

# LX-224 Serial Servo User Manual



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# 1 Product Introduction

## 1.1 Picture



## 1.2 Product parameters

Product	LX-224 Serial Servo
Net weight	60 g
Product size	39.82*20.09*51.10mm
Rotation speed	0.12sec/60degree(6.8v)
Servo accuracy	0.24°
Torque	20kg.cm(6.8V)
Servo ID	0~253(user setting)
Storage users' parameter setting after power off	support
Working voltage	6-8.4V
Length of servo wire	20cm (other length optional)
Read back function	support
Control method	Serial command
Communication baud rate	115200
Gear type	metal
Parameter feedback	temperature/voltage/speed/position
Apply to	all kinds of Bionic robot joints

## **2 Product Functions**

### **2.1 Features**

#### **2.1.1 Serial bus interface:**

The control board use a I/O port to connect the serial servo, up and down series connection between servos by three interfaces. This can reduce the occupation of the serial port. Simple wiring make product more simple, exquisite, attractive.

#### **2.1.2 ID number set:**

Each servo can set the ID number for the identification of the servo. The servo ID defaults to 1 and can be modified by yourself. The controller communicates with the servo in a single bus mode and the communication baud rate is 115200. The user can assign an ID number to each servo, and the command from the controller contains the ID information. Only the servos that match the ID number can receive this instruction and follow the instructions to execute the action.

#### **2.1.3 High-precision potentiometer:**

The interior of the servo with high precision potentiometer as an angle feedback. The accuracy and linearity of the servo are good, making the robot run more stable. The life expectancy of the servo is also significantly increased.

#### **2.1.4 High torque**

20KG high torque serial bus dual-axis digital servo, make your robot fully powerful

#### **2.1.5 Position, temperature, voltage feedback:**

With position feedback, temperature feedback and voltage feedback, controller can gain the internal data of the servo in real time to protect it. The top of the servo has a warning light, and the RGB indicator will flash if the internal of servo is abnormal.

#### **2.1.6 Two working modes:**

- (1)The servo can be controlled within the range of 240 degrees in the servo mode
- (2)The servo can be rotated continuously for 360 degrees, you can control the direction and speed of rotation.

#### **2.1.7 Red metal shell**

Red oxidized metal shell, strong heat dissipation.

#### **2.1.8 Double ball bearing:**

The Joint parts of the Humanoid robot need to combine the bracket and metal driving ball bearing and assistant ball bearing, powered by the servo to drive the rotation of the bracket, so that the robot joint can move steadily.

### 2.1.9 Metal Bearing

The high-speed output of the internal DC motor achieves greater torque through the 5-stage reduction ratio, while the high-precision gear setting reduces the noise caused by the gear friction.

## 2.2 Product Structure

Compatible with LOBOT series dual-axis digital servo brackets



## 3 TTL/USB Debug Board

### 3.1 Brief introduction


Because the bus servo is using our private protocol, so you need to connect our debug board to control bus servo no matter what single chip you are using(we provide communication protocol).

No matter how many bus servos you need to control, all you need to use is a debug board.

The use of the debug board requires the debug software (please refer to the "Debugging Software" section)

### 3.2 Install driver

You need to install the driver before using debug board.

