

ESTUN Robotics

Operation Manual of ESTUN Editor V2.2 Software

Thank you for purchasing ESTUN robots.

Before using the robot, be sure to read the SAFETY PRECAUTION and understand the contents.

ESTUN endeavor to improve the products. All specifications and designs are subject to change without notice.

All statements, information and advice provided in this manual have been carefully processed, but no guarantee is given for their completely accuracy. We shall not be held liable for any direct or indirect losses arising from the use of this manual.

User are solely responsible for the application of any product and should exercise caution when using this manual and the associated product.

The interpretation of all content in this manual belongs to Nanjing ESTUN Robotics Engineering Co., Ltd.

No part of this manual may be reproduced in any form.

ESTUN Robotics. All Rights Reserved Copyright.

Service Hotline: 400-025-3336

Address: No.1888, Jiying Avenue, Jiangning Economic Development Zone, Nanjing, China

Postcode: 211102

Telephone: 025-81031813

Website: www.ESTUN.com

Email: robot@ESTUN.com

SAFETY

This Chapter describes the precautions which must be followed to ensure the safe use of the robot. Before using the robot, be sure to read this chapter thoroughly.

ESTUN robots must be transported, mounted and operated in accordance with national laws,

regulations and standards. Appropriate safeguards must be correctly performed to protect the users. Before using (mounting, operating, maintaining, repairing) the robot, be sure to read and understand this manual and its relevant manuals. Be sure to have familiarization with the knowledge of robot system and the safety precaution. Even if all instructions are followed, this is not a guarantee that the robot will not cause injuries or damage.

DEFINITION OF USER

The personnel can be defined as follows.

- Operators
 - Turns the robot power ON/OFF.
 - Start the robot program from the panel.
- Programmers
 - Operates the robot;
 - Teaches the robot inside the safety area;
- Maintenance engineer
 - Operate the robot;
 - Teaches the robot inside the safety area;
 - Maintenance (repair, adjustment, replacement).

Operators must not work in the safety area.

Programmer and maintenance engineer can work in the safety area.

During operation, programming and maintenance of the robot, the operator, programmer, and maintenance engineer should take precautions to ensure the safety by wearing the following safety items.:

- Clothes for operation
- Safety shoes
- A helmet

SPECIAL TRAINING

Tasks in the safe area including transportation, setting, teaching, adjustment, maintenance, etc.




Training course must be performed before operating the robot.

For more information about training course, contact ESTUN.

DEFINITION OF SAFETY NOTATIONS

Precautions and information are defined as follows.

Safety Instructions

Symbol	Definition
	Danger Death or serious injury will be expected to occur if the user fails to follow the approved procedure.
	Caution Minor or moderate injury of the user or equipment damage will be expected to occur if the user fails to follow the approved procedure.
	Information A supplementary explanation helps users operating the robot more efficiently.

Safety OF THE USER

- (1) The robot should be transported and installed as procedures recommended by ESTUN. Wrong procedures may cause severe injuries or damage due to the robot fall.
- (2) Draw an area clearly indicates the safety area. Install a fence or hang a warning board to ensure the safety operation of the robot, and keep unauthorized personnel outside the safety area.
- (3) Never hang any tools above the robot. Falling of these tools may cause damage to equipment.
- (4) Never lean on the cabinet. Never touch any buttons without permission. Unexpected movement of the robot may cause personnel injuries and equipment damage.
- (5) Take precautions for falling parts to avoid injuries when disassemble the robot.
- (6) Turn off the power when adjusting peripheral equipment.
- (7) Peripheral equipment must be grounded.
- (8) The robot should be operated in a low speed in the first operation. The speed should be added gradually to check if there is any abnormal situation.
- (9) Do not wear gloves when using the teach pendant. Operate with gloves may cause an operation error.
- (10) Programs, system variables, and other information can be saved on the memory card or USB memories. Be sure to save the data periodically in case that the data is lost.
- (11) Never forcibly move any axis of the robot. Move the axes forcibly may cause injuries or damage.
- (12) Take precautions when wiring and piping between the robot, the cabinet, and peripheral equipment. Put the pipes, wires or cables through a pit or covered with a protective lid, to avoid stepped by personnel or run over by a forklift.
- (13) Unexpected movement may occur on any operating robot, which will cause severe injuries or damages in the working area. Test (safe door, brake, safe indicators, etc.) must be performed on each safety measures before using the robot. Before turn on the system, make sure that no one is in the working space.
- (14) Never set motion range or load condition exceeds the rated range. Incorrect setting may cause personnel injury and equipment damage.
- (15) Observe the following precautions when teaching inside the working space of the robot
 - Do not enable the system unless the mode is switched to manual, and make sure that all auto-control is cut off.
 - Speed must be limited under 250mm/s at manual mode. Only authorized person with fully understand of the risks can adjust the robot to rated speed manually.
 - Be careful about rotating joints to prevent hair and clothes involved. Take precautions of injury or damage caused by the manipulator or other auxiliary devices.

