Shenchen Syringe Pump Manual of ISPLab Series

Baoding Shenchen Precision Pump Co..Ltd

⚠ Important Information

➢ Please read the instruction before operating the product.

⚠ Warning

➢ Please connect directly the power line to the wall socket,and avoid using the extension electric line.

➢ If power line or plug have wear and other damage,please unplug it, holding the plug, not the line.

➢ If following situations happened,please turn off the electric power and unplug the plug, holding the plug, not the line.

1. Fluid splash on the pump.

2. You think the pump need to maintain or amend.

➢ The customers' power socket must have ground wire, and have reliable grounding.

Note: The foot switch and other external control plugs must be loaded and unloaded in the power-off state to prevent burning of the external control interface.

Catalogue

1. ISPLab Series Product Introduction

Infusion & Withdraw Syringe pump, 304 stainless steel mirror hosing, 4.3'' color LCD touch screen and imported mechanical keypad control,graphical interface, Dynamic display the working status, the filling parameters and running status display in same screen. Support RS-232 and RS-485 communication, rich external control interface, convenient for users to remote control under different conditions.

2. ISPLab Series Product Appearance
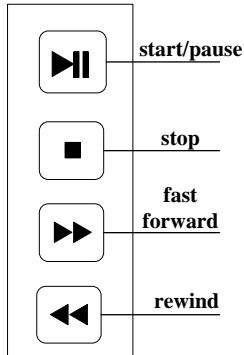
3. ISPLab Series Interface Description


Foot pedal interface 9 pin interface 15 pin interface
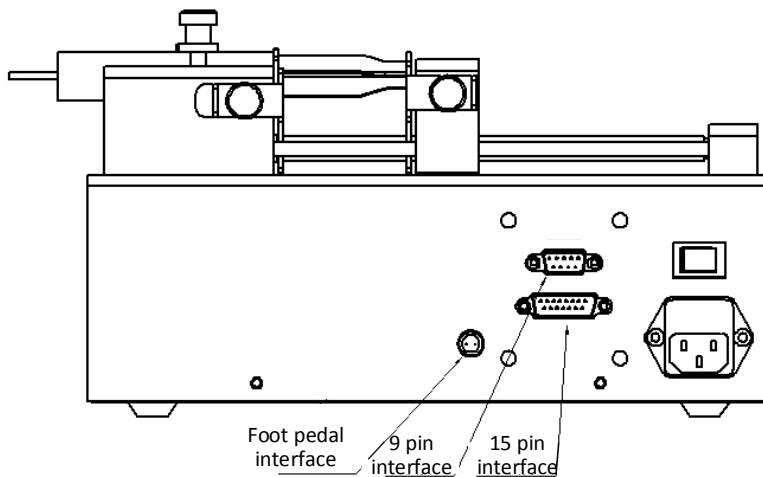
a) Foot pedal interface:connect with foot pedal switch

b) 9 pin interface: RS-232 and RS-485

c) 15 pin interface:External input and output

Mechanical Keypad Instruction

- ➢ Start/pause:After setting the running parameters, click the start and pause button, the syringe pump will start running follow the parameters, and click the button again to pause the current running.After click the button, the main interface will be grayed out (disabled) except that the calibration button is colored (available).
- ➢ Stop:Click the button,stop running. Main interface disabled status button becomes available
- ➢ Fast forward:When press this button in the stop state, the syringe pump will run to the right at the highest speed. Press this button again and the pump will stop running.
- ➢ Rewind:When press this button in the stop state, the syringe pump will run to the left at the highest speed. Press this button again and the pump will stop running.

