



MOTION CONTROLLER USER MANUAL

MOC-01 & MOC-02

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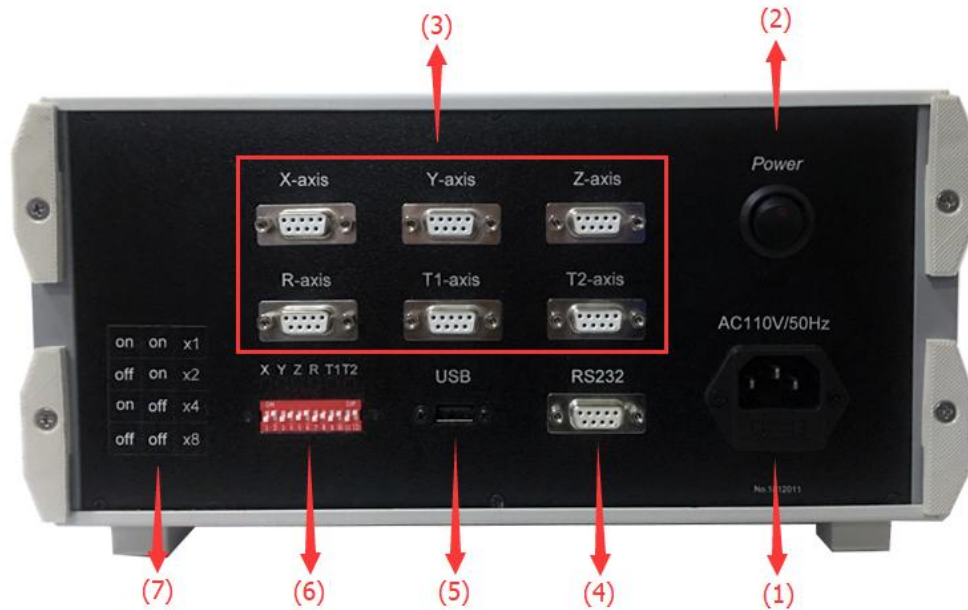
1. Front Panel



- (1) **LCD** It displays the following information in turn from top to bottom: current position value for X, Y, Z, R, T1 and T2 axis, speed value, displacement value, direction and corresponding status.
- (2) **Ctrl key (mode switch)** It's the switch of manual operation or computer control.
- (3) **Axis(select axis key)** It's enabled only when the mode is manual operation. Press the key, screen will display '*', and you can select any axis of X, Y, Z, R, T1 and T2 in turn .
- (4) **Run key** It's enabled only when the mode is manual operation. It controls the stage to start running. The stage will move the displacement value you set when you press it each time.
- (5) **Home key (return to zero)** It's enabled only when the mode is manual operation. It controls the stage to return to mechanical zero or return to the previously position after it returns to mechanical zero firstly.
- (6) **Set key** It's enabled only when the mode is manual operation. Press the key, you can enter the setting status. The corresponding position in the screen will flash, at this time, you can press '←', '→', '↑', '↓' key to adjust the parameters of each axis.
- (7) **←(move toward left key)** It's enabled only when the mode is manual operation. Under the setting status, press the key, cursor will move toward left.
- (8) **↑(up key)** It's enabled only when the mode is manual operation. Under the setting status, press the key, value of the flash digit will increase 1.
- (9) **↓(down key)** It's enabled only when the mode is manual operation. Under the setting status, press the key, value of the flash digit will decrease 1.

- (10)  (move toward right key) It's enabled only when the mode is manual operation. Under the setting status, press the key, cursor will move toward right.

2. Back Panel



6-axis Motion Controller

- (1) Power socket
- (2) Power switch
- (3) Connection port for each axis
- (4) RS232 port
- (5) USB interface (Not available)
- (6) DIP switches of subdivision setting, please refer to the left table. Each axis has **two DIP switches** to decide the subdivision of itself. Up position is on, down position is off. **Please read section 4 to get the detailed setting methods.**
- (7) Table of subdivision setting

Note: When you control the positioning stages by software, you must enter the same subdivision value in the parameter's settings. Otherwise, the positioning stages can't move correctly.

3. Change Current

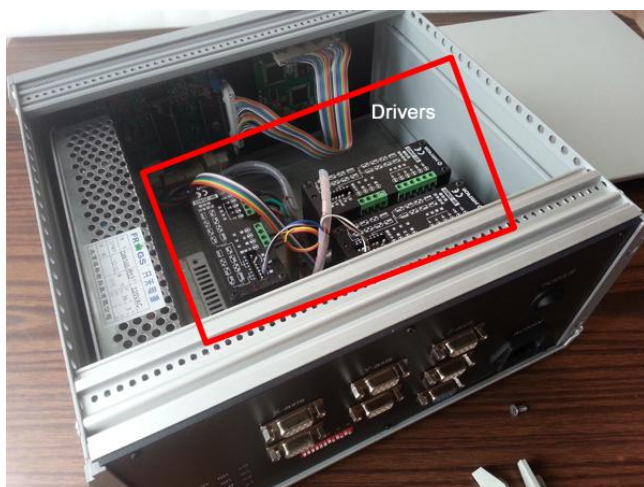
If you bought MOC-01 series controller, please ignore this section. If you bought MOC-02 series controller to connect the motorized positioning stages with NEMA17 stepper motors, please change the currents for NEMA17 stepper motors according to the below methods.

(1) Open the top cover of motion controller.



(2) Find the driver of corresponding axis.

According to the cable connected to the axis on rear panel, you will find the corresponding driver.

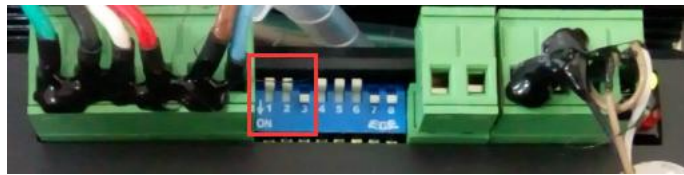


(3) Change the status of current switches to set up current for corresponding motorized stage.

You will find the current switches 1, 2 and 3 on the driver. Please just change the positions of switch 1, 2 and 3 to OFF, OFF and ON. It means to change the current for NEMA17 stepper motor to 1.69A. Please don't change the positions of other switches.

