



# QUICK START MANUAL

Applicable For RM Actuators With  
Stand-alone Controller

## RM-C

Please read this MANUAL before use.

**Assess website for further info:**

**<https://doc.rmaxis.com>**

- Modbus Parameters
- CANOpen Parameters
- SDK and API

**Service Hotline:** +86-0757-2220 5682

# 1. Preparation

## 1.1 Are The Products Complete?

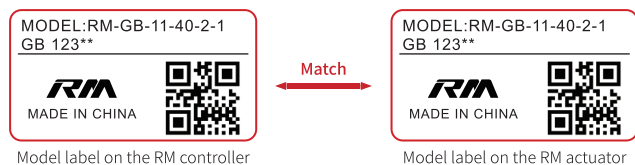
Please check whether the model and quantity of the product received inside the package corresponds to the "Sales Delivery Sheet".

Sales Delivery Sheet				
<b>SAMPLE</b>				
Client Name: xxx Co.Ltd			Delivery Date: 2022-08-08	
Contact Person: Zhang Xiaoming			Serial Num: xxxxxxxx	
Contact Num: xxxxxxxx			Remark: xxx	
Address: xxx xxx xxx, China				
No.	Item	Unit	Quantity	Remark
1	RM-GB-11-20-2 Gripper	pcs	78	
2	RM-C-20 Controller	pcs	78	
3	CB-RM-C-ME Cable	pcs	78	
4	USB-485 module	pcs	5	

## 1.2 Matching



The model number of the controller should be match exactly with the actuator.



## 1.3 Extra Items To Be Prepared By User

- 1) Output power supply: DC24V±10%; please refer to the controller label for Rated Current.
- 2) A PC.

	Minimum System Requirements Of The PC
Processor	Intel® or AMD processor with 64-bit support
Operating system	Windows 7 (64-bit) version or above
RAM	2GB

## 1.4 Controlling Software Platform

Please contact our after-sales engineer for the software installation zip package.

## 1.5 Parameters & Description Of The Controller

	Parameters Of RM-C Controller		
Model	RM-C-20	RM-C-40	RM-C-60
Number of control axes	Single Axis		
Voltage Power	DC24V±10%		
Rated current	2A	4A	6A
Control method	I/O, Pulse and BUS control (ModbusRTU, CANOpen)		
RMO Interface	<ul style="list-style-type: none"><li>• Optocoupler Isolation</li><li>• Input 16 points / Output 16 points (depending on the selected model, the number of input/output points varies)</li><li>• NPN support</li></ul>		
Maximum input pulse frequency	Max.200KPPS(24V)/Max.500KPPS(5V)		
LED display	Red, yellow and green status lights		
Cable length	≤ 10m, standard 3/5/10m		
Usage environment	<ul style="list-style-type: none"><li>• Ambient temperature for use: 0-40°C</li><li>• Environmental humidity for use: 85% RH or less (non-condensing state)</li><li>• Environment for use: avoid using in strong light source, strong ultraviolet ray, corrosive gas environment</li><li>• Environment temperature for preservation : -10°C -65°C</li><li>• Environmental humidity for preservation: 90% RH or less (not in condensation state)</li></ul>		
Size	190mm×77mm×48.75mm		
Weight	0.4kg		
Protection level	IP20		
Cooling	Natural convection cooling		

## 2. Wiring of Actuators

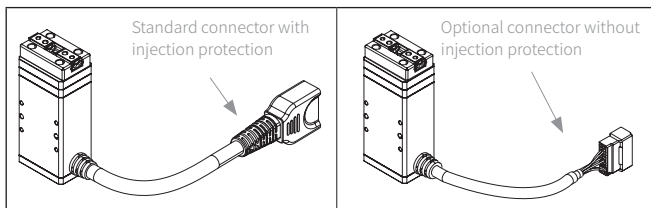
Depending on the product design of different product models, or different optional cable connectors selected by user, you may receive the following types of actuator and cable. Please follow the corresponding guidelines for wiring of actuators.



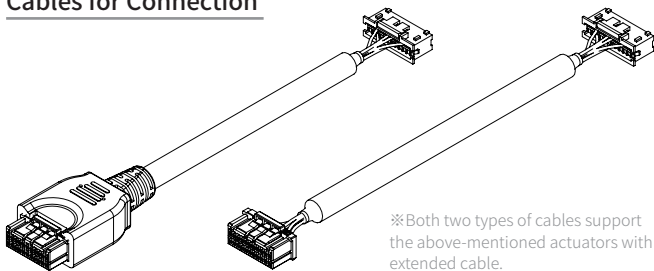
### Hot Plugging Is Prohibited.

The power supply and cable of the actuator cannot be hot plugging while it's working, which will cause damage to both the actuator and controller.

