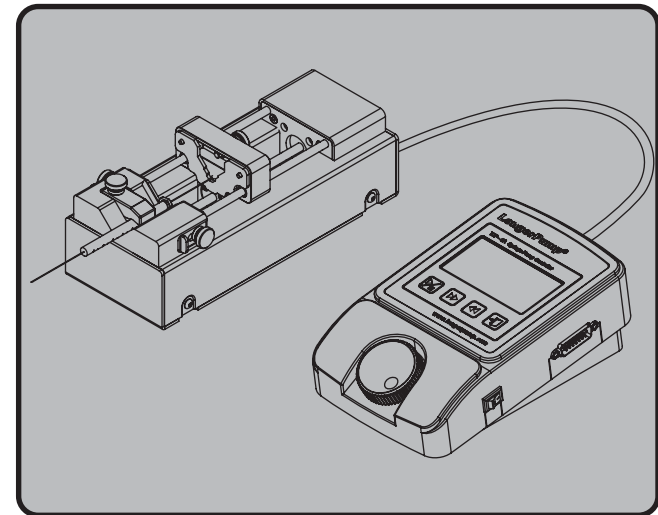




TJP-3A/W0109-1B

Programmable Syringe Pump Operating Manual



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Baoding Longer Precision Pump Co., Ltd.

Important Information:

Please read operation manual carefully before operation.

Warning:

- Misoperation of the syringe pump may result in the fluid sprayed. Use appropriate measures to protect operator and equipment. Be careful during operation.
- When the fluid sprays out on the drive unit please shut down the power supply immediately and clean the drive unit, then turn on the power supply.
- If a trouble happens please contact us or our dealer. Don't repair the equipment by yourself.
- Be careful when inserting or extracting the connection wire between controller and drive unit to prevent the plug from damaging.
- If the power line or the plug are worn or damaged please pull out the plug. Please shut down the power supply before connecting the external control equipment.
- If this syringe pump works under high voltage electrostatic environment. Syringe pump may be interfered with high voltage electrostatic, this may damage syringe pump.
- Longer pump can provide "Syringe Pump Isolation Power Supply".

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Instruction

TJP-3A is one kind of programmable syringe controller; it combines with W0109-1B to form a powerful syringe pump. It has all the functions of TJ-3A, merging the programming function. TJP-3A can realize total 8 steps program to implement complicate testing and process control.

This chapter includes:

- TJP-3A/W0109-1B Main Features
- Out of Box Audit
- TJP-3A/W0109-1B System Structure
- Technical Parameters

1.1 TJP-3A/W0109-1B Main Features

- Suitable syringe: 5 μ L-60mL, select syringe from syringe list or input syringe diameter directly.
- Linear Force Output: >90N
- Control Accuracy: The tolerance of control accuracy is smaller than 0.5% in the condition of 30% of max. infusion.
- Work Mode: Common Mode and Program Mode, Common mode includes withdraw, infusion, infusion/withdraw and withdraw/infusion mode; program mode can realizes maximum 8 steps program.
- Calibration Function: Calibrate syringe barrel to get more accuracy flow rates.
- Memory Function: Adopt EEPROM separately save the setting of common mode and program mode.
- External Interface: With input and output control functions, for example, direction, running, footswitch or timer control start/stop and the usage of valve and relay.
- Communication: Adopt RS485 module which can be convenient to connect to computer. Allows users to remotely check the working status, running parameters of syringe pump, and can remotely set the parameters of syringe pump.

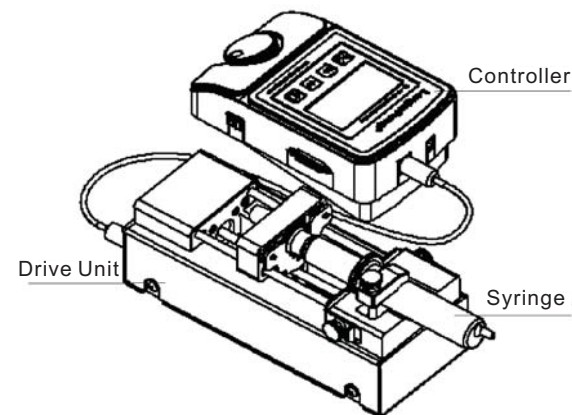
1.2 Out of Box Audit

Follow the below steps to unpack the box:

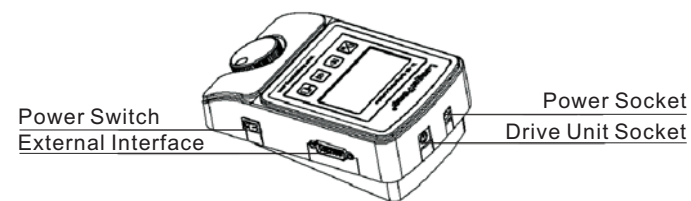
1. Take out controller, drive unit and accessories.
2. Checking the packing list to confirm complete accessories had been put into carton.

1.3 TJP-3A/W0109-1B System Structure

This syringe pump consists of TJP-3A controller and W0109-1B drive unit, shown as below:



1.3.1 TJP-3A Controller Interface Instruction



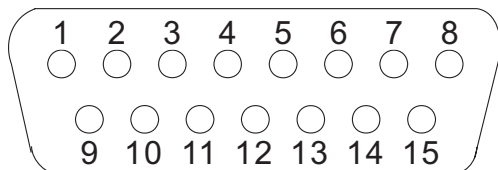
Power Switch: Control the start/stop of syringe power supply.

Power Socket: DC12V power supply input interface.

Drive Unit Socket: The socket is for connect controller and drive unit with a data cable.

External Interface: DB15 male Socket, input and output of control signal,

the pins are defined as follow:



- Pin 1: Pin 10, NC
- Pin 2: RS485-B, communication input negative end -
- Pin 3: RS485-A, communication input positive end +
- Pin 4: Output signal of Start/stop and direction
- Pin 5: Input end of pulse start/stop signal (TTL). Input a pulse, system start to run according to programmed parameter until finish; if the input another pulse signal during operation, the system will be stopped.
- Pin 6: Input end of TTL Start/stop (TTL). Input high voltage, system start to work according to programmed parameters until finish; if the input voltage change to low TTL, the system will be stopped.
- Pin 7: Work Status output end which is only suitable for program mode.
- Pin 8: Input public end of Start/stop, event trigger signal.
- Pin 9, 11 Public end of communication input, status output, VCC.
- Pin 12: Output end of VCC and 5VDC, current < 20 mA.
- Pin 13: Event trigger signal input end (TTL); descend edge available which is only suitable for program mode.
- Pin 14: Direction status output end (OC gate), node close when withdrawing, node disconnect when infusing.
- Pin 15: Start/stop status output end (OC gate), node close when pump runs, node disconnect when pump stops.