4.Syringe Installation
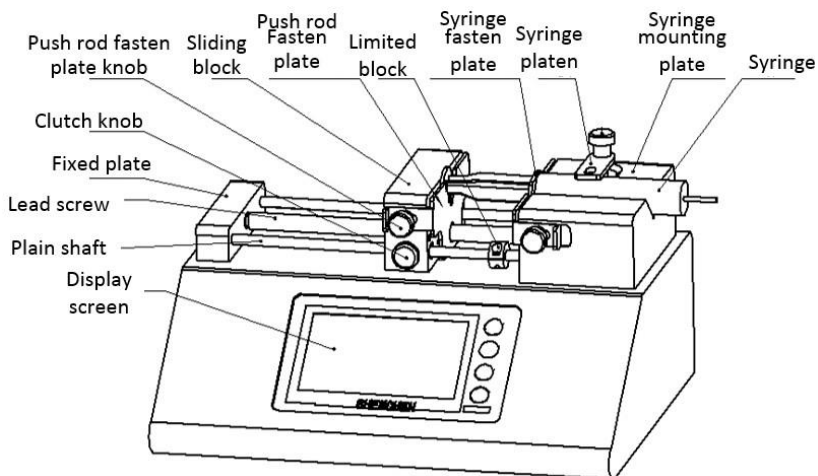
a)Hold down [clutch knob] to disengage [sliding block] from [lead screw] and move to other positions manually (or use the fast forward and rewind buttons to move [sliding block]).

b) Rotate two [Push rod fasten plate knob] on the side of the [Sliding Block] to open the [Push rod fasten plate]. Rotate the [Syringe fasten plate knob] on the side of the [Syringe mounting plate] to open the [Syringe fasten plate].

c) Lift and rotate the [Syringe platen], place the syringe, adjust the syringe to the appropriate position, and rotate the [Syringe platen] to hold the syringe.

d) Tighten the knobs to secure the syringe.

Tips: If you need to install a glass syringe, please consult the company's technical department.

5. ISPLab Series Controller Interface Structure

```
                          System main
                           interface
          ┌─────────────┬───────┴───────┬─────────────┐
       Date&        System          Calibrate      Stored
       time          set
   ┌────────┬──────────┬──────────┼──────────┬──────────┐
Configur  Parameter  Commun    Other set   About    Parameter
ation                ication                         view
                                  │
                               Warning
```
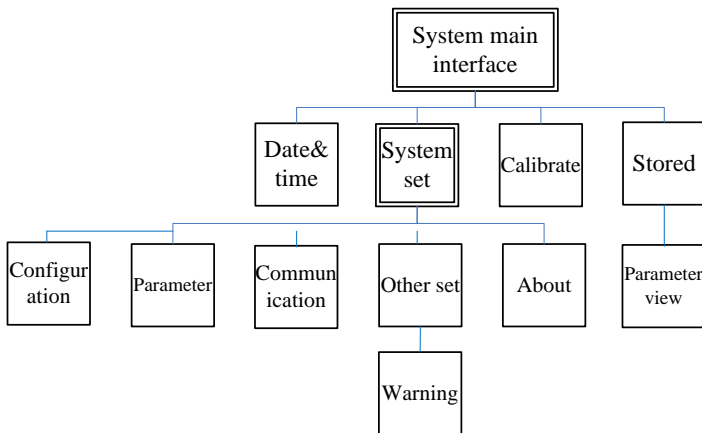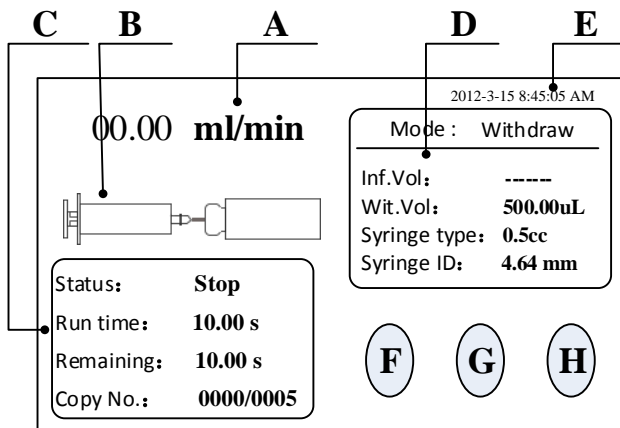
ISPLab Series Controller Operation Interface Description