### 2.1 Actuator with Extended cable



### Cables for Connection

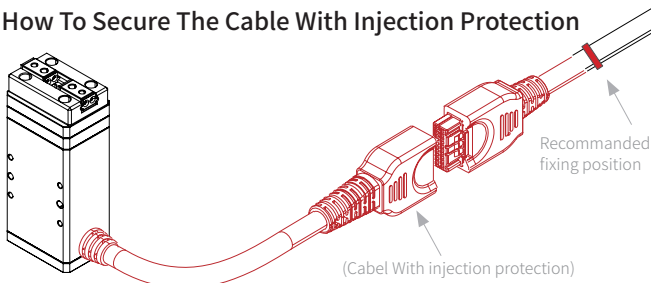


Standard Connector  
(with injection protection)

Optional Connector  
(without injection protection)

### Correctly Tie the Cables

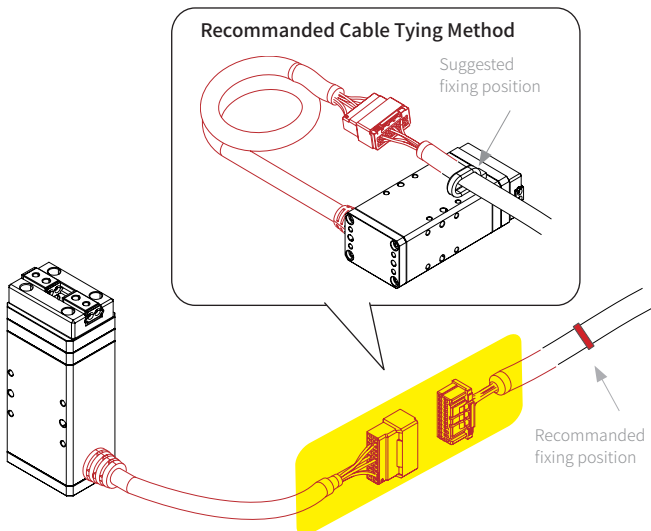
#### 2.1.1 How To Secure The Cable With Injection Protection



### The whole part in red must be fixed intact.

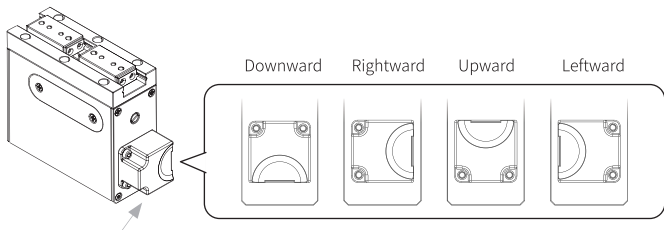
The connector and the actuator shall be at rest relative to each other to prevent the internal cable from being pulled and causing a break.

#### 2.1.2 How To Secure The Cable Without Injection Protection



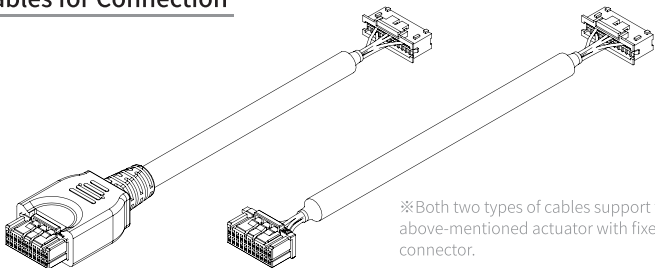
The connection head and the actuator must be at rest relative to each other. The yellow area must remain relatively stationary.

## 2.2 Actuators With Fixed Connector



Standard fixed terminal block. Interface terminals can be reoriented by need.

### Cables for Connection



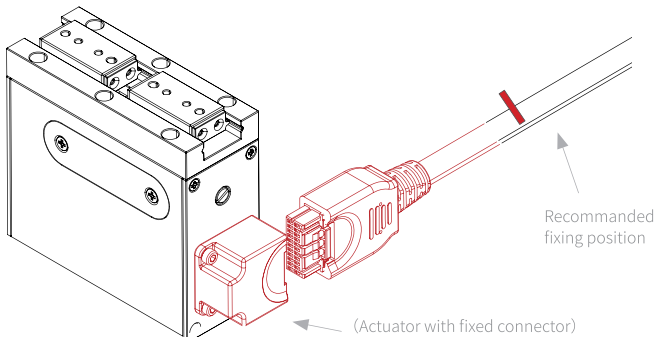
Standard Connector  
(with injection protection)

Optional Connector  
(without injection protection)

※Both two types of cables support the above-mentioned actuator with fixed connector.