1.4 Technical Parameters

- Max. infusion distance: 90mm
- Acceptable syringe : 5 μ L-60mL
- Linear speed: 7.94 μ m/min 79.4mm/min
- Adjusting resolution: 7.94 μ m/min
- Distance resolution: 0.165 μ m
- Linear force: >90N
- Max. Programmable steps: 8
- Operating mode: Membrane keypad and rotary encoded switch
- Display: 128 64 graphic LCD, Chinese & English language are available.
- Dispensing accuracy: 1.0%
- Repeat accuracy: 0.5%
- Memory function: Separately save the setting of common mode and program mode.
- External input interface
 - 1.Pin 5: Start/stop control (TTL), pulse mode, the status of start/stop is changed when descend edge is triggered each time.
 - 2.Pin 6: Start/stop control (TTL), gated mode, pump stops under high voltage.
 - 3.Pin 3: Event trigger (TTL), descend edge available which only suitable for program mode.
- Control output interface:
 - 1.Pin15: Start/stop status (OC gate), node close when pump runs, node disconnect when pump stops.
 - 2.Pin14: Direction status (OC gate), node close when withdrawing, node disconnect when infusing.
 - 3.Pin 7: Output pin under program mode.
- Communication interface: RS485
- Power supply: AC100-240V or DC12V
- Power consumption: ≤10W
- Operating condition: Temperature 0-40 °C, relative humidity<80%
- Controller dimensions (L W H): 170×108×65 (mm)
- Controller weight: 0.8 kg
- Drive unit dimensions (L×W×H): 245×100×95 (mm)
- Drive unit weight: 1.3 kg
- IP rating: IP41

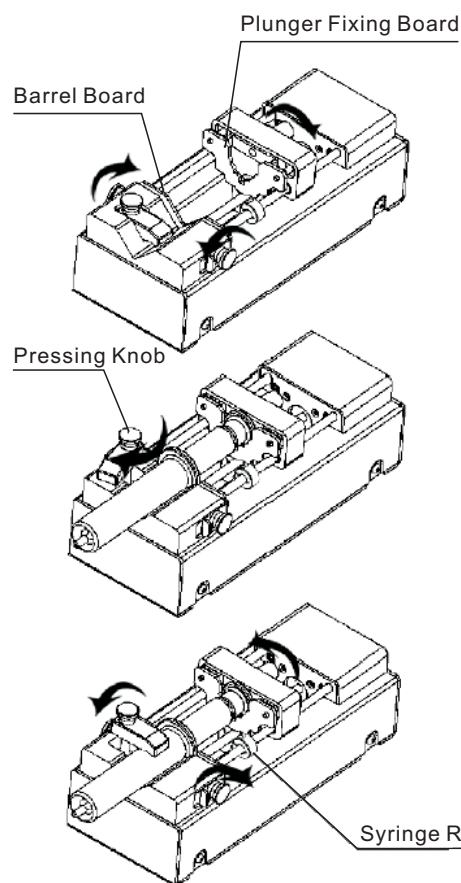
2. System Installation

This chapter includes:

- Installing syringe
- Connection of data cable and power cord

2.1 Installing Syringe

Follow below steps to install syringe:



1. Rotate the fastening knobs according to the arrowhead directions. Loose the plunger fixing board and the barrel fixing board.

2. Lift up the pressing knob and rotate the pressing knob according to the arrowhead direction. Load the syringe. Rotate the pressing knob to press the syringe.

3. Tighten the fastening knobs according to the arrowhead directions to fix the syringe. Adjust and the syringe rest to prevent the syringe from damaging.

2.2 Connection of Data Cable and Power Cord

1. Connect controller and drive unit with data cable. The plug of data cable is pin connection, so please take care when plug the data cable into the socket of controller and drive unit.
2. Connect controller to power supply using power cord.

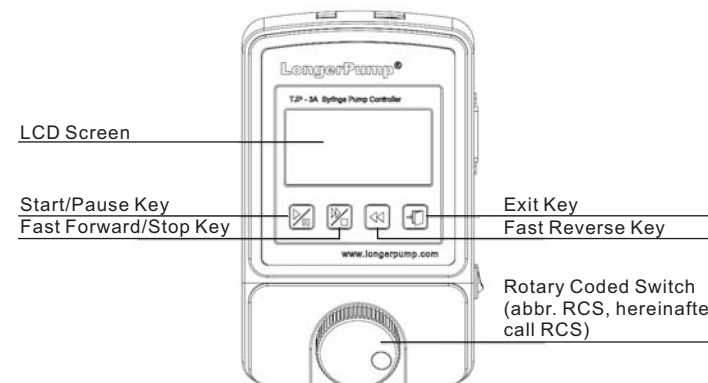
3. Usage & Operation

This chapter includes:

- Operation Panel
- Software Operation
- Program Application Sample

3.1 Operation Panel

Operation panel consists of membrane and LCD display, shown as below:



3.1.1 Basic Function

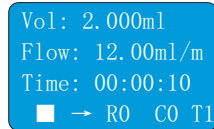
Membrane consists of Start/Pause Key, Fast Forward/Stop Key, Exit Key, Fast Reverse Key and Rotary Coded Switch.

- Start/Pause Key: Press this key to start or pause the pump.
- Fast Forward/Stop Key: In stop state, pump infused at maximum speed while pressing Fast Forward/Stop Key; loose the key pump stops. press this key to stop the pump in pause state.
- Fast Reverse Key: In stop state, the pump withdraws at maximum speed while pressing the Fast Reverse Key. Loosen the key then pump stops. Press this key to stop the pump in pause state.
- Exit Key: Cancel current operation and return to previous menu.
- Rotary Coded Switch (RCS): Turn the rotary coded switch for menu selections or parameters setting. Press the Rotary Coded Switch to save the setting.

3.1.2 Display Interface

There are three kinds of display interface of Work Interface, Setting Interface and Prompt Interface.

- Work Interface



Work interface is shown as above illustration:

First line is the volume of current step or current process.

Second line is the flow rate of current step or current process.

Third line is the current running time, counting down when pump running.

Forth line is state information:

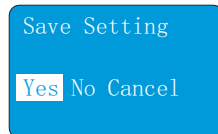
First symbol is representative of start, pause, stop state, ► means pump works, || means pump pause, ■ means pump stops.

Second symbol is representative of direction state, → means withdraw direction, ← means infusion direction, ►► means the plunger of syringe pump moves fast forward, ◀◀ means the plunger of syringe moves fast reverse.

Third symbol is Rx which indicates copy number. The range of “x” is from 1 to 99.

Fourth symbol is “Cx” which indicates current operation steps, the range of “x” is from 0 to 8, “0” means pump do not start yet. Fifth symbol is “Tx” which indicates general operation steps, the range of “x” is from 1 to 8, and the “x” value should be 2 when work mode is infusion /withdraw or withdraw /infusion.