Safety Instructions

- Check the motor brake to avoid personnel injuries caused by unexpected situation.
- Always have an escape plan in mind in case the robot comes towards you unexpectedly.
- Ensure that there is a place to retreat to in case of emergency.



Never stand beneath the in case of unexpected movement or the system be turned on inadvertently.



Make sure there is a CO₂ fire extinguisher at hand.

SAFETY OF OPERATORS:

- (1) Before operating the robot, check that the SERVO ON indicator goes out when the EMERGENCY STOP button on the right of the front door of the controller and the pendant are pressed. And confirm that the power is turned off.
- (2) Never allow unauthorized personnel to touch the controller during operation. This may result in unexpected movement of the robot, severe injuries and material damage.
- (3) When attaching tools to the robot, be sure to turn off the power of the controller and the peripheral equipment, and display a warning sign. Turning the power on during equipment installation may cause electric shock or injury due to unexpected movement of the robot.
- (4) E-stop

Emergency stop is an external button of the controller that can stop the robot operation.

When emergency button is pressed, the power of the robot (except the power of the servo) is cut off. The system will not run unless the pressed emergency button being released and the system being turned on.



There are several emergency stop buttons in a robot system to stop the robot in case of emergencies. The red button, as shown in the left figure, can be mounted on the teach pendant and the controller. Certainly, the emergency buttons can be mounted by special requirement.

Emergency stop button should be mounted where is easy to reach, so that the buttons can be pressed down immediately in case of emergencies.



Emergency button is used in case of emergency only. Do not use it to stop the robot for normal operation.



Operators must take precautions to avoid high voltage from cables of servo motors, grippers and other devices.

SAFETY OF PROGRAMMERS:

While teaching the robot, the programmer must enter the robot operation area. The programmer must ensure the safety especially.



Turn on or off the system by press or release Mot button on the teach pendant. When pressing this button, the servomotor is enabled, and disabled when releasing it.

To ensure the safe use of the teach pendant, the following precautions should be taken:

- Be sure that the enable switch is effective at any time.
- Turn off the enable switch when pausing, programming or testing the system.
- Teach pendant must be taken with the programmer when teaching in the work space, to avoid inadvertent operation by unauthorized person.
- Teach pendant must not be left within the working space of the robot, as injury or damage can occur if the robot comes in the contact with the teach pendant.

SAFETY OF MAINTENANCE ENGINEERS:

(1) Heated parts

Some parts of the robot are heated when robot is operating, especially the servo motor and reducer. If a maintenance engineer needs to touch such a part, the user should wear heat-resistant gloves or use other protective tools.



Try to feel the temperature of heated parts before touching them, to avoid burn injuries. After turning off the power supply, wait until the heated parts cool down before performing any maintenance.

(2) Disassembly parts

Open the cover or shell only after interior parts such as gears are not moving any more. Never open the cover or shell when the gear or bearing is moving. Use auxiliary device to keep interior part to its position.

Observe the following precaution when performing the first test after installation, inspection or maintenance:

- a) Clear tools to proper locations outside of the working space of the robot.
- b) Make sure that all precaution measures are available.
- c) Make sure that there is no one in the working space of the robot.
- d) Pay special attention to working condition of the maintenance parts when performing test.

Never use the manipulator as a ladder when performing maintenance. Never climb on the manipulator to avoid falling down.

(3) Pneumatic / hydraulic pressure

There may be air/liquid residue in the system when the air pump or hydraulic pump is turned off. Before checking the pneumatic or hydraulic parts, release remaining pressure from the system to avoid personnel injury or equipment damage.



Install a safety valve in case of accident.

(4) Although the power supply need to be turned on during fault diagnosis, it must be turned off when perform maintenance.

(5) Brake inspection

Safety Instructions

Brake may be wearing in daily operation. So brake inspection should be performed by the following procedure

- a) Move each joint to the position where the joint bears maximum load.
- b) Turn off the robot. The brake works.
- c) Mark each joint.
- d) Check if the joint moves over a period of time.

(6) Greasing

Personnel injury or equipment damage may occur during greasing. Observe the following precautions before greasing.

- Take additional care of safety by wearing safety items (such as gloves) to avoid injury from heated oil or reducer.
- Open the oil chamber with caution and keep away from the opening. Oil may spray due to oil pressure.
- Feed the oil according to required quantity and never fill up the oil chamber. Check the oil indicator when finished.
- Never mix different types of oil into one reducer. Clean the oil chamber thoroughly before changing oil type.
- Oil draining must be performed thoroughly. Check the oil indicator when finished.

IN FO

Operate the robot for a short period of time before oil draining to heat the oil.

SAFETY OF THE TOOLS AND PERIPHERAL EQUIPMENT

Peripheral device may still be running even after the system has been turned off. Personnel injury may occur due to damaged power lines.

SAFETY OF THE ROBOT MECHANICAL UNIT

For abnormal or emergency situations, e.g. persons trapped in or pinched by the robot, the robot axes should be moved. (Contact ESTUN for more details about dismantling).

