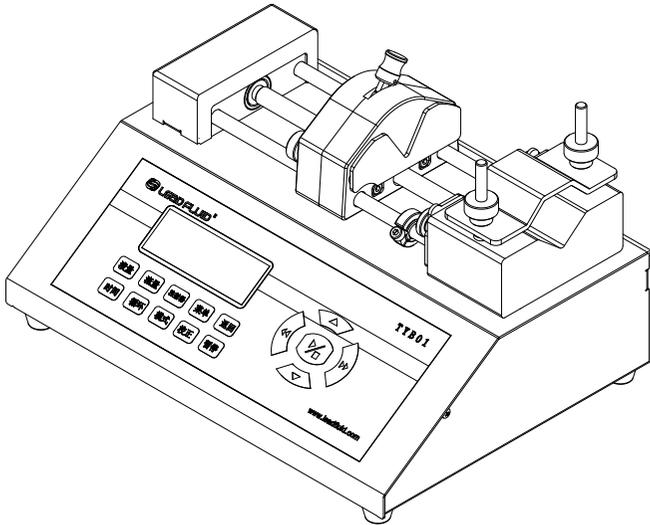




TYB01 Laboratory Syringe Pump Series Manual



BAODING LEAD FLUID TECHNOLOGY CO.,LTD.

Safety Caution

Please read the following safety precautions to ensure that the correct use of syringe pump. Wrong operation may cause dangerous situation, and cause personnel injury or equipment damage.



Danger: Please use the power as the same as the nameplate on the equipment, or it will damage the equipment!

Please do not remove or remold the equipment, or it will cause the malfunction, even the electrical shock!

About the maintenance of the equipment, please contact with the dealers or the company.

Danger: in the process of the syringe pump operation, please don't near the screw of the rotating parts, prevent the fingers and clothing were involved in machinery agency!



Danger: When installing the syringe, adjust the limit block to the appropriate position at the same time to prevent accidental

damage to the syringe!

Our company is not responsible for losses caused by damaged syringes, especially including leakage of toxic and harmful and valuable liquids.

Please power off and choose the good ground wire, when install and knock down the external control equipment, prevent damaging the equipment and the electric shock!



Warning: This product is not designed for, not intended for use in patient connected applications, including but not limited to

medical and dental use.

Catalogue

Catalogue.....	2
Description.....	3
Application.....	3
Function and Feature.....	3
Components and Connectors.....	4
Display Panel and Operating Keypads.....	5
keypad board.....	5
LCD display.....	7
Operation Instruction.....	10
The preparatory work.....	10
Syringe Installation.....	10
Power connection.....	11
Operation guide.....	11
External control mode.....	22
Footswitch.....	24
Communication Function.....	25
Malfunction and maintenance.....	26
Guarantee Repair and after-sales.....	26
Routine Maintenance.....	26
Fault handling.....	27
Dimension.....	28
Naming rule.....	29
Technology Parameters.....	29
Version History.....	33

Description

This product can assemble many kinds of syringes, support a variety of working modes, liquid crystal display supports Chinese and English, many function keys directly set parameters, convenient and fast, stored five groups of self-defined syringe parameters to meet the requirements of different experiments. High precision control, and protection mechanism and alarm mechanism. External signal control start and stop, built-in RS-485 communication, support Modbus protocol, all metal shell, wide range of power input, suitable for all kinds of occasions.

TYB01-01 for single 10ul-60ml syringe, linear speed 1um/min-120mm/min

Application

- Suitable for the transmission of the amount of the micro-liquid
- Suitable for micro-flow transmission
- Suitable for no pulse transmission
- Suitable for high precision transmission

Function and Feature

- LCD, supports both Chinese and English
- Multiple function keys set parameters directly
- Support keystroke mute operation
- Support for multiple syringes
- Pre-Stored five groups of custom syringe parameters
- High precision control
- Syringe protection and traffic jam alarm
- RS485 communication, supporting Modbus protocol
- External signal control start and stop and direction
- Wide range power input
- Full Metal Jacket

