

MOC-03 MOTION CONTROLLER MANUAL

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1. Overview

MOC-03 series motion controller is a closed-loop motion controller, which is controlled by computer software. It is mainly used to connect with our motorized positioning stages and control the movement.

Features:

- The grating ruler or encoder can be connected to realize closed-loop control
- Built-in fixed high subdivision driver, constitute a multidimensional high precision position control system or speed control system
- 1.69A and 3A stepper motors can be driven, and displacement adjustment automation can be realized by cooperating with our motorized positioning stages.
- Multi - axis linkage and any single - axis motion can be realized
- The software has three modes of manual operation, target operation and incremental operation.

2. Technical Parameters

Operating voltage: AC220V10%/50Hz±

Ambient temperature: -10℃ ~ 45℃

Relative humidity: ≤85%

Maximum number of axes: 6

3. Overall Dimensions

3.1 Front Panel

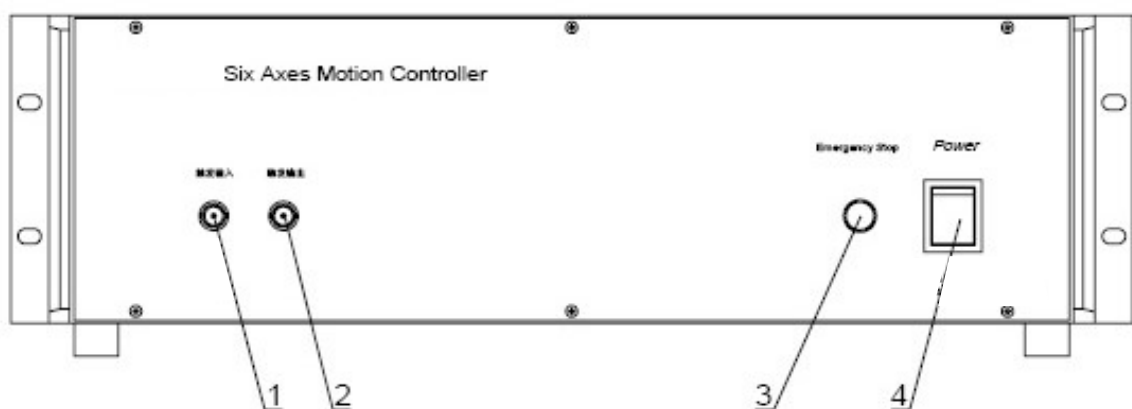


Figure 1 Front panel diagram

(1) Trigger input: Used for synchronizing pulse signal input.

- (2) Trigger output: Used for synchronizing pulse signal output.
- (3) Emergency stop button. When this button is pressed, all the motorized positioning stages will stop running at the same time, but will be continuously charged for safety braking.
- (4) Power switch

3.2 Back Panel

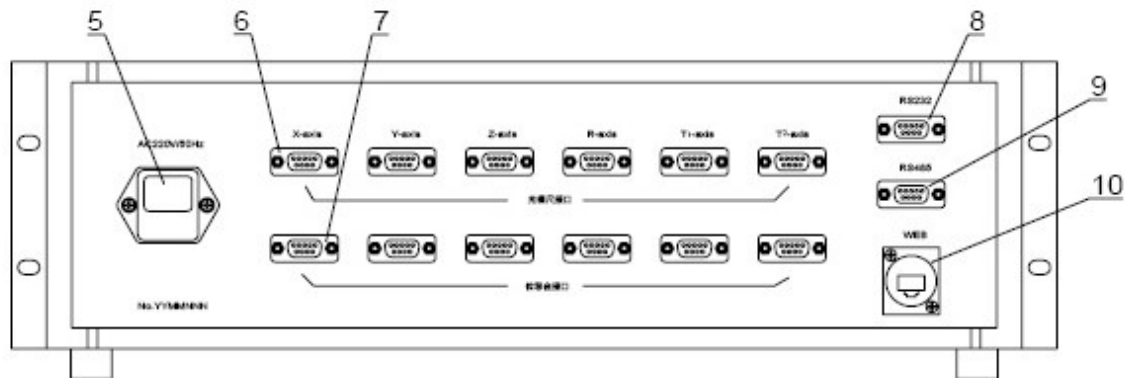


Figure 2 Back panel diagram

Interface description:

- (5) AC220V / AC110V power socket
- (6) Connecting interface of each axis
- (7) Connecting interface of grating ruler for each axis
- (8) RS232 interface
- (9) RS485 interface
- (10) Ethernet interface

Note: This picture takes the rear panel of 6-axis motion controller as an example. Other models are subject to the real object.