### Correctly Tie the Cables

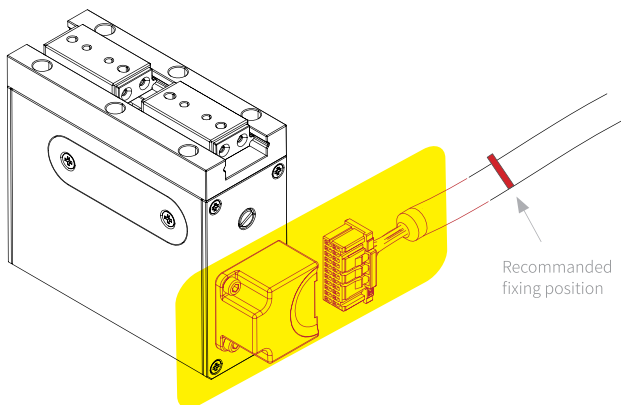
#### 2.2.1 How To Secure The Cable With Injection Protection



**The whole part in red must be fixed intact.**

The connector and the actuator shall be at rest relative to each other to prevent the internal cable from being pulled and causing a break.

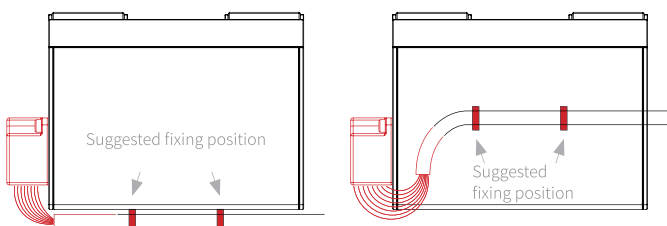
#### 2.2.2 How To Secure The Cable Without Injection Protection



**The connection head and the actuator must be at rest relative to each other.**

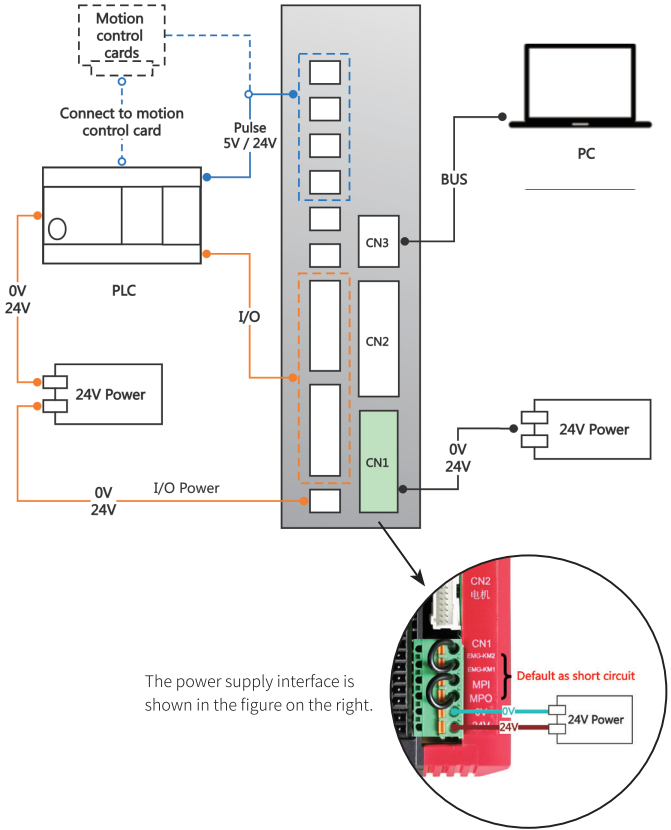
The yellow area must remain relatively stationary.