Peak Current	RMS Current	SW1	SW2	SW3
1.00 A	0.71 A	ON	ON	ON
1.46 A	1.04 A	OFF	ON	ON
1.91 A	1.36 A	ON	OFF	ON
2.37 A	1.69 A	OFF	OFF	ON
2.84 A	2.03 A	ON	ON	OFF
3.31 A	2.36 A	OFF	ON	OFF
3.76 A	2.69 A	ON	OFF	OFF

4.20 A	3.00 A	OFF	OFF	OFF
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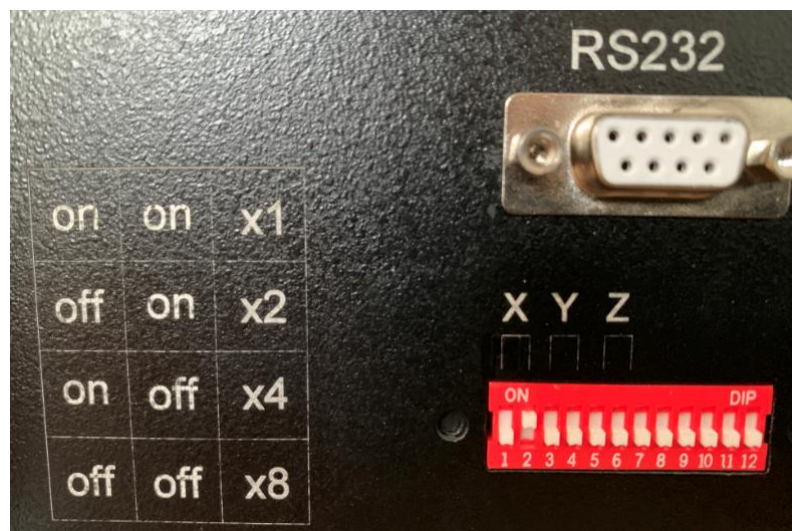


4. Set Subdivision (micro step)

On the back panel of controller box, there's a table to show the relationship between switch status and subdivision.

And next to the table, there're DIP switches of each axis.

This is the picture of back panel of 3-axis motion controller.



Each axis has two switches to decide the subdivision of itself. For example, on this picture, the subdivision of X axis is decided by 1 and 2 switches and the subdivision of Y axis is decided by 3 and 4 switches.

On the top left corner of switches, there's an "ON" label. It means that the up position of switch is ON, the down position of switch is OFF. So we can know the status of switches for X axis is OFF and ON, and Y axis is OFF and OFF as well.

Please refer to the left table, when the status of switches is OFF and ON, the subdivision is 2. So the subdivision for X axis is 2 and for Y axis is 8.

If you want to change the subdivision, please change the status of switches according to the table.

Note: After you change the subdivision, you need to update the subdivision setting in the software.

5. Connection Method

(1) Steps for using our motion controller:

Turn off the controller before connecting.

Connect the positioning stages to the motion controller using the black cables provided.

Connect the motion controller to the computer using white RS232 cable and RS232-USB converter.

Note: Please ensure the motorized positioning stages are connected to the motion controller prior to powering it on.

(2) If you want to control our motorized positioning stages via the motion controller from other company, you may need the following information:

- The drivers must be compatible with our stepper motors. Please refer to the motor details in section 9.
- You need to make the cables with DB-9 connector according to the below table or contact us to get the wiring diagrams.
- If you need to change the direction, please exchange the positive end and negative end of the phase (for example, A-→A+,B-→B+).

Meaning of the DB9 pins:

Pin	Meaning
1	Null
2	Zero position and the limit switch which is at the opposite end of the motor
3	The limit switch which is at the end of the motor
4	Loop circuit of limit switch
5	Null
6	A+
7	A-
8	B+
9	B-

The current transmission ratio of photo-electric switch is 20%, please set aside enough margin when you design the power and circuit.

6. Manual Operation Mode

The initial state of the motion controller is computer control mode. 'C' will be displayed on the top left corner of the LCD and flash. Press **Ctrl** key, the mode will be changed to manual operation.

6.1 Parameters setting

When it's the manual operation mode, you can set parameters of motion controller as follows.

LCD displays the following information:

* XPos= [000000]

YPos=[000000]

ZPos=[000000]

RPos=[000000]

T1Pos=[000000]

T2Pos=[000000]


Speed <255>


Step <+001000>

Axis: Press the key, '*' will appear and flash. You can select the X, Y, Z, R, T1, T2 axis in turn by pressing the key. Then you can set parameters for the corresponding axis or control the motion.





Ctrl: Press the key, 'C' will be displayed on the top left corner of the LCD and flash. In this case, the mode changes to computer control, all keys of the panel are disabled. When you press it again, the mode changes to manual operation and 'C' disappeared.

Home: Press the key, 'H' will be displayed on the top left corner of the LCD and flash. There are two options under 'H', 0 and 1.

(1) Press  to select '0' and '0' will flash. The function is to control the stage return to the mechanical zero position.

(2) Press  to select '1' and '1' will flash. The function is to control the stage return to mechanical zero position firstly, then the stage will return to previous position.








Run: Press the key, '*' will flash. The stage will move the displacement you set when you press it each time.

Set: Press the key, the speed value will flash. You can use ,  key to adjust the value, but the maximum speed value is 255. You can use ,  key to select digit position.

Note: The speed value is better not more than 150.

Formula:

Actual speed(mm/s or degree/s)=(speed value + 1)*22000* pulse equivalent / 720

After you adjust the speed value, press the key again, the direction sign '+' will appear and flash. You can use ,  key to change the direction. Press  key to set up the displacement value, you can use , , ,  to adjust the value.

After you finish the parameters setting, please press **Set** key again. Then you can make another operation.

Note: Under setting mode, Axis, Ctrl, Home and Run keys are disabled.

6.2 Displacement (step) calculation

In manual operation mode, run distance of motion controller is decided by the displacement. Its unit is step. When the motor runs a step, the displacement of stage equals to pulse equivalent, namely resolution.

Integral step value of per rotation of the stepper motor = $360 / \text{stepper angle}$

For linear stage:

Pulse equivalent = $\text{pitch of the lead screw (mm)} / (\text{integral step value of per rotation of the stepper motor} * \text{subdivision})$
= $\text{pitch of the lead screw (mm)} * \text{stepper angle} / (360 * \text{subdivision})$

For rotation stage or goniometer stage:

Pulse equivalent = $360 / (\text{integral step value of per rotation of the stepper motor} * \text{subdivision} * \text{transmission ratio})$
= $\text{stepper angle} / (\text{subdivision} * \text{transmission ratio})$

Please refer to section 8 to get more formulas.

You can set the subdivision number via the switch on the back panel.

If you set the pulse number of displacement to N, then the actual displacement equals to $N * \text{pulse equivalent}$. The pulse equivalent is resolution, for the linear stage, its unit is mm, for the rotation stage, its unit is degree.

Note: The unit of displacement is step. If the value on LCD is 100, then the actual displacement equals to $100 * \text{pulse equivalent}$.

6.3 Motion operation

Please operate the motion controller according to the following steps:

1. Press Home key to let the stage return to the mechanical zero position.
2. Press Axis key to select the axis.
3. Set proper speed value.
4. Set the displacement:
 - (1) If you want to run forward 10mm, you need to set direction '+', then set the displacement and press Run key to start. The displacement of linear stage equals to $10(\text{mm}) / \text{pulse equivalent}$.
 - (2) If you want to run backward 40mm, you need to set direction '-', then set the displacement and press Run key to start. The displacement of linear stage equals to $40(\text{mm}) / \text{pulse equivalent}$.

If you want to control the rotation stage, please replace the value of displacement by the angle value.

6.4 How to control rotary stage manually

There're two steps to control the motorized rotation stage MOR-200-90 manually by our motion controller. One step

is to calculate the pulse value depending on the formulas, and the other one step is to input the pulse value into the motion controller.