For more information about the interface of the motorized positioning stages, please refer to the section 4.

3.3 Dimensions

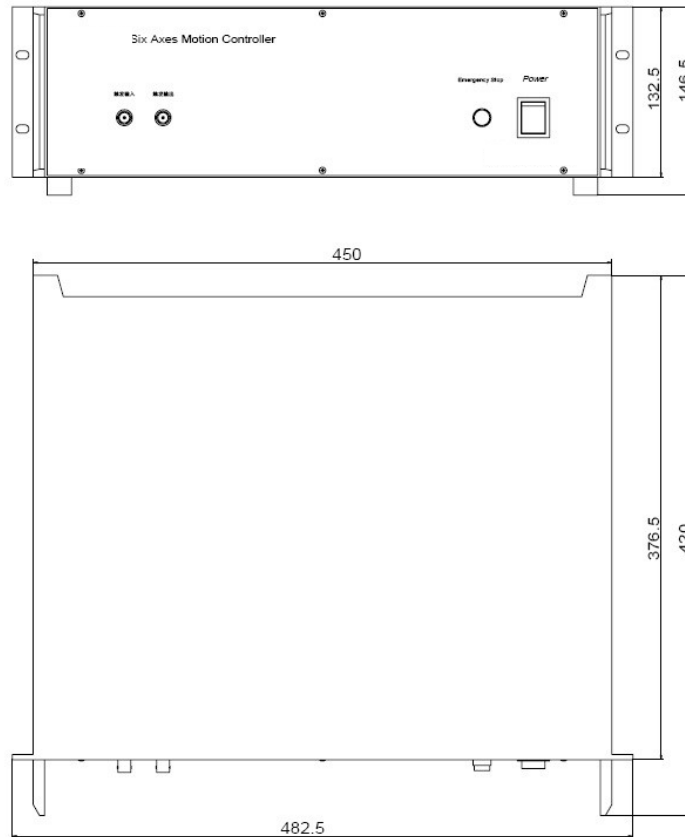


Figure 3 Dimensions

4. Pin Definition

The following table lists the connection information between the motion controller and the motorized positioning stages. When users need to connect with the motorized positioning stages of other company, please refer to this table.

Pin	Signal
1	24 V
2	The limit switch on opposite side of motor.
3	The limit switch near the motor.
4	The limit switch signal loop.
5	Photoelectric signal input
6	Positive end of A phase winding (A+).
7	Negative end of A phase winding (A-).
8	Positive end of B phase winding (B+).
9	Negative end of B phase winding (B-).

Table 1 Interface definition of motorized positioning stage

Pin	Signal
1	A -
2	Ground
3	B -
4	Null
5	Z -
6	A +
7	Power supply + 5 v
8	B +
9	Z +

Table 2 Interface definition of grating ruler

5. Hardware Connection and Setup

There're three ways to connect the controller with computer, via RS232 interface, via RS485 interface or via Ethernet interface. We suggest to connect to computer via the Ethernet communication interface. Please connect the controller to the computer via an interconnect cable. The default IP address of the controller is 192.168.5.11. Before starting the software, set the PC's IP address. The IP set for the PC should be the same as the first three fields of the controller's IP address, and the fourth field should be different. As shown in the figure, IP set for PC is 192.168.5.6.

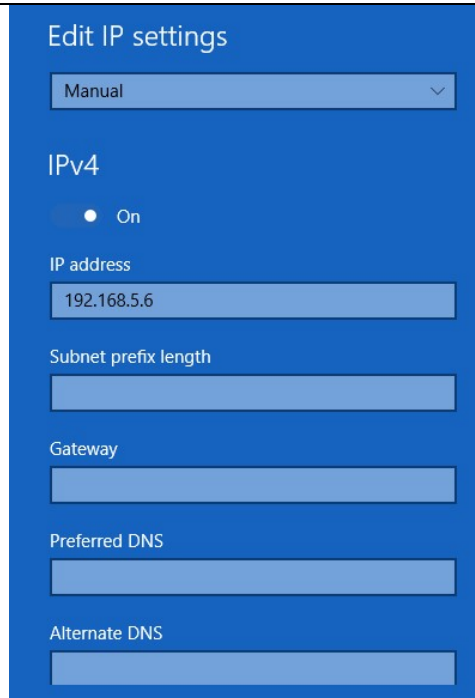


Figure 4 IP address setting

6. Software Operating

6.1 Introduction

The motion control software is mainly combined with the series motion controllers to achieve complex and accurate control of the motorized positioning stages:

- Free mode: free to increase or decrease position.
- Increment mode: increase or decrease position precisely.
- Target mode: quickly and accurately run to a certain location.

