



Laboratory Syringe Pump

Manual No. 13710



For research use only. Not for human clinical use.

Important Information

Read this manual carefully before operating the pump.

Warnings

- Use only the power cord supplied with or specified for this product.
- The device is grounded through the AC power cord. Connect it to a properly grounded outlet to reduce electric shock and interference risk.
- Do not touch the moving linear mechanism while the pump is operating.
- Excessive pushing or pulling of the syringe may cause liquid overflow and may injure the operator or damage the device.
- If liquid spills onto the actuator or moving mechanism, turn off power immediately. Clean and dry the area before powering on again.
- Do not open the enclosure or attempt internal repairs.
- Turn off the pump before installing external control equipment.
- **This device is not FDA registered and must not be used clinically on humans.**

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1. Product Overview

The touch screen laboratory syringe pumps are designed for high-precision, low-flow liquid transfer. The interface supports direct touch operation and synchronized physical membrane-key operation.

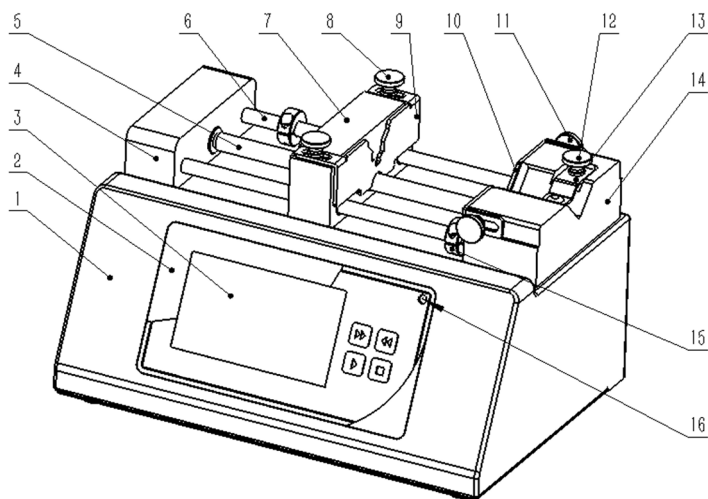
The models support four operating modes: Infuse, Withdraw, Infuse then Withdraw, Withdraw then Infuse and cyclic infuse/withdraw operation. The system can run by time/volume or by speed/volume, depending on the parameter-setting method selected in System Settings.

1.1 Reference Flow Ranges

Reference ranges depend on syringe inner diameter and model. Use the minimum and maximum prompts shown by the touch screen when entering parameters.

Syringe	Inner Dia. (mm)	Flow Range (nL/min - mL/min)
0.5 uL	0.103	0.0031 - 0.0013
1 uL	0.146	0.0062 - 0.0027
2.5 uL	0.206	0.0124 - 0.0053
5 uL	0.343	0.0342 - 0.0148
10 uL	0.485	0.0684 - 0.0295
25 uL	0.729	0.1545 - 0.0668
50 uL	1.03	0.3083 - 0.1333
100 uL	1.457	0.6170 - 0.2668
250 uL	2.304	1.5427 - 0.6671
500 uL	3.256	3.0878 - 1.3320
1 mL	4.73	6.5015 - 2.8110
2 mL	8.92	23.122 - 9.9980
2.5 mL	8.92	23.122 - 9.9980
5 mL	12.4	44.683 - 19.3220
10 mL	14.87	64.256 - 27.7860
20 mL	19.07	105.68 - 45.6990
30 mL	23.36	158.58 - 68.5730
50 mL	28.95	243.55 - 105.3190
60 mL	29.47	252.38 - 109.1360
100ml (For USS-SP00008 Only)	33.00	316.46 - 136.84

2. Product Structure



No.	Part	No.	Part
1	Enclosure	9	Middle pressure plate
2	Panel	10	V-clamp plate
3	Touch screen	11	Locking knob
4	Rear support	12	Pressure plate pull knob
5	Lead screw	13	Syringe pressure plate
6	Guide rod	14	V-block support
7	Slider	15	Limit collar
8	Slider knob	16	Indicator light

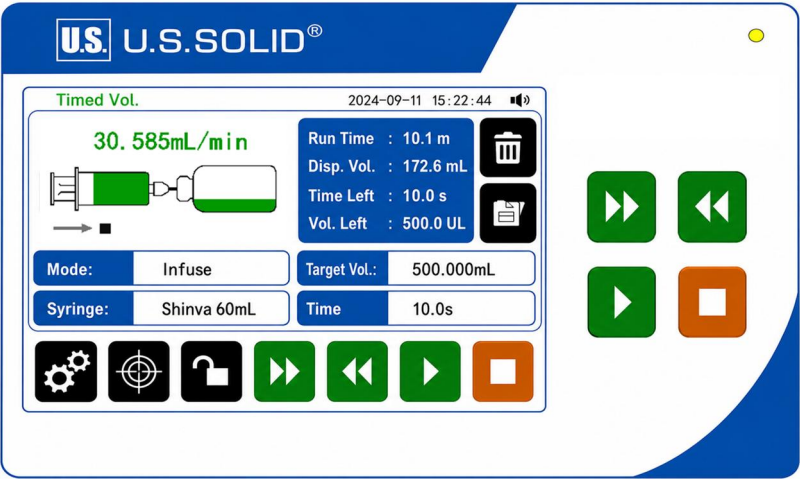
The limit collar stops slider travel and helps protect the syringe. Loosen the collar screw, slide it to the required position, then lock it.

