04
Valve: 4 port non-distribution valve

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)



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
Valve material	Valve body: PCTFE; Valve element: PTFE	Baud rate (bps)	9600 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	Drive Dimension(mm)	121.5 x 49 x 63.7
Connection	1/4-28UNF	Weight	625g

Valve



HXF3YB1/HXF3F1/HXF4B1 Technical Specifications

Connection	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 series

HXF3YB2 Technical Specifications

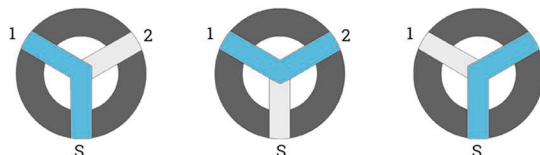
Connection	1/4-28 UNF	Material	Alumina ceramics
Path diameter	1.5mm	Working temperature	0°C~100°C
Maximum pressure	0.4MPa	Storage temperature	-20°C~65°C
Media compatibility	Compatible with most reagents (Alumina ceramic compatible materials)	Compatible Industrial Syringe Pump Model No.	SP60-1A, SP30-1A, ASD60 series, CFSP-I

HXF3YB3 Technical Specifications

Connection	1/4-28 UNF	Material	PEEK, UHMWPE
Path diameter	1.4mm	Working temperature	2°C~40°C
Maximum pressure	0.68MPa	Storage temperature	-20°C~65°C
Media compatibility	Compatible with most reagents (PEEK, UHMWPE compatible materials)	Compatible Industrial Syringe Pump Model No.	SP60-1A, SP30-1A, ASD60 series, CFSP-I

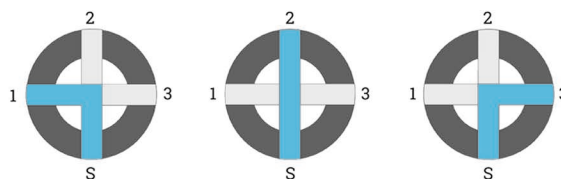
3-port non-distribution valve (S-1, 1-2, S-2)

HXF3YB1
HXF3YB2/HXF3YB3



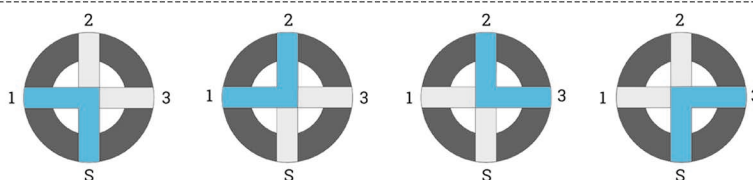
3-port distribution valve (S-1, S-2, S-3)

HXF3F1



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

HXF4B1



Valve



3-Port
Distribution Valve
Model: HXF3F2



4-Port
Distribution Valve
Model: HXF4F2



6-Port
Distribution Valve
Model: HXF6F2



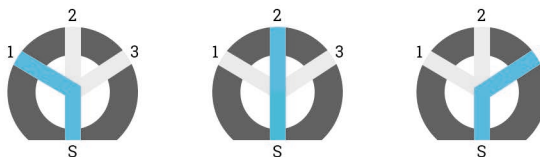
9-Port
Distribution Valve
Model: HXF9F2

HXF3F2/HXF4F2/HXF6F2/HXF9F2 Technical Specifications

Connection	1/4-28 UNF	Material	Alumina ceramics
Path diameter	1mm	Working temperature	0°C~100°C
Maximum pressure	0.4MPa	Storage temperature	-20°C~65°C
Media compatibility	Compatible with most reagents (Alumina ceramic compatible materials)	Compatible Industrial Syringe Pump Model No.	SP60-1A、SP30-1A、 ASD60 Series

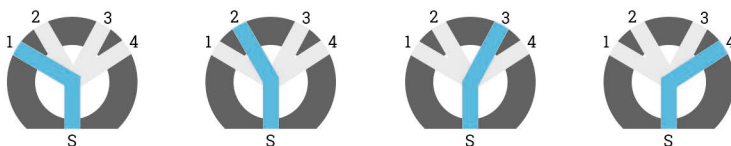
3-way ceramic distribution valve
(S-1、S-2、S-3)

HXF3F2



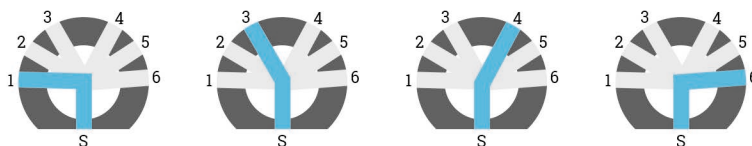
4-way ceramic distribution valve
(S-1、S-2、S-3、S-4)