(1) You have to understand these formulas:

- a. $\text{Pulse equivalent} = 360 / (\text{integer step of per rotation of the step motor} * \text{subdivision} * \text{transmission ratio}) = \text{stepper angle} / (\text{subdivision} * \text{transmission ratio})$
- b. $\text{Pulse number} = \text{Actual rotation degree} / \text{pulse equivalent}$

If you want to move the rotary stage M degree, then the corresponding pulse number equals to M / pulse equivalent.

(2) You have to get the parameters in the formulas from the specifications table from our website and then calculate the pulse value you need.

- a. Get these two parameters from our website.

Stepper angle=1.8

Transmission ratio=180

You can easily get these two parameters from the specification of our product from our website.

- b. Get subdivision from the back panel of controller box.

Subdivision depends on the DIP switches on back panel of the controller. If you need high resolution, please change the subdivision to 8. More information about the subdivision, please refer to section 4.

Let's suppose the subdivision is 8. Then we can calculate the pulse equivalent is $1.8 / (8 * 180) = 0.00125$. This value is also the maximum resolution.

- c. Get the pulse value you need to input into controller.

So if you need to make the rotation stage rotating 90 degrees, the corresponding pulse value is 72000. ($90 / 0.00125$)

Then please input pulse value 72000 into the controller. About the speed, you can try to set up one value less than 255. More operation methods please refer to section 6.

If you need to rotate 180 degrees, the pulse value you need to input is 144000. ($180 / 0.00125$)

7. Computer Operation Mode

Please connect the motion controller to the PC using the white RS232 cable and the RS232-USB converter before turning on the motion controller. Then turn on the controller, 'C' will be displayed on the top left corner of the LCD and

flash. That means it is now the computer control mode.





Note:

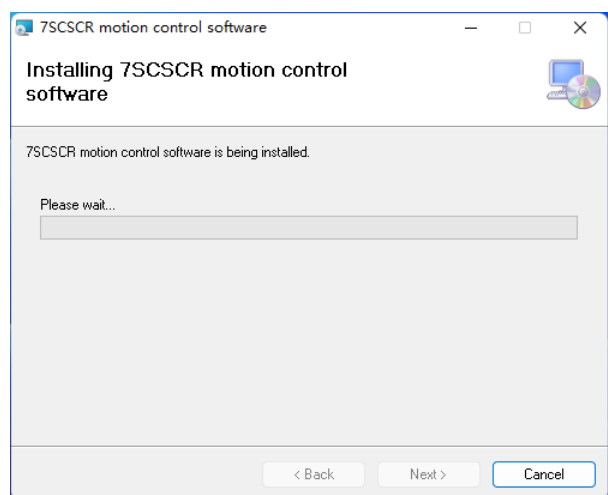
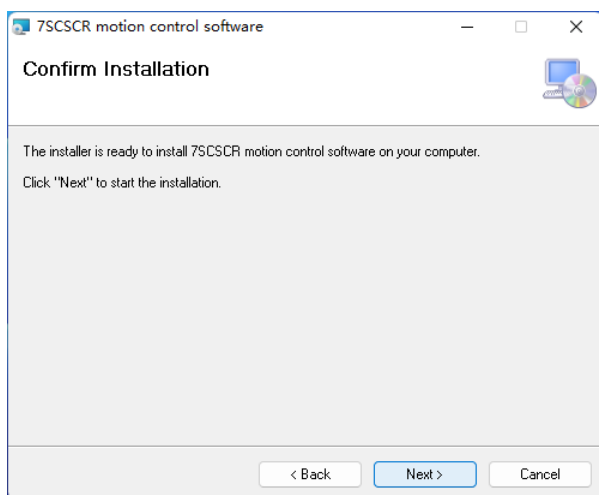
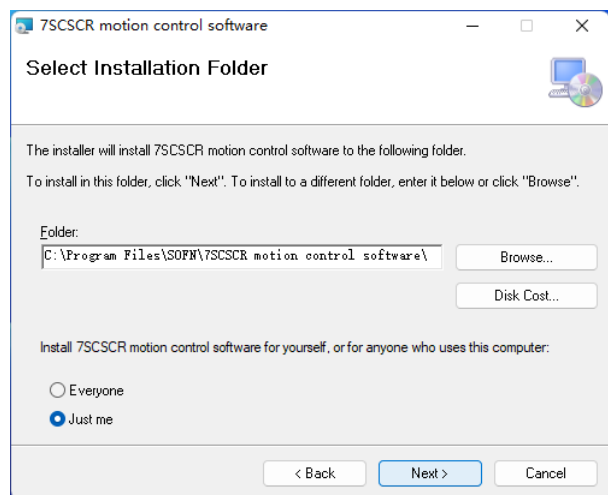
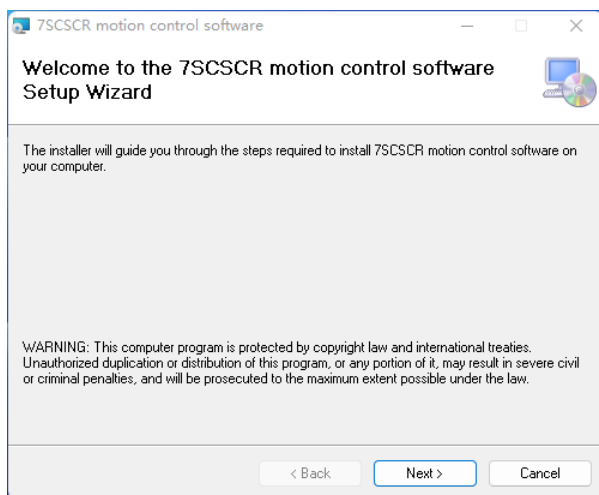
Please make sure the motion controller is powered off before connecting the motion controller to the computer.