Double click the icon  ch341ser , The interface is shown below

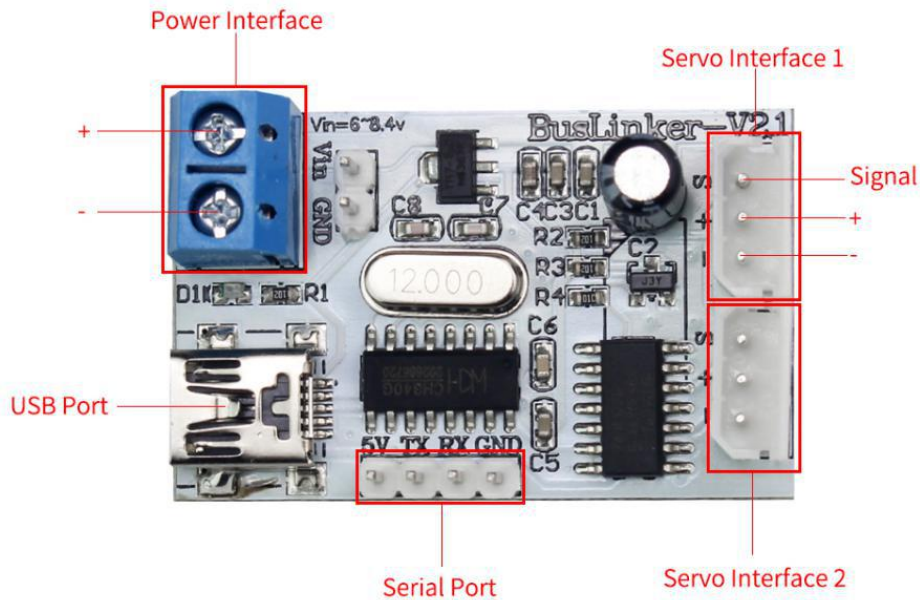


Click “install”, the following interface appears after waiting for a few seconds



It means the installation is successful, debug board can be used normally.

### 3.3 The introduction of the debug board



When the debug board is connected to the power supply, you can directly connect to the computer with the USB cable. You can test servo and set the servo parameters through our PC software.

You can control servo and read the angle of the servo with the debug board by connecting to the TXD and RXD of the single chip .

(LX-224 servo has three wires, positive, negative and signal wire respectively. This signal wire can receive and send data at the same time. It's too much trouble If we want to use the single chip to control the bus servo. So we offer you this BusLinker debug board which can convert the serial port of the servo into a two - wire serial port. It is easy for you to control bus servo with single chip.

## 4 Bus Servo Debugging System

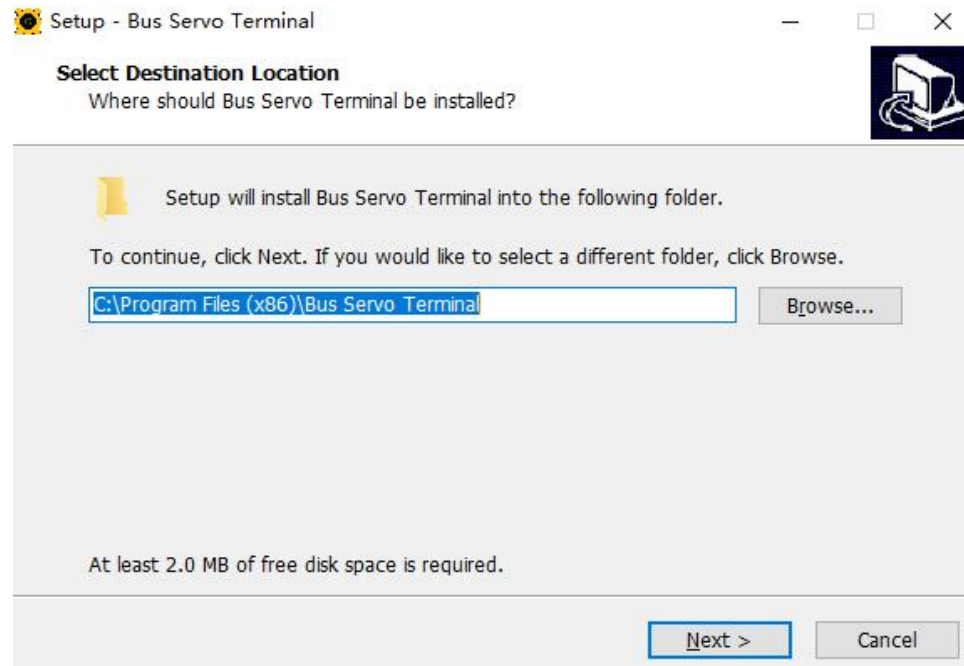


## 4.1 Installation

You can set the ID number, working modes, rotation speed, rotation range, the state of the LED lights (off/on), you can also set the over temperature alarm, over voltage alarm and stall alarm for bus servo.

Setting ID number is the necessary step before using each servo. In other words, we can use bus servo normally only after setting up ID number for bus servo.