#### Recommended Cable Tying Method

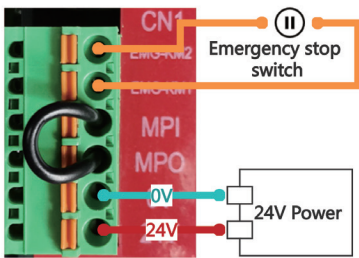


### 3. Connect the Actuator To The Controller

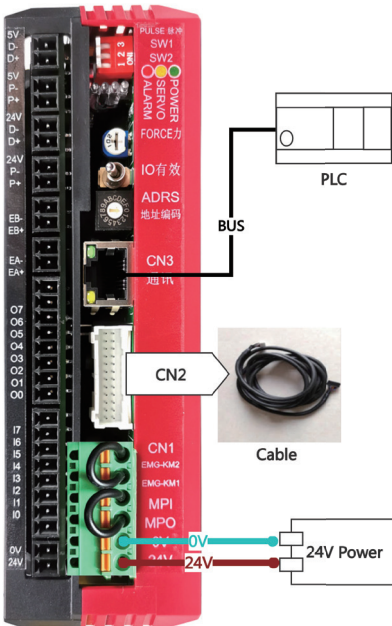
#### 3.1 Overview Of the Controller



#### 3.2 Setting of Emergency Stop Switch



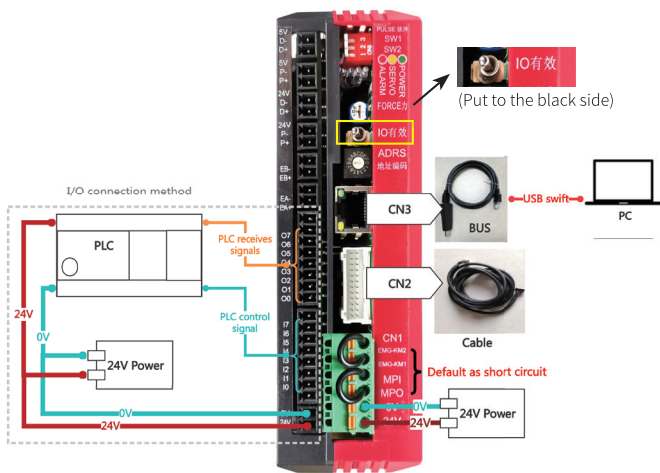
#### 3.3 Wiring Of BUS Control



### 3.4 Wiring Of I/O Control



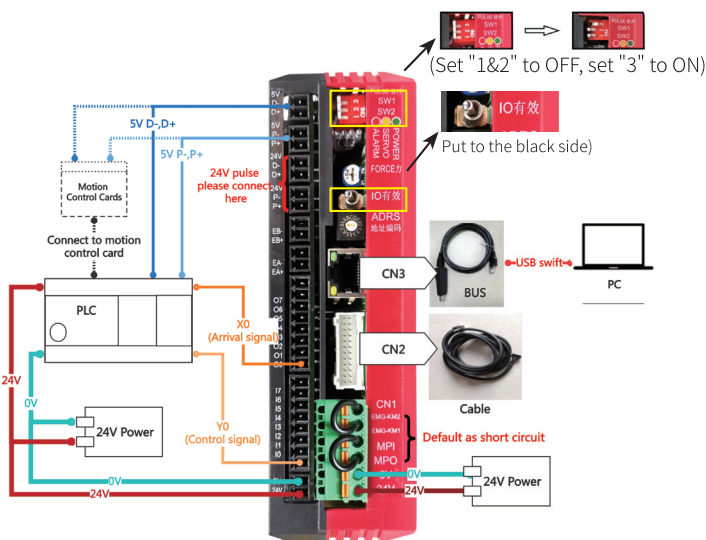
- a. **Hot Plugging Is Prohibited.** Otherwise the controller will be damaged.
- b. Push the I/O button in the upper center position to the "black" side to turn on the I/O switch



### 3.5 Wiring Of Pulse Control



- a. **Hot Plugging Is Prohibited.** Otherwise the controller will be damaged.
- b. Push the I/O button in the upper center position to the "black" side to turn on the I/O switch, then set the pulse button in the upper right corner to "1-2:OFF, 3:ON" to turn on the pulse switch.



### 3.6 Description Of USB Cable Sequence

RJ45	Function	RJ45 Plug
RJ45-1	485-SGA	
RJ45-2	485-SGB	
RJ45-3	CAN_H	
RJ45-4	485-VCC-5V*	
RJ45-5	N/A	
RJ45-6	CAN_L	
RJ45-7	485-GND	
RJ45-8	N/A	



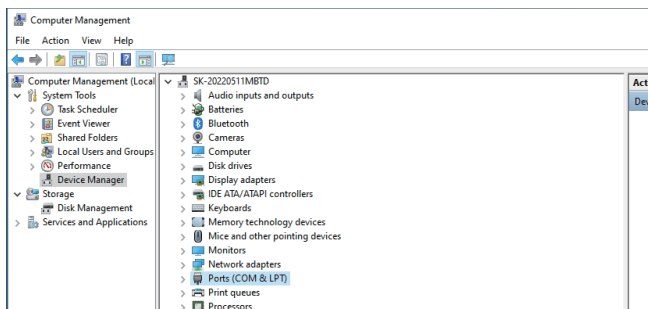
It's required that the controller J1 interface need to be connected to PC via USB-485 or USB-CAN module. Please DO NOT connect the controller directly to PC network port/router to avoid damaging the device.

## 4. Computer Setting & Software Installation



### 4.1 Driver Installation

- ① Connect USB to the computer, click to open the "Device Manager".

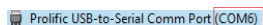
Select "Computer" and right click >- Select "Management" >- Find "Device Manager" in the left column >- Find "Universal Serial BUS Controller" on the right side - Double click to expand it.



- ② If the following alert appears, please refer to the Instruction Guide of "Communication Driver Installation".

- a.  Prolific USB-to-Serial Comm Port (COM6)
- b.  Universal Serial Bus controllers

- ③ When the driver is successfully installed, remember the corresponding COM terminal number as shown below.