- Setting Interface
Parameters can be set in this interface, refer to “Software Instruction”.
- Prompt Interface



Prompt interface is shown as above illustration:

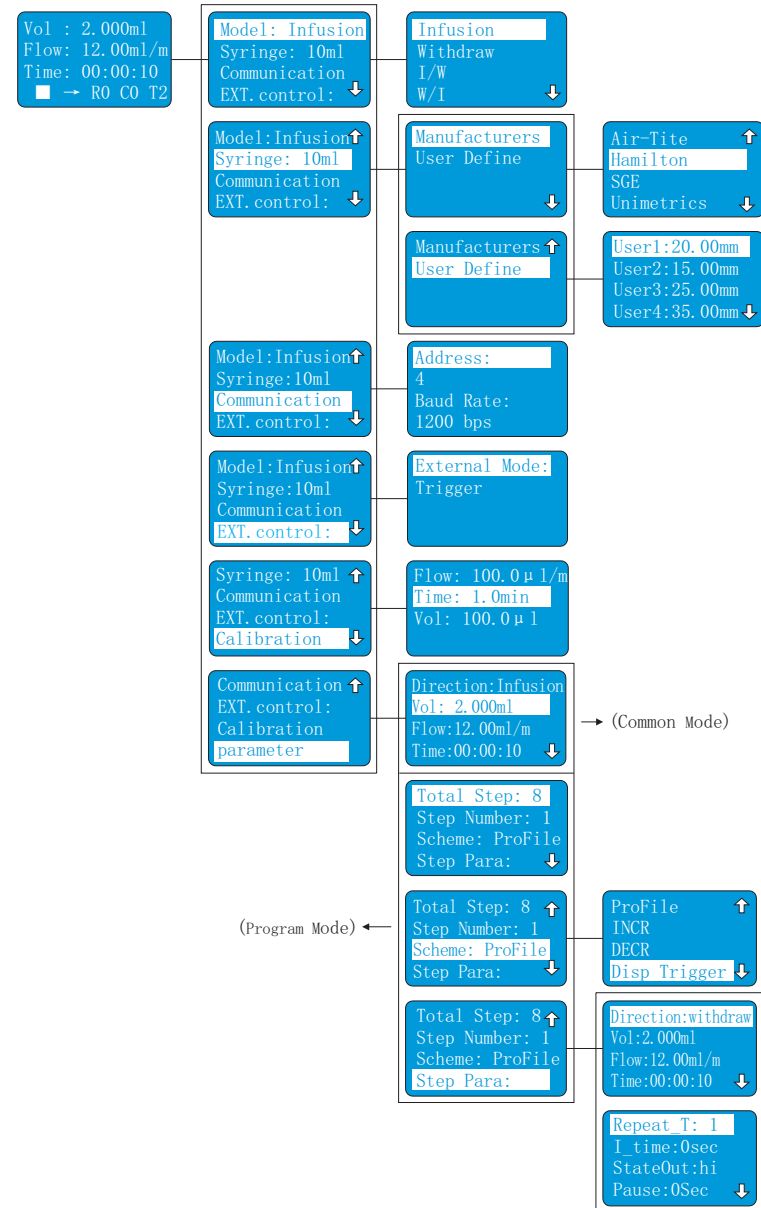
Choose “Yes” and press RCS to save the setting and back to previous menu.

Choose “No” and press RCS cancel the setting and back to previous menu.

Choose “Cancel” and press RCS cancel the setting to reset the parameters.

3.2 Software Operation

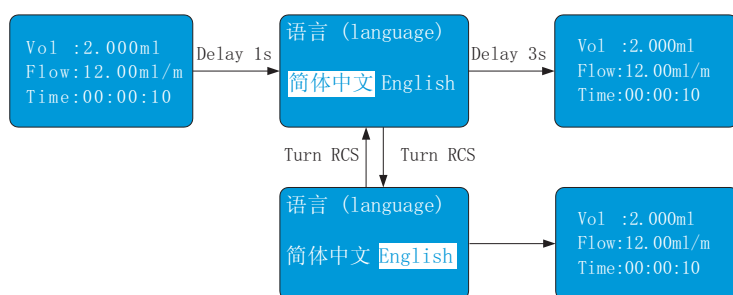
3.2.1 Menu Navigation



3.2.2 Language Selection

Switch on the controller, the controller will display product type, display language options interface after 1 second delay. Language selection interface will keep 3 seconds. Turn RCS to select necessary language if need to select language and save the setting; if need not to select language, the displayed language is last language option. System will enter work interface after 3 second.

Setting example is shown as below:



3.2.3 Start Pump

In stop state, press “Start/Pause Key” to start current process, pump will works according to programmed mode and relative parameters, direction symbol flashes. In running state, press “Start/Pause Key” to pause current work process; in pause state, press “Start/Pause Key” to restart pump. In pause state, press “Fast Forward/Stop Key” to stop pump. In run and pause state, pump is forbidden to set parameters.

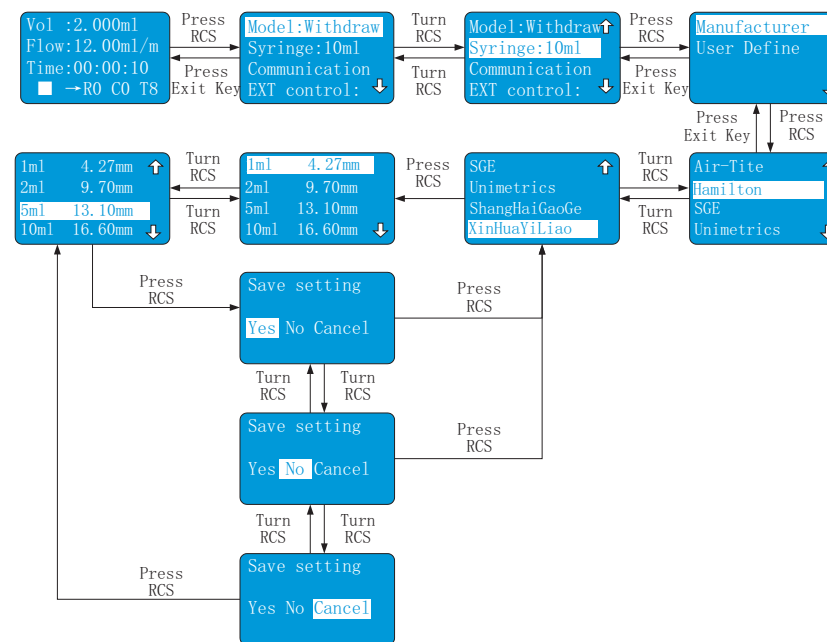
3.2.4 Syringe Selection

Syringe barrel diameter can be selected according to manufacturer and syringe type, or input syringe barrel diameter directly.

3.2.4.1 Standard Syringe Selection

In work mode and stop mode, press RCS to enter menu setting interface, turn “RCS” to highlight “Syringe”, press RCS to enter next interface. Turn RCS to highlight “Manufacture”, press RCS to enter manufacturer list which has six manufacturers which are “Air-Tite, Hamilton, SGE, Unimetrics, ShanghaiGaoGe, XingHuaYiLiao. Select suitable manufacturer and then press RCS to enter syringe list. Choose corresponding syringe, press RCS to save the setting.