The indicator light turns on while the pump is running and turns off when the pump is paused or stopped.

2.1 Syringe Installation

1. Lift the pressure plate pull knob and rotate it 180 degrees. Place the syringe pressure plate on the V-block support.
2. Loosen the locking knobs on both ends and loosen the two slider knobs on top of the slider.
3. Install the syringe. Rotate and release the syringe pressure plate to press the syringe barrel.
4. Slide the V-clamp plate and tighten the locking knobs to fix the syringe barrel flange.
5. Use Fast Forward or Fast Reverse to adjust the slider position, or manually move the slider if the half-nut is released.
6. Fit the slider against the syringe plunger end, then tighten the two slider knobs to fix the plunger.
7. Confirm that the syringe is secure and set the limit collar before operation.

3. Touch Screen Interface and Operation



3.1 Main Screen

- The main screen displays the current flow value and operating direction. During operation, an animation shows the movement direction.
- Total injected volume, run time, remaining time, and remaining liquid volume are displayed in real time.
-  The clear key resets total injected volume and run time.
-  The program key opens the program storage and recall screen.
-  Status icons show direction,  running,  paused, and  stopped states.

3.2 Operation Workflow

1. Install the syringe and set the limit collar.
2. Open System Settings and select the parameter-setting method: Time/Volume or Speed/Volume.
3. Select the working mode. Support four modes: Infuse, Withdraw, Infuse/Withdraw, and Withdraw/Infuse.
4. Select a built-in syringe or create a custom syringe by entering syringe capacity and inner diameter.
5. Open Parameter Settings and enter the target volume and time or flow values. The on-screen keypad displays minimum and maximum prompts for easier entry.
6. Confirm the settings and press Run. Use Pause to pause and Stop to stop the pump.

3.3 Syringe Settings

Multiple syringe manufacturers and injection syringes are available. The selected option appears in blue.

- If the syringe is not listed, select Custom.
- Enter the syringe capacity and inner diameter.
- Confirm the setting before entering operating parameters.

3.4 Parameter Settings

Parameter Settings

Target Volume

5 mL

(Single)

Infuse Rate

20.000 uL/min

Infuse Time

4 : 10 : 00 : 00

Withdraw Rate

6.975 mL/min

Withdraw Time

0 : 00 : 43 : 00

Cycles

1 t

(0 for Continuous)

Interval Time

1.0 s

Confirm

Exit

- Time/Volume mode: enter target volume and infusion time or withdrawal time. The pump calculates infusion or withdrawal flow rate automatically.
- Speed/Volume mode: enter target volume and infusion flow or withdrawal flow rate. The pump calculates infusion or withdrawal time automatically.
- Tap an input field to open the keypad. Minimum and maximum prompts help prevent out-of-range entries.
- Live adjustment: while running, the pump can accept updated time values in Time/Volume mode or updated flow values in Speed/Volume mode. After confirmation, the pump runs according to the new parameters.
- For cycle operation, set the run count. A count of 0 means continuous operation. Set interval time if a delay is required between cycles.

3.5 System Settings



Press  to enter system settings.

Item	Setting
Parameter setting method	Time/Volume or Speed/Volume.
Language	Chinese or English.
Sound	Enable or disable key tone, completion sound, and stall alarm sound.
Communication interface	COM or USB. COM uses the DB15 interface for RS485 communication; USB uses the USB port.
Baud rate	1200 bps to 115200 bps. Default: 9600 bps.
Address	Device address 01-31.
Date and time	Set current date/time. Scheduled start can run at the set date/time; it is not retained after power loss.
Factory reset	Restores all syringe flow calibration coefficients to factory values; other parameters remain unchanged.
External Control Settings	Use external signal to control the running status of the syringe pump. See section 3.6.

3.6 External Control Settings

- **Start/Stop:** Input source can be Manual, Communication, or Switch.
 - Manual: start/stop is controlled from the touch screen. Other start/stop methods are disabled.
 - Communication: start/stop is controlled through RS485 communication. Touch screen and other methods are disabled.
 - Switch: start/stop is controlled by a foot switch or other external switch. Other methods are disabled.

When Switch is selected: Configure Start Type, Signal Type, and Signal Logic. When Start Type select Switch, input uses UP1; When Start Type select voltage, input uses UP2.