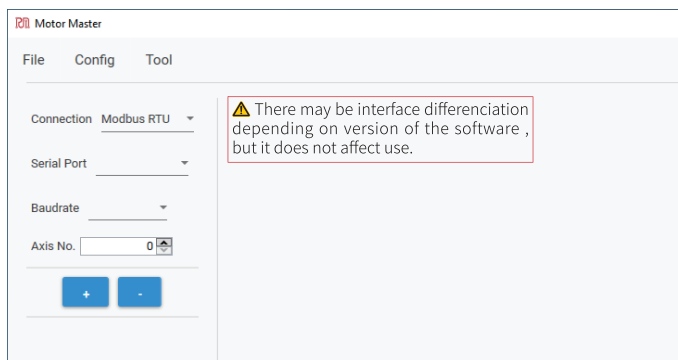
 The COM port is not consistent for each computer after driver installation, please refer to the actual port.

### 4.2 Software Installation

- ① Unzip the software file package and double click the .exe program file to start the software.

 If you do not receive the software zip, please contact our after-sales engineer.

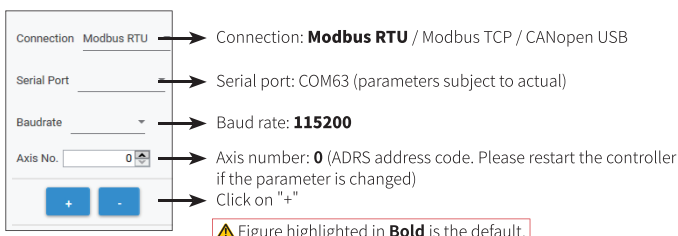
- ② When the following screen appears, it shows the software is successfully installed.



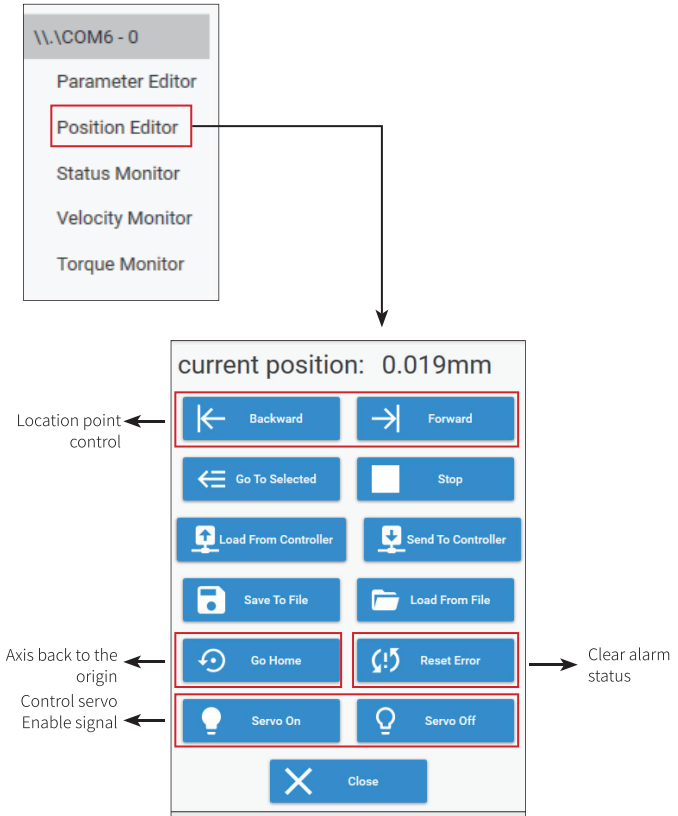
## 5. Point Parameter Editor

### 5.1 Start-up

- ① When the controller is powered on, the "POWER" (green light) and "Servo/Enable Signal (yellow light)" of the controller are ON at the same time.
- ② Follow the below steps to put in the communication parameters.



- ③ When connect successfully, the below menu shows. You can double click to open the "Point Editor".

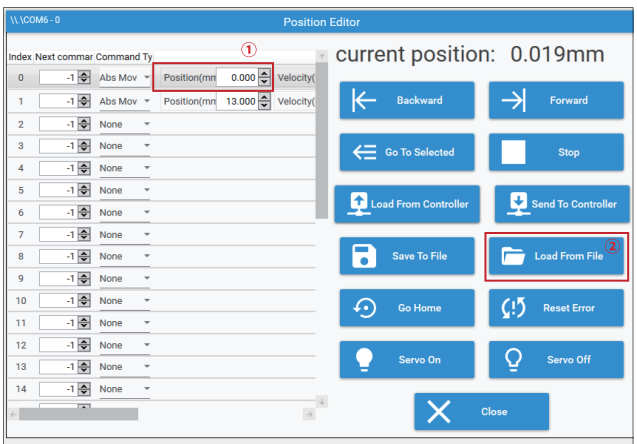


- ④ Every time you open the software, it will automatically read the current control data from the controller.