First, you should install the system

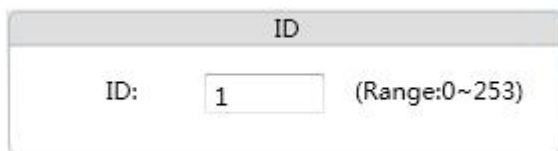




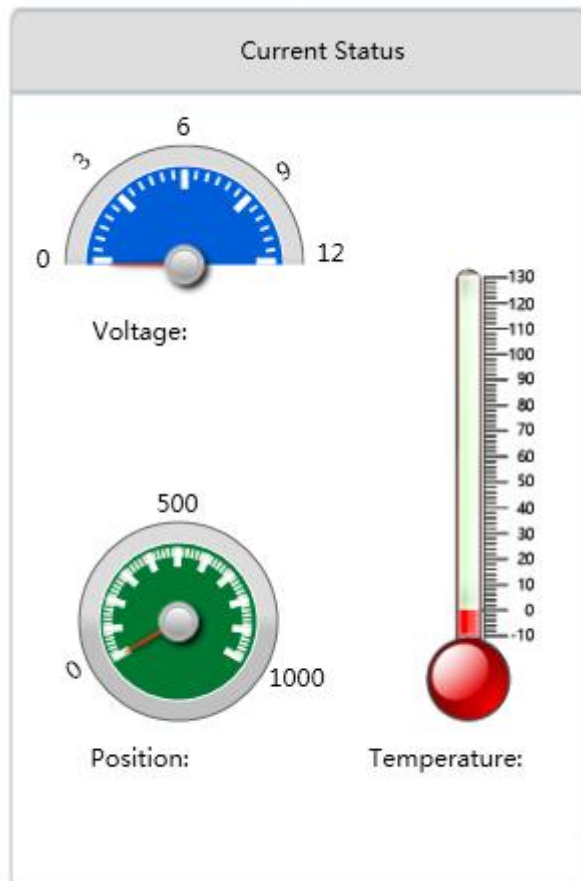
## 4.2 Interface introduction:



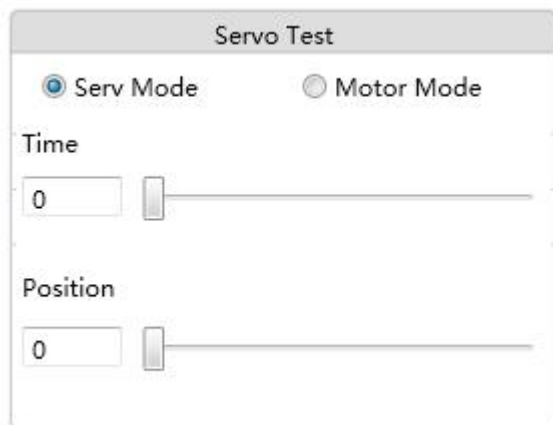
After you connect to the computer, select "COM3" (COM3 will appear when the connection is normal), the baud rate is the default value, and then click "Open Port", the left indicator light turns green, indicating the connection is successful (The blue light on the top of the bus servo will always light, indicating everything is normal).



Fill in the ID of the servo you want to control, the default value is 1, range 0 ~ 253, you can only control one servo at the same time.



The right interface of this window shows the current position and temperature of the servo and the battery voltage.



Servo Mode:

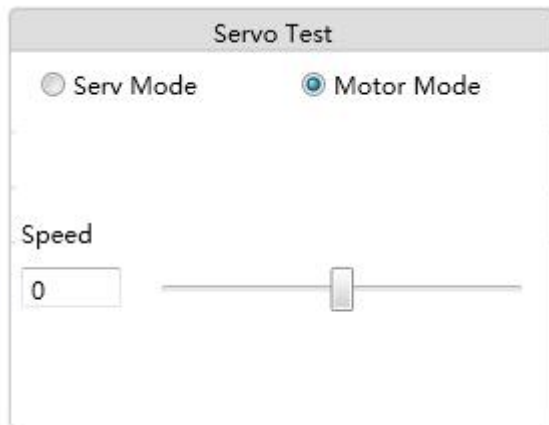
Two modes: servo mode and motor mode

In Servo Mode,

Position: you can drag the slider to make servo rotates ,the faster you drag, the faster the servo rotates

Time:set the rotation time of the servo, the greater the time value, the slower the rotation of the servo

Motor Mode:



Drag the slider to change the speed value.

