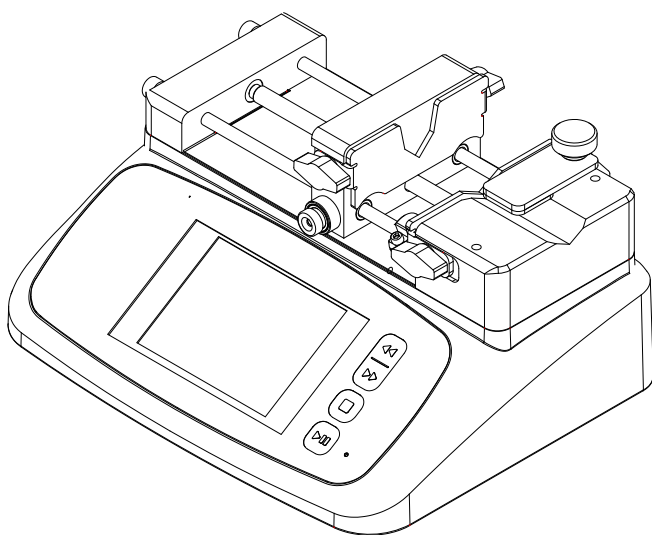




LAA (TYD01) Series Syringe Pump

Operating Manual



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Safety Precautions



Danger

- To avoid damage, use the correct voltage indicated on the rating plate label of the pump.
- Make no unauthorized dismantling, changes, or modifications to the pump. This may result in malfunctions or potential accidents. Take special care when servicing internal components.
- Keep a distance from the lead screw when the syringe pump is in operation. Fingers or loose clothing may get caught in the drive.



Warning

- When installing a syringe, the limit block must be adjusted to the appropriate position to avoid accidental damage to the syringe. Our company cannot be held liable for loss caused by damage to the syringe, including leakage of toxic, hazardous, or valuable liquids.
- Turn off the power before connecting or disconnecting external control devices or communication interfaces.
- The pump is equipped with a grounding plug. It must be well-grounded at all times.
- This product is not intended for medical use.

1 Description

The LAA series syringe pumps are versatile, supporting a wide range of syringe sizes and offering five operational modes: infuse, withdraw, infuse/withdraw, withdraw/infuse, and continuous operation. They feature a high-resolution color LCD touchscreen for easy parameter adjustment, along with multiple status indicators for real-time monitoring. A broad selection of built-in syringe manufacturers and specifications simplifies setup, while the ability to save and quickly recall up to three operating configurations enhances user convenience. These pumps deliver high-precision control, backed by robust protection and alarm systems. External signal inputs allow for easy start and stop control, and the built-in RS-485 communication interface, compatible with the MODBUS protocol, enables seamless control of one or multiple pumps by external devices. The LAA series includes the following models:

LAA-01: Single syringe, size range 10 μ L to 60 mL, linear velocity from 1 μ m/min to 150 mm/min.

LAA-02: Dual syringes, size range 10 μ L to 60 mL, linear velocity from 1 μ m/min to 150 mm/min.

Applications

- Micro volume transfer
- Micro flow rate transfer
- No pulsation transfer
- High-precision transfer

2 Functions and Features

- Multiple operating modes
- Color LCD touchscreen for ease of use
- Screen lock and mute key operation available
- Clear operation status indicators

- Support a variety of syringes, both standard and custom-defined options
- Multiple pre-stored data
- High precision control
- RS485 MODBUS communication
- External control signal for start/stop and direction
- Wide power input range
- Streamlined plastic housing

3 Components

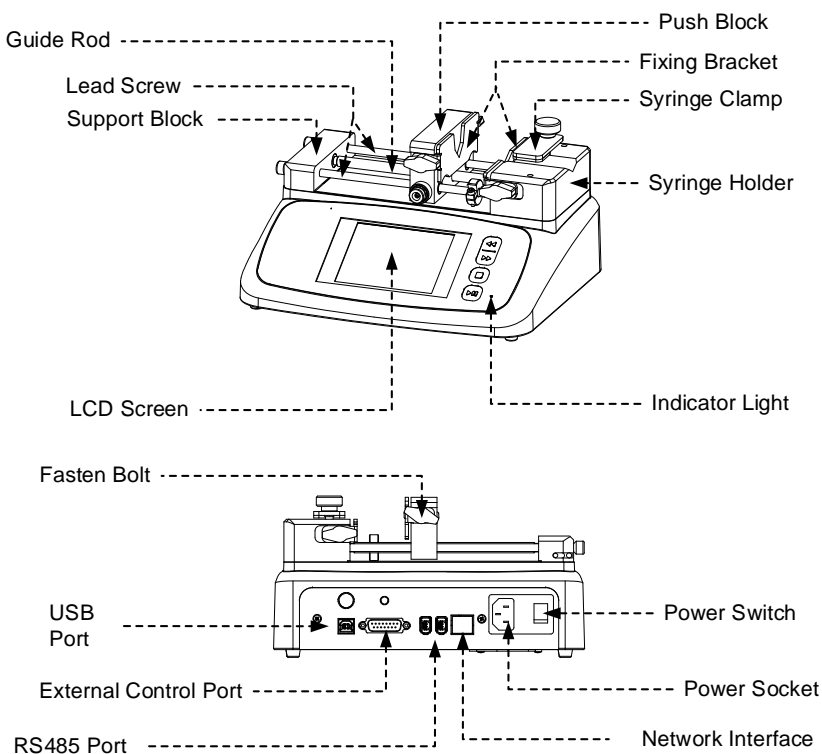


Figure 1. Components

4 Operating Keypad and Display Panel







4.1 Keypad

- ▶ || START/PAUSE key. Press to start, pause, or resume the defined operation.
- STOP key. Stop or reset the operation.
- ▶▶ FAST FORWARD key. When the pump stops, press and hold the key to push at the maximum speed.
- ◀◀ FAST BACKWARD key. When the pump stops, press and hold the key to retreat at the maximum speed.










Green indicator: Illuminates during operation and blinks when paused.

Red indicator: Illuminates when an operation ends and blinks if the motor loses speed.

4.2 LCD Touch Screen Display

Icon	Indication	Icon	Indication
	Tone On		Tone Off
	Communication Connected		Communication Disconnected

Golander LAA Series Syringe Pump

	Infuse		Withdraw
	Screen Locked		Screen Dislocked
	Run		Pause
	Stop		Selected
	Not Selected		


Data entry: When the pump is not running, press the number to input the desired value in the pop-up window.



Figure 2. Flow Input

Max: Maximum input value

Min: Minimum input value

 : Delete the last digit

X: Cancel the current entry data

Enter: Confirm the current entry data

4.3 Main Display

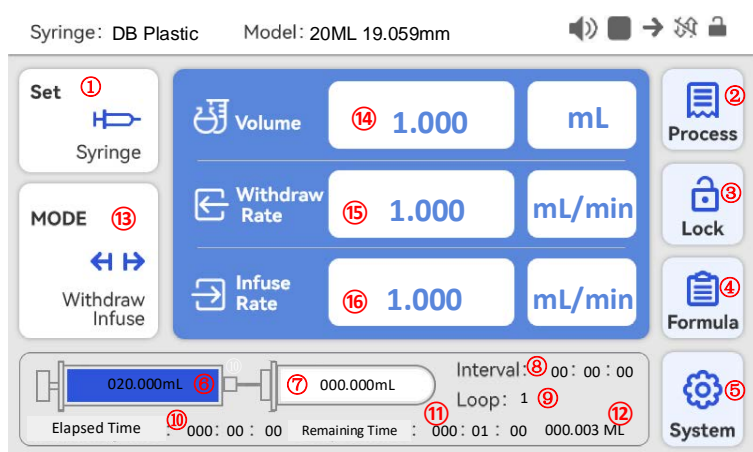



Figure 3. Main Interface Display

1.  Click the icon to access the syringe manufacturer selection and then the syringe specification interface. Choose "Custom" if the syringe manufacturer is not specified (details see section 6.5.1).