HXF4F2



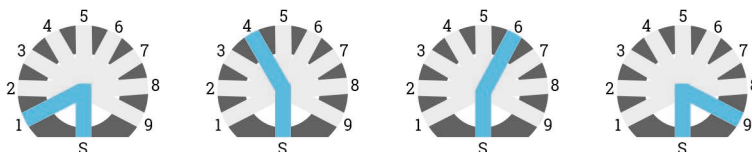
6-way ceramic distribution valve
(S-1、S-3、S-4、S-6)

HXF6F2



9-way ceramic distribution valve
(S-1、S-4、S-6、S-9)

HXF9F2



Accessories



Technical Specifications

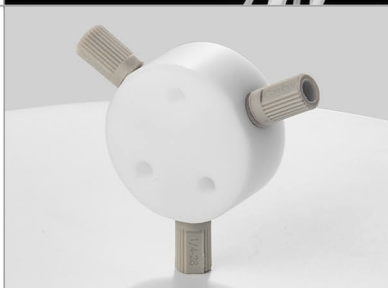
Syringe size	1ml, 2.5ml, 5ml, 10ml, 25ml	Liquid temperature	0°C~40°C
Stroke	60mm	Lifetime	2,000,000 times
Plunger rod, barrel material	Zirconia	Max. pressure	0.68MPa
Liquid path material	Zirconia, PTFE	Compatible pumps	SP60 Series, ASD60 Series, CFSP-I

Name	Picture	Size	Material	Suitable Product
60mm Syringe		50μl	Barrel material: Borosilicate glass; Plunger rod material: Stainless steel; Plunger seal material: PTFE	SP60 Series, ASD60 Series, CFSP-I
		100μl		
		250μl		
		500μl		
		1.0ml		
		2.5ml		
		5.0ml		
		10ml		
		25ml		
		50ml		SP60-1A50
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		
		12.5ml		

Accessories

Name	Picture	Size	Material	Suitable Product
Microsyringe		0.5µl	Barrel material: Borosilicate glass; Plunger rod material: Stainless steel; Plunger seal material: PTFE	SPLab series, ISPLab series, ZU-I(SPC, SPM)
		1µl		
		2µl		
		5µl		
		10µl		
		25µl		
		50µl		
Gastight glass syringe with Luer-lock		100µl	Barrel material: Borosilicate glass; Plunger rod material: Stainless steel; Plunger seal material: PTFE	ISPLab-Pro ZU-I(SPC, SPM)
		250µl		
		500µl		
		1ml		
		2.5ml		
		5ml		
		10ml		
Gastight glass syringe with Internal thread		25ml	Barrel material: Borosilicate glass; Plunger rod material: Stainless steel; Plunger seal material: PTFE	ISPLab-Pro ZU-I(SPC, SPM)
		50ml		
		100ml		
		250µl		
		500µl		
		1ml		
		2.5ml		
Plastic syringe		1ml, 2ml, 5ml, 10ml, 20ml, 30ml, 50ml	Barrel material: PP; Seal plug: Rubber	SPLab series, ISPLab series, ZU-I(SPC, SPM)
		100ml		SPLab series, ISPLab series
		150ml		

Accessories

Name	Picture	Model No.	Material	
Inverted Cone		CC-16ET	Use together with connector, ETFE material	
		CC-20ET		
		CC-25ET		
		CC-30ET		
		CC-32ET		
Connector		CC-1601-GY-PP	Used for rotary valve, 1/4-28 thread, PP material	
		CC-3201-GY-PP		
PTFE Tubing		Model No.(ID*ODmm)	Material	
		0.3*1.6	PTFE	
		0.5*1.6		
		0.8*1.6		
		1.0*2.0		
		1.5*2.5		
		1.6*3.2		
		2.0*3.0		
Multiway Connector		CBR-3W-F01-PT	PTFE	
Model No.	Picture	ID(mm)	OD(mm)	Material
14G		1.55	2.1	Luer connector: PP; Needle: Stainless steel
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	PTFE	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
Aluminum Chloride 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	PTFE	PPS	UHMWPE
Antimony Trichloride	A	A	N/A	D
Aqua Regia (80% HCl, 20% HNO ₃)	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	PTFE	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
Cyanoic 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	PTFE	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
Hydroxyacetic Acid 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	PTFE	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	PTFE	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
Pyrogalllic 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	PTFE	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 Hyposulfite	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

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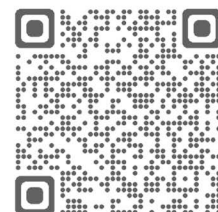


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