When the speed value is 0, the servo is in a stopped state.

When the speed is positive, the servo turn counterclockwise, the greater the speed value, the faster the rotation speed.

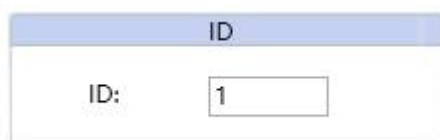
When the speed is negative, the servo turn clockwise, the smaller the speed value, the faster the rotation speed.



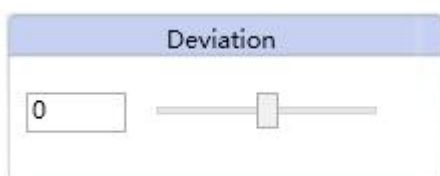
Turn on/off the power supply of motor.

### 4.3 Parameter setting

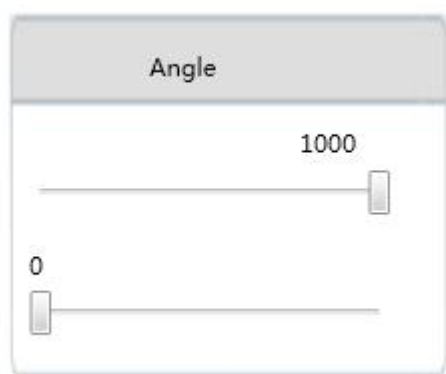
Switch to the “Parameters” interface by clicking the Parameters icon.



Sets the ID number for the currently controlled servo



Adjust servo deviation



The default value of the servo rotation range is 0 to 240 degrees. Changing this value allows you to adjust the rotation range of the servo.

For example: if you drag the slider to 500 value and don't change the drag the slider located below, the servo rotation range becomes to 0 ~ 120 degrees.



Select whether to turn on the LED

LED Warning

☒ Over Heat

☒ Over Voltage

☒ Locked Rotor

When the servo is running normally, the blue light is on and the blue light flashes when over heat, over voltage or locked-rotor occurs.

Tick to determine whether the light will alarm the selected status.

Voltage

14

4.5

Set the voltage alarm range, the light will flash to alarm when the battery voltage is not within the setting voltage range.

Temperature

85 °C

Setting the upper limit of the temperature alarm , and the light will flash to alarm when the servo temperature exceeds the setting range.

Read

Apply

Default

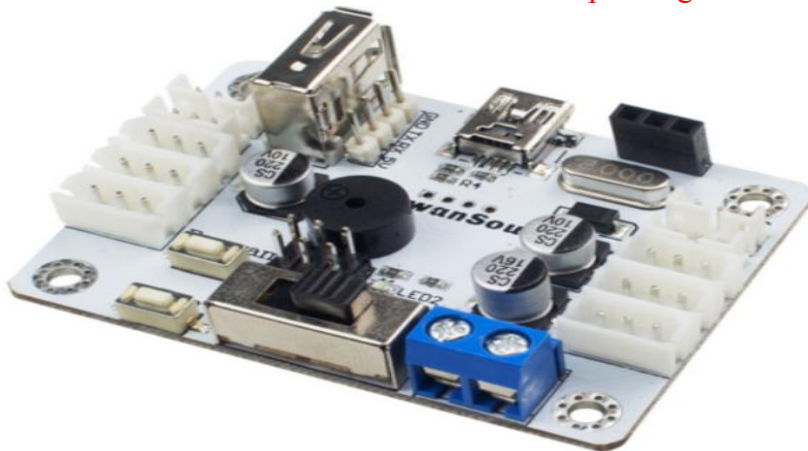
Read: Reads the parameter settings of the currently controlled servo

Apply: After changing the parameter value, you need to click the Apply button to take effect