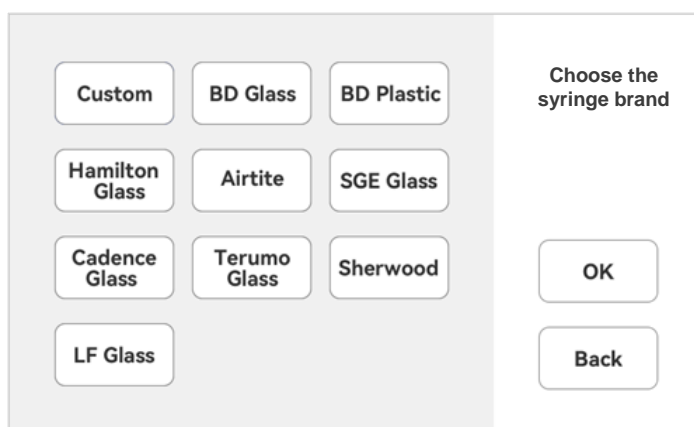
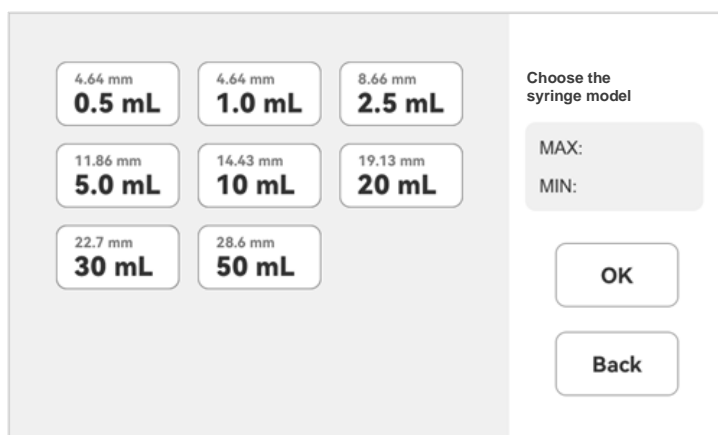


Figure 4. Syringe Manufacturers Interface



The interface displays a grid of syringe models with their dimensions and capacities. On the right, there are fields for 'MAX:' and 'MIN:' and two buttons: 'OK' and 'Back'.

Dimensions (mm)	Capacity (mL)
4.64	0.5
4.64	1.0
8.66	2.5
11.86	5.0
14.43	10
19.13	20
22.7	30
28.6	50

Choose the syringe model

MAX:
MIN:

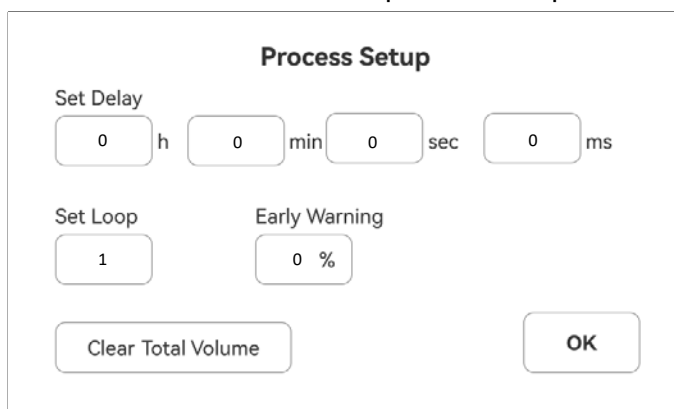
OK

Back

Figure 5. Syringe Specification Interface



2. Press this icon to access the process setup interface.



The interface is titled 'Process Setup' and contains fields for 'Set Delay', 'Set Loop', and 'Early Warning'. At the bottom, there are two buttons: 'Clear Total Volume' and 'OK'.

Process Setup

Set Delay
 0 h 0 min 0 sec 0 ms

Set Loop
 1

Early Warning
 0 %

Clear Total Volume

OK

Figure 6. Process Setup



Set Delay: set the delay time in motion, first delay then operation.

Set Loop: set the number of loops for repetitive operation.

Early Warning: configure a reminder to alert before completing the operation, triggered when a preset percentage of the total transmission volume is reached.

Clear Total Volume: clear the accumulative volume.



3. Press this icon to lock the screen to prevent accidental modification of parameters. When the screen is locked, the icon will change to . Press  and enter the password to unlock the screen. If there is no preset password, simply press “OK” to unlock the screen.



4. Press this icon to enter the quick setting interface for the selection of pre-entered three sets of data (see section 6.5.5 for details).

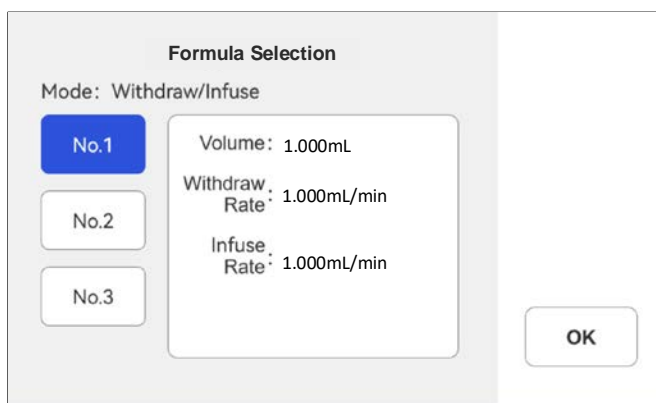


Figure 7. Quick Setting



5. Press the icon to access the system setting menu, and then select the corresponding menu to modify the parameters (see section 4.4 for details).
6. The current volume in a syringe is displayed, with the blue bar indicating progress with the current fluid volume.
7. The current volume in an external container, with the blue bar showing progress with the current fluid volume.
8. Display the current interval time.
9. Display the current number of repetitions.

10. Display the elapsed time of the current running process.
11. Display the remaining time of the current running process.
12. Display the current accumulated total liquid volume.



13. Press the icon to enter the operating mode selection interface (see section 6.5.2 for details).

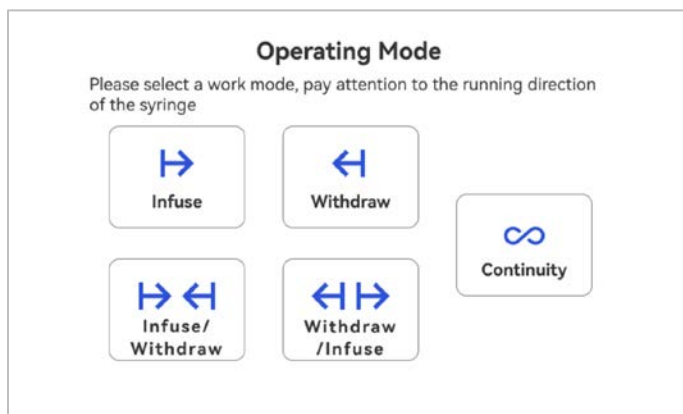


Figure 8. Operating Mode Selection Interface

14. Volume: Set the fluid volume to be withdrawn or infused. Tap the liquid volume value to input the desired value, and tap the liquid volume unit to switch between nL, uL, and mL.
15. Withdraw Rate: Set the withdrawal flow rate. Tap the flow rate value to input the desired value, and tap the flow rate unit to switch between nL/min, µl/min, and mL/min.
16. Infuse Rate: Set the infusion flow rate. Tap the flow rate value to input the desired value, and tap the flow rate unit to switch between nL/min, µl/min, and mL/min.