Components and Connectors

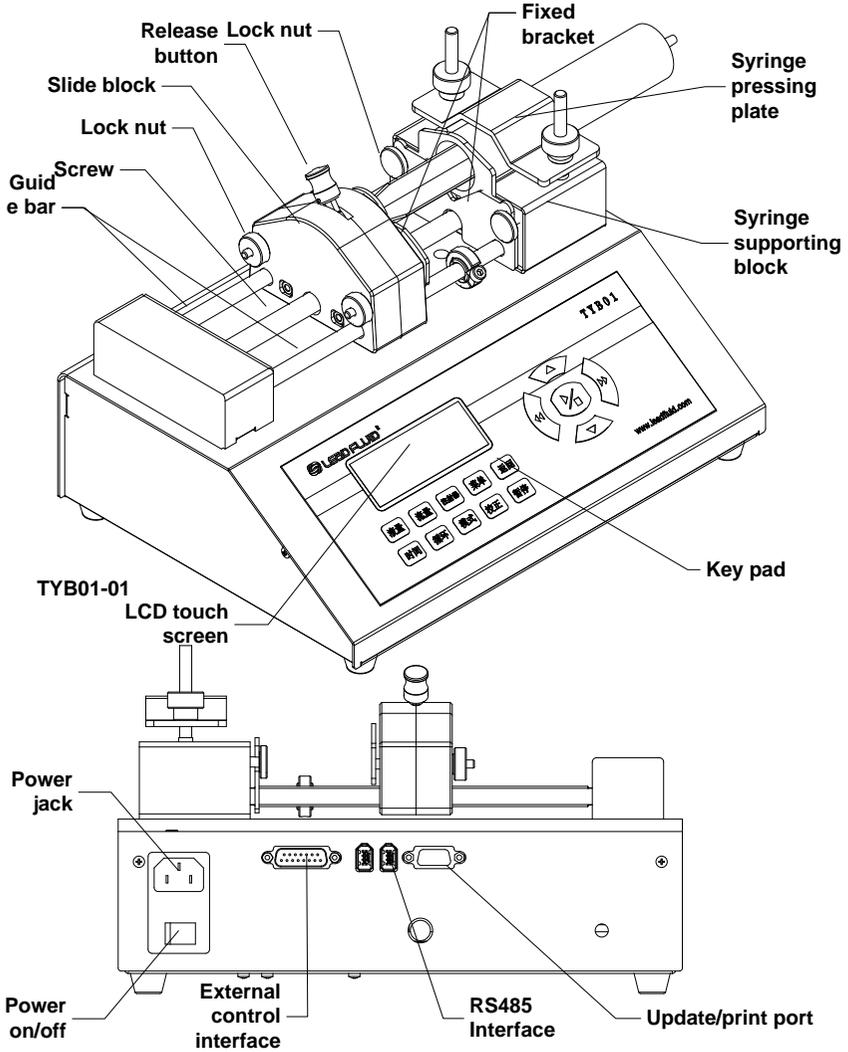


Figure1 Components and Connectors

Display Panel and Operating Keypads

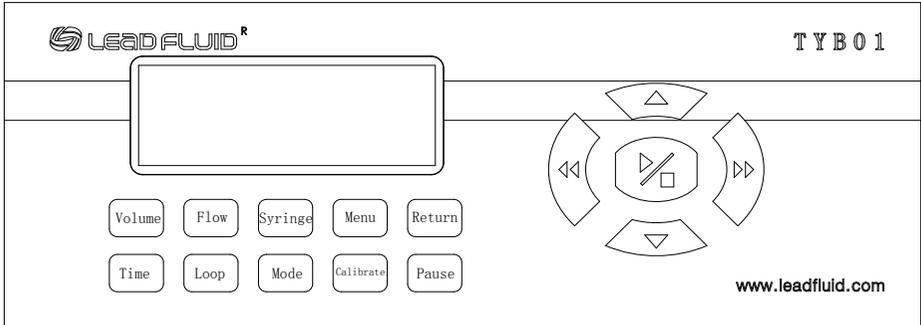


Figure 2 Display Panel

keypad board

Volume : Liquid key, enter the liquid volume setting interface

Flow : Flow key, enter the flow setting interface.

Time : Time key, enter the time setting interface

LOOP : Cycle key, press this key to enter the cycle times setting interface, when the number of cycles more than 1, press enter interval time to set the interface.

Syringe : Syringe key, press this key to enter the syringe parameter setting interface

Mode : Mode key, press this key to switch mode

: Menu key, enter menu setup interface

: Calibration key, enter flow correction interface

: Return key, return main interface

: Pause key, pause current motion control

: In the main interface, the amount of liquid increases in the internal control mode, and the flow rate increases in the external control mode; in the other interfaces, the corresponding parameters are increased.

: In the main interface, the amount of liquid decreases in the internal control mode, the flow rate in the external control mode decreases, and the corresponding parameters are increased under the other interfaces.

: Left key, stop state, long press this key with maximum speed fast back; in parameter setting interface, press this key to return to the next level interface.

: Right key. Under the condition of downtime, press this key to advance quickly at the highest speed; in the parameter setting interface, press this key to enter the next interface.

: Start and stop key: control syringe pump pump start and stop.
Restore current operations control in pause mode

LCD display

- Internal control mode

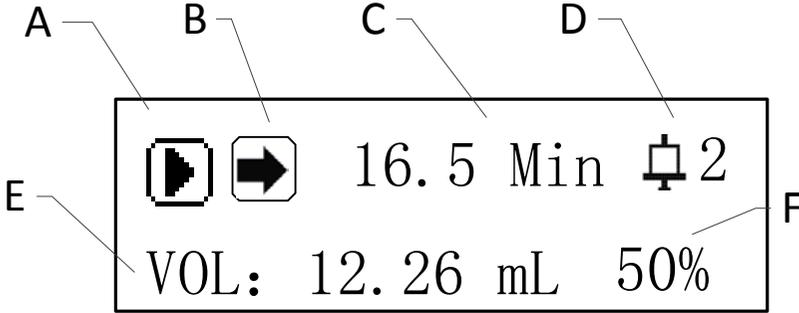


Figure 3 LCD Display

A:Running status: displays current running status



B:Mode of work: displays the current mode of work



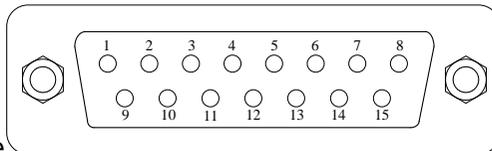
C:Time display: shows the time it takes to perform a motion control under the current parameter