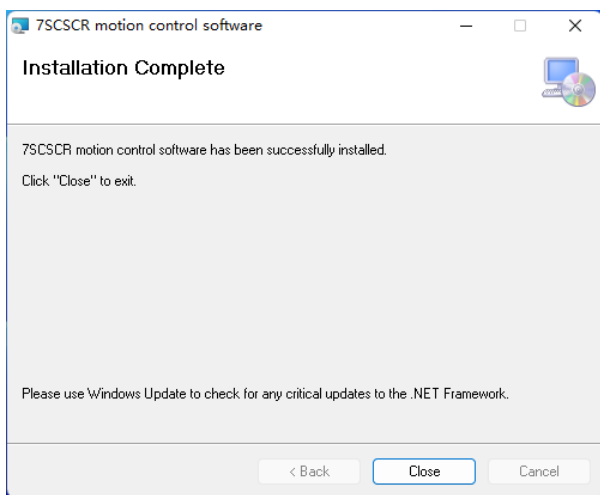
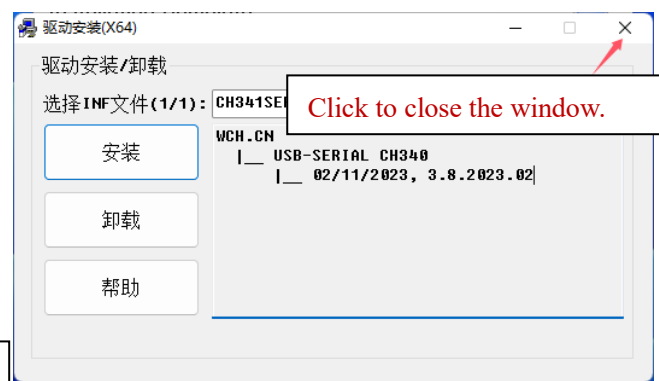
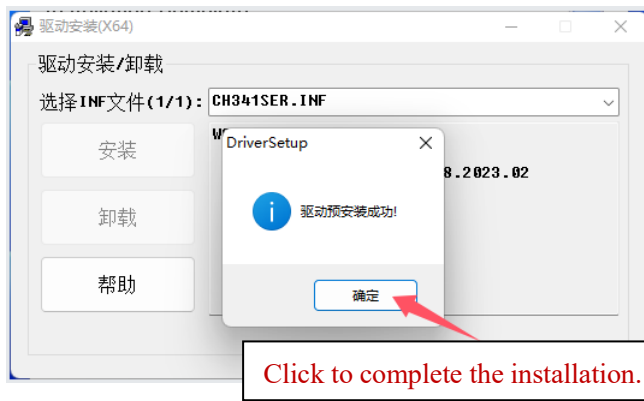
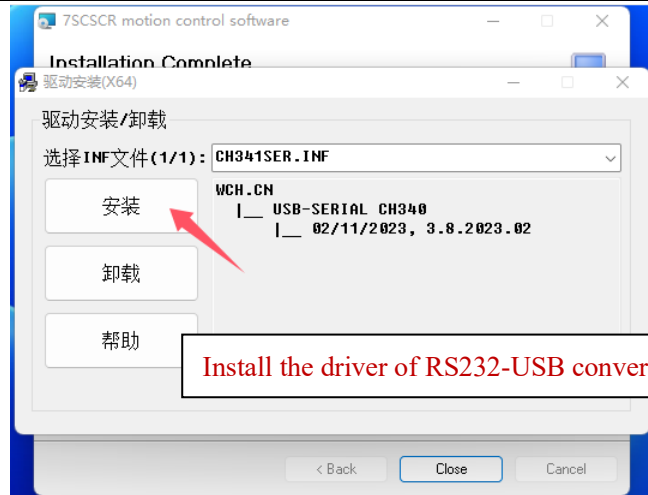
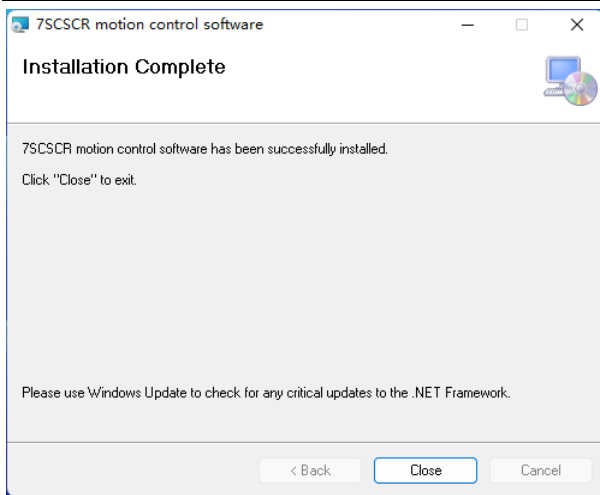
If you want to control the stages from a long distance, please use a longer RS232 cable. A long USB cable may not work well.

7.1 Software & RS232-USB converter installation

Please double click the setup.exe file to install our software 7SCSCR and driver of the RS232-USB converter.

-  DotNetFX40Client
-  WindowsInstaller3_1
-  7SCSCR for x64.msi
-  setup.exe





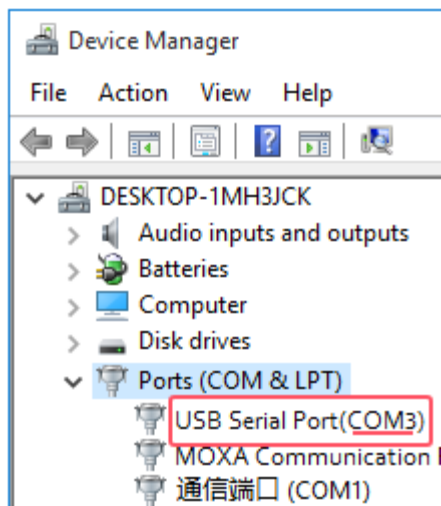
Shortcut on the desk.

The RS232-USB converter driver will be installed when you install the 7SCSCR motion controller software. However, if the driver doesn't install successfully, please download it from our website and install it separately.

The unrecognized RS232-USB converter will be listed in the Device Manager as follows.



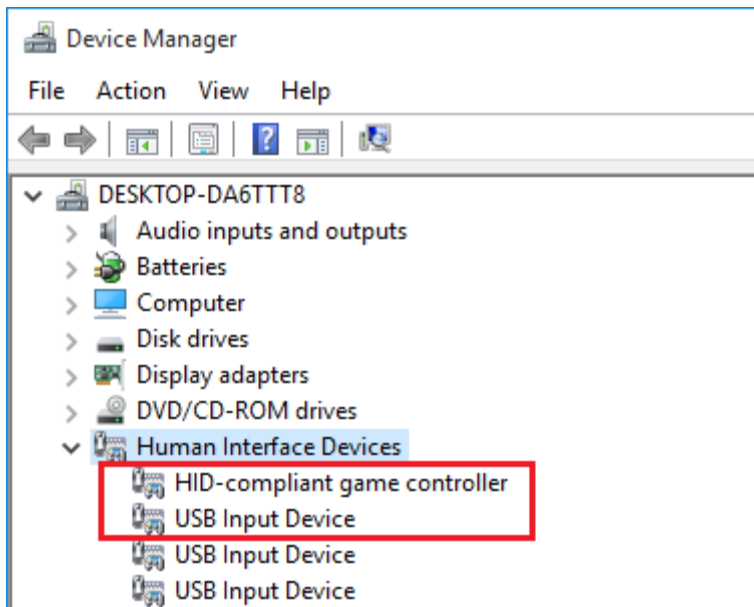
After the installation, please get the port number assigned for the USB Serial Port in the Device Manager and then select the same serial port in our software to connect to the controller.