Attention: When “Overflow” or “Underflow” is shown, the value entered is out of range. Please re-enter the value or change the unit.

4.4 System Setting

When the pump is not running, press



on the main screen to enter the system setting interface.

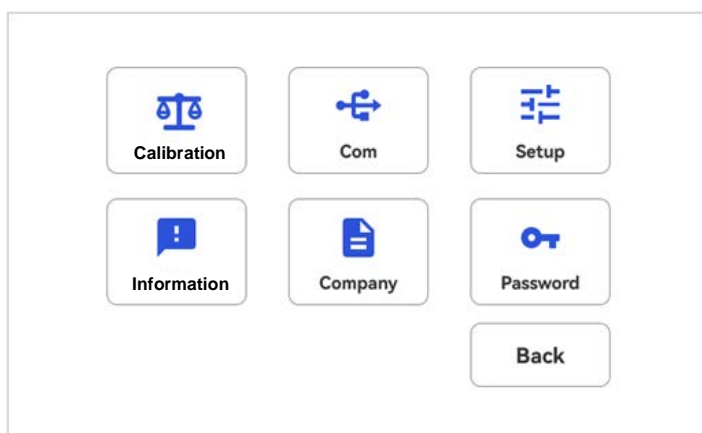


Figure 9. System Setting

Calibration - Calibrate the flow rate for a custom syringe by using the calibration wizard. Follow the provided instructions and measure the dispensed volume to accurately display the actual flow rate.

Com - This setting configures RS485 MODBUS communication parameters, such as baud rate, transmission mode, and pump address. To change the address, tap the address number displayed on the screen, then input the desired value in the pop-up window. Restart the drive to implement the changes.

Communication Setup

<p>Baud (bps) :</p> <div style="display: flex; align-items: center;"> <input checked="" type="checkbox"/> 4800 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> 9600 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> 19200 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> 38400 </div>	<p>Byte:</p> <div style="display: flex; align-items: center;"> <input checked="" type="checkbox"/> CDAB </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> ABCD </div> <p>Parity bit:</p> <div style="border: 1px solid black; height: 20px; width: 80px; margin-top: 5px;"></div>	<p>Pump No. :</p> <div style="border: 1px solid black; height: 30px; width: 100px; margin-top: 5px;"></div> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;">Wi-Fi Reset</div> <div style="border: 1px solid black; padding: 10px; text-align: center; margin-top: 10px;">Back</div>
--	---	---

Figure 10. Communication Settings

Setup - Set general settings as shown below.

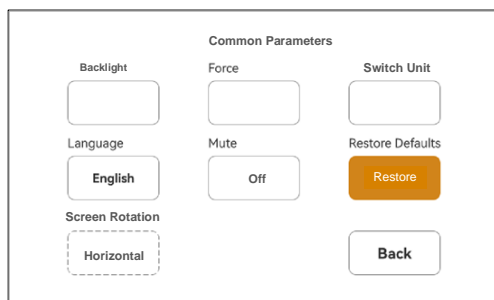


Figure 11. General Settings

- **Backlight:** Adjust the brightness of the backlight. Tap the number to modify the value.
- **Force:** Set the force according to the material of the syringe to prevent damage. Tap the number to adjust the value.
- **Switch Unit:** Switch between units.
- **Language:** System language, English or Chinese.
- **Mute:** Choose whether to enable or disable the sound.
- **Restore Defaults:** Reset all parameters to factory defaults. Restart to apply the settings.
- **Screen Rotation:** Choose between a vertical or horizontal interface.

Information- This section displays the syringe pump's hardware version, software version, ambient temperature, and device serial number.

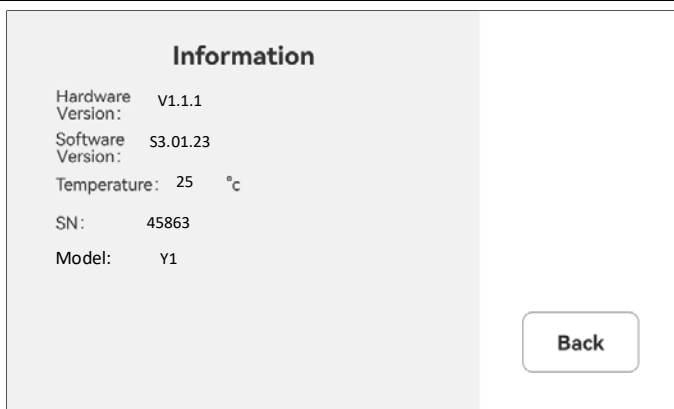


Figure 12. Information

Password – A password can be set to lock the screen and prevent accidental changes to parameters. The default password is 000000. To set a new password, enter the desired password and confirm by pressing “OK”.

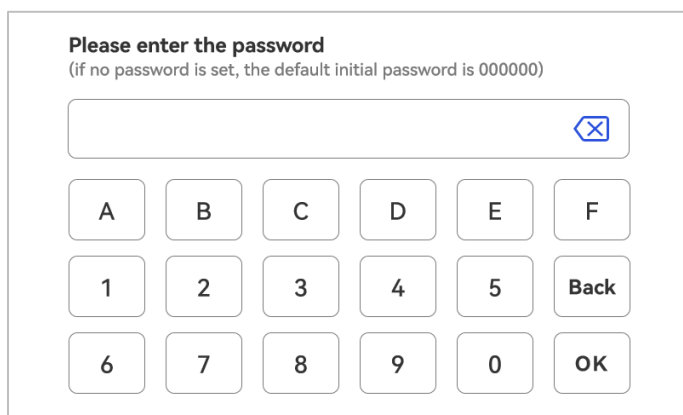
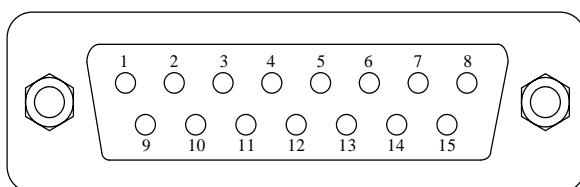


Figure 13. Password

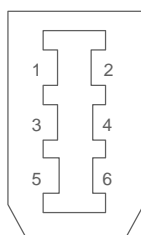
5 External Control Interface



- DB15 Interface**

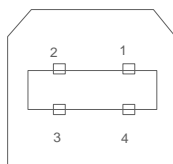
Pin	Mark	Note
1		
2	B	Communication interface, B pole of RS485
3	A	Communication interface, A pole of RS485
4	VCC_W	External DC power input
5		
6	CW_IN	External input signal to control direction
7		
8	COM	Ground of external power
9		
10	+24V	Positive of internal +24V power source
11	GND	Ground of Internal power source
12	CW	Direction signal output
13	RS_IN	External start/stop signal input
14		
15	RS	Start/stop signal output

- RS485 Interface**



Pin	Mark	Note
1		
2		
3	B	Communication interface, B pole of RS485
4	A	Communication interface, A pole of RS485
5		
6		

• USB Interface



Pin	Mark	Note
1	+5V	+5V power source
2	DATA-	Data -
3	DATA+	Data +
4	GND	Power Ground



Caution: Ensure the correct signal is provided according to the legend pins. Do not exceed the specified signal range. When connecting to an external power supply, adhere to the specified voltage range to avoid permanent damage, which is not covered by warranty.

Caution: Low voltage signals must be isolated from the main power supply. Use an independent, shielded, and grounded input cable.

Caution: Multi-strand cable ends must be protected with qualified protective sleeves to prevent equipment damage.