5.1 Boot Interface

Display welcome interface when power is turned on. Click any place or wait 2.5 seconds enter main interface automatically.
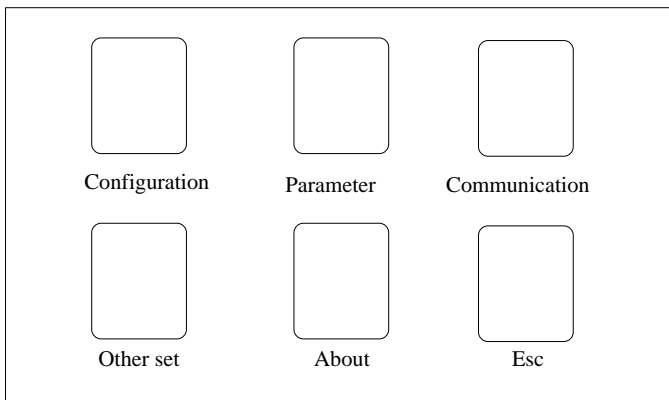
5.2 Main Interface

Main interface structure as shown below:

C   B   A   D   E

2012-3-15 8:45:05 AM

00.00 **ml/min**

Mode： Withdraw

Inf.Vol：   ------
Wit.Vol： **500.00uL**
Syringe type： **0.5cc**
Syringe ID： **4.64 mm**

Status：   **Stop**
Run time： **10.00 s**
Remaining： **10.00 s**
Copy No.： **0000/0005**

F   **G**   **H**

a) Real-time flow rate display: Display the current flow rate

b) Real-time Dynamic Display: Display the filling unit running state and monitoring results.

c)Real-time Parameter Display: Display the current running state, setting time, remaining time, repeat count.

d) Set Parameter Display: Display the current working mode, infusion volume, withdraw volume, syringe size and syringe ID.

e) Date and Time Display: Display the current data and time, you can change it in the system setting.

f) System Set: Click this button, enter system setting interface,set up syringe size, running datas, external control, other settings, parameter view.

g) Calibrate: Click this button enter the flow rate calibration interface.

h) Stored: Click this button enter the common mode interface.

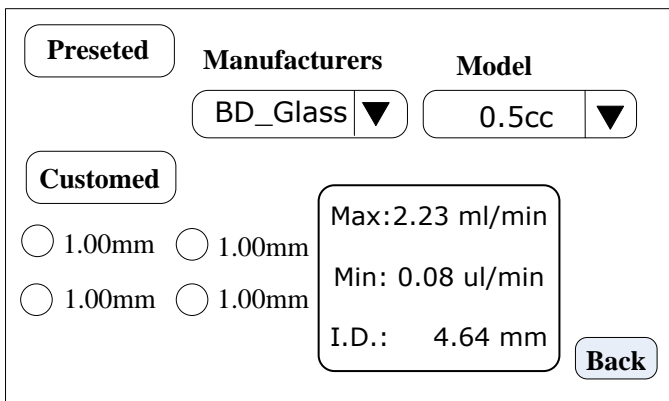
5.3 System Set Interface

System set interface as shown below:

Click **System set** button,enter system set interface

5.4 Configuration Interface

Configuration interface as shown below:

The main interface clicks **System set** button,click **Configuration** button,enter syringe size set interface.

Under this interface click **Preseted**, choosing the manufacturer built-in syringe, **Manufacturers.**menu choose syringe manufacturer,**Model** menu choose syringe size.Click **Preseted**,**Customed** prohibited.

Under this interface click **Customed**,choosing customized syringe size,can be set 4 groups syringe.After selection **Customed** can be set syringe ID.And **Preseted** prohibited.

The right side shows syringe max and min flow rate,syringe ID.