Index	Next commar	Command Ty				
0	-1	Abs Mov	Position(mm)	0.000	Velocity(mm)	100.000
1	-1	Abs Mov	Position(mm)	13.000	Velocity(mm)	30.000
2	-1	None				
3	-1	None				
4	-1	None				
5	-1	None				

### ⑤ Modify & Save the Parameters

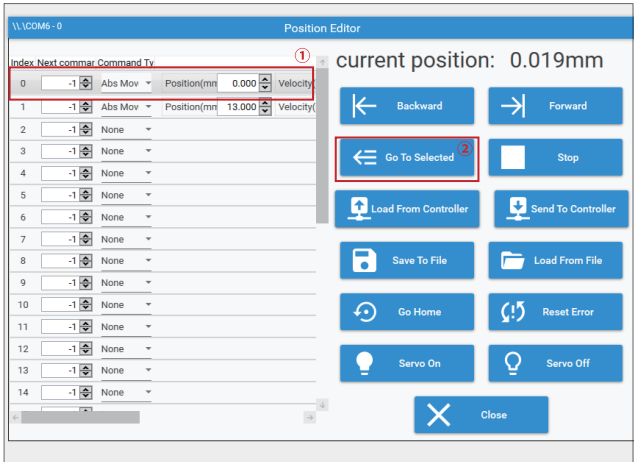
- ① Select "**Target Location**" on the "Point Edit Sheet" and modify the relevant parameters. Click "**Send to Controller**" button to save the modified parameters.
- ② Each time you click "**Send to Controller**", only the latest modified parameters will be saved by the controller.
- ③ If you want to save history parameters, you can use the "**Save To File**" and "**Read From File**" functions to save and call the parameter data in your computer.





## ⑥ Trigger The Motion

- ① Make sure to click "Send To Controller" to save the latest parameters to the controller. Select the first command you want to run (e.g. "Serial Number 1"), and click "Move to The Selected Point", then the actuator will start to execute the command.
- ② Be sure to monitor the motion of the actuator while it is executing the command.
- ③ If you want to execute more than one motion command, just edit the "Next Sequence Number" to define which command to be executed after the current point is completed. Set "Next Sequence Number" as "-1" means "not to jump to the next command".



## 5.2 Description of Point Motion Modes

<b>Absolute Motion</b>	The distance of the target position from the origin point.
Target Location	The position that needs to be absolutely moved.
Speed	The speed of movement (default 30mm/s).
Acceleration and Deceleration	The acceleration and deceleration of movement (default 500mm/s <sup>2</sup> ).
Positioning Range	<p>Define the in-position signal giving range (default 0.1mm, i.e. the in-position signal is given within <math>\pm 0.1</math>mm of the actuator movement to the target position). Note: The positioning range is at least 0.1mm, lower than 0.1mm may cause the actuator to always have a low in-position signal.</p> <p><b>Do not use absolute motion for clamping or pushing, use push-press motion for setting instead (see below).</b> Using Absolute Motion frequently for pushing may cause damage to the actuator.</p>
<b>Relative Motion</b>	Indicates the relative amount of the current position as the starting point.
Target Position	The position that needs to be moved relative to each other.
Speed	The speed of movement (default 30mm/s).
Acceleration and deceleration	The acceleration and deceleration of movement (default 500mm/s <sup>2</sup> ).
Positioning Range	<p>Define the range of in-position signal giving (default 0.1mm, i.e. the in-position signal of the actuator movement is given within <math>\pm 0.1</math>mm to the target position).</p> <p><b>The Positioning Range should be no less than 0.1mm. Otherwise it may cause in-place signal of the actuator maintain in low level.</b></p>
<b>Push-press Motion</b>	<p>Executing Push-press motion by torque in the current position.</p> <p><b>Judging of fail push/ fail press:</b></p> <ul style="list-style-type: none"> <li>» If the "corresponding point" in place signal and the "in motion" signal are output, the object is pushed/clamped.</li> <li>» If it only output the "corresponding point" in place signal, the object is pushed/clamped failure.</li> </ul>
Speed	The default setting is 20mm/s.
Pushing Force	<p>Please use push-press motion mode (30%~100% push pressure) for clamping/pushing.</p> <p><b>The recommended setting range for pushing force is 30-100%.</b></p> <p><b>When pushing force maintains in 100%~150%, it is in high power motion, which will shorten the service life of the equipment.</b></p>
Pushing Distance	The set value must be higher than the clamping size of the clamped object.

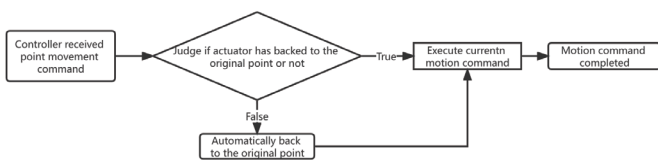
## 5.3 Go Home Setting

The actuator has been set automatically return to the home point by default before leaving the factory. It does NOT need to be set manually each time it is re-powered (when the power is applied again, the controll system will automatically judge whether the actuator has returned to the original point; if not, the actuator will automatically return to the original point before executing other target motion command).