D:Syringe number display: displays currently selected syringe number

E:Flow volume display: set currently infuse liquid volume

F:Progress display: completion of current fluid flow progress

- External control interface



- DB15 interface

DB15

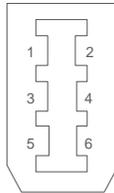
English

Specification

notes		
1		
2	B	Communication interface,B pole of RS485
3	A	Communication interface,B pole of RS485
4	VCC_W	External DC power input
5		
6	CW_W	External input signal to control direction
7		
8	COM	Ground of external power
9		
10	+24v	Positive of internal +24Vpower source
11	GND	Ground of Internal power source
12	CW	Internal direction signal output
13	RS-W	External start/stop signal input terminal
14		
15	RS	Internal start and stop signal output

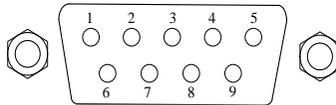
Laboratory Syringe Pump TYB01-01

- RS485 Port



numbers	English note	specification
1		
2		
3	B	RS485 - The cathode
4	A	RS485 +The anode
5		
6		

- DB9 interface, connect printer available (RS232 port)



numbers	English note	specification
2	TXD	send data
3	RXD	receive data
5	GND	Power ground

Operation Instruction

The preparatory work

- Open the syringe pump outer packing, please compare the packing list, check whether all the parts is wrong or damaged, if found the problem, please contact the manufacturer or agent
- Read the instruction for use, and put it in the hand, or a fixed site collection, in order to check at any time
- Place the syringe pump in a level table, the back of the distance barrier to keep a distance of more than 200 mm

Syringe Installation

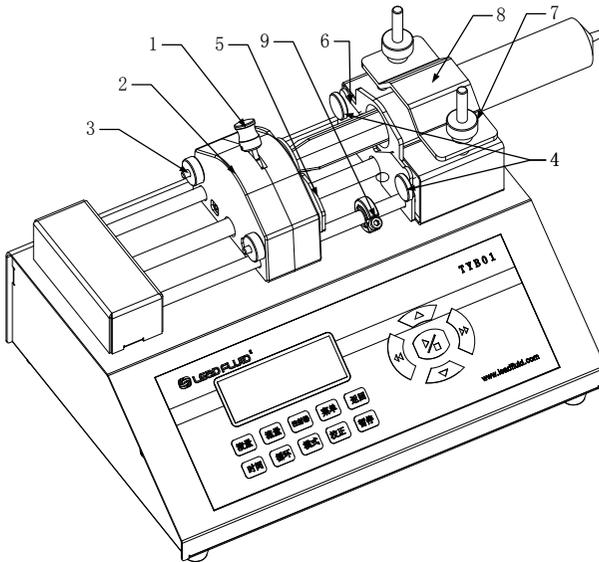


Figure 4 Syringe Installation

1. Hold down the release button (1), move the slider (2) to close to the location of the syringe length
2. Loosen the lock nut (3) (4), regulating the fixed bracket (5) (6)
3. Loosen the press nut (7), lift the syringe plate (8) up

Laboratory Syringe Pump TYB01-01

4. Put the syringe into the grooves in the right side of the fixed seat, at the same time the syringe putter tail card into the fixed bracket (5), syringe needle wings card fixed bracket (6)
5. Fasten the press nut (7), press the syringe plate (8) on the syringe needle
6. To tighten the lock nut (3) (4)
7. Adjust the spacing block (9) with Allen key position, to prevent excessive damage syringe

Power connection

The power of the power supply should be used with the chassis at the back of the nameplate marking. It will be accompanied with the power switch at the back of the power supply cord into the drive.

Operation guide

1. Liquid volume setting: under the main interface press
Entering liquid volume setting interface

A rectangular button with rounded corners and a thin border, containing the word "Volume" in a sans-serif font.

Press  Right-click, perform a shift operation, and press  Or Add
 or subtract 1 to the selected number Or Switch between nL,uL,mL.

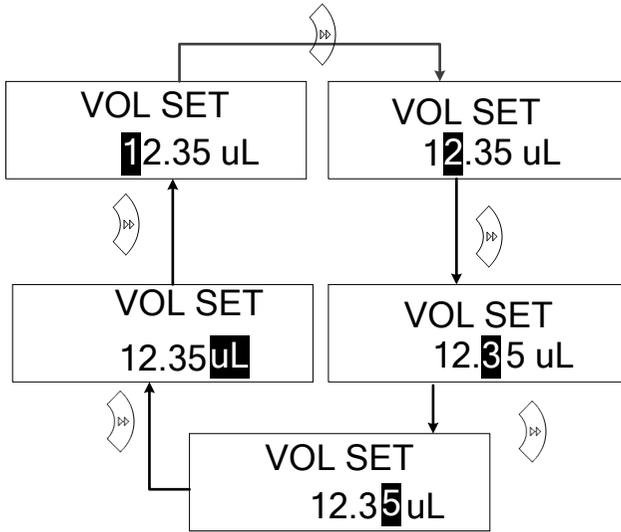


Figure 5 Volume Setting

2. Flow setting: press **Flow** the Enter the flow setting interface

Press Right-click, perform a shift operation, and press Or Add or reduce 1 to the selected number

Press Or The units of flow are switched between the

nL/m,uL/m,mL/m. In the flow setting interface, click **Flow** Key back to the main interface.