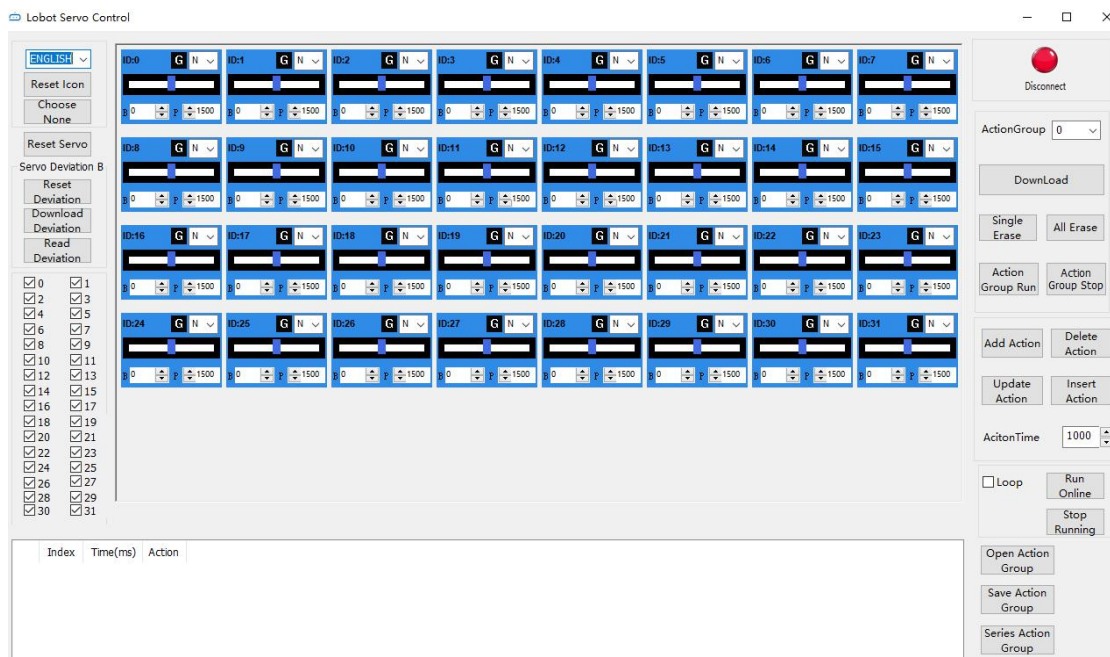
Default: Returns to the default

## 5 PC software

Note: PC software should be used with corresponding control board



### 5.1 Main interface

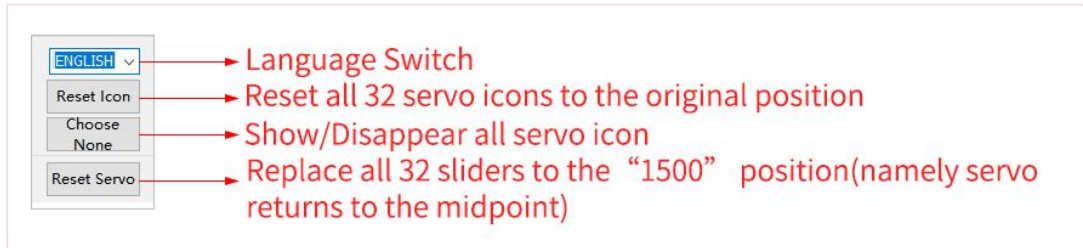


The red indicator means disconnected

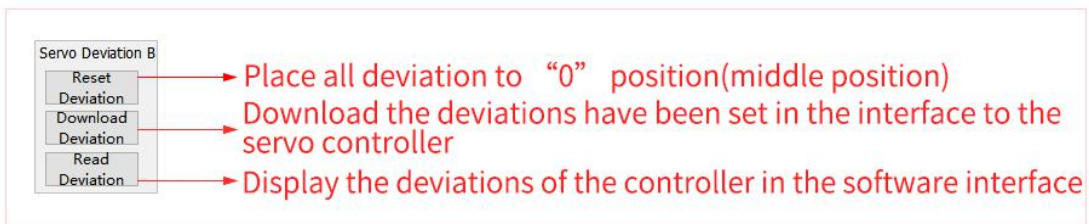


The green indicator means connected

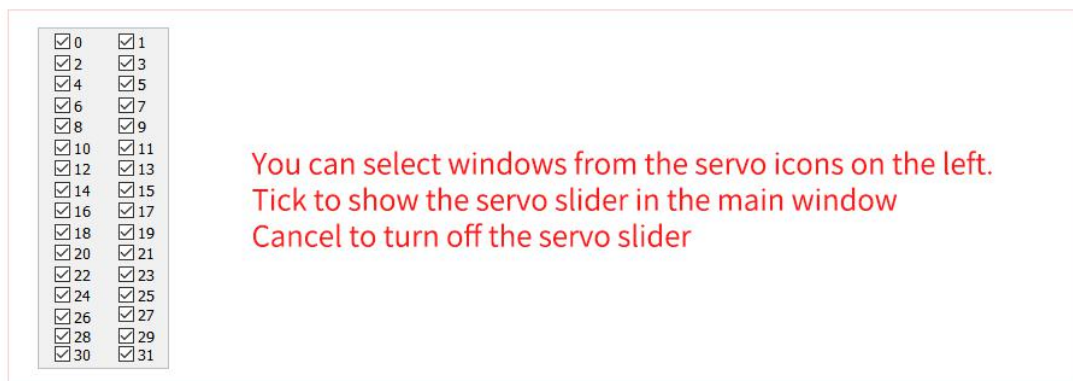
### 5.2 Global Operation Window



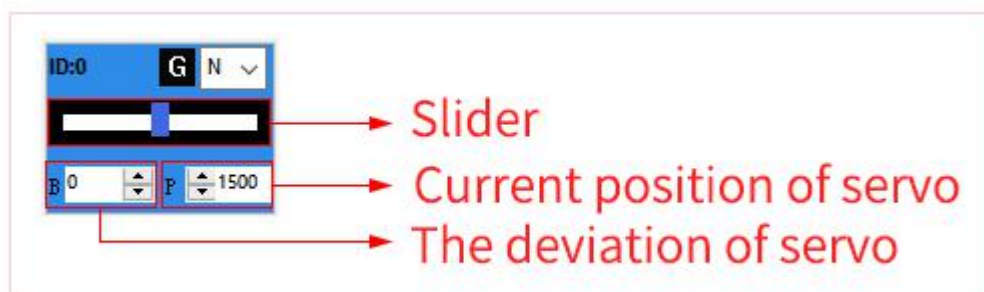
### 5.3 Deviation Operation Window



### 5.4 Servo Icon Selection Window



### 5.5 The Introduction of the Servo Window function



The servo slider can be free to drag ( the range is 500-2500). The P value will change as the slider moves, and it can visually show the rotation position of the servo