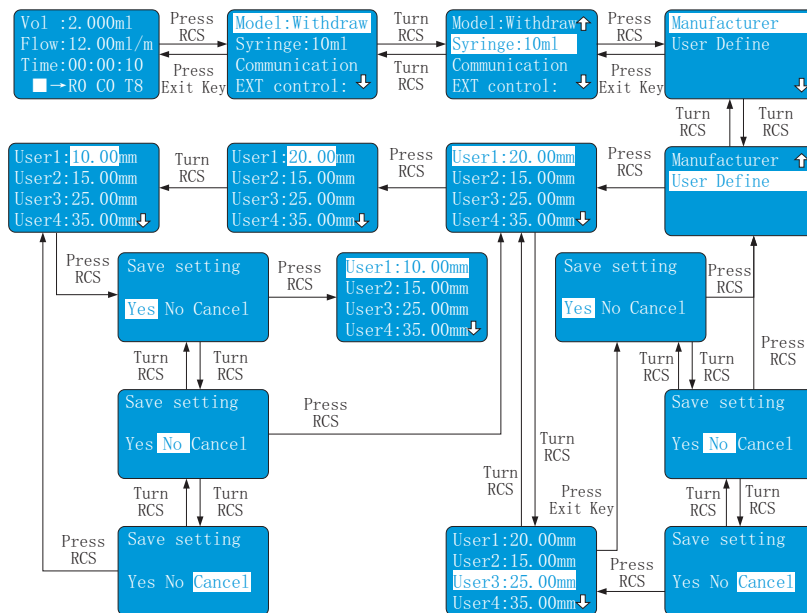
Setting example is shown as below:



3.2.4.2 Setting & Selection of User-Define Syringe

In work mode and stop state, press RSC to enter to menu setting interface, turn RCS to highlight “Syringe”, press RCS to enter next interface. Turn RCS to highlight “User Define”, press RCS to enter “User Define” interface. There are four user define syringes available. User input the diameter of syringe barrel, the default value is 20.00mm, the available diameter is from 0.01 to 50mm.

Setting example is shown as below:



3.2.5 Work Mode Selection

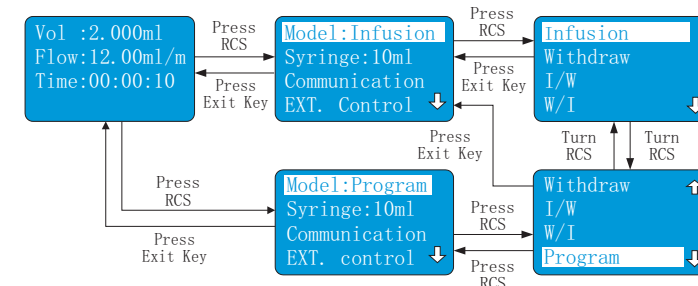
There are five kinds of work modes available, which are withdraw mode, infusion mode, infusion/withdraw mode, withdraw/infusion mode, program mode.

- Infusion mode: pump infuses according to programmed parameters. The pump will automatically stop when pump infuses target volume.
- Withdraw mode: pump withdraws according to programmed parameters. The pump will automatically stop when pump withdraws target volume.
- Infusion/Withdraw mode: first, pump infuses according to programmed parameters, the pump pauses when pump infuses target volume, the interval time is programmed pausing time; after pausing time, pump withdraws according to programmed parameters, the pump will automatically stop when pump withdraws target volume.
- Withdraw/infusion mode: first, pump withdraws according to programmed parameters, the pump pauses when pump withdraws target volume, the interval time is programmed pausing time; after pausing time, pump infuses according to programmed parameters, the pump will automatically stop when pump infuses target volume.

- Program mode: In program mode, every step can set different scheme, and combine multi-step to accomplish a complicated work process. There are software simulation modules in testing software which can simulate the parameters of each step into figure. Operator will be easy to check if there are any wrongs with inputted parameters. Refer to “Testing Software Instruction” to know more details.

In work mode and stop state, press RCS to enter menu setting interface, turn RCS to highlight “model”, press RCS to next interface. Turn RCS to choose program mode, press to save the setting or press Exit Key to cancel the setting.

Setting example is shown as below:



3.2.6 Running Parameters Setting:

Different work mode is corresponding to different running parameters. Now divide five kinds of work modes into two categories: common mode and program mode. Common mode includes withdraw, infusion, infusion/withdraw, withdraw/infusion.

3.2.6.1 Common Mode

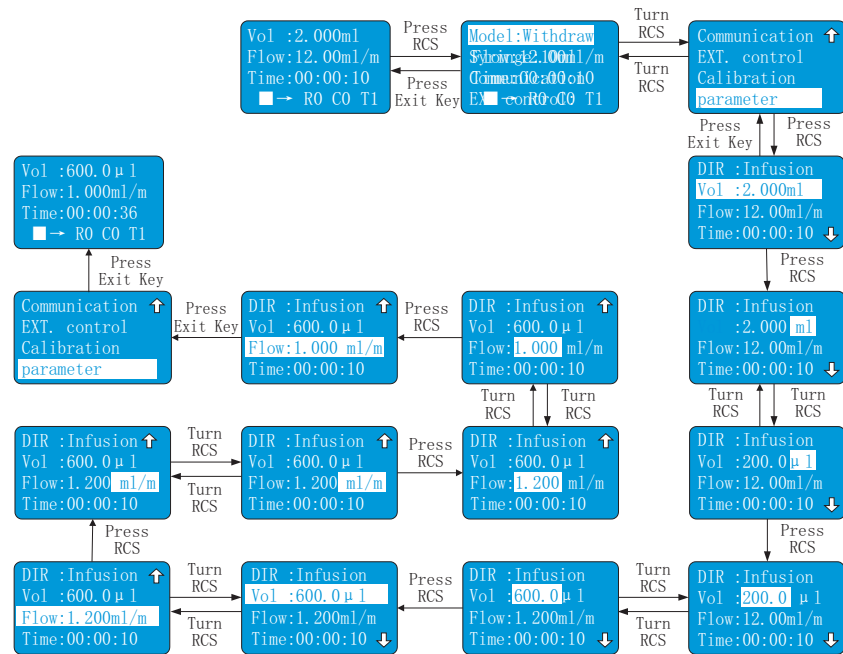
- Infusion/Withdraw Mode

In work interface and stop state, set pump in infusion/withdraw mode, turn RCS to enter menu setting interface, turn RCS to highlight “parameter”, press RCS to enter parameters setting menu. In this interface, only “Vol” and “flow” are optional; “direction” is decided by work mode; “time” is the ratio of volume and flow. The time displays in hour, minutes and seconds. Volume Parameters include the numerical part of the fluid volume and unit part.

Turn RCS to select “Vol”, press RCS to highlight unit. Turn RCS clockwise, unit changes from ml to μ l to ml; turn RCS to change unit from ml to μ l to nl. After setting unit, press RCS to highlight numerical part. Turn RCS clockwise to increase numerical part until this numerical part reach to maximum value. Turn RCS counter clockwise to decrease the numerical part until to minimum value of “0”.