Initial State: When the signal type is set to "Pulse," the device's operating state upon startup aligns with the selected initial state.

External setting	Control behavior
Switch + level + positive logic	UP1 open = stop; UP1 shorted to GND = start.
Switch + level + negative logic	UP1 open = start; UP1 shorted to GND = stop.
Switch + pulse	UP1 input used. Negative or positive pulse toggles start/stop according to selected logic. Positive logic: - pulse Negative logic: + pulse
Voltage + level + positive logic	UP2 open = stop; UP2 shorted to GND = start.
Voltage + level + negative logic	UP2 open = start; UP2 shorted to GND = stop.
Voltage + pulse	UP2 input used. Negative or positive pulse toggles start/stop according to selected logic. Positive logic: - pulse Negative logic: + pulse

3.7 Calibration

Press  to enter system settings.

1. Fill the syringe with liquid. Make sure the syringe contains at least 60% of its capacity.
2. Open the Calibration screen from the bottom key area.
3. Press  Run to start calibration. The pump runs and stops automatically at the set time.
4. Measure the actual delivered volume and enter it in the measured-volume field.
5. Press Confirm to complete calibration.

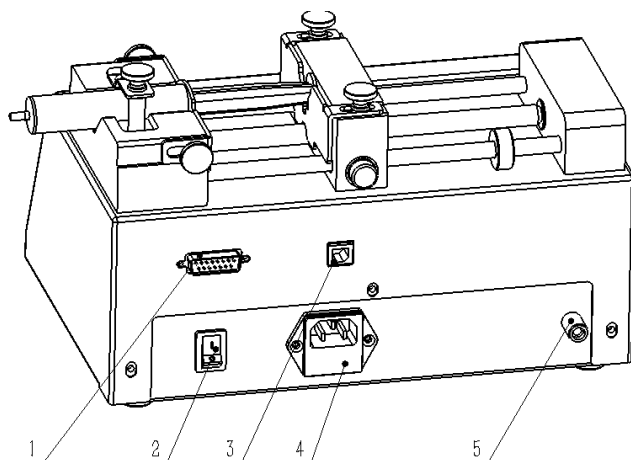
Calibration Note

Calibration is syringe-specific. Use factory reset only when you want to restore all syringe flow calibration coefficients to factory defaults.

3.8 Lock, Fast Motion, Run, Pause, and Stop

- Lock  /Unlock  : tap the lock key to enter or exit lock state. Some buttons become gray in lock state to prevent accidental operation.
- Fast Forward  / Fast Reverse  : hold the key to move the pump at maximum speed. Release the key to stop. Use these keys to adjust the slider position.
- Run  /Pause  : tap Run to start operation with the current parameters. During operation the icon changes to Pause; tap it to pause.
- Stop  : tap Stop during operation to stop the pump.
- Sound icon  : tap the sound icon to enable or disable sound  . Sound can also be changed in System Settings.

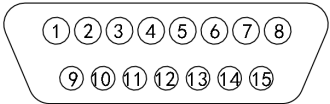
4. Rear Interfaces



No	Interface	Function
1	DB15 external control interface	Used with the external module for RS485 communication and external start/stop control.
2	Power switch	Turns device power on or off.
3	USB interface	Communication control input interface.
4	Power socket	AC power input with built-in fuse. If power is abnormal, check the fuse and replace it with the spare fuse if required.
5	Ground terminal	Use grounding for safe and reliable operation.

4.1. External Control Interface Definition

After installing the optional external control module, the rear panel DB15 connector can be used to enable external signal control. An optional foot switch can also be connected for start/stop operation.



Pin	Terminal Name	Pin	Terminal Name
1	—	9	—
2	—	10	—
3	GND	11	GND
4	—	12	External Control Enable
5	UP2 (Start/Stop 2) Voltage Control Start/Stop	13	UP1 (Start/Stop 1) Switch Signal Control Start/Stop
6	GND	14	GND
7	UART2-RS485-A	15	UART2-RS485-B
8	GND		

RS485 Communication Control

When "Communication" is selected for at least one of the options (Start/Stop or Parameter Input) in the external control settings interface, select COM as the upper computer interface. Connect RS485-A to Pin 7 and RS485-B to Pin 15. The optional RS485 communication module is required for this function.

The device uses the Modbus RTU communication protocol. For detailed communication protocol information, please contact us at service@ussolid.com.

Start/Stop Control

When Start/Stop is set to "Switch" and the start/stop type is set to "Switch Signal", connect one end of the dry contact switch to Pin 13 and the other end to Pin 3 (or Pin 6, 8, 11, or 14).

When Start/Stop is set to "Switch" and the start/stop method is set to "Voltage", connect the positive terminal of the adjustable voltage source to Pin 5, and connect the negative terminal to Pin 3 (or Pin 6, 8, 11, or 14).

Contact

Feel free to visit our website: www.ussolid.com

You can email us at service@ussolid.com