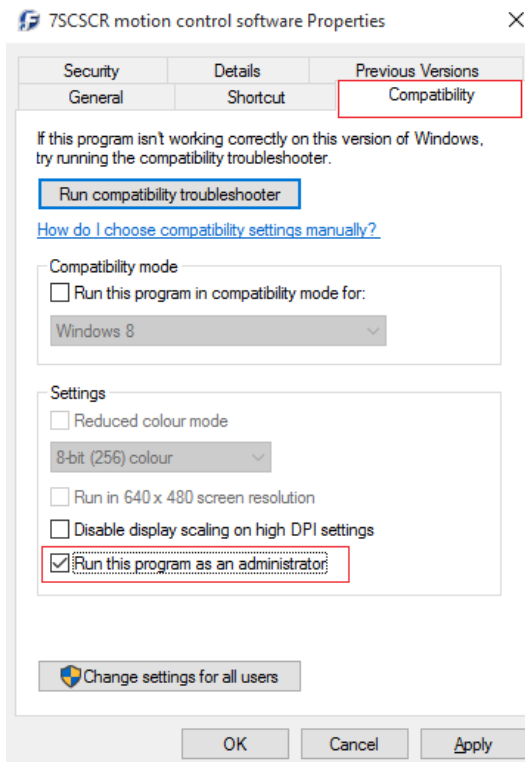
7.2 Joystick installation

If you also bought our joystick, the joystick driver will be installed automatically when you connect it to the computer.

After the joystick driver was installed successfully, these devices will be listed in the Device Manager as follows.



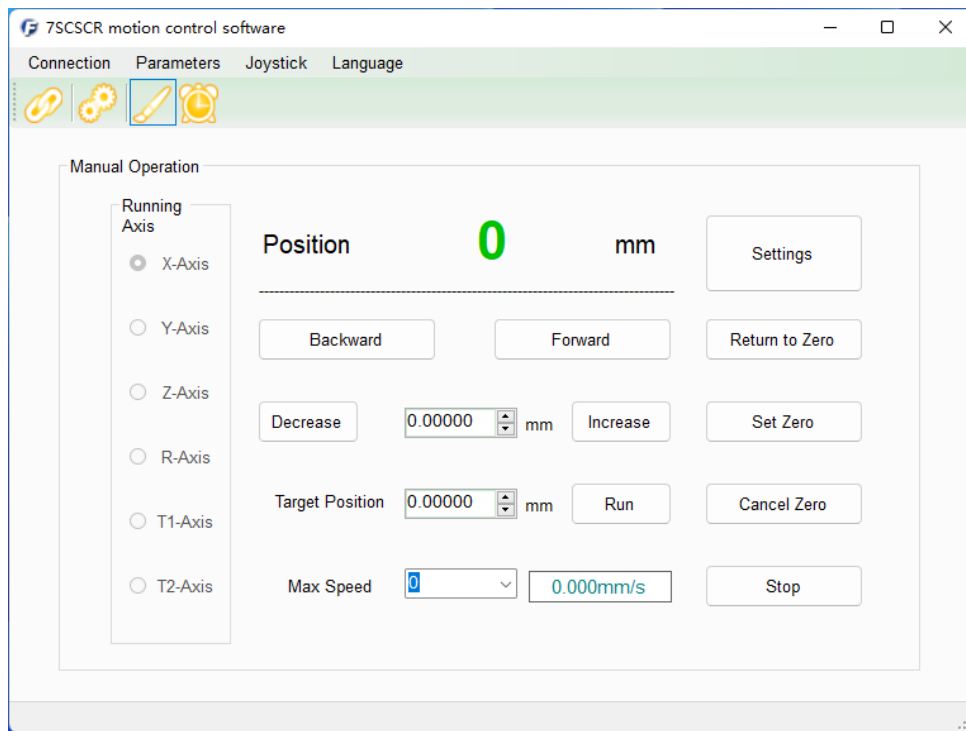
Before using the software, right-click on the desktop icon of the 7SCSCR motion control software, select 'Properties' from the dropdown menu, then switch to the 'Compatibility' tab, check 'Run this program as an administrator', and click 'OK'.



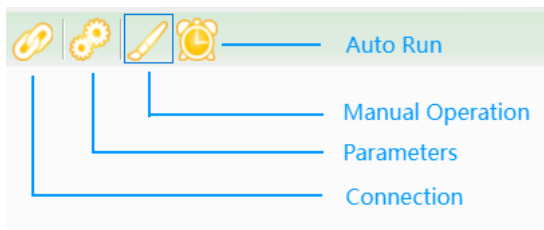
7.3 Software operation

Double-click the shortcut on the desk to run the software. If there's any connection error prompt, please ignore it. After you choose the correct serial port in the software, the connection error prompt won't display.

(1) Main interface (Manual Operation):



The main menu includes 'Connection', 'Parameters', and 'Joystick'; the toolbar contains the corresponding shortcut buttons. Please click "Connection" to connect with the controller first, then click "Parameters" to set the parameters for all the stages before use.



(2) Connection

Please choose "Connect MOC-01/MOC-02 Series Motion Controller" and the corresponding serial port NO. If you also have our joystick, please select the corresponding model number. Click the "Connect" button to connect to the controller.

Please set the parameters for each stage before use.

Running Axis

☒ X-Axis

☐ Y-Axis

☐ Z-Axis

☐ R-Axis

☐ T1-Axis

☐ T2-Axis

Parameter Settings

Stage Type

Translation Stage ▾

Running Unit

mm ▾

Step Angle

1.8 ▾

Subdivision

2 ▾

Screw Lead(Linear Stage)

1 ▾

Ok

Transmission Ratio

None ▾

Travel Range

50 ▾

Negative Travel Range

▾

Positive Travel Range

▾

Close

Running Axis

☒ X-Axis

☐ Y-Axis

☐ Z-Axis

☐ R-Axis

☐ T1-Axis

☐ T2-Axis

Parameter Settings

Stage Type

Rotary Stage

Running Unit

Degree

Step Angle

1.8

Subdivision

2

Screw Lead(Linear Stage)

None

Transmission Ratio

180

Travel Range

50

Negative Travel Range

Positive Travel Range

Ok

Close

Running Axis	Parameter Settings	
<input checked="" type="radio"/> X-Axis	Stage Type Lab Jack	Transmission Ratio 1
<input type="radio"/> Y-Axis	Running Unit Step	Travel Range 50
<input type="radio"/> Z-Axis	Step Angle 1.8	Negative Travel Range
<input type="radio"/> R-Axis	Subdivision 2	Positive Travel Range
<input type="radio"/> T1-Axis	Screw Lead(Linear Stage) 1.25	
<input type="radio"/> T2-Axis		
	Ok	Close

Running Axis	Parameter Settings	
<input checked="" type="radio"/> X-Axis	Stage Type Goniometer Sta	Transmission Ratio 252
<input type="radio"/> Y-Axis	Running Unit Degree	Travel Range 30
<input type="radio"/> Z-Axis	Step Angle 0.9	Negative Travel Range
<input type="radio"/> R-Axis	Subdivision 2	Positive Travel Range
<input type="radio"/> T1-Axis	Screw Lead(Linear Stage) None	
<input type="radio"/> T2-Axis		
	Ok	Close

- **Stage Type:** Select the stage type according to the actual situation. There are four types: No connection, Translation Stage, Rotary Stage, Lab Jack and Goniometer Stage.
- **Running Unit:** mm (for translation stage and lab jack (except for MOZ-80-50)), degree (for rotary stage and goniometer stage) or step (for all of them)

Note:

For Lab Jack MOZ-80-50, the running unit must choose 'Step', because there's no linear relationship between pulse and height(mm). Please set all parameters for Lab Jack MOZ-80-50 according to the above picture.