Turn RCS to highlight “Flow”, press RCS to highlight unit part. Turn RCS clockwise to change unit from nl/sec to L/sec or from nl/min to L/hour; turn RCS counter clockwise to increase the digit from one to three after decimal point, in the meantime, the unit change from nl/min to μ L/min or from μ l/min to ml/min. After setting unit, press RCS to highlight numerical part, turn RCS clockwise to increase value until to maximum value; turn RCS counter clockwise to decrease value until to minimum value.

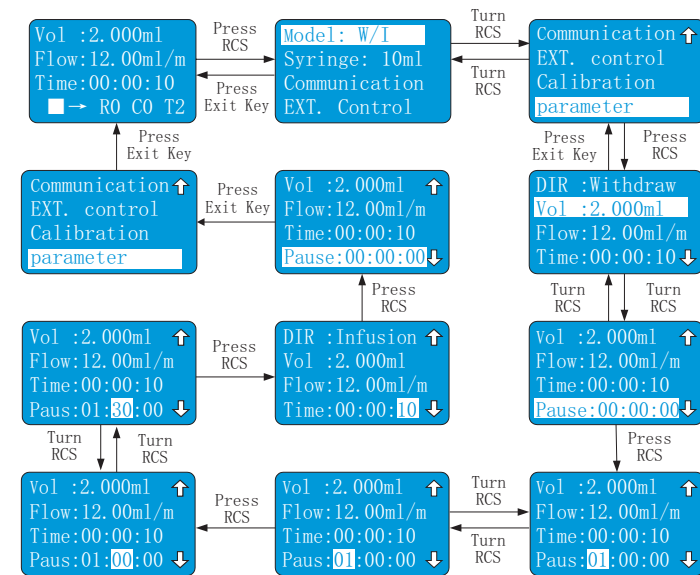
Setting example is shown below:



- Infusion/Withdraw & Withdraw/Infusion mode
In work interface and stop state, set pump in Infusion/Withdraw or Withdraw/Infusion mode, press RCS to enter menu setting interface, turn RCS to highlight “parameter”, press “RCS” to enter menu setting interface. In this interface, “Vol”(volume), “Flow”, “Vol2” (volume2), “Flow” and “Pause” are optional; “DIR” (direction) and “DIR2 (direction 2) are set by mode; “Time” is the ratio of volume and flow, “Time2” is the ratio of volume 2 and flow 2. The time displays in hours, minutes and seconds. Volume and flow setting includes the setting of volume/flow values and the setting of volume/flow unit. The pause time range is from 00:00:00 second to 10:00:00.

The setting of volume and flow is same as infusion/withdraw mode.

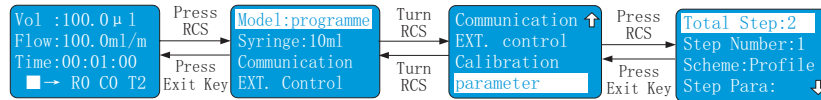
Setting example is shown as below:



3.2.6.2 Program Mode

In work interface, stop state and program mode, press RCS to enter menu setting interface, turn RCS highlight “parameters” press RCS to enter to set parameters in this interface.

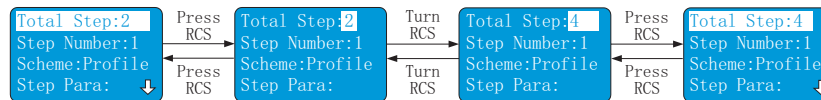
Setting example is shown as below:



- Total Steps**

The steps quantity required to complete a task, the step number range is from 1 to 8.

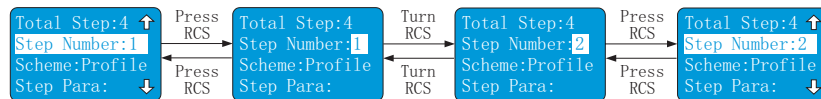
Setting example is shown as below:



- Step number**

Current step, minimum value is 1, and the maximum is 8.

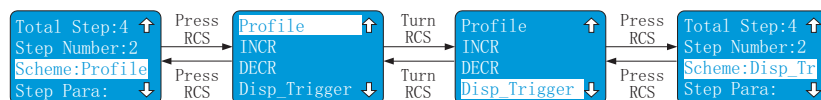
Setting example is shown as below:



- Scheme:**

The operation schemes of current programming step include “ProFile” (uniform speed), “INCR” (increase speed), “DECR” (decrease speed), “Disp_Trigger” (trigger dispensing), “Disp_Cycle” (periodic dispensing), “Pump”, “Event” and “Restart”.

Setting example is shown as below:



Operation scheme of single scheme instruction shown as below table:

No.	Operation Scheme	Instruction
1	Profile (Uniform Speed)	Pump works according to programmed flow until withdraw/infuse target volume. In this scheme, “Dir” (Direction), “Vol” (Volume), “Flow” and “StateOut” (State Output) can be set; “time” is the ratio of volume and flow; the default “Repeat_T” (Repeat Times) is one time. The default time of “I_time” (time interval) and “Pause” time is zero second.
2	INCR (speed Increment)	Pump works each time according to programmed flow increment, running time and repeat times. In this scheme, “Direct” (Direction), “Iflow” (flow increment), running “Time”, “Repeat_T” (Repeat Times) and “StateOut” (State output) can be set. Divide this step into several process according to programmed repeat times, the flow rate of each process will increase according to programmed flow increment. Running time is the work time of each process. The first flow rate is the sum of flow increment and the initial flow rate (the flow rate of last step). The Initial flow is zero if this step is first step or last step is not uniform speed, increment speed or decrement speed. In this step, liquid volume is displayed value; it is the total liquid volume of this step. The default pausing time and time interval are zero second.
3	DECR (speed decrement)	Pump works each time according to programmed flow decrement, running time and repeat times. In this scheme, “Direction”, “Dflow” (flow decrement), running “Time”, “Repeat_T” (Repeat Times) and “StateOut” (state output) can be set. According to programmed Repeat times, divide this step into several process, the flow of each process is decreased according to programmed decrement values. Running “Time” is the work time for each process. The first flow value is initial flow (the flow of last step) to minus flow decrement, that means initial flow should be bigger than the product of repeat times and flow decrement. In this step, liquid volume is the display values, and it is the total liquid volume of this step. The default time interval and pause time are zero second.
4	Disp_Trigger (dispensing trigger)	Multi-trigger dispensing, the start of each dispensing process depends on the trigger signal. For example, Star/Pause Key or footswitch. In this scheme, “Dir” (Direction), “Vol” (Dispensing Volume), “flow” (dispensing flow), “Repeat_T” (repeat times), “stateOut” (State output) and “Pause” can be set; work time is the ratio of volume to flow. The default pausing time is zero second.
5	Disp_Cycle (dispensing cycle)	Multi dispensing, pump will pause according to programmed time interval; and pump start after time interval is over. In this scheme, “Dir” (Direction), “flow” (dispensing flow), “Repeat_T” (repeat times), “stateOut” (state output) and “Pause” can be set; work time is the ratio of volume to flow. The default pausing time is zero second.
6	Pump	Pump works according to programmed flow. In this scheme, “Dir” (Direction), “flow” (dispensing flow), “stateOut” (state output) can be set.
7	Event (Event Trigger)	If there is an event trigger signal on input end, that will have a descend edge (from high TTL to low TTL), then this step will be activated and turn to specified step. There is only one option of “switch”.
8	Restart	This step is set to perform the whole process from first step when restart system.