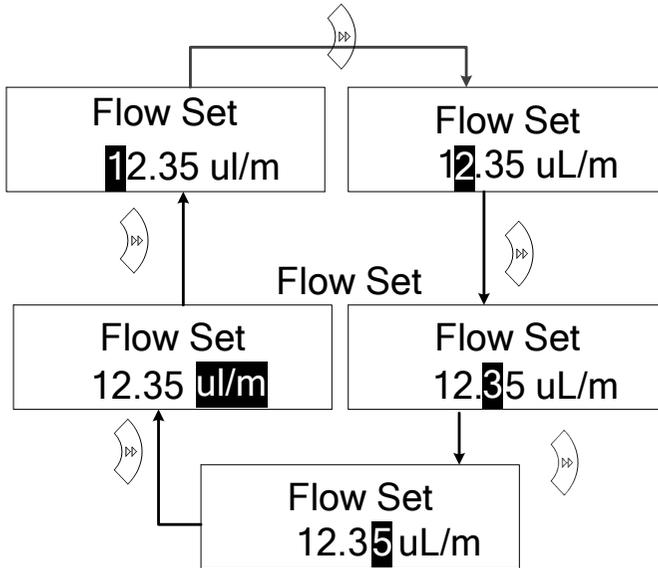


Figure 6 Flow Setting

3. Time setting: press **Time** Entry time setting interface

Press Right-click, perform a shift operation, and press Or Add or subtract 1 to the selected number; press Or Switch between hours, minutes, and seconds for time units; in the time setting interface, click

Time Key to return to the main interface;

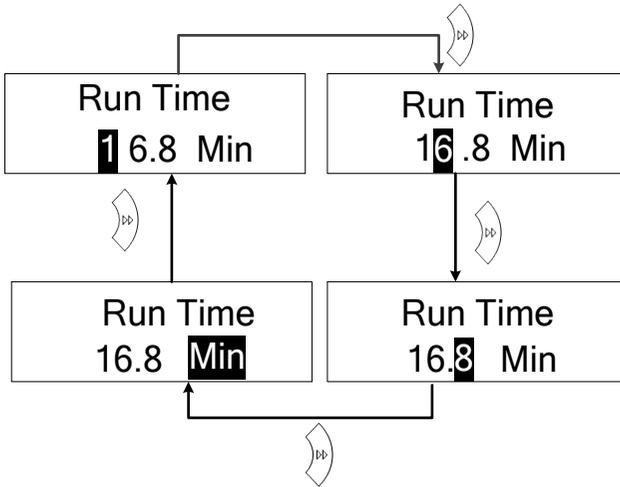


Figure 7 Time Setting

4. Loop setting: press **LOOP** Key into the loop setting interface
- Press Or Adjust the number of cycles.

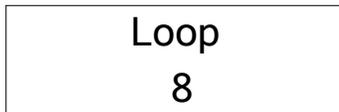


Figure 8 Loop Number Setting

- When the number of loops is greater than 1, press **LOOP** the Key into the interval setting interface.

Press Right-click, perform a shift operation, and press Or Add or subtract 1 to the selected number

Press Or Switch between hours, minutes, and seconds for the unit of time; press again **LOOP** Key to return to the main interface.

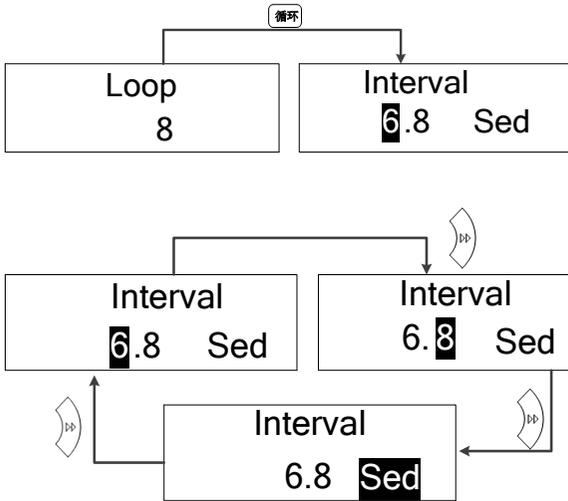


Figure 9 Interval Setting

5. Syringe selection: press  Key into the syringe setting interface



Figure 10 Syringe Setting

- Press  Or  Select the number of the custom syringe, and five sets of data are stored in the device
- Press  Right-click into syringe modification mode, via  Or  Adjust the parameters,  Key to perform a shift operation; press  The left button returns to the upper menu.