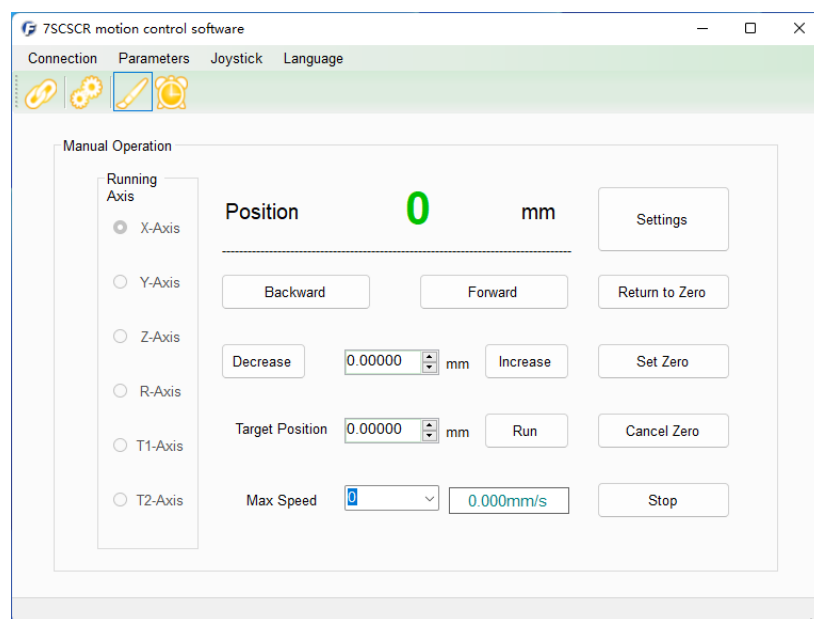
- **Step Angle:** 0.9 or 1.8. Please refer to "motor type" in the specifications table of corresponding motorized stage. Please get the specifications table from our website.
- **Screw Lead:** (for linear stage) Please refer to "screw pitch" in the specifications table of corresponding translation stage. Please get the specifications table from our website. **Values can be directly entered into this field.**
- **Transmission Ratio:** (for rotary stage and goniometer stage) Please refer to "transmission ratio" in the specifications table of corresponding rotation stage or goniometer stage. Please get the specifications table from our website. **Values can be directly entered into this field.**
- **Subdivision:** Please get the subdivision from the table on back panel of controller box, and then select exact

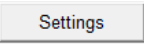

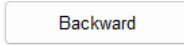



same value. Please refer to section 4 to get more detailed information.

Note: This parameter is very important. Please read section 4 to learn how to set it correctly.

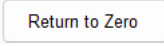
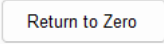
- **Travel Range:** Please select the travel range of translation stage, rotation stage or goniometer stage. Please refer to “travel range” in the specifications table of corresponding stage. Please get the specifications table from our website. **Values can be directly entered into this field.**
- **OK Button:** Save the parameters.
- **Close Button:** Save the parameters and return to the main interface.

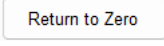
(4) Manual Operation



- **Settings:** Click the  button to set the parameters for each axis. **Please set the parameters for the positioning stages before use.**
- **Free mode:** When you press the  or  button, the positioning stage will move toward corresponding direction, and when you stop pressing the button, the positioning stage will stop.
- **Increment mode:** After inputting or selecting a value, you can click  or  button, then the positioning stage will move forward or backward.
- **Target mode:** After inputting or selecting a value, you can click  button, then the positioning stage will move correspondingly.
- **Max Speed:** The speed range is from 0 to 255. The actual speed is displayed on the right side of the drop-down menu.

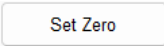
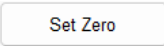
Note: The speed value is better not more than 150.

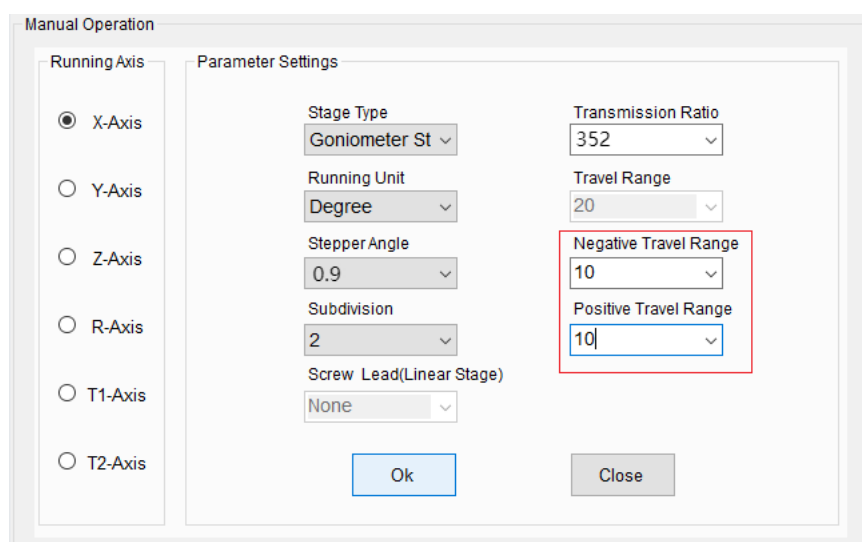
■ : Click the  button to move the positioning stage back to the mechanical zero position (micro switch or Hall sensor) or the nominal zero position (if set).

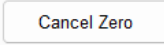
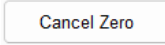
If you have set the nominal zero position, when click the  button and then click 'N', the positioning stage will move to the mechanical zero position firstly, and then will move to the nominal zero position.

Note:

Some of the rotary stages don't have the mechanical zero. So, for the rotary stages without mechanical zero, return to zero operation is just to clear the step value in the controller. If you make the return to zero operation for the rotary stages without mechanical zero, the rotary stages will need a long time to stop.

■ : Click the  button to set the current position as the nominal zero position for the translation stages, rotary stages, lab jacks and goniometer stages with a mechanical zero position. After setting the nominal zero position for positioning stage, you need to reset the positive travel range and negative travel range. The direction close to the motor end is defined as the positive direction, while the direction away from the motor end is defined as the negative direction.



■ : Click  button to cancel the nominal zero position. After canceling the nominal zero position for positioning stage, please reset the travel range.

■ : Click  button to forcibly terminate motion.