The parameters in the software can be changed to match the hardware parameters, which can flexibly adapt to the control of all kinds of motorized positioning stages.

Technical parameters

Software name: Closed loop Motion Controller Application program

Software version: V1.0

Applicable operating systems: Windows XP, Window 2K, Windows 7

Hardware requirements: more than 128MB memory, more than 500M CPU

6.2 Software Installation

Click the installation file setup.exe in the X86 or X64 directory. The default installation path is "C:\Program Files\SOFN\7SCSCR motion control software".

6.3 Software Operation Introduction

Start the software after turning on the controller for about half a minute to display the main control interface.

Note: Since the identification of network interface power supply takes a certain time, it is necessary to wait for at least half a minute after starting up to ensure correct port identification, otherwise the controller may not be found, at this time, please restart the software to reconnect the controller.

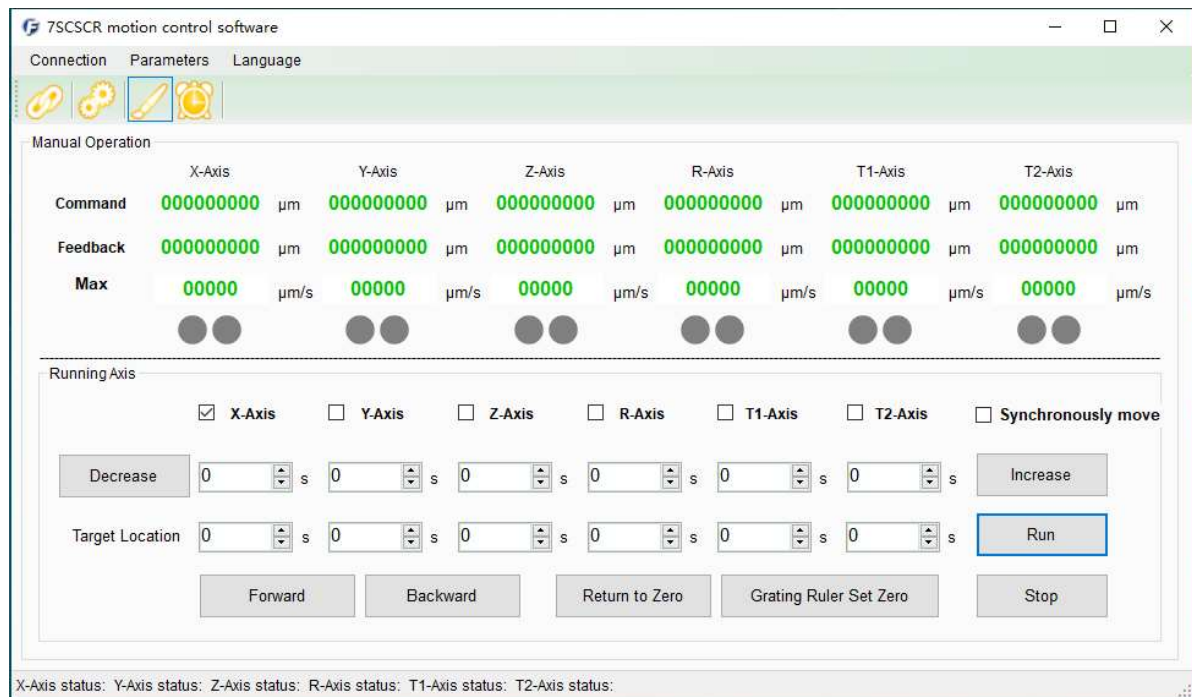
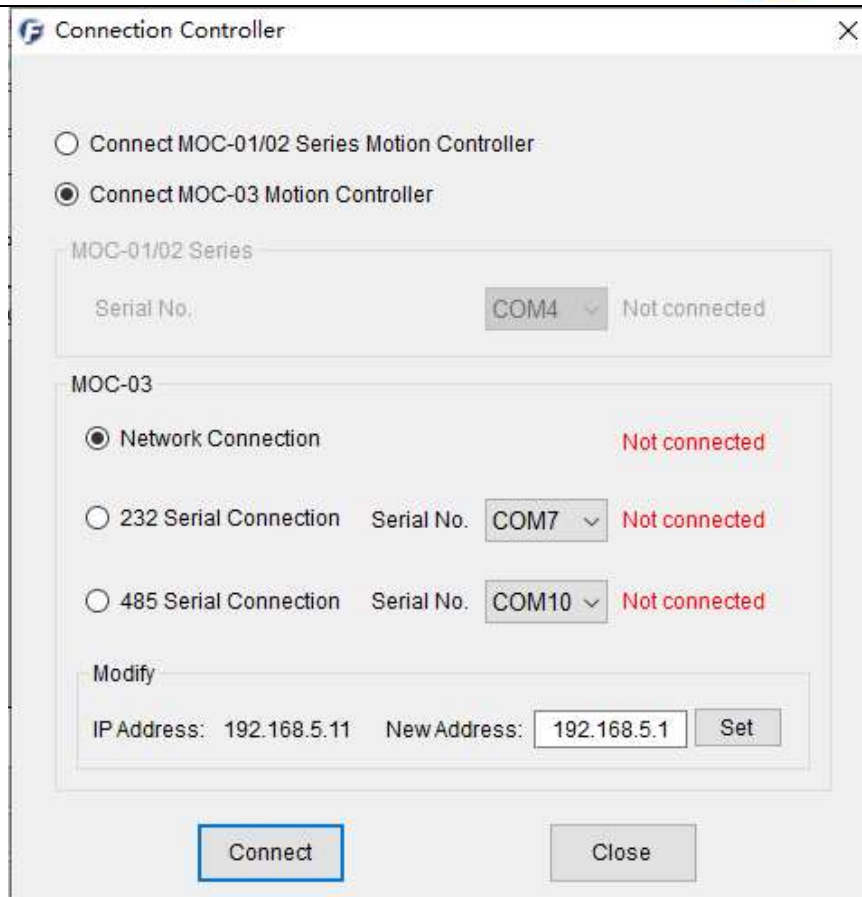