- Single step parameters

Single step parameters include direction, volume, flow, time, repeat times, time interval, state output, pause, increase, decrease and reverse. Different single step schemes are corresponding to different single step parameters.

Direction: The running direction of single step, infusion or withdraw directions are optional.

Volume: It is dispensing volume of single step in uniform, increase, decrease speed scheme; it is dispensing volume of each time in trigger dispensing and periodic dispensing scheme.

Flow: In uniform speed, trigger dispensing, periodic dispensing scheme, it is constant flow of single step.

Time: In uniform speed, trigger dispensing, periodic dispensing scheme, set the work time to dispense target volume according to programmed flow; in speed increment or decrement scheme, it is the work time for each step; the displays in hours, minutes and seconds.

Repeat Times: In speed increase, decrease scheme, it is the times of flow increment and decrement, and it is the step number; and it is repeat times in trigger dispensing and periodic dispensing scheme. The value range is from 0 to 99.

Time Interval: In periodic dispensing scheme, it is the time interval between two dispensing, the value range is from 0 to 36000 seconds, the resolution is 1 second.

State output: Output of the state of single step, high and low TTL are optional; set the state is high TTL then the corresponding pin output high TTL; set the state is low then the corresponding pin output low TTL.

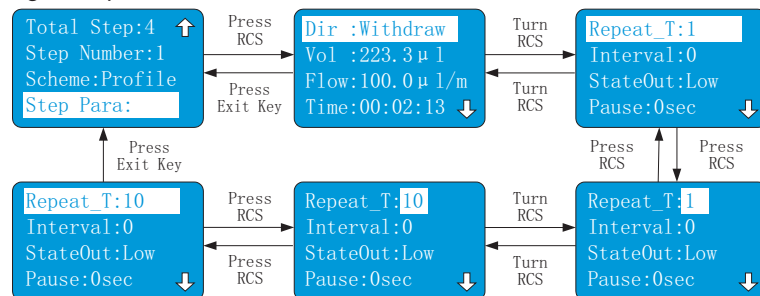
Pause Time: In periodic dispensing and trigger dispensing.

Increment: the increment of flow in speed increasing scheme.

Decrement: the decrement of flow in speed decreasing scheme.

Switch: Switch to certain step.

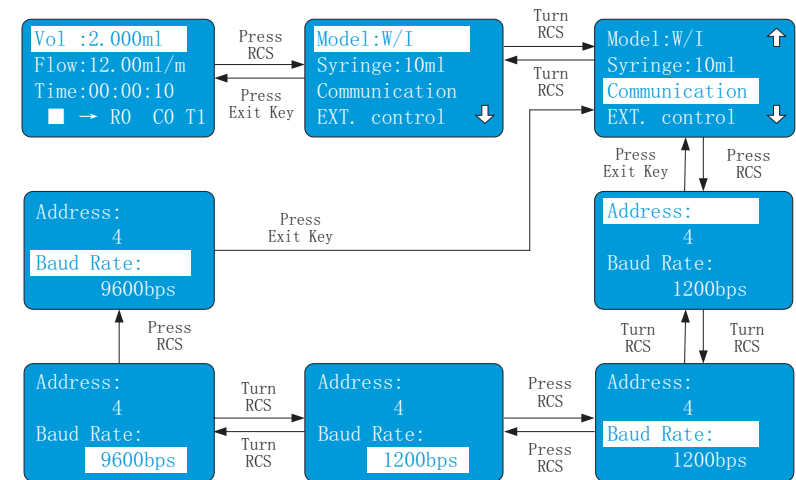
Setting example is shown as below:



3.2.7 Communication

Operator needs to set address and baud rate of controller when remotely controlling the pump by communication. The address range is from 1 to 30, there are three kinds of baud rates are optional, which are 1200bps, 2400bps, 9600 bps. In work interface and stop state, press RCS to enter menu setting interface, turn RCS to highlight "Communication", press RCS to enter communication interface, turn RCS to highlight "Address" or "Baud Rate", press RCS to highlight value of address or baud rate, and turn RCS to change the value. Press RCS to save the setting.

Setting example is shown as below:

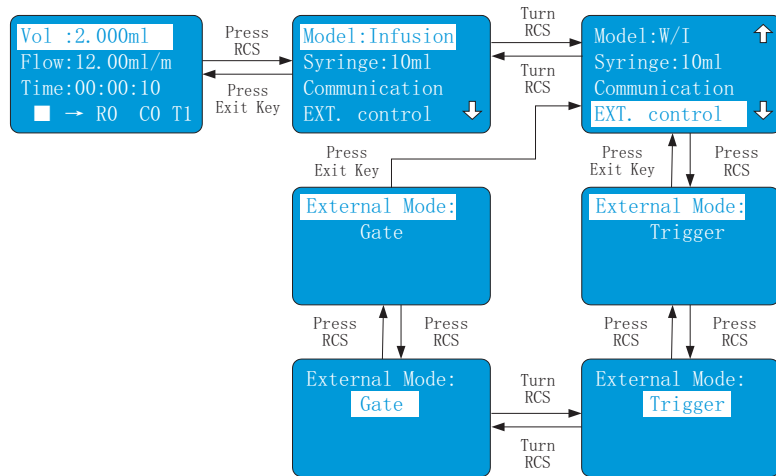


3.2.8 External Control

Control the Start/Stop of the pump by external signal, the trigger and gate modes are optional.

In work interface and stop state, press RCS to enter menu setting interface, turn RCS to highlight "EXT control", press RCS to enter external start/stop mode setting interface. Press RCS again to select "Trigger" or "Gate", press RCS to save the setting.