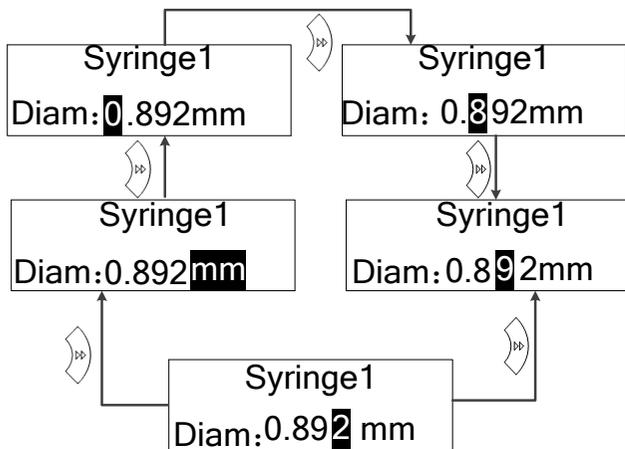


Figure12 Syringe Data Change

6. Mode setting:

Press **Mode** Key-forward switching mode

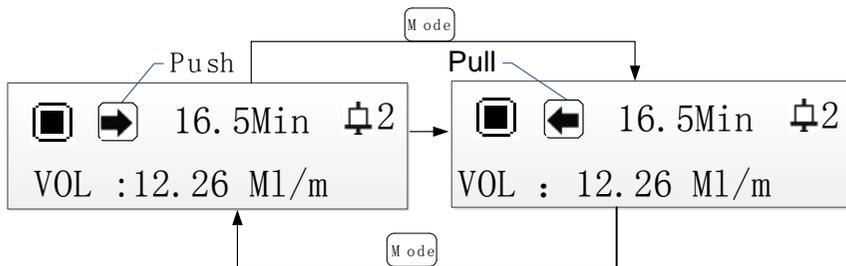


Figure13 Mode Switching

-  **infuse mode;**  **withdraw mode**

7. Calibration : press **Calibrate** Key into the correction interface

The flow rate of the syringe is corrected by weighing the liquid actually transmitted by the balance or the measuring cylinder.

Laboratory Syringe Pump TYB01-01

The specific operation is as follows:

- 1) Install the syringe and prepare the right balance or cylinder, measuring cup
- 2) Under downtime, long press  fast back key Fill the syringe with liquid
- 3) Press  start and stop in correction mode The syringe begins to transfer the liquid outward, and when the right amount of liquid is output, press  the start-stop button Stop working (recommended output more than 2 / 3 of syringe capacity to improve testing accuracy), weigh liquid with balance or cylinder, record its value, input the measured value to the equipment (pay attention to liquid unit), long press  Key, the system automatically calculates the correction coefficient and displays the correction coefficient.

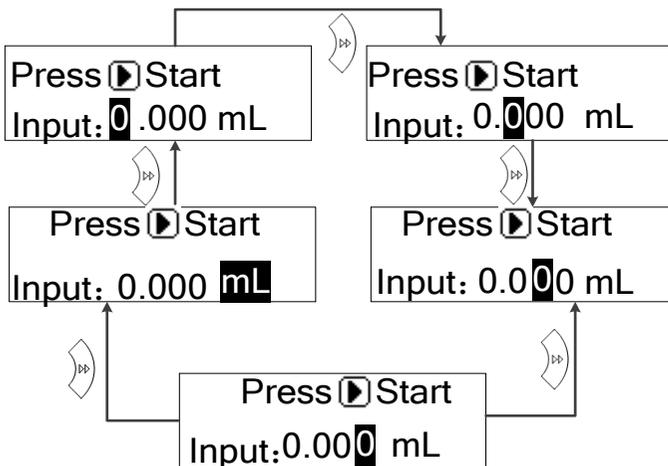


Figure15 Accurate Flow Input Interface

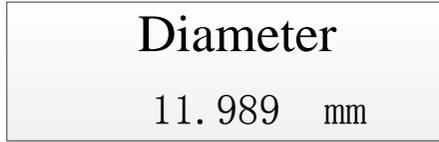


Figure16 Flow Coefficient Display

8. Menu: press  Key into the menu setup interface
- 1) On the menu setup interface, click  Or  Select sub-menu items



Figure 17 Main menu

- Thrust setting: according to different materials of syringe, set up different size of thrust, to prevent the use of the syringe damage, thrust

Laboratory Syringe Pump TYB01-01

range of 5- 100.

- Alarm for traffic jam: setting up alarm function of traffic jam on or off
- Keystroke setting: setting the key tone on or off
- Pump number setting: set the address of the pump.
Note: a reboot drive is required to take effect, address range 1-247
- Language settings: choose the language to use, Chinese or English
- Contrast setting: set the contrast of the LCD screen, contrast range 1-20
- Control mode setting: select equipment control mode, internal control or external control

- 2) On the menu setup interface, click  Enter the submenu item, and in the submenu, click  Return to the main menu