Click **Back** to system set interface.

5.5 Parameter Set Interface

The main interface click **system set**,click **parameter**,enter parameter set interface.

Fisrtly choose **Run mode** (example:Withdraw-Infuse),setting withdraw parameter (**volume,runtime,flow**), **Roll back** (That is, after withdraw, a certain distance is run in the opposite direction, which can be used to discharge bubbles, and the input range is 0.01 mm-10 mm.),**Space time**. Click **NEXT**,enter infuse set parameter.

Note: Only Withdraw can be set Roll back.

Run mode		
Withdraw	**Volume** uL 500.00	**Flow** uL/min 500.00
Infuse	**Run time** Sec 500.00	
Withdraw- Infuse		PREV
Infuse- Withdraw	**Space time** Sec 1.00	**Copy times** 06000	OK

In the interface to set infuse parameters;Setting **Space time** and **Copy times** (Copy times 1-9999,0 means unlimited).Click **PREV**,can be check and change Withdraw parameters;Click **OK**,save the parameters and exit.

5.6 Communication

Communication set interface as shown below:

Baud Rate
9600 ▼

COMM.enable
On   Off

COMM.Interface
RS485 ▼

Parity bit
Even parity ▼

Slave No.
01

Back

The interface is setting communication between controller and HMI,just need to change slave (controller) address.

In main interface click **System set**,click **Communication**,enter communication set interface.

The syringe pump suppot Modbus communication protocol-RTU mode,firstly choose Baud Rate and COMM.interface RS485/RS232,click Slave No.,enter pump addressnumber(1-32),choosingCOMM.enable ON, and Parity bit, then HMI communicate with contoller, receives HMI signal control.

Note:

1) After the setting is completed, the syringe pump only receives the communication signal under the main interface, and the other setting interfaces are invalid.

2) A controller can cascade up to 32 pumps.

**5.7 Other Set**

Other set interface as shown below:
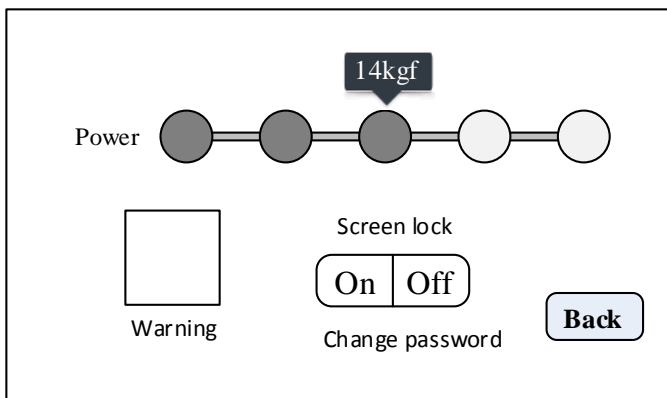
The main interface clicks **System set**,click **Other set**,enter other set infterce.

In other set interface clicks **Warning**,enter warning set interface;Click **Power** right side button, can be adjusted the torque of the pump online (Note: Please select the appropriate torque according to the actual situation. The improper torque may cause

the pump to operate abnormally. The torque of the pump is divided into 5 stages, 8kgf,11kgf,14kgf,17kgf,20kgf);

Click **Screen lock**, can be on/off such function,and need to input password,the password default to 12345678;Click **Change password**,you can change your password yourself.