**Do not use the "Go Home" button when the actuator is open in push-press motion mode.**

Please set absolute movement to "0mm" to achieve "home position" or movement to the desired position.



## 6. Mode Setting Of Pulse Control

### 6.1 Control Switch For Pulse Control



1-2 is OFF, 3 is ON

⚠ If you use pulse control, please be sure to follow the diagram. Otherwise, the control cannot be used.



### 6.2 Specification Of Pulse Control

	5V Pulse		24V Pulse	
	Specification	Rated Load Voltage	DC5V	Rated Load Voltage
Maximum Input Pulse Frequency		500KPPS	Maximum Input Pulse Frequency	200KPPS
Insulation Method		Optical coupler	Insulation Method	Optical coupler
NPN				
⚠	Default unit distance of 1 pulse is 0.01mm. If you need to modify the default, please open the Parameter Editor >- "Pulse Equivalent" setting. Pulse Control need to set the "pulse in place" signal.			
Process	Send "Return to Origin" signal after power on up → Waiting for the "Returned to Origin" Signal → Generate pulses → Wait for "Pulse in Place" Signal			

## 7. Mode Setting of I/O

### 7.1 Control Switch For I/O Control



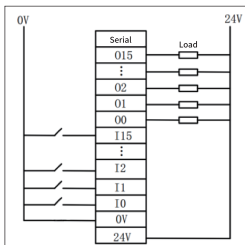
→ Toggle to "ON" (black side) for valid.  
Toggle to "OFF" (red side) for invalid.

⚠ If you are using I/O control, please make sure the I/O button is ON, otherwise the control system is invalid.

### 7.2 Input and Output Specification

	Input		Output	
	Specification	Input Points	16 points	Input Points
Input Voltage		DC24V±10%	Input Voltage	DC24V±10%
Input Current		5mA/1 circuit	Input Current	RM-C Series: 50mA
Insulation method		Optical coupler	Insulation method	Optical coupler
NPN				

## 7.3 Point Wiring Mode And Control Point Mode Wiring Diagram (NPN, 0V valid, output 0V)



## 7.4 Description Of I/O Customization



Since I/O control is of higher priority than both the upper computer software control and Modbus communication control. Therefore, when you set I/O control on the software, the upper computer software and Modbus communication control will be disabled. That is, the same command in "Point Editor" cannot be triggered by I/O Control or BUS control at the same time.

	Signal	Function
Input	Go Home	Return to the original point when this signal is detected.
	Servo	<ul style="list-style-type: none"> <li>When this signal is "ON", servo "ON" is activated, motor is locked, and forward and reverse commands can be executed.</li> <li>When this signal is "OFF", servo "ON" is turned off and the motor is released, and the move command cannot be executed.</li> </ul>
	Reset Alarm	Disarm the alarm output signal. When the alarm indicator light is red, use this signal to disarm.
	Input pins 0 - 15	Run the function of input pin mapping.
Output	Signal of Arriving Target Position	Current position relative to the target position: <ul style="list-style-type: none"> <li>It is "ON" if it is within the range of the set value in the "Position Distance" column of the position sheet.</li> <li>It's "OFF" if it is out of the range.</li> </ul>
	In-place (INP) Signal	This signal indicates that the target position has been reached and the positioning signal has been completed.
	Returned to home signal	This signal is "ON" when the "Go Home" signal is triggered and the home return action is completed.
	Regional Signals	<ul style="list-style-type: none"> <li>In the global area: the set global lower limit <math>\leq</math> the current position <math>\leq</math> the set global upper limit, this signal is "ON".</li> <li>Less than the global area: the current position &lt; the set global lower limit, this signal is "ON".</li> <li>Greater than the global area: the current position &gt; the set global upper limit, this signal is "ON".</li> </ul>
	Reach 0 - 15	This signal goes from "OFF" $\rightarrow$ "ON" and the target movement is completed.
	Alarm Signal	When an error occurs, the red color on the controller will flash, so that you can judge the error status according to flashing frequency by referring to the "Error Code Guide". You can also check the error information through the PC software. Error Code Guide: <ul style="list-style-type: none"> <li>0: Normal</li> <li>1: Other errors</li> <li>2: Motor is out of phase</li> <li>3: Position error</li> <li>4: Speed overrun</li> <li>5: Motor blocking</li> <li>6: Excitation error of the initial phase</li> </ul> Please refer to the RM-FAQ document for error finding and recovery operations.

## 8. Summary of Precautions (Note Before Use)



### Cautions

1. Please fix both ends of the actuator connection cable to prevent rubbing to the internal terminals.

The end of the cable rubber case plug should not be rubbed.

2. Please make sure the power supply is with sufficient power.

Insufficient power can lead to abnormal movement to the actuator. It may lead to damage in severe cases.