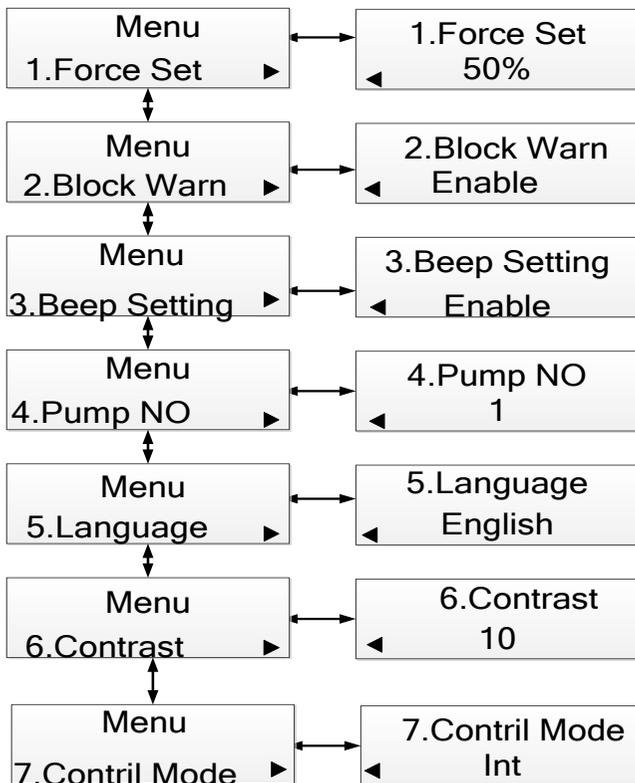


Figure 18 Submenu Setting

- 3) In the submenu, click  Or  Adjust submenu parameter item
- 9. On-stop main interface display
- 1) After setting the motion control parameters, return to the main menu



Figure 19 Standby Interface

- 2) When the device is on standby, press  Key, the device starts to run ,
- 3) In the running state, click  Key to stop the current work



Figure 20 InWorking

- 4) When the number of cycles is greater than 1, one time into the interval wait time, after the waiting interval is over, the loop starts again until the set number of cycles is completed.



Figure 21Interval Waiting

10. Pause

While the device is working, press  the pause key To pause the current motion control; press  the Key to continue the current motion control.



Figure 22 Pause State

External control mode

External signal control starts and stops.

- When the power supply is cut off, connect the circuit according to the following wiring diagram, and connect the DB15 interface to the back interface of the pump.

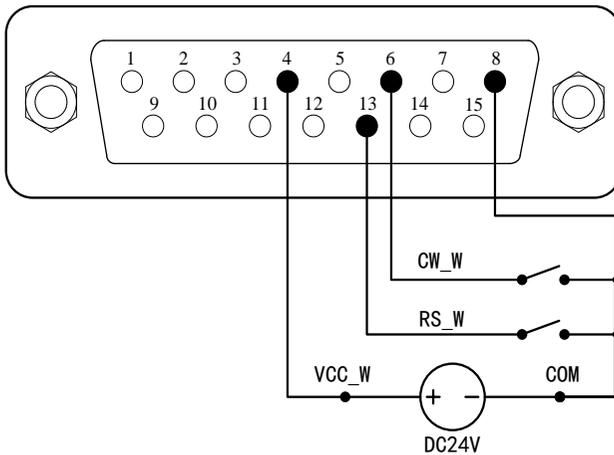


Figure23External Control Mode Connecting
External DC24V Power Supply

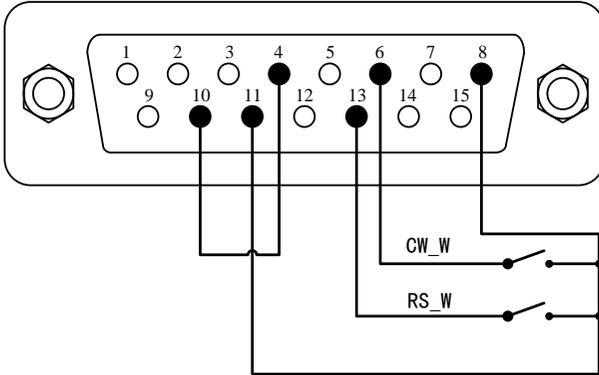


Figure 24 External Control Mode Connecting Internal DC24V Power Supply

- Turn on the power switch, select the control mode settings in the menu, control mode select external control

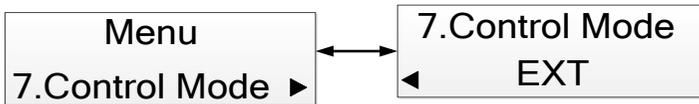


Figure 25

- External control main interface



Figure26

- Setting motion control parameters
- Always close the external RS_W switch, the syringe pump starts the operation process; disconnect the external RS_W switch, the syringe

pump will terminate the operation process.

- Disconnect the external CW_IN switch, the syringe pump pump is the syringe pump direction, always close the external CW_IN switch, the syringe pump is the extraction direction

Footswitch

- When the power supply is cut off, connect the circuit according to the following wiring diagram, and connect the DB15 interface to the back interface of the pump.

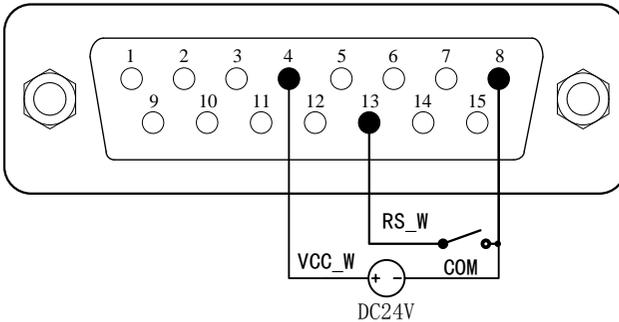


Figure 27 Foot external 24V power supply

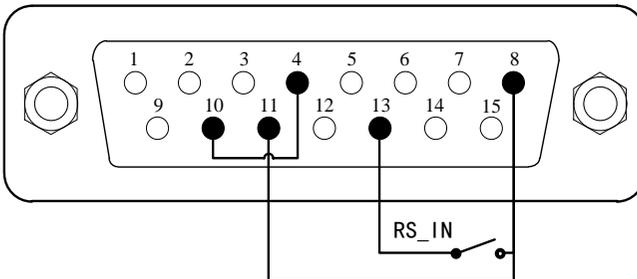


Figure 28 Foot Internal 24V Power Supply

- Turn on power switch, screen display main control interface

Laboratory Syringe Pump TYB01-01

- Setting parameters for motion control
- Close the external RS_IN switch and the syringe pump starts running. Once again close the external RS_IN switch, the syringe pump will stop running.