at this time.

Because some of the installation deviations will happen in the process of robot production. sometimes we need to use the function of “Deviation Adjustment” to make some fine-tuning. B represents servo deviation which ranges from 100~100.

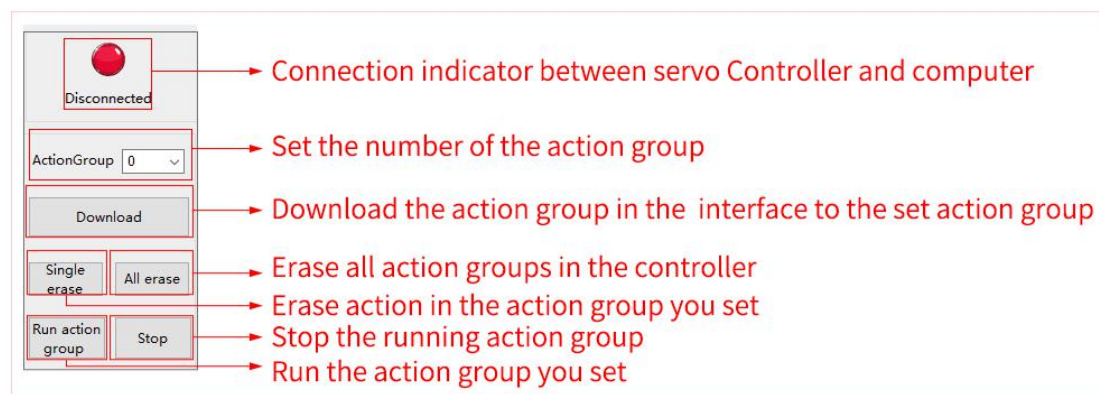
When the deviation of each servo is adjusted, click the "Download Deviation" button, then the all deviations will be downloaded to the controller. If you want to modify the deviation later, please click on the "Read Deviation" button, the deviation will automatically show in the interface.