(5) How to set the parameters

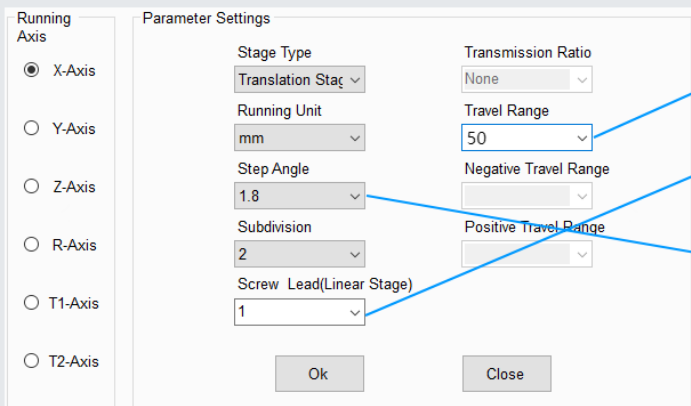
When you use the software to operate the motorized positioning stages, you need to set the parameters in the

software firstly. You can get the parameters from the specifications table shown on our website.

For example, we will explain how to set the parameters of motorized translation stage MOX-02-50.

(a) Please get the specifications table of MOX-02-50 from our website.

(b) You can get the following parameters from the specifications table:



Specifications:

Model	MOX-02-50
Axes of Motion	1
Travel Range	50mm
Table Size	110x90mm
Mechanical Drive System	Lead Screw
Screw Pitch	1mm
Guide Type	Crossed Roller Guides
Resolution (1/8 Micro Step)	0.625μ
Maximum Speed (1/2 Micro Step)	10mm/sec
Minimum Speed (1/8 Micro Step)	2.5mm/sec
Yaw	1'
Pitch	25"
Unidirectional Repeatability	<5μ
Backlash	<20μ
Limit/Home Switch	Mechanical Micro Switch
Motor Type	NEMA17 Stepper Motor (1.8°)
Motor Connector	DB9(M)
Maximum Static Torque	0.4Nm

You can get Step Angle from **[Motor Type]** in Specifications table.

You can get Screw Lead from **[Screw Pitch]** in Specifications table.

You can get Travel Range from **[Travel Range]** in Specifications table.

(c) Subdivision setting is on the back panel of motion controller. Please refer to section 4.

(6) How to set the zero position for goniometer MOG-65-15

If you want to set the '0' scale on the goniometer as the zero position, please follow these steps:

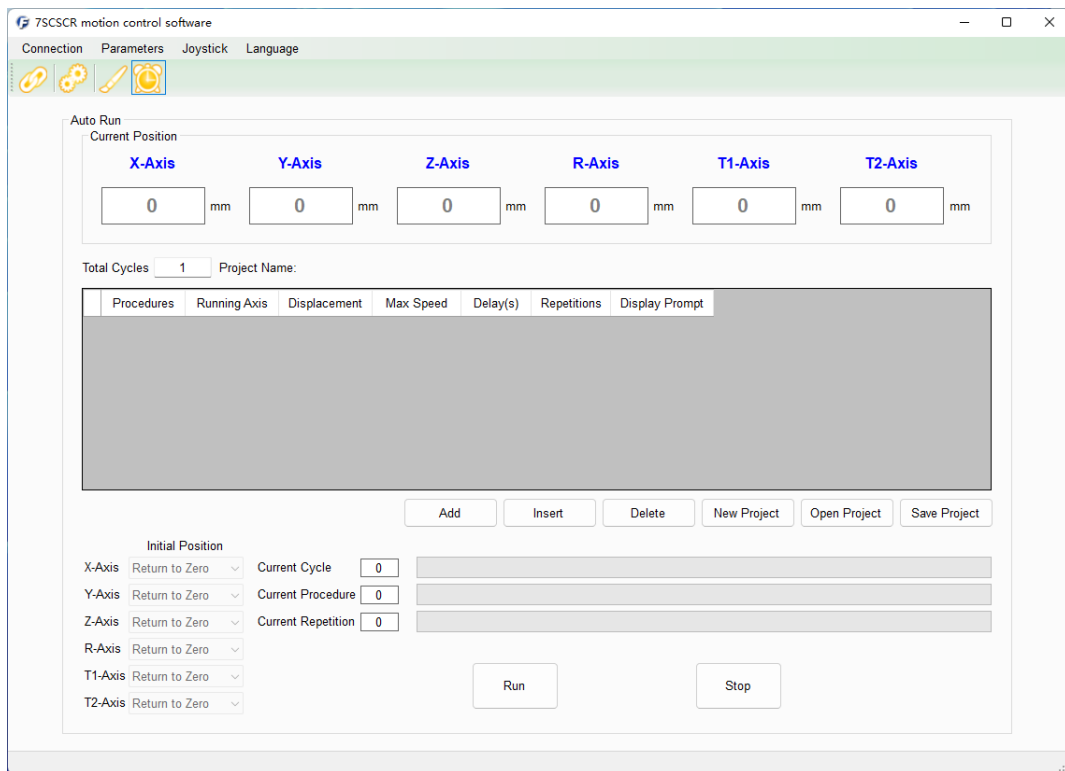
- Run the software, firstly set the parameters of goniometer by clicking [Settings] button.
- Click [Return to Zero] button and then click 'N', the goniometer will move to the mechanical zero position.
- Input the '20' in the Increment Mode and click [Increase] button to move the goniometer to '0' scale.
- Click [Set Zero] button and then click 'Y' to set the current position as the zero position.
- Set '15' as the negative travel range and the positive travel range.
- Click [Return to Zero] button and then click 'N', the goniometer will move to the mechanical zero position firstly and then move to the zero position you set.

If you want to set other degree as the zero position, please refer to the above steps.

(7) Auto Run

You can easily make a new program or edit an existing program to control the complex movement of positioning

stages.

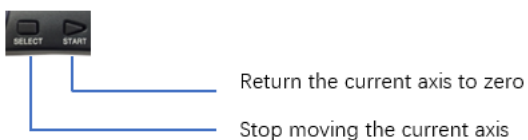
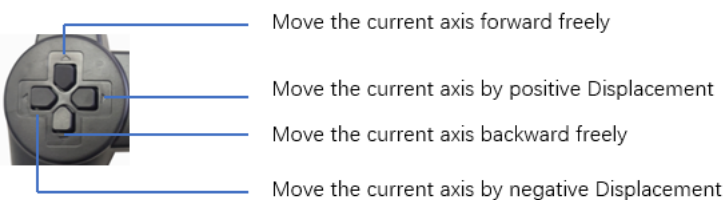
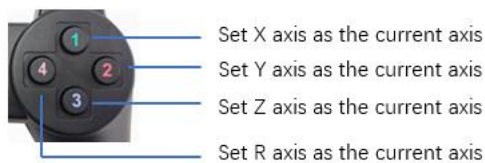