Setting example is shown as below:



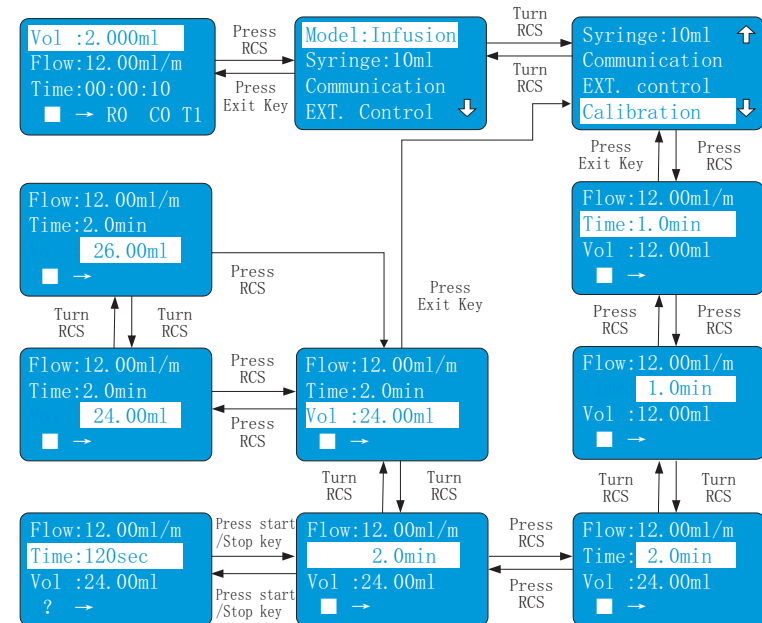
3.2.9 Flow Rates Calibration

Flow calibration: Operator can get more accurate flow through calibrating the diameter of syringe barrel.

In work interface and stop state, press RCS to enter menu setting interface, turn RCS to highlight “Calibration”, press RCS to enter next interface, the first line display the programmed flow in current mode; the second line displays the testing time whose range is from 1 to 60 minutes. The third line displays theoretical volume (the product of flow and testing time) or input measured volume directly. The fourth line displays the start/stop and direction state.

Calibration procedure: set testing time first, start pump. Pump automatically stop after the testing time is over, measure the liquid volume and input the measured volume, the calibration is over. If knew the measured volume in advance, operator can directly input the measured volume.

Setting example is shown as below:

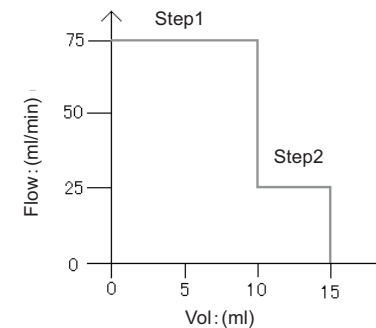


3.3 Program Application Sample

3.3.1 Multi-step uniform speed (profile) infusion

Each step is uniform speed dispensing, each small step can adopt different volume and flow. The work time of each small step is decided by programmed volume and flow. And there is no time interval between small steps, that means the next small step will immediately implement according to programmed flow and volume after last step is over.

Setting example is shown as below:



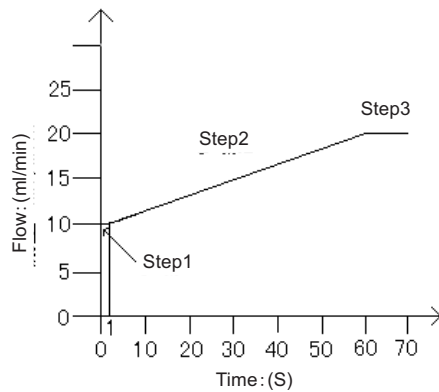
Parameters Instruction:

- Step 1: Uniform Speed**
- Flow: 75 ml/min
- Vol: 10 ml
- Direction: Infusion
- Step 2: Uniform Motion**
- Flow: 25 ml/min
- Vol: 5 ml
- Direction: Infusion

3.3.2 Uniform increment/decrement speed infusion

First set an initial speed in uniform speed mode, and set an increment and repeat times, then pump can accomplish a process of uniform increment speed. Similarly set a decrement and repeat times, then pump can accomplish a process of uniform decrement speed.

Setting example is shown as below.

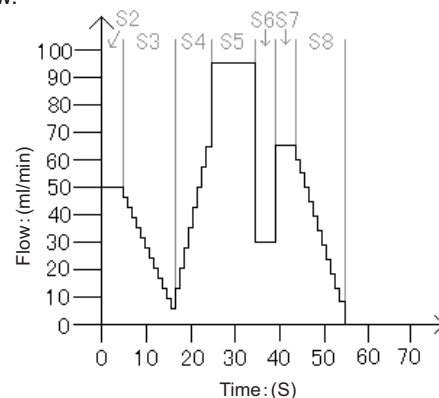


Parameters Instruction:
Step 1: Uniform Speed
 Flow: 10 ml/min
 Vol : 0.5 ml
 Direction: Infusion
Step 2: Uniform Increment Speed
 Increment: 0.17 ml/min
 Time: 1sec
 Direction: Infusion
 Repeat Times: 59
Step 3: Uniform Speed
 Flow: 20ml/min
 Vol : 1 ml
 Direction: Infusion

3.3.3 Complicated curve of Uniform Speed & Uneven Speed-

This mode combines uniform speed mode, uniform increment speed mode and uniform decrement speed mode. Operator can use this mode to implement more complicated flow curve.

Setting example is shown as below.



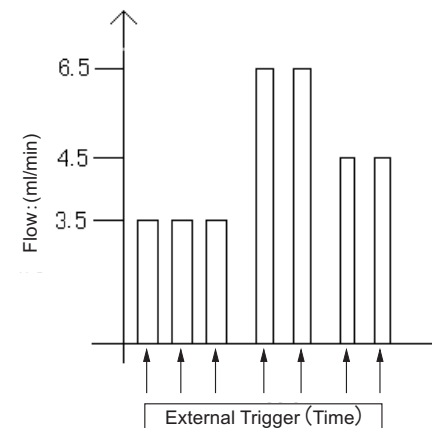
Parameters Instruction:

Step 2: Uniform Speed Flow: 5.0 ml/min Vol : 0.5ml Direction: Infusion	Repeat Times: 8 Direction: Infusion	Step 7: Uniform Speed Flow: 65 µ l/min Vol : 0.8ml Direction: Infusion
Step 3: Decrement Speed Decrement: 400 µ l/min Time: 00:00:00 Repeat Times: 12 Direction: Infusion	Step 5: Uniform Speed Flow: 95 µ l/min Vol : 1ml Direction: Infusion	Step 8: Decrement Speed Decrement: 5ml/min Time: 00:00:01 Repeat Times: 11 Direction: Infusion
Step 4: Increment Speed Increment: 800 µ l/min Time: 00:00:00	Step 6: Uniform Speed Flow: 30ml/min Vol : 250 µ l Direction: Infusion	

3.3.4 Dispensing Trigger

Operator can accomplish dispensing process of several variable volume and flow based on programmed scheme. Each dispensing is started by external trigger signal, for example, Star/Stop Key or Footswitch. The dispensing volume should be smaller than capacity of syringe.

Setting example is shown as below:



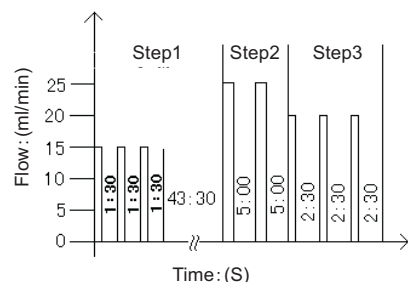
Parameters Instruction:

Step 1: Decrement Speed
 Flow: 3.5ml/min
 Vol : 1.5 ml
 Repeat Times: 3
 Direction: Infusion
Step 2: Decrement Speed
 Flow: 6.5ml/min
 Vol : 2.5 ml
 Repeat Times: 2
 Direction: Infusion
Step 3: Decrement Speed
 Flow: 4.5ml/min
 Vol : 1.7 ml
 Repeat Times: 2
 Direction: Infusion

3.3.5 Dispensing Cycle

Operator can set a periodic dispensing process. And each step can set different dispensing volume and flow.