6 Operating Instructions

6.1 Before Operation

- 1) Please check the packing slip to ensure all parts are included and undamaged. If any issues are detected, please contact the manufacturer or distributor.
- 2) Read the manual thoroughly.
- 3) Maintain a minimum distance of 200mm from the back of

the pump while it is in operation.

6.2 Install a Syringe

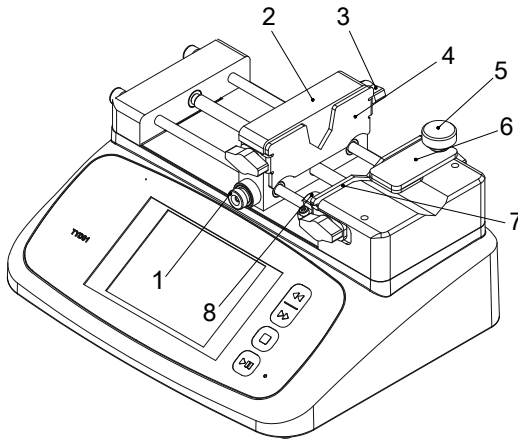


Figure 14. Install Syringe

- 1) Press and hold the release button (1), then slide the block (2) to a position near the length of the syringe.
- 2) Loosen the fasten bolts (3) and adjust the position of the fixing brackets (4) (7).
- 3) Lift the screw (5) and rotate the syringe clamp (6) 180 degrees outward.
- 4) Place the syringe into the right holder groove, securing the syringe plunger flange onto the fixing bracket (4) and the syringe barrel flange onto the fixing bracket (7).
- 5) Lift the screw (5), rotate the syringe clamp (6) 180 degrees to hold the syringe in position.
- 6) Tighten the fastening bolt (3).
- 7) Use an Allen Key to adjust the position of the stop block (8) to prevent over-pushing the syringe.

6.3 Power Connection

Ensure that the voltage of the power supply matches the rating indicated on the pump's rating plate label. Plug the power cord into the power connector located at the rear of the drive, and then

connect the opposite end of the power cord to an electrical outlet. Flip the power switch, also located at the rear of the drive, to turn it on.

6.4 First Run Wizard

When using the syringe pump for the first time or after a factory reset, the system will show a welcome message, followed by the selection of Syringe Manufacture-> Syringe Specification -> Work Mode. Users can customize parameters and operating modes to meet specific requirements, with the option to save settings for future use, eliminating the need to rerun the setup process.

Custom	BD Glass	BD Plastic	Choose the syringe brand
Hamilton Glass	Airtite	SGE Glass	
Cadence Glass	Terumo Glass	Sherwood	
LF Glass			
			OK
			Back

4.64 mm 0.5 mL	4.64 mm 1.0 mL	8.66 mm 2.5 mL	Choose the syringe model
11.86 mm 5.0 mL	14.43 mm 10 mL	19.13 mm 20 mL	
22.7 mm 30 mL	28.6 mm 50 mL		
			MAX:
			MIN:
			OK
			Back

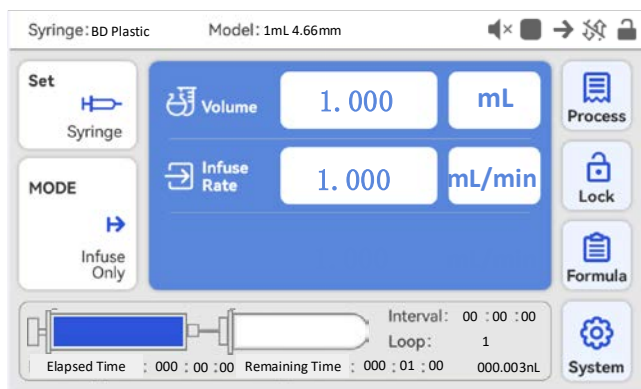


Figure 15. First Run Wizard

6.5 Operation Flowchart

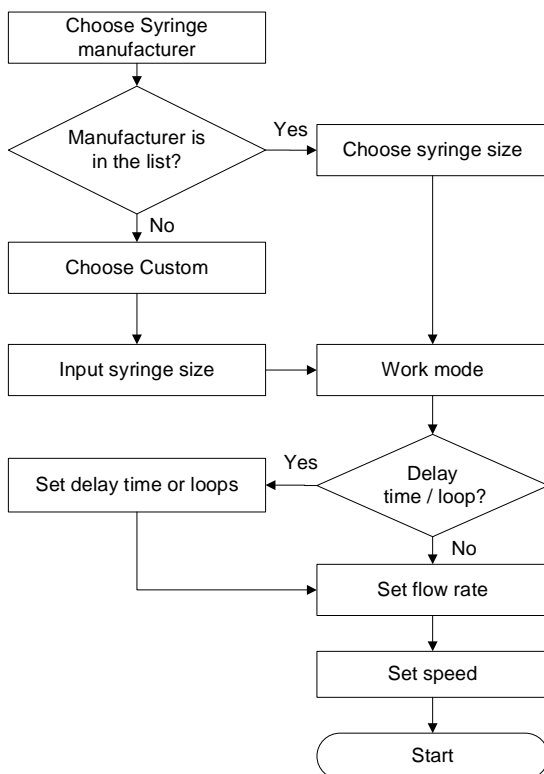



Figure 16. Operation Flowchart

6.5.1 Syringe

On the main screen, press  to access the syringe manufacturer interface. Choose “Custom” if a manufacturer is not listed. Press “OK” to proceed to the syringe specification interface, and press “Back” to return to the main screen.

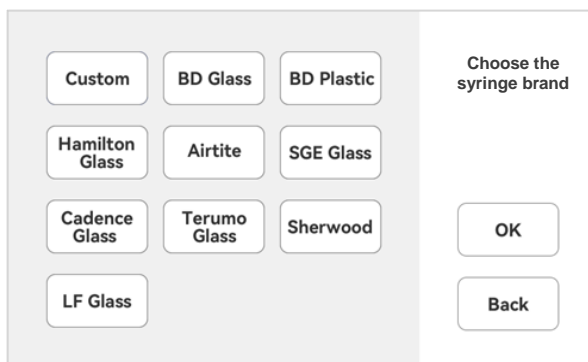


Figure 17. Select a Syringe Manufacturer

In the syringe specification interface, select the corresponding syringe. The left side of the screen shows the syringe volume capacity and barrel internal diameter, while the right side shows the maximum and minimum flow rates.

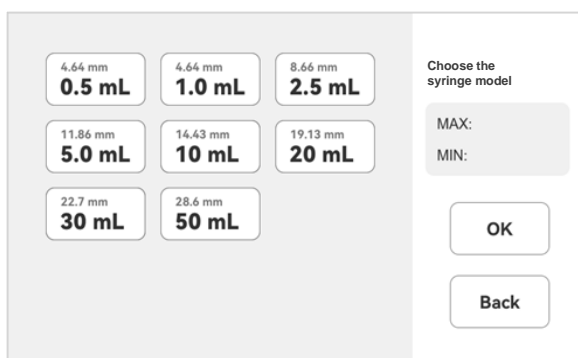


Figure 18. Select Syringe Model

If “Custom” is selected as the syringe manufacturer, it allows a user to input the specification of a syringe. Press the numbers to change the values for the ID and volume, and press the volume unit to

switch between mL and uL.

The Custom Syringe

Syringe inner diameter

0.001 mm

Syringe specification

0.001 mL

OK

Figure 19. Custom Syringe

Note: Each syringe manufacturer is associated with a specific series of syringe models. Ensure the correct transmission combination is selected.

6.5.2 Operating Mode

Press “Mode” on the main screen to access the operating mode interface, then select the operating mode.