Warning set interface as shown below:
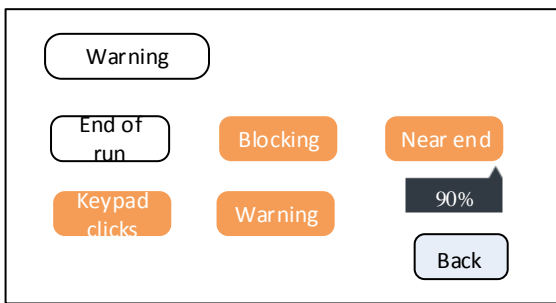
On this interface can be turn on/off warning function.Including following:

End of run: turn on the function, the buzzer alarm after stopped and the red words indicates the current status on the main interface;

Near end:turn on the function, when running to the specified percentage, the buzzer alarm and the red words indicates the current status on the main interface;

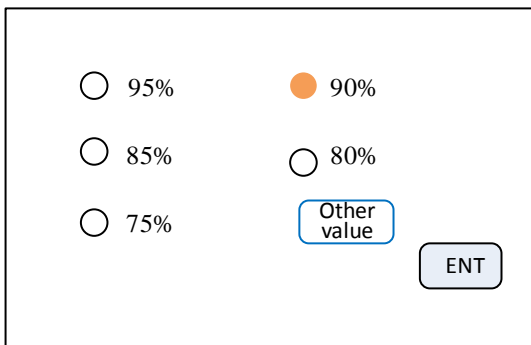Click the below button,can be set percentage (An integer between 0 and 100).

Blocking:turn on the function,when blocking, the buzzer alarm and the red words indicates the current status on the main interface.

Keypad clicks:turn on the function, press mechanical button, the buzzer will have a "beep" sound.

Warning:turn on the function,when the prompt interface or warning interface pops up,the buzzer alarm.

Percentage set infterface as shown below:

On the **Other set** infterface, click the **percentage** below near end,enter percentage set interface.The interface presets several common values. Click the radio button in front of the common value to set the value. Click the **other value** button to customize other percentage values.

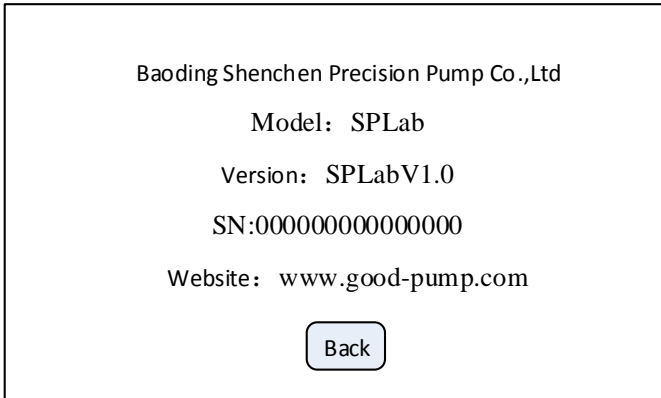**5.8 Calibrate Interface**
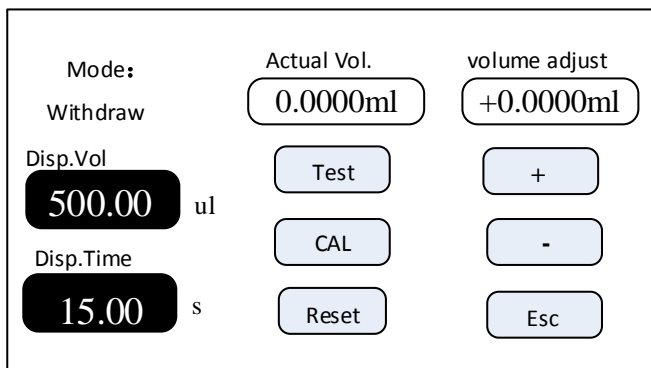
Calibration before operation:

A. If the work mode is withdraw/infuse or Infuse/withdraw,firstly need to choose calibrate for withdraw or Infuse.

B. Click **Test** to start the test. Running Time count-down and running time stops automatically. The digital keyboard for inputting the actual volume is automatically popped up. After inputting the actual volume, click the confirmation button, ask if the test should continue (more than three times recommended), select 'Yes', retest, select' No', and return to the calibration interface.

C. After several tests, the actual volume display area shows the average value of the actual volume of the test groups, and clicks the **CAL** to indicate that the calibration is successful.