Setting sample is shown as below:



Parameters Instruction

Step 1: Periodic Dispensing

Flow: 15ml/min
Vol : 3.5ml
Time: 00:01:30
Repeat Times: 3

Direction: Infusion
Pause: 00:43:30

Step 2: Periodic Dispensing

Flow: 25.7ml/min
Vol : 6.75ml
Time: 00:05:00

Repeat Times: 2
Direction: Infusion

Pause: 00:00:00

Step 3: Periodic Dispensing

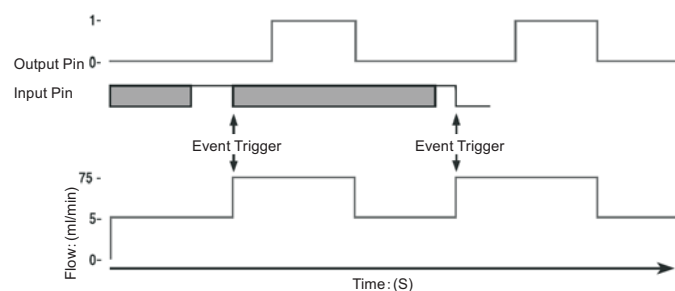
Flow: 20ml/min
Vol : 4.3ml
Time: 00:02:30

Repeat Times: 3
Direction: Infusion

Pause: 00:00:00

3.3.6 Event Trigger

Setting sample is shown as below:



Parameters Instruction

Step 1: Output low TTL

Vol : 5ml

Step 2: Event Trigger

Direction: Infusion

Switch to: Step 4

Step 3: Pump Start

Step 5: Output High TTL

Flow: 5ml/min

Step 6: Uniform Speed

Direction: Infusion

Flow: 15 ml/min

Step 4: Uniform Speed

Vol : 10ml

Flow: 15 ml/min

Direction: Infusion

Step 7: Restart Process

4. Maintenance

- Keep the surface of the pump clean and dry. Prevent the liquids from entering the inner of the drive unit.
- The surfaces of drive units are not organic solvent and aggressive liquids resistant. Please pay attention when using.
- If a trouble happens, please contact us or our dealers.

5. If need more information on order and operation, please email to longer company to ask the assistance.

6. Appendix:

A Order Information

Standard Configuration

No.	Name	Configuration	Quantity	Remarks
1	Drive Unit	W0109-1B	1	
2	Controller	TJP-3A	1	
3	Syringe	1ml – 60ml	2	Plastic syringe, its size depends on customer requirement.
4	Adapter	RA1203F01	1	CE certificate
5	Date Cable		1	Dedication
6	Power Cord	1.5m length	1	
7	Operating Manual		1	
8	Allen Key	M3	1	

No.	Name	Configuration	Quantity	Remarks
1	Software		1	Testing software
2	External Interface	DB15	1	Pin type
3	Syringe	5 μ l – 60ml	2	According to customer requirement.
4	Power Cord	1.5 China Type	1	According to customer requirement.
		European Type	1	
		American Type	1	

B Syringe diameter and flow rate range:

Manufacturer	Syringe Type	Syringe Diameter(mm)	Minimum Flow Rate	Maximum Flow Rate
Air-Tite	1ml	4.70	0.1377ul/min	1.377ml/min
	2.5ml	9.70	0.5866ul/min	5.866ml/min
	5.0ml	12.48	0.9710ul/min	9.710ml/min
	10ml	15.89	1.574ul/min	15.74ml/min
	20ml	20.00	2.494ul/min	24.94ml/min
	30ml	22.50	3.156ul/min	31.56ml/min
	50ml	28.90	5.207ul/min	52.07ml/min
Hamilton	10ul	0.46	1.32nl/min	13.19ul/min
	25ul	0.73	3.32nl/min	33.22ul/min
	50ul	1.03	6.61nl/min	66.14ul/min
	100ul	1.46	13.29nl/min	132.9ul/min
	250ul	2.30	32.98nl/min	329.8ul/min
	500ul	3.26	66.25nl/min	662.5ul/min
	1ml	4.61	0.1325ul/min	1.325ml/min
	2.5ml	7.28	0.3304ul/min	3.304ml/min
	5ml	10.30	0.6614ul/min	6.614ml/min
	10ml	14.57	1.323ul/min	13.23ml/min
	25ml	23.03	3.306ul/min	33.06ml/min
	50ml	32.57	6.613ul/min	66.13ml/min
	Scientific Glass Engineering	25ul	0.73	3.32nl/min
50ul		1.03	6.614nl/min	66.14ul/min
100ul		1.46	13.29nl/min	132.9ul/min
250ul		2.30	32.98nl/min	329.8ul/min
500ul		3.26	66.25nl/min	662.5ul/min
1ml		4.61	0.1325ul/min	1.325ml/min
2.5ml		7.28	0.3304ul/min	3.304ml/min
5ml		10.30	0.6614ul/min	6.614ml/min
10ml		14.57	1.323ul/min	13.23ml/min

B Syringe diameter and flow rate range:

Manufacturer	Syringe Type	Syringe Diameter(mm)	Minimum Flow Rate	Maximum Flow Rate
Unimetrics	10ul	0.46	1.32nl/min	13.19ul/min
	25ul	0.73	3.32nl/min	33.22ul/min
	50ul	1.03	6.61nl/min	66.14ul/min
	100ul	1.46	13.29nl/min	132.9ul/min
	250ul	2.30	32.98nl/min	329.8ul/min
	500ul	3.26	66.25nl/min	662.5ul/min
	1000ul	4.61	132.5nl/min	1325ul/min
Shanghai Gaoge	5ul	0.35	0.76nl/min	7.637ul/min
	10ul	0.50	1.56nl/min	15.59ul/min
	25ul	0.80	3.99nl/min	39.90ul/min
	50ul	1.10	7.54nl/min	75.43ul/min
	100ul	1.60	15.96nl/min	159.6ul/min
	250ul	2.30	32.98nl/min	329.8ul/min
	500ul	3.25	65.85nl/min	658.5ul/min
	1000ul	4.61	132.5nl/min	1325ul/min
XinHua YiLiao	1ml	4.72	0.1389ul/min	1.389ml/min
	2ml	9.70	0.5866ul/min	5.866ml/min
	5ml	13.1	1.070ul/min	10.70ml/min
	10ml	16.6	1.718ul/min	17.17ml/min
	20ml	19	2.251ul/min	22.51ml/min
	30ml	23	3.298ul/min	32.98ml/min
	60ml	29.14	5.294ul/min	52.94ml/min