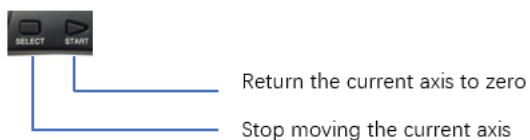
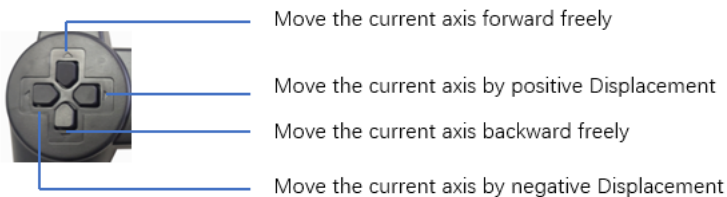
- **Total Cycles:** One cycle means all procedures run once. Total Cycles mean repetitions of a cycle.
- **Running Axis:** Select the axis which needs to run in the current procedure.
- **Displacement:** Input the displacement of corresponding axis. If you input a negative value, the stage will move to the negative direction.
- **Note:** The total displacement of can't exceed the travel range of the positioning stage.
- **Max Speed:** Input the running speed of corresponding axis.
- **Delay:** Input the interval value between current procedure and next procedure. The unit is second.
- **Repetitions:** It's the repetitions of current procedure.
- **Display Prompt:** Whether to pop up a prompt to wait for user confirmation before proceeding to the next procedure.
- **Initial Position:** The positioning stage will move to the initial position before running of project.
- **Add:** Click **Add** to add a new procedure.
- **Insert:** Click **Insert** to insert a new procedure before the current procedure.
- **Delete:** Click **Delete** to delete the current procedure.
- **New Project:** Add a new project.
- **Open Project:** Open an existing project. You can also edit the program and save it to a new project.

- **Save Project**: Click **Save Project** to save the current project.
- **Run**: When you open a project or add a new project, you can click **Run**, the positioning stages will move according to the procedures in the project.

(8) Joystick operation

Click “Joystick” menu to use the joystick to operate the positioning stages.





8. Formulas

8.1 Definition:

- Step value: The steps stepper motor runs when the stepper motor rotates one circle.
- Step angle: The angles stepper motor rotates by single pulse caused.
- Pulse equivalent: The displacement (mm) of translation stage or rotation degree (degree) of rotary stage by single pulse caused, namely control resolution.
- Subdivision: Default subdivision is 2, please refer to the table on the rear panel of controller.

- Pulse number: The corresponding pulse of the displacement translation stage moves or the degree rotary stage rotates.
- Speed value range: 0-255. It depends on the value you set up.
- The relationship between the speed value and pulse period: $30 / (\text{speed value} + 1)$. When the speed value is 255, the driver will send 0.1171875 pulse /ms.

8.2 Formulas:

Integral step value of per rotation of the stepper motor = $360 / \text{stepper angle of the stepper motor}$

Stepper angle of stepper motor is 0.9 degree or 1.8 degree. Please refer to the specifications of specific motorized stage.

(1) For translation stage:

- Pulse equivalent = $\text{pitch of the lead screw (mm)} / (\text{integer step value of per rotation of the step motor} * \text{subdivision})$ = $\text{pitch of the lead screw (mm)} * \text{stepper angle} / (360 * \text{subdivision})$
- Actual displacement (mm) = pulse number * pulse equivalent
If you set the pulse number of displacement to N, then the actual displacement equals to $N * \text{pulse equivalent}$.
- Pulse number = $\text{Actual displacement (mm)} / \text{pulse equivalent}$
If you want to move the translation stage M mm, then the corresponding pulse number equals to $M / \text{pulse equivalent}$.
- Actual speed(mm/s) = $(\text{speed value} + 1) * 22000 * \text{pulse equivalent} / 720$
The speed value is the value you set up. Range of speed is 0-255.

(2) For rotation stage or goniometer stage:

- Pulse equivalent = $360 / (\text{integer step of per rotation of the step motor} * \text{subdivision} * \text{transmission ratio})$ = $\text{stepper angle} / (\text{subdivision} * \text{transmission ratio})$
- Actual rotation degree (degree) = pulse number * pulse equivalent
If you set the pulse number of rotation degree to N, then the actual rotation degree equals to $N * \text{pulse equivalent}$.
- Pulse number = $\text{Actual rotation degree (degree)} / \text{pulse equivalent}$
If you want to move the rotary stage M degree, then the corresponding pulse number equals to $M / \text{pulse equivalent}$.
- Actual speed(degree/s) = $(\text{speed value} + 1) * 22000 * \text{pulse equivalent} / 720$
The speed value is the value you set up. Range of speed is 0-255.

9. Parameters of motor

Model: 42BYGHM607B

Phase: 2

Stepping angle: 0.9°

Current: 1.7A

Torsion: 3.2 Kg.cm

Profile: Both ends of the stages have extended shafts. The front end shaft is 24mm, the other end shaft is 10mm.

Model: 42BYGH613-01B

Phase: 2

Stepping angle: 1.8°

Current: 1.7A

Torsion: 3.5 Kg.cm

Profile: Both ends of the stages have extended shafts. The front end shaft is 24mm, the other end shaft is 10mm.

Model: 57BYGH435-07B

Phase: 2

Stepping angle: 1.8°

Current: 2.8A

Torsion: 12.6Kg.cm

Profile: Both ends of the stages have extended shafts. The front end shaft is 24mm, the other end shaft is 10mm.

The diameter is $\varnothing 6-0.02$.

10. Attentions and FAQ

10.1 Attentions

- Long-term overload

Please avoid to use the translation stages and rotary stages in the status of long-term overload.

- Temperature factor

Please use the controller and stages at normal temperature, otherwise the material will be distorted and life will be shortened and the accuracy will be dropped. If you have special request, please contact us.

- Condition factor

We have taken some measures to prevent dust for important parts of the products. If the condition is bad, please adopt better measures.

- Lubrication

Please add lubricating grease in the translation stages and rotary stages every half year according to the using status.

- Limit switch

The translation stages have two limit switches and a optoelectronic switch. When the running distance exceeds the maximum value, the motion controller will cut off the power to stop running. When the power is off, the motorized stages can be moved by hand.

10.2 FAQ

Abnormal phenomena	Possible cause	Solution
The stage doesn't move.	1.Power is off. 2.Cable is not be connected well. 3.Cable wiring error. 4.The stage doesn't back to zero. 5.The direction is wrong.	1.Turn on power. 2.Turn off power and reconnect cable. 3.Cable wiring error correctly. 4.Back to zero position. 5.Select right direction.
The LCD displays nothing, the keys don't work, the stages don't move.	1.Reset is not good when turn on the controller. 2.Connect the cable when power is on. 3.Interference.	1.Turn on the controller again. 2.Turn off the power, reconnect the cable. 3.Turn on the controller again.
Speed is wrong.	1.Select wrong speed. 2.Select wrong equivalent. 3.There is foreign matter in the guide or screw. 4.Lack of lubricating grease. 5.Overload.	1.Reset the speed value. 2.Select correct equivalent. 3.Clear the foreign matter. 4.Add lubricating grease. 5.Unload.
Noise.	1.There is foreign matter in the guide or screw. 2.Lack of lubricating grease. 3.The stage is not fixed well.	1.Clear the foreign matter. 2.Add lubricating grease. 3.Fix the stage well.
The stage can't stop after touching the limit switch.	The limit switch is disabled.	1.Check the wiring of limit switch carefully. 2.Replace the limit switch.
Can't run program.	Parameters are wrong.	Reset the parameters.

If you have any other questions, please feel free to contact us.