D. Test the datas again, whether it meets the volume requirement or not, if need high precision, can click the button **"+"** or **"--"** at the volume adjustment to achieve high-precision volume.

E. Click **Reset**, restore to default calibration parameters at factory.

Online micro adjusting process as below:

If the volume is larger or smaller in the production process, it can be micro adjust online without affecting the production line.

A. In the main interface click **Calibrate**,enter to calibration interface.

B. At this time, only the work mode (withdraw/infuse,infuse/withdraw), "+" ,"--",Esc are available, and other buttons are disabled.

C. Click "+" or "--" to do micro adjust online.

5.9 About

Baoding Shenchen Precision Pump Co.,Ltd

Model：SPLab

Version：SPLabV1.0

SN:000000000000000

Website：www.good-pump.com

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In the main interface click **System set**,click **About**,enter to About interface.Can be check syringe pump and company information.

5.10 Stored

Stored interface as shown below:

Work mode	Manufacturer	Model	I.D.
Withdraw/infusion	BDGlass	0.5cc	4.64

< Add Del. Clear Calling Param Cancel >

In the main interface click **Stored**,enter common mode interface.

Add: Click it to save current parameters as common mode,can be save 60 groups at most.

Del.: Select one common mode,click **Del.**, Click 'OK' to delete this mode.

Clear: Click this button,ask for confirm empty or not.Click'OK' clear all common modes.

Calling: Select one common mode,click **Calling**,ask for confirm calling or not,click 'OK',back to the main interface,running parameters are selected common mode datas.

Param.: Select one common mode,click **Param.**,can be check detailed parameter.

Cancel: Back to main interface.

"<",">": View the common mode on the previous or next page

Detailed parameters view interface as follows:

Withdraw Vol.	Withdraw flow	Withdraw time	Back steps
500.00ul	2000ul/min	15.00sec	6000
Infuse Vol.	Infuse flow	Infuse time	Space time
500.00ul	1875ul/min	16.00sec	2.00sec

Copy parameter	Interval	Copy times	
	2.00sec	0010	Back

In the common mode interface, select a common mode and click the **Param.** button to enter the parameter view interface.

This interface allows you to view the detailed operation parameters and repetitive parameters of the selected common modes.

5.11 Date&Time
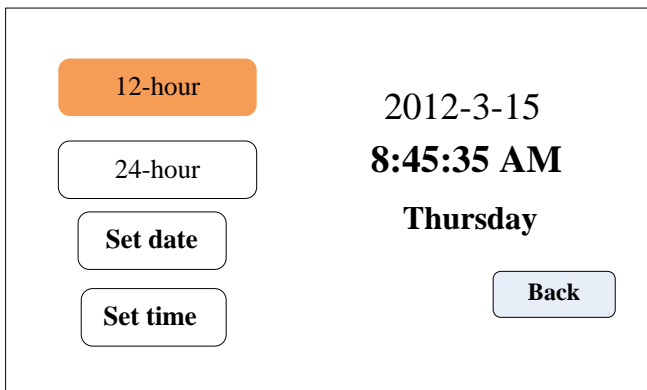
The main interface clicks the time and date in the upper right corner to enter the time and date setting interface.Under this interface, the current date and time can be set and displayed in the upper right corner of the main interface.

Click the **Set Date** button and pop up the Set Year Number Keyboard. Set the year from 1970 to 2099. After setting up, click the ENT to enter the Set Month Number Keyboard, and then set the Day Number Keyboard.

Click the **Set Time** button to pop up the digital keyboard and set the time, minutes and seconds in turn.

6. ISPLab Series External Control Interface Instruction

The communication interface is located in the DB9 pin plug on the back of the syringe pump, as shown in the figure below.
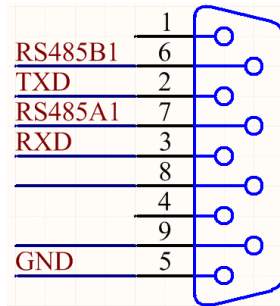
a) RS232 interface,in the Communication set interface,select RS232,the port is valid.