Figure 5 Main interface

6.4 Connection

Please click connection menu to set up the connection parameters. Please choose the controller type and the connection method according to the real situation. Please get the correct port number in Device Manager before choosing the serial port.



Connection Controller

☐ Connect MOC-01/02 Series Motion Controller
☒ Connect MOC-03 Motion Controller

MOC-01/02 Series

Serial No. COM4 Not connected

MOC-03

☒ Network Connection Not connected
☐ 232 Serial Connection Serial No. COM7 Not connected
☐ 485 Serial Connection Serial No. COM10 Not connected

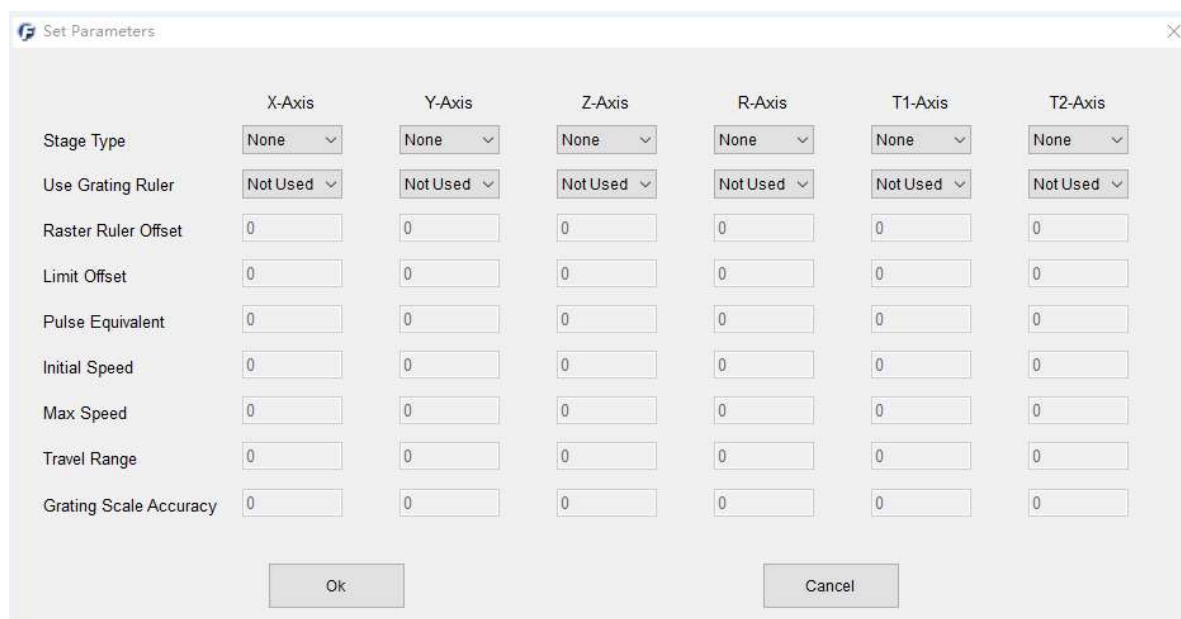
Modify

IP Address: 192.168.5.11 New Address: 192.168.5.1 Set

Connect Close

Figure 6 Connection Setting

6.5 Set Parameters



Set Parameters

	X-Axis	Y-Axis	Z-Axis	R-Axis	T1-Axis	T2-Axis
Stage Type	None	None	None	None	None	None
Use Grating Ruler	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
Raster Ruler Offset	0	0	0	0	0	0
Limit Offset	0	0	0	0	0	0
Pulse Equivalent	0	0	0	0	0	0
Initial Speed	0	0	0	0	0	0
Max Speed	0	0	0	0	0	0
Travel Range	0	0	0	0	0	0
Grating Scale Accuracy	0	0	0	0	0	0

Ok Cancel

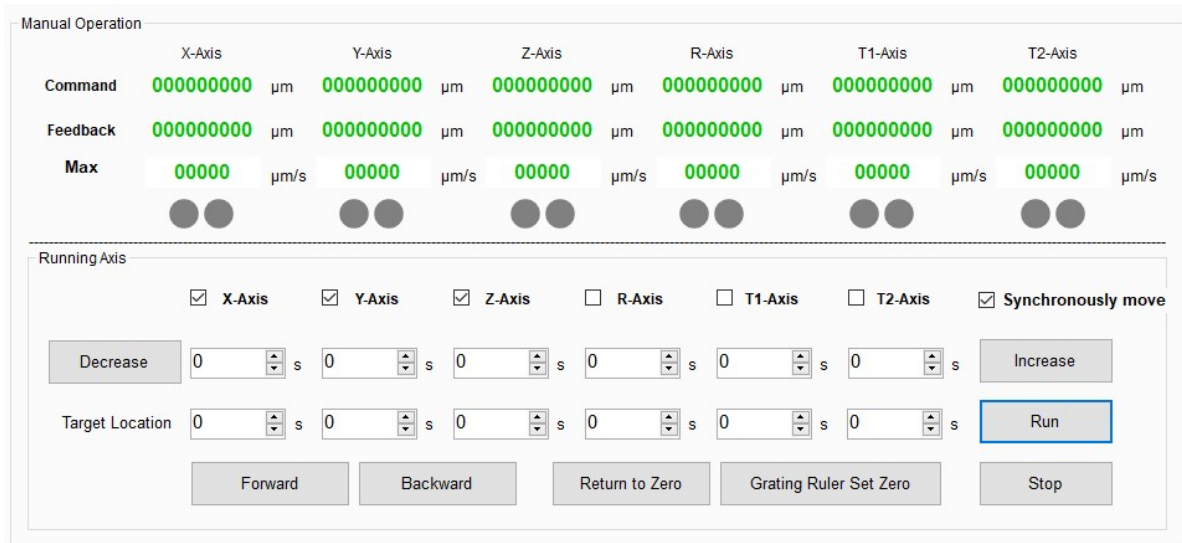
Figure 7 Set Parameters

- Grating Ruler offset: feedback position = grating ruler position count - grating ruler

offset

- Limit Offset: the distance to the zero of the grating.
- Pulse Equivalent: it will be set up before shipment and saved in the controller.
- Initial Speed: the speed at which the motor begins to move.
- Max Speed: the maximum speed at which the motor runs.
- Travel Range: the total number of pulses corresponding to the stroke.

6.6 Manual Operation



The screenshot shows the 'Manual Operation' interface. It features a table with columns for X-Axis, Y-Axis, Z-Axis, R-Axis, T1-Axis, and T2-Axis. The rows are labeled 'Command', 'Feedback', and 'Max'. Each cell contains a numerical value and a unit (μm or μm/s). Below the table, there are two rows of circular indicators (green and red) for each axis. The 'Running Axis' section includes checkboxes for X-Axis, Y-Axis, Z-Axis, R-Axis, T1-Axis, T2-Axis, and 'Synchronously move'. Below these are 'Decrease' and 'Increase' buttons, followed by 'Target Location' input fields for each axis. At the bottom, there are buttons for 'Forward', 'Backward', 'Return to Zero', 'Grating Ruler Set Zero', and 'Stop'.