Operating Mode

Please select a work mode, pay attention to the running direction of the syringe

Infuse

Withdraw

Infuse/Withdraw

Withdraw/Infuse

Continuity

Figure 20. Operating Mode

Infuse Only: This mode permits single-direction infusion operations. If replay loops are set, multiple infusions can be conducted.

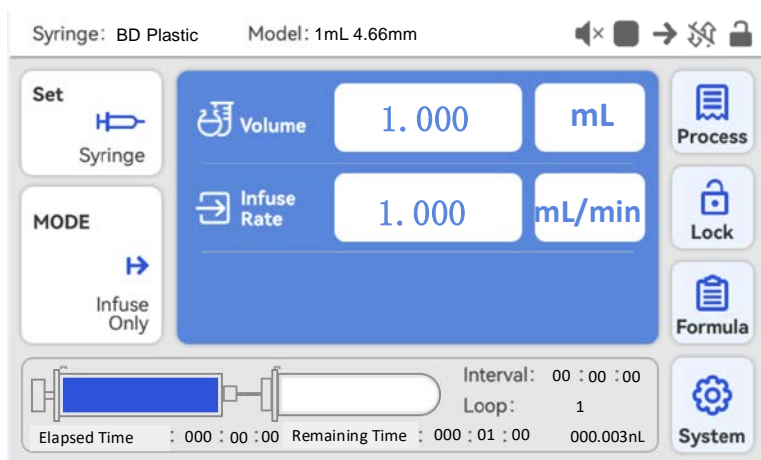


Figure 21. Infuse-only Display Interface

Withdraw only: This mode allows single-direction withdrawal operations. If replay loops are set, multiple withdrawals can be performed.

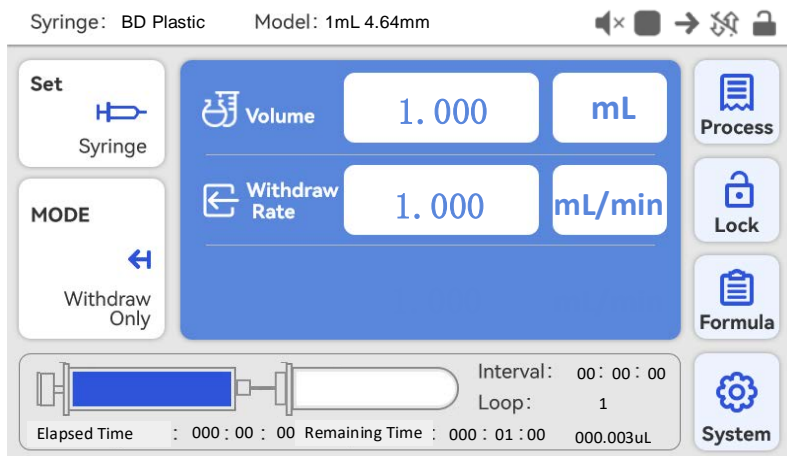


Figure 22. Withdraw-only Display Interface

Withdraw/infuse: This mode enables withdrawal first, followed by infusion. Multiple loops can be set for multiple operations.

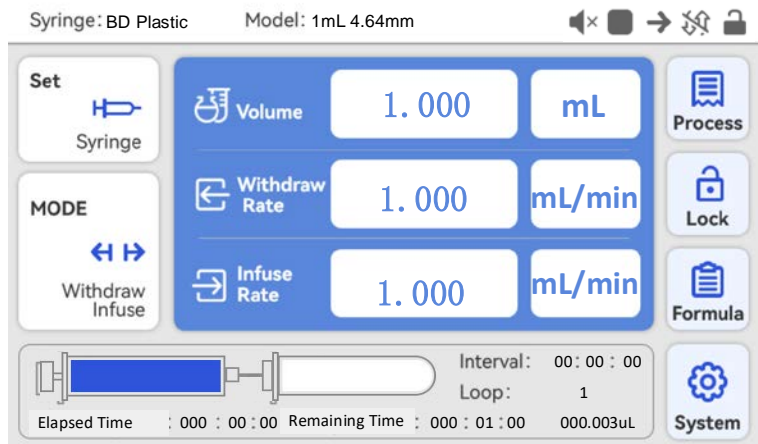


Figure 23. Withdraw/infuse Display Interface

Infuse/withdraw: This mode allows infusion first, followed by withdrawal. Multiple loops can be set for multiple operations.

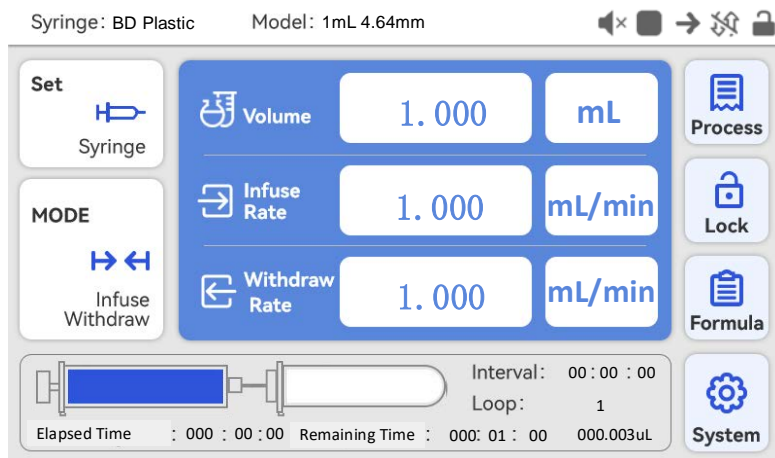


Figure 24. Infuse/Withdraw Display Interface

Continuity: Operations are conducted through external signals or communication. Pulse or level can be selected as the control mode.

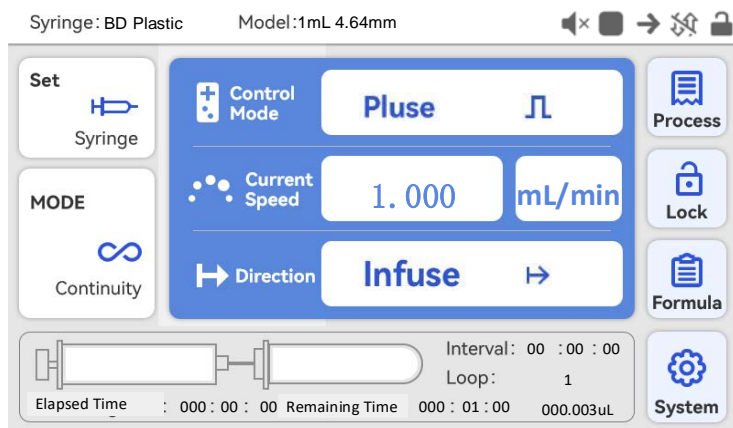



Figure 25. Continuity Display Interface

Press  to set delay time and loop as shown below.

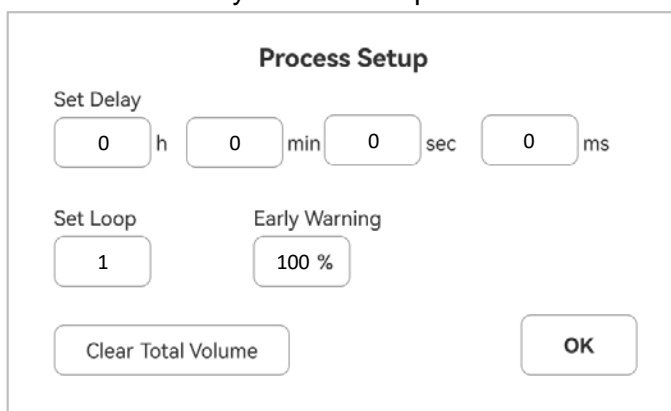


Figure 26. Process Setup

Please refer to the workflow chart below for details.