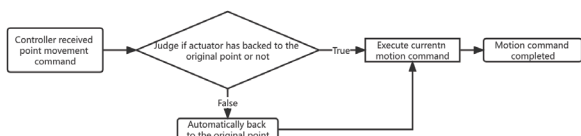
3. Hot plugging is prohibited.

The power supply and cable of the actuator cannot be plugged out when it's working, which will cause serious damage to the actuator.

4. The actuator is set automatically return to original point by default every time it's re-powered, so it's no need to operate manually in this case.

It is recommended to use the way "setting absolute movement to 0mm" to control the actuator to back to the original point. Everytime the power is re-applied, the system will first judge whether it has return to the original point. If not, it will automatically "go home" before executing other target motion command.

Do not use the "Go Home" button when the actuator is open in push-press motion mode. Please set absolute movement to "0mm" to achieve "home position" or movement to the desired position.



5. Please use push-press motion (30%~100% pushing force) for clamping/pushing.

Using absolute motion for clamping/pushing will block the actuator, and 100%~150% is high power mode, which will affect the service life in long term use.

7. If you need to debug with the upper computer software, please turn the controller "I/O Active" switch to "OFF" (red side) first.

After the I/O input function is mapped, if "I/O active" is ON, only external I/O trigger can be used.

6. Important Alarms.

If alarm code 6 or abnormal movement occurs, it may be caused by resistance to the slider during power-on initialization. Please try to power off and manually open and close the slider of grippers for 3~5 times, in order to eliminate the resistance.

For alarm information, please refer to "RM Actuator FAQ RM-FAQ".

8. Please contact our after-sales engineers if you need to modify the default parameters.

## 9. Maintenance Guide (Note Before Use)

### 9.1 Overviews

#### 9.1.1 Use For The First Time

Before the initial use, please confirm whether the interval from the date of receipt to the first use exceeds half a month (reduce appropriately in winter). If it does, it is recommended to apply a small amount of WD-40 rust-preventing lubricant to the actuator's screw rod, guide rail, and other transmission components before use, and move back and forth 3-5 times to allow the lubricant to fully contact the transmission components, ensuring the actuator is in optimal condition.

#### 9.1.2 Unused For A Long Time

It is necessary to first apply a small amount of WD-40 rust-preventing lubricant before use, especially when accessing travel ranges that have not been utilized for a long time.



- WD-40 rust-preventing lubricant should only be used in the aforementioned situations.
- For regular daily maintenance, please use NSL grease.
- Please use lubricants that are compatible with the specified grease to avoid abnormal chemical reactions that could cause mechanical damage.

## 9.2 Frequency Of Maintenance

	Regular Check of Transmission Parts	Regularly Check The Tightness of The Connecting Screws	Regular Grease Replenishment
First time of use	○		
After one month of operation	○	○	
After six months of operation	○	○	○
After one year of operation	○	○	○
Every six months thereafter	○	○	○

The above suggestion period is based on regular operation of 5 working days a week (8 hours/day).

If the actuator is to be operated around the clock or used at high frequency and/or in a relatively harsh environment (e.g. dusty, high temperature, etc.), the maintenance frequency should be shorten relatively.

## 9.3 Key Maintenance Parts Of Different Product Models

	Frequency of Grease Refilling	Area of Grease refilling
RM-GB Series	Opening and closing for 100W times or half year	Guide rails and filaments
RM-MGBD Series	Opening and closing for 100W times or half year	Guide rails
RM-PLA/RPLA/WRPLA Series	Every 100KM or half year of operation	Guide rails
RM-SLD/RSLD Series	Every 100KM or half year of operation	Guide rails and filaments
RM-RT Series	Every 200W runs or six months	Gears

## 9.4 Replacement of Dustproof Sheets

- If the dustproof sheet is bent, chipped, broken and in other abnormal situation, it needs to be replaced in time, otherwise the service life of the RM actuator will be affected.
- If you need to replace the dustproof sheet, please contact our after-sales engineers.

## 9.5 Surface Cleaning

- The exposed transmission part of the actuators and its surroundings should be kept clean, and be cleared and lubricated regularly, including the slide rails of the grippers, slide rails and telescopic rod of the sliders, etc.
- When there is heavy stains on the actuators, please use a soft cloth with a little neutral detergent or alcohol and gently wipe it off.
- It is recommended to clean the actuators thoroughly in a regular basis. Or you can determine a suitable frequency of cleaning to the actuators depending on its working environment.
- For grippers, it is recommended to manually open and close the jaws for 3~5 times each time before it's power-on and/or it change its stroke, in order to keep the grippers in the best condition. It will also help to prevent accruing abnormal power-up movement or error code 6 caused by large resistance introduced by the slider.

The above section is for quick instructions only.

For more information, please refer to **RM Actuator Maintenance Guide**.