Figure 8 Manual Operation Interface

- Command Position: pulse * pulse equivalent, i.e. principle position
- Feedback Position: The feedback position of the grating ruler.
- Max speed: Displays the max speed in real time during movement.
- The two dots indicate the limit switches status. Green means the limit switches are not effective and red means the limit switches has been effective.
- Free Mode: when pressing the Forward or Backward button, if the limit switches are not effective, the motorized positioning stage will move accordingly until one of limit switches is effective, or the Stop button is clicked.
- Increment Mode: after inputting or selecting a value and clicking the Increase or Decrease button, the motorized positioning stages will move forward or backward.
- Target Mode: after inputting or selecting a value and clicking the Run button, the motorized positioning stages will move to the position specified.
- Grating Ruler Set Zero: the motorized positioning stages will move to the relative zero position of grating ruler, that is, the feedback position is zero.

Note: Please set the zero of grating ruler first after starting up, otherwise operation error may be caused by the incorrect feedback position.

- Return to Zero: the motorized translation stages will move to the mechanical zero position.

6.7 Auto Run

Auto Run

Current Value

	X-Axis	Y-Axis	Z-Axis	R-Axis	T1-Axis	T2-Axis
Command	0.0000 μm	<input type="text"/> μm	<input type="text"/> μm	<input type="text"/> μm	<input type="text"/> μm	<input type="text"/> μm
Feedback	<input type="text"/> μm	<input type="text"/> μm	<input type="text"/> μm	<input type="text"/> μm	<input type="text"/> μm	<input type="text"/> μm
Max Speed	<input type="text"/> $\mu\text{m/s}$	<input type="text"/> $\mu\text{m/s}$	<input type="text"/> $\mu\text{m/s}$	<input type="text"/> $\mu\text{m/s}$	<input type="text"/> $\mu\text{m/s}$	<input type="text"/> $\mu\text{m/s}$

Total Cycle Project Name:

Procedures	Running Axis	Displacement	Initial Speed	Max Speed	Delay(s)	Cycles

Add

Insert

Delete

New Project

Open Project

Save Project

Initial Position

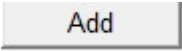
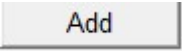

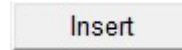
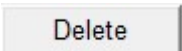


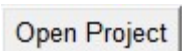
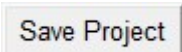
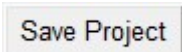


X-Axis	Return to Zero	Current Cycle	<input type="text" value="0"/>
Y-Axis	Return to Zero	Current Procedure	<input type="text" value="0"/>
Z-Axis	Return to Zero	Current Running	<input type="text" value="0"/>
R-Axis	Return to Zero		
T1-Axis	Return to Zero		
T2-Axis	Return to Zero		

Run

Stop

Figure 9 Auto run interface

- Total Cycle: One cycle means all procedures run once. Total Cycle means times of one cycle running.
- Running Axis: Select the axis which needs to run. For example, you can select x, y, z axis to perform moving.
- Unit: Select the running unit (mm, degree, step) from the drop-down list according to the stage type.
- Initial Position: The stage will move to the initial position before running the project.
- Project Name: Input the name of new project.
- Running Axis: Select the axis which needs to run in the current procedure.
- Displacement: Input the displacement of corresponding axis. If you input negative value, the stage will move to negative direction.
- Initial Speed: Input the running speed of corresponding axis.
- Max Speed: Input the max speed of corresponding axis.

- Delay: Input the interval value between current procedure and next procedure. The unit is second.
- Cycles: It's the running times of current procedure. After the current procedure finishes, the next procedure will start to run.
- : Click  to add a new procedure.
- : Click  to insert a new procedure before the current procedure.
- : Click  to delete the current procedure.
- : Add a new project.
- : Open an existing program. It's very useful to avoid repeated operation. You can also edit the program and save it to a new project.
- : Click  to save the current project.
- : When you open a project or add a new project, you can click , the stages will move according to the procedures in the project.

At the top of the interface, it will display the position of each axis. At the bottom of the interface, there're three progress bars to display the progress of the program.