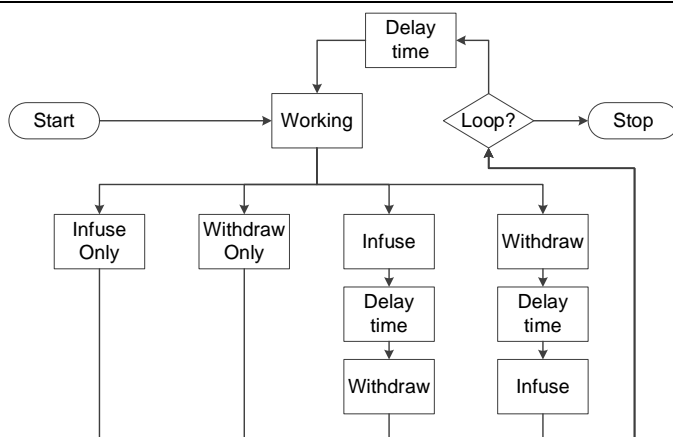


Figure 27. Workflow Chart

6.5.3 Volume and Flow Rate

To set the desired injection or withdrawal volume, press the volume value to change it. Press the volume unit to switch between nL/min, μ L/min, or mL/min.

To set the desired inject or withdraw flow rate, press the flow rate value to change it. Press the flow rate unit to switch between nL/min, μ L/min, or mL/min.

6.5.4 Start the process


Press the START/PAUSE key to start the running process, indicated by a green indicator light. Upon completion, the red indicator will be on. During the running process, pressing the START/PAUSE key will suspend the current operation, indicated by the green indicator blinking. Press the START/PAUSE key again to resume the paused process. To terminate the process entirely, press the STOP key, reset the process parameters, and the red indicator light turns on.

If the push block encounters the limit block or is obstructed by external force mid-process, the syringe pump will trigger an alarm, with the red light flashing. Press the START/PAUSE key to disarm

the alarm and resume the process, or press the STOP key to end it.

6.5.5 Save and Recall Settings

- Save settings

Set the work mode on the main screen, then press  to proceed to the quick setting interface.

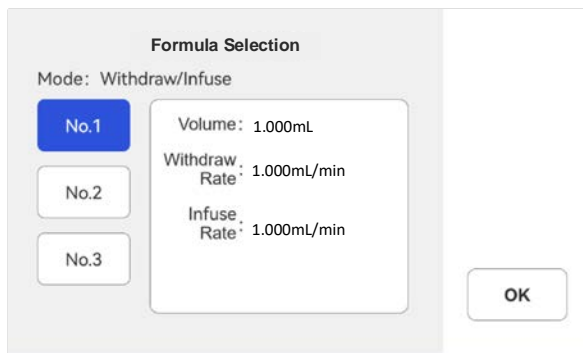



Figure 28. Quick Settings



Settings can be saved to one of the three slots, with the system initialized to the No. 1 by default. After choosing a slot, proceed to configure the settings for liquid volume and flow rate. Once the desired parameters are set, click OK to save this group of data. Repeat these steps for the second and third groups for convenient storage and retrieval of settings as needed.

- Recall settings

Press  to access the Quick Settings interface to choose settings saved in a group slot, and then press “OK” to return to the main screen. The settings on the main screen will be updated accordingly.

6.6 Flow Rate Calibration

To calibrate the flow rate:

- 1) Install a syringe and prepare a suitable balance or measuring cylinder and measuring cup.
- 2) On the main screen, select” Custom” syringe, and enter the Inner diameter and syringe volume capacity.
- 3) When the pump is not running, press the fast backward key  to fill the syringe with fluid.
- 4) Press  to enter System Setting, and press “Calibration” to access the calibration wizard.

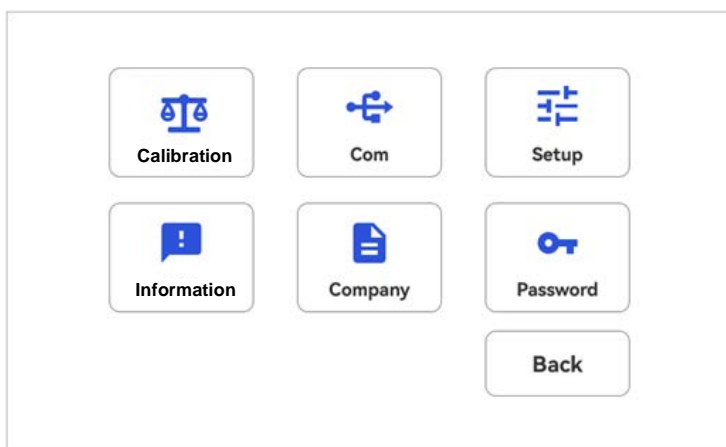


Figure 29. System Setting

- 5) Flow rate and volume are shown in the calibration wizard interface. Flow rate is the expected speed, and volume is the testing volume. Press the number to change the value if necessary. Press “Next” to enter the test window or press “Back” to return to the system setting window.

Note: To ensure test accuracy, the liquid volume value should not be less than the value recommended by the system.

Calibration

Custom syringe flow calibration

Flow Rate

Volume

Next

Back

Advised test volume>

The flow rate accuracy can reach 0.5%.

Figure 30. Flow Rate Calibration

6) The calibration test interface is shown below.

Calibration

Press the Start/Stop button to perform multiple tests and enter data.

Test1

1.000

mL

Test2

1.000

mL

Test3

1.000

mL

Back

Next

Home

Figure 31. Calibration

Ensure the syringe is filled with liquid. Press the START/PAUSE key to begin fluid injection. Once the pump stops, measure the transferred fluid volume using a measuring cylinder. Enter this value as Test 1 on the screen. Optionally, repeat these steps for Test 2 and Test 3. Verify the unit is correct. Press 'Next' to access the 'Analyze and Calculate' interface.

To modify the desired flow rate and test volume, press “Back” to re-enter values, and input the results into the system. Press “Home” to

exit the calibration wizard and return to the system setting interface. Press the STOP key to stop a test at any time and press the START/PAUSE key to resume the test.

- 7) The system will automatically compute the average value, calculate the correction coefficient, and display the reference of the original coefficient. Press “OK” to save the data. Press “Back” to cancel the test and return to the system setting interface.

The screenshot shows a 'Calibration' window with the subtitle 'After analysis and calculation'. It displays four lines of data: 'The average liquid volume : 1.000 mL', 'The correction factor is : 1.000', 'The parameter coefficient is : 1.000', and 'The coefficient : 1.000'. On the right side, there are two buttons: 'OK' and 'Back'.

Figure 32. Analyze and calculate

If no result data is entered, the window below will appear. Press “Back” to redo the test.

The screenshot shows the same 'Calibration' window as Figure 32, but with a warning overlay. The warning message, preceded by a yellow triangle icon, reads: 'WARNING No data, please click Back to retest or exit the calibration wizard'. There is an 'OK' button within the warning box. The background text of the calibration window is partially obscured but still visible. The 'OK' and 'Back' buttons are also present on the right.

Figure 33. No data entered

6.7 External Control Mode

- 1) Switch the power off. Wire the DB15 connector as shown below and connect it to the DB15 port on the rear of the pump.