## 5.6 The introduction of Action Date Display Area

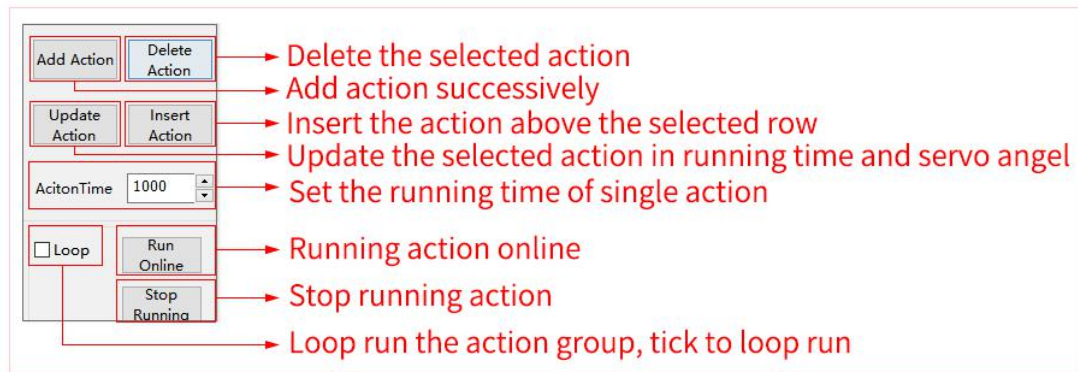
Index	Time(ms)	Action
1	1000	#0 P1500 #1 P1500 #2 P1500 #3 P1500 #4 P1500 #5 P1500 #6 P1500 #7 P1500 #8 P1500 #9 P1500 #10 P1500 #11 P1500 #12 P1500 #13 P1500 #14 P1500 #15 P1500 #16
2	1000	#0 P1500 #1 P1500 #2 P1500 #3 P1500 #4 P1500 #5 P1500 #6 P1500 #7 P1500 #8 P1500 #9 P1500 #10 P1500 #11 P1500 #12 P1500 #13 P1500 #14 P1500 #15 P1500 #16
3	1000	#0 P1500 #1 P1500 #2 P1500 #3 P1500 #4 P1500 #5 P1500 #6 P1500 #7 P1500 #8 P1500 #9 P1500 #10 P1500 #11 P1500 #12 P1500 #13 P1500 #14 P1500 #15 P1500 #16

# Indicates what is the number of the servo, P indicates the position of the servo, and T indicates the time that the servo is running to that position.

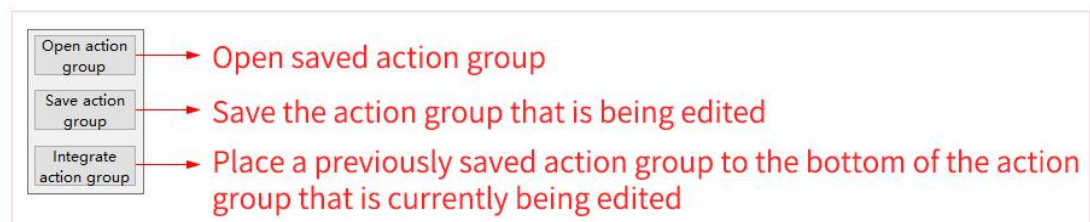
## 5.7 Download and invoke action group window



## 5.8 Online action debugging window



## 5.9 File operation window



## 6 The Historical version of the user manual

Version	Modification date	Instructions	Modifier
V1.0	2019.2.13	The add information: (1) Bus Servo Debugging System (2) PC software	Carey