Communication Function

RS485 communication supports MODBUS protocol and can control all functions of pump. Specific parameter addresses and support instructions refer to Rayver communication technical standards

- When the power supply is cut off, connect the circuit according to the following wiring diagram, and connect the DB15 interface to the back interface of the pump.

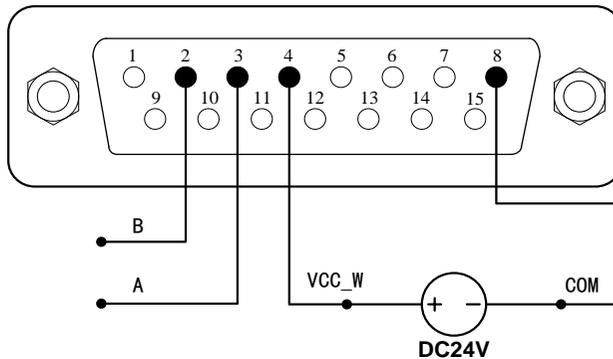


Figure 29 External 24V Power Supply

Fault handling

N O.	Type of malfunction	Malfunction description	Solution
1	hardware	no display of the drive	1. check the lines connected well 2. the fuse is good, or change with the 0.5A time-delay fuse 3. the lines in internal equipment connected well 4. Check the LCD panel and the main control board connection is loose or not.
2	hardware	the motor not work	check the motor and the driver connected well 2. check the voltage corresponding with the nameplate
3	hardware	the motor trembling	1. check the motor and the driver connected well 2. The motor overloaded, check the machine drive well
4	hardware	the motor rolling in one direction	1. the line loose or not connected the driver and the main board
5	hardware	the keypad not work	1. check the keypad and the main board connected well 2. check the keypad broken or not
6	hardware	external not work	1. check the lines connection right or not 2. check external power on or off 3. check the external board fixed well

7	hardware	communication not work	<ol style="list-style-type: none"> 1. check the lines connected right or not 2. check external power on or off 3. check the communication board fixed well
8	hardware	operation noise loud	<ol style="list-style-type: none"> 1. check the motor and the main control board connected well
9	software	Flow rate is not right	<ol style="list-style-type: none"> 1. For the flow calibration
10	software	communication not work	<ol style="list-style-type: none"> 1. Use the soft provided by LEADFLUID, reset up the address 2. Check up whether two pump use the same address on bus



If the malfunction cannot be solved, please contact with the manufacturer.

Dimension

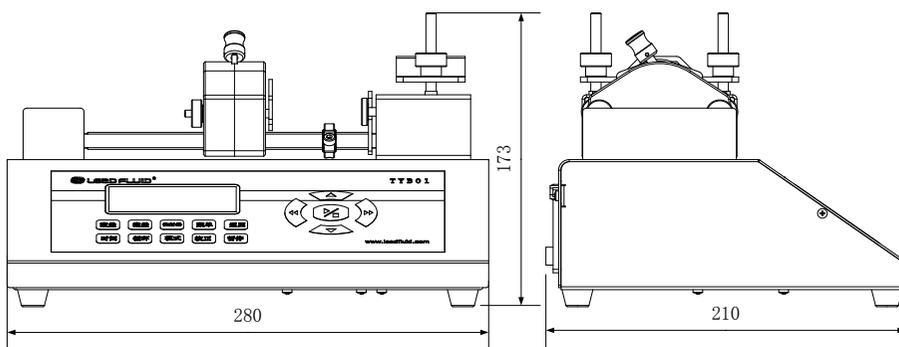
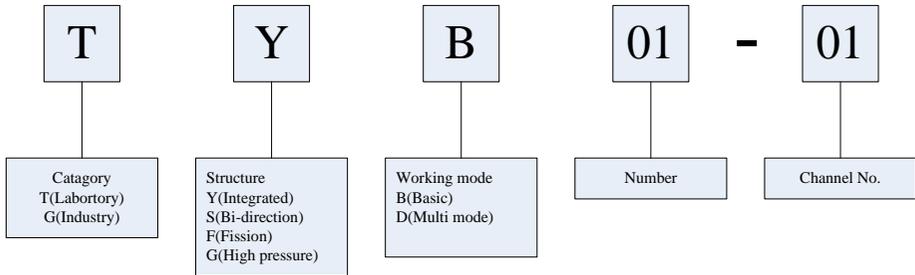