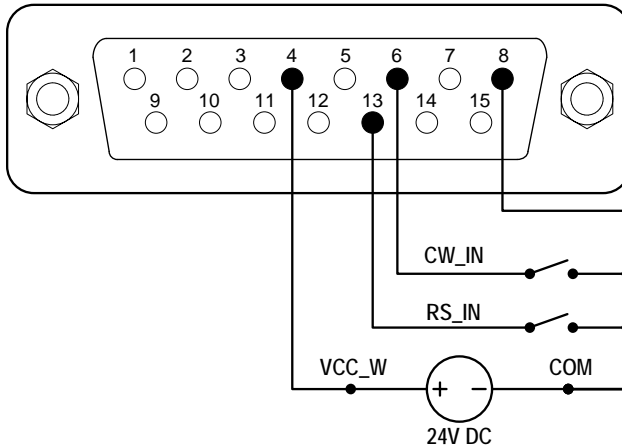


Figure 34. DB15 wiring with external 24VDC power source

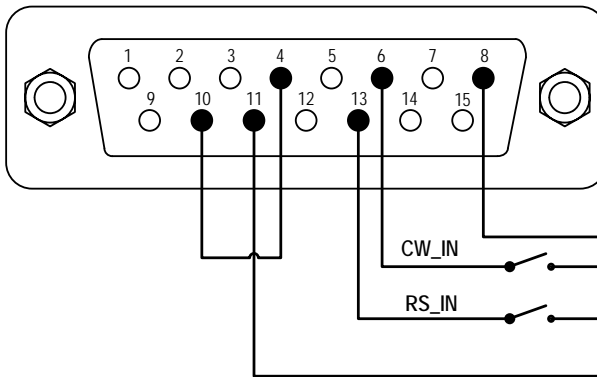


Figure 35. DB15 wiring with internal 24VDC power source

- 2) Power on to display the main screen.
- 3) When the work mode is Infuse Only, Withdraw Only, Withdraw/Infuse, or Infuse/Withdraw, close then open the external RS_IN switch, the pump will run. Repeat the process to stop the pump.

4) In Continuity work mode:

- Pulse Signal Control: close and then open the external RS_IN switch to start the pump. Repeat the process to stop the pump.
- Level Signal Control: close the external RS_IN switch to start the pump. Open the RS_W switch to stop the pump.
- Open the external CW_IN switch for infusion. Close the external CW_IN switch for withdrawal.

6.8 Footswitch Mode

- 1) Switch off the power. Wire the DB15 connector as shown below and connect it to the DB15 port on the rear of the pump.

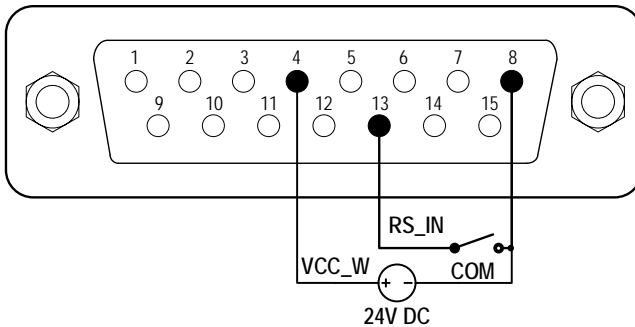


Figure 36. Control with external 24V DC power source

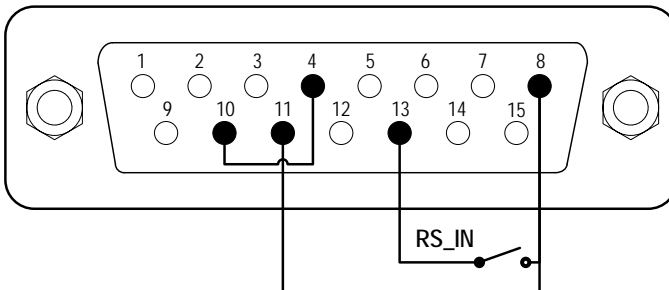


Figure 37. Control with internal 24V DC power source

- 2) Power on to display the main screen.

- 3) When the work mode is Infuse only, Withdraw only, Withdraw/Infuse or Infuse/Withdraw, close and then open the external RS_IN switch to start the pump; close and then open the RS_IN switch again to stop the pump.
- 4) In Continuity work mode:
 - Pulse Signal Control: close and then open the external RS_IN switch to start the pump. Repeat the process to stop the pump.
 - Level Signal Control: close the external RS_IN switch to start the pump. Open the RS_W switch to stop the pump.
 - Open the external CW_IN switch for infusion. Close the external CW_IN switch for withdrawal.

6.9 Communication Mode

The RS485 interface supports the standard MODBUS protocol. The pump can communicate with external devices via the communication port. Please refer to the [Communication Instruction manual](#) for the parameters and supported commands.

- 1) Switch off the power. Wire the DB15 connector as shown below and connect it to the DB15 port on the rear of the pump. An external DC power source is recommended to avoid electrical interference.

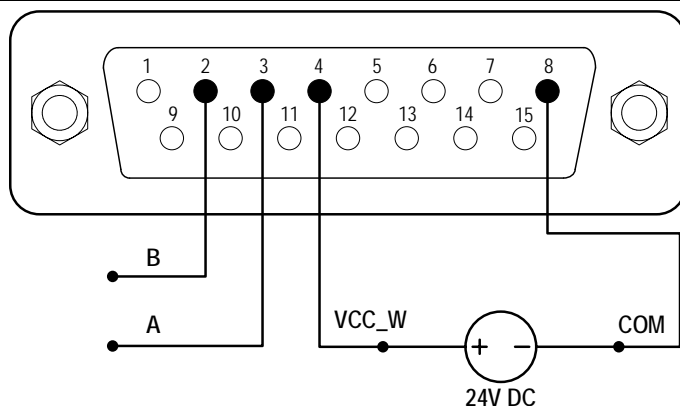


Figure 38. RS485 MODBUS wiring with external 24V DC Power Source

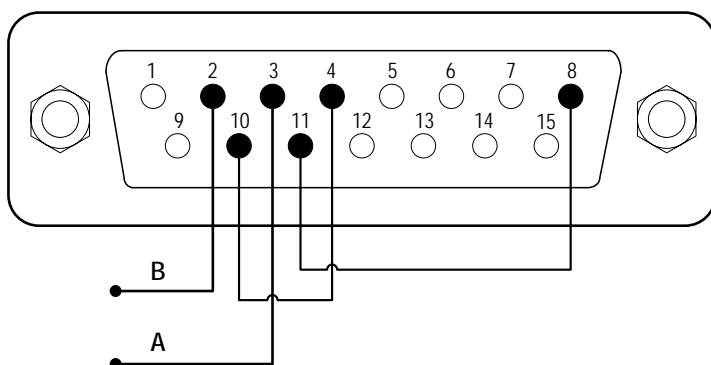




Figure 39. RS485 MODBUS wiring with internal 24V DC power source

- 2) Turn on the power to display the main screen.
- 3) When  is displayed on the main screen, the communication is connected. The communication is disconnected when  is displayed.
- 4) Control the pump with the communication interface.

7 Maintenance

7.1 Warranty

The product comes with a one-year labor and parts warranty. The limited warranty does not cover any damage that is caused by improper usage and handling.

7.2 Regular Maintenance

- 1) Check the push block and the lead screw regularly, and apply bearing grease when necessary.
- 2) Do not use water to wash the pump. Keep the pump dry.
- 3) Do not use chemical solvents to clean the case.