      GND: Communication ground terminal

      TXD: Master sending, syringe pump receive signal terminal

      RXD: Syringe pump sending, master receive signal terminal

b) RS485 interface,in the Communication set interface,select RS485,the port is valid.

      RS485A1: connect RS485 A+.
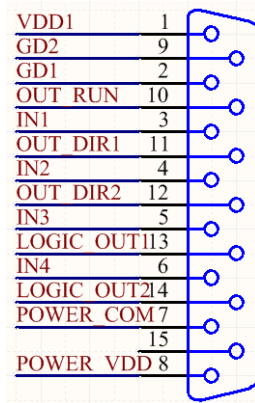
      RS485B1: connect RS485 B-.

  Note:

1.Whether select RS232 or RS485, the communication protocol is standard MODBUS protocol.

2.Have to back main interface to communicate.

External control interface instruction

The external control interface is located in the DB15 pin plug on the back of the syringe pump, as shown in the figure below.

VDD1	1
GD2	9
GD1	2
OUT_RUN	10
IN1	3
OUT_DIR1	11
IN2	4
OUT_DIR2	12
IN3	5
LOGIC_OUT1	13
IN4	6
LOGIC_OUT2	14
POWER_COM	7
	15
POWER_VDD	8

Active signal input,the default is 5V,If need change to 12VDC or 24VDC input, please open the controller housing, and change the jumper connection on the external control board as below :
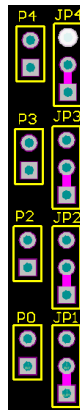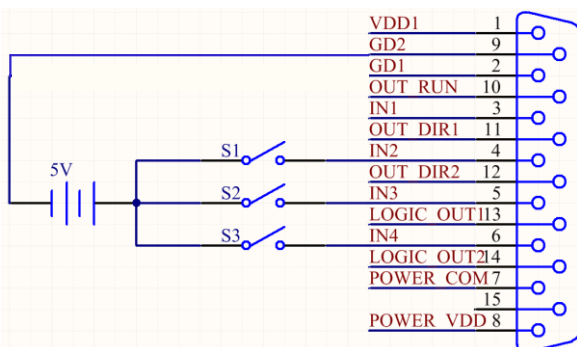
5V level input	12V level input	24V level input

a)VDD1 and GD1: internal 5V output.

b) IN2,quick start withdraw (active signal)

c) IN3,quick start infuse (active signal)

d) IN4,active start and stop

Wiring diagram as follows:

S1 short connect and then disconnect, the syringe pump starts running according to the parameters in the withdrawmode(repeat time is 1). Short connect and disconnect again, the pump stop running.

S2 short connect and then disconnect, the syringe pump starts running according to the parameters in the withdrawmode(repeat time is 1). Short connect and disconnect again, the pump stop running.

S3 short connect and then disconnect, the syringe pump starts running according to the current parameters Short connect and disconnect again, the pump stop running.

OUT_RUNmotor running status output,OUT_DIR1,OUT_DIR2 motor running directionoutput,wiring diagram as follows:
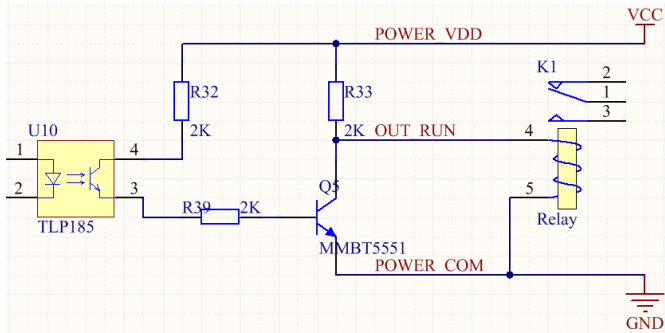
If it is an external relay, when the motor is running, K1 operating;when it stops, K1 disconnected.