Figure 46 Dimension Drawing

Naming rule

Syringe pump naming rule



Technology Parameters

TYB01-01 parameters

Main-function

Suitable Syringe	one syringe 10ul-60ml
Main function	Support infusion, working modes, prepare more parameters on each mode. Prepared 5groups of syringe brand, and protection feature and stalling alarm, linear force is adjustable .calibration is available.
Communication function	RS485, support MODBUS protocol
Display function	True color touch screen display
External	External signal control Start/Stop, and have a status signal

control	output
---------	--------

Main-parameters

Flow range	0.185nl/min(10ul) - 72.174ml/min(60ml)
Linear speed	1um/min – 120mm/min
Linear travel accuracy	±1%(When > 30% full trip)
Linear force	>16kg, force is adjustable
Advance permicroste p	0.156um/ustep
Display setting	Mask keypad + Lattice liquid crystal display
Display way	132*32Lattice liquid crystal display
Power supply	AC 100-240V 50Hz/60Hz
Consumption	<50W
Working environment	environment temperature 0~40°C relative humidity < 80%
Dimension	280*210*160mm
Drive weight	4kg

Syringe manufacture and specification

Air-Tite HSW Norm-Ject		SGE Scientific Glass		Cadence Science, Inc. glass	
Spec	ID	Spec	ID	Spec	ID
1 ml	4.69 mm	5 µl	0.343 mm		

Laboratory Syringe Pump TYB01-01

2.5	9.65	10	0.485	0.25 ml	3.47 mm				
5	12.45	25	0.728	0.5	3.62				
10	15.9	50	1.03	1	4.82				
20	20.05	100	1.457	2	8.91				
30	22.9	250	2.303	3	8.91				
50	29.2	500	3.257	5	11.71				
Becton Dickinson Plastic Spec ID 1 ml 4.699 mm 3 8.585 5 11.989 10 14.427 20 19.05 30 21.59 50 26.594 60 26.594		1 ml	4.606 mm	10	14.65				
		2.5	7.284	20	19.56				
		5	10.301	30	22.7				
		10	14.567	50	28.02				
		25	23	100	35.7				
		50	27.5	Becton Dickinson Glass Spec ID 0.5 ml 4.64 mm 1 4.64 2.5 8.66 5 11.86 10 14.34 20 19.13 30 22.7 50 28.6 100 34.9					
		100	35						
		Hamilton Glass Spec ID 0.5 µl 0.103 mm 1 0.146 2 0.206 5 0.3257 10 0.485 25 0.729 50 1.03 100 1.457 250 2.304 500 3.256 1 ml 4.608 mm 1.25 5.151 2.5 7.285 5 10.3 10 14.567					Sherwood-Monoject Plastic Spec ID 1 ml 4.65 mm 3 8.94 6 12.70		
							Sherwood-Monoject Plastic Spec ID 1 ml 4.65 mm 3 8.94 6 12.70		
		Terumo Spec ID 1 ml 4.70 mm 3 8.95 5 13 10 15.8 20 20.15 30 23.1 60 29.1		Sherwood-Monoject Plastic Spec ID 1 ml 4.65 mm 3 8.94 6 12.70					
Sherwood-Monoject Plastic Spec ID 1 ml 4.65 mm 3 8.94 6 12.70									
Sherwood-Monoject Plastic Spec ID 1 ml 4.65 mm 3 8.94 6 12.70									
Sherwood-Monoject Plastic Spec ID 1 ml 4.65 mm 3 8.94 6 12.70									
Sherwood-Monoject Plastic Spec ID 1 ml 4.65 mm 3 8.94 6 12.70									
Sherwood-Monoject Plastic Spec ID 1 ml 4.65 mm 3 8.94 6 12.70									
Sherwood-Monoject Plastic Spec ID 1 ml 4.65 mm 3 8.94 6 12.70									
Sherwood-Monoject Plastic Spec ID 1 ml 4.65 mm 3 8.94 6 12.70									

	25	23.033	12	15.90
	50	32.573	20	20.40
	100	32.573	35	23.80
			60	26.60
			140	38.40

Flow rate chart

Normal syringe Max /min flow					
Spec	ID	MIN flow rate	Unit	MAX flow rate	Unit
10µl	0.485mm	184.00	pl/min	24.004	µl/min
25µl	0.729mm	417.00	pl/min	54.233	µl/min
50µl	1.03mm	833.00	pl/min	108.264	µl/min
100µl	1.457mm	1.667	nl/min	216.638	µl/min
250µl	2.304mm	4.169	nl/min	541.724	µl/min
500µl	3.256mm	8.326	nl/min	1.081	ml/min
1000 µl	4.608mm	16.676	nl/min	2.167	ml/min
1ml	4.699mm	17.342	nl/min	2.253	ml/min
3ml	8.585mm	57.885	nl/min	7.521	ml/min
5ml	11.989mm	112.890	nl/min	14.668	ml/min
10ml	14.427mm	163.469	nl/min	21.241	ml/min
20ml	19.05mm	285.027	nl/min	37.034	ml/min
30ml	21.59mm	366.090	nl/min	47.568	ml/min
50ml	26.594mm	555.459	nl/min	72.174	ml/min

Laboratory Syringe Pump TYB01-01

60ml	26.594mm	555.459	nl/min	72.174	ml/min
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Note:

The above flow data are obtained by testing pure water under normal temperature and pressure. The actual use is affected by specific factors such as pressure and medium characteristics, which is for reference only.

Version History

Date	version	Adjustment
	V1.0	Initial release version



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