7.3 Malfunction Solutions

No.	Malfunction	Description	Solution
1	Hardware	No display	<ol style="list-style-type: none"> 1. Check the power cord. 2. Check the fuse. If it was blown, replace it with a 1A slow-blow fuse. 3. Check the internal power cord connection inside the drive. 4. Check the wire connection between the LCD and the main control board.
2	Hardware	Motor does not work	<ol style="list-style-type: none"> 1. Check the wire connection between the motor and the drive board. 2. Check the power voltage for the drive.
3	Hardware	Motor vibrates	<ol style="list-style-type: none"> 1. Check the wire connection between the motor and the drive board. 2. The motor is overloaded. Check the mechanical connection.
4	Hardware	Motor only runs in one direction	Check the connection between the drive board and the main control board.
5	Hardware	Keypad does not work	1. Check the wire connection between the keypad and the

Golander LAA Series Syringe Pump

			main board. 2. Check if the key is damaged.
6	Hardware	External control does not work	1. Check the wiring of the connector. 2. Check if the external control power voltage is provided. 3. Check the connections of the external control board.
7	Hardware	RS485 com does not work	1. Check the wiring of the connector. 2. Check if the external control power voltage is provided. 3. Check the connections of the communication board.
8	Hardware	Noisy when running	Check the wire connection between the motor and the main board.
9	Software	Touch screen does not work	Press and hold the FAST FORWARD and FAST BACKWARD buttons at the same time, then power on the drive to calibrate the screen.
10	Software	Flow rate not accurate	Calibrate the flow rate.
11	Software	RS485 does not work properly	1. Check if the display shows that the communication is ready. 2. Reset the address of the drive. 3. Check if two pumps on the bus utilizing the same address.

*If a problem cannot be solved, please contact the manufacturer or distributor.

8 Dimensions

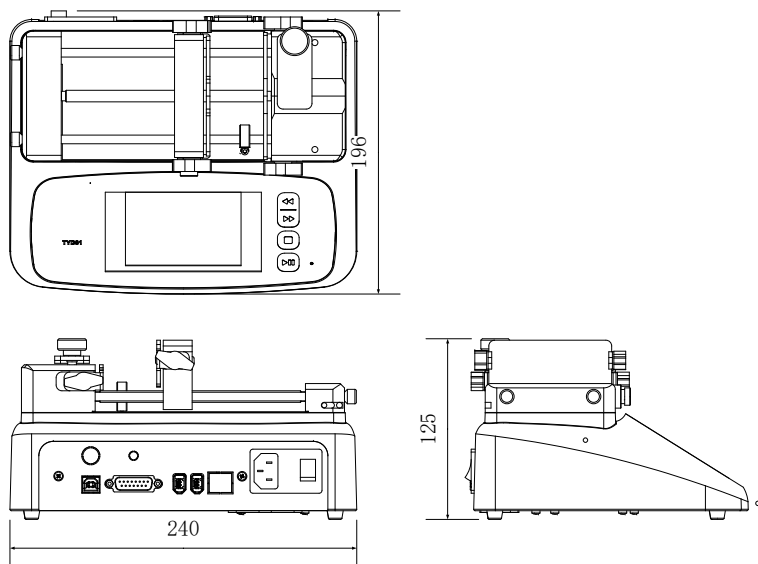


Figure 40. LAA-01 Dimensions (mm)

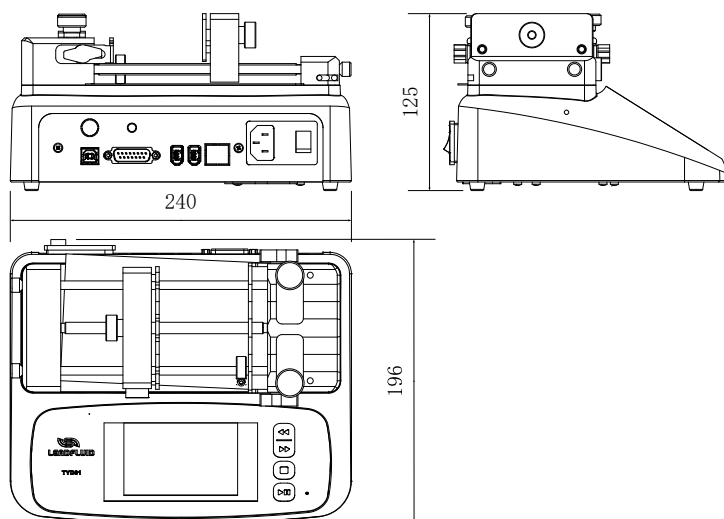


Figure 41. LAA-02 Dimensions (mm)

9 Naming Rule

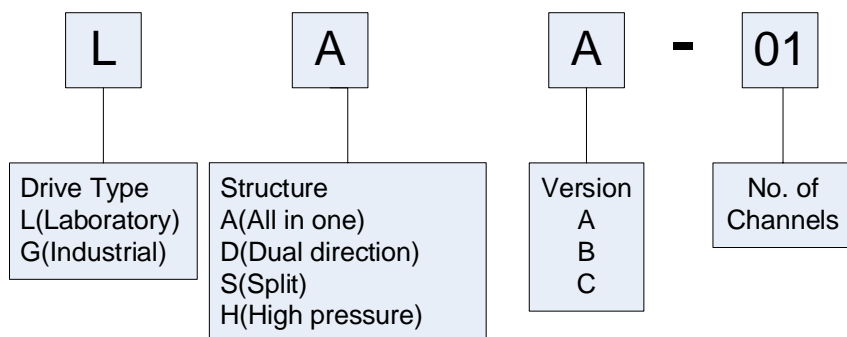


Figure 42. Naming Rule

10 Specifications

LAA-01: single syringe

LAA-02: dual syringes

Syringe	10uL-60mL
Function	Infusion, withdrawal, infusion/withdrawal, withdrawal/infusion, continuity mode. Built-in main brand syringes. Syringe protection and traffic jam alarm. Thrust adjustable
Communication	RS485 Modbus
Display	Color LCD touchscreen
External control	External signal control start-stop and direction. Direction status signal output.

Flow rate	0.184nl/min(10uL)-83.318ml/min(60mL)
Linear speed	1um/min - 150mm/min
Linear travel accuracy	$\pm 0.35\%$ (when $>30\%$ of drive stroke)
Linear force	$>16\text{kgf}$, adjustable
Pusher advance per microstep	0.156um/ustep
Operation	touch screen + button
Display	5-inch high-resolution color LCD
Power supply	AC 100-240V 50Hz/60Hz
Wattage	$<50\text{W}$
Working environment	Temperature $5-40^{\circ}\text{C}$ Relative humidity $<80\%$
Dimension	240x196x125mm
Weight	2.95 kg

The specified flow data was tested under standard conditions using pure water and serves as a reference. The actual consumption may vary depending on specific factors such as pressure and the properties of the medium.

11 Flow Rate Reference

Size	ID	Min flow rate	Unit	Max flow rate	unit
0.5ul	0.103mm	8.000	pl/min	1.249	μl/min
1ul	0.146mm	16.000	pl/min	2.511	μl/min
2ul	0.206mm	33.000	pl/min	4.999	μl/min
5ul	0.343mm	83.000	pl/min	12.497	μl/min
10ul	0.485mm	184.00	pl/min	27.711	μl/min
25ul	0.729mm	417.00	pl/min	62.608	μl/min
50ul	1.03mm	833.00	pl/min	124.984	μl/min
100ul	1.457mm	1.667	nl/min	250.092	μl/min
250ul	2.304mm	4.169	nl/min	625.383	μl/min
500ul	3.256mm	8.326	nl/min	1.248	ml/min
1000ul	4.608mm	16.676	nl/min	2.501	ml/min
1ml	4.699mm	17.342	nl/min	2.601	ml/min
3ml	8.585mm	57.885	nl/min	8.682	ml/min
5ml	11.989mm	112.890	nl/min	16.933	ml/min
10ml	14.427mm	163.469	nl/min	24.520	ml/min
20ml	19.05mm	285.027	nl/min	42.754	ml/min
30ml	21.59mm	366.090	nl/min	54.913	ml/min
50ml	26.594mm	555.459	nl/min	83.318	ml/min
60ml	26.594mm	555.459	nl/min	83.318	ml/min

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