Foot pedal interface description

The foot pedal interface is located in the aviation plug on the back of the syringe pump.

7. ISPLab Series Technical Specification

Working mode	Infusion,withdraw,infusion/withdraw,withdraw/infusion							
Channel No.	1	2	4	6	8	10	12
Syringe size	10uL-140mL		10uL-10mL					
Flow rate	0.001uL/min-127mL/min		0.001uL/min-21.997mL/min					
Infusion volume per microstep	0.078um							
Min. linear rate	5um/min							
Max. linear rate	132um/min							
Min. step rate	0.035ms/Micro step							
Max. step rate	0.937sec/Mirco step							
Max.linear force	8—20kgf for option							
Advance per microstep	0.078um							
Accuracy	Error≤±0.5%（Stroke≥30% of the maximum stroke）							
Syringe selection	Installed syringe size and custom syringe ID							
Display	Industrial grade 4.3''LCD color display							
Control method	Touch screenand Mechanical keypad							
Power-off memory	Display the previous data parameter after power supply again							
Output state	OC gate signal output,used to indicate running status and direction.							
Eexternal control signal	Active switch signal: 5V、12V、24V for option Passive switch signal:foot pedal switch							
Communication interface	RS232+RS485(Modbusprocotol，RTU mode)							
Power supply	AC 90-264V							
Condition temperature	0-40℃							
Relative humidity	<80%							
IP rate	IP31							

8. ISPLab Series Function & Features

Input Syringe ID function: Users can choose syringe from menu or input the syringe ID directly.

Choose working mode: Syringe pump has 4 working mode--Infusion, withdrawal,infusion/withdrawal,withdrawal/infusion.Every working mode technical data save separately, do not influence each other.

Calibration and micro adjusting online function: Users can control the flow volume more precisely with calibrate programme.

Memory function: After turn on the pump again, no need to re-set up the parameters.

Block protection function: The pump will stall and give an alarm when the drive structure of the pump is blocked.

External control function: Input/Output control function.

Syringe protection function: Prevent syringe damage by adjusting the position of the limit block

Online adjusting linear force: The linear force can be adjusted on the interface, 8-20kgf for option.

Common mode: It can save up to 60 common modes and reduce the input time of customers.

Communication interface: Support RS232 and RS485 Modbus communication.

9. Dimension (Unit:mm)
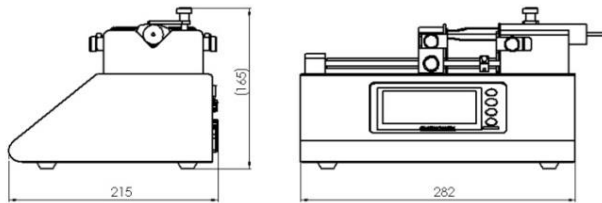
10. Maintenance

➤ In order to keep the machine good performance and long service life, please pay attention to routine maintenance, regular inspection of syringe pump.

➤ Cleaning and maintenance: during operation or after the completion of the operation, please keep the equipment clean, with a soft cloth to wipe the liquid splashing into the syringe pump.

➤ Cleaning note：

　　1. In the cleaning process, please disconnect the power to avoid electric shock.

　　2. Do not immerse the pump in the water

　　3. Do not heat the syringe pump at high pressure.

➤ The edge must be inserted into the syringe pump side ring fixing groove, and pay attention to clean syringes.

➤ Regular check the parts and scews of syringe pump.

➤ Keep good working condition.

11. Warranty and After-sales Service

We support three years warranty (not including syringe). During the warranty, the products are damaged because of users' wrong operation or other human damages, our company do not responsibility for warranty. Beyond the warranty, we only charge the cost of maintenance. Refer to all maintenance including in and beyond the warranty, we do not bear any freight charges because of maintenance.

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