Small arms can be moved by hand. Lager arms should be moved by crane or other handling equipment.

Fasten the robot firmly before releasing the brake to avoid secondary injury caused by falling arms.

STOP TYPE OF ROBOT

There are three types of robot stop.

Power-Off Stop

Servo power is turned off and the robot stops immediately. Servo power is turned off when the robot is moving, and the motion path of the deceleration is uncontrolled.

The following processing is performed at Power-Off stop:

- An alarm is generated and servo power is turned off, and the robot operation is stopped

immediately.

- Execution of the program is paused.

Frequent Power-off stop of the robot during operation can cause failures of the robot. Avoid system designs that require routine or frequent Power-off stop conditions.

Alarm Stop

The robot system sends alarm (not include power-off alarm), and the robot is decelerated until it stops by control instructions.

The following processing is performed at Alarm stop:

- An alarm (not include power-off alarm) is generated due to overload, system faulty, etc.
- Control instruction is send from servo system. The robot operation is decelerated until it stops. Execution of the program is paused.
- Servo power is off.

Hold

The robot is decelerated until it stops, and servo power remains on.

The following processing is performed at Hold:

- The robot operation is decelerated until it stops. Execution of the program is paused.

LABELS (1) Electric shock Warning

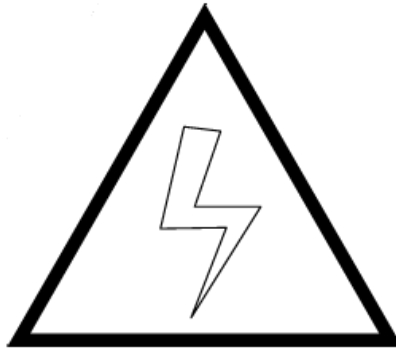


Figure 0.1 Electric shock warning sign

This label indicates hazardous voltage or electric shock.

(2) High-temperature Warning

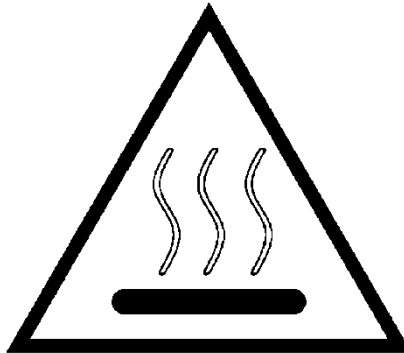


Figure 0.2 High temperature warning sign

Be cautious about a section where this label is affixed, as the section generates heat. If you have to inevitably touch such a section when it is hot, use a protective provision such as heat-resistant gloves.

(3) No Step-on Warning



Figure 0.3 Step-on prohibitive Warning

Never step on or climb the robot or controller as it may adversely affect the robot or controller and may get hurt if you lose your footing as well.

(4) Personal Injury Warning

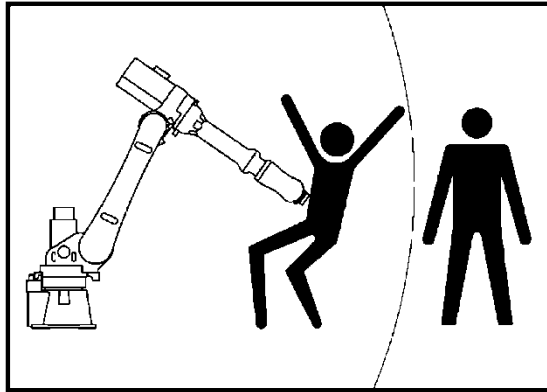


Figure 0.4 Personal Injury Warning

Never enter the operation area while the Manipulator is moving. This is extremely hazardous and may result in serious safety problems.

(5) No Disassembly Warning



Figure 0.5 No Disassembly Warning

Never perform disassembly arbitrarily where the warning is affixed. Contact ESTUN for disassembly.

PREFACE

This document provides a breakdown of the software functions of EditorP programming software and provides a brief explanation of each functional module. It is intended to assist operators in understanding the software.



CONTENTS

CONTENTS

SAFETY	1
PREFACE	1
CONTENTS	1
1. User Management System.....	1
1.1. Login Interface	1
1.2. Switch User	1
1.3. User Management	1
2. Controller Module	2
2.1. Controller Connection	2
2.1.1. Virtual Controller	3
2.1.2. Actual Controller.....	4
2.2. Controller Disconnection	5
2.3. Robot Control Module	6
2.4. Connect the Teach Pendant.....	7
2.5. Introduction to the Main UI Functions of the Editor Software	8
3. Functions of Project Management	9
3.1. Differentiate Icons in Project Management	14
3.2. Global Project	14
3.3. Create a New Workspace.....	15
3.3.1. Create a New Text Workspace	15
3.3.2. Create Text and Graphical Workspaces Based on Templates.....	16
3.4. Right-Click Menu on the Project Tree	17
3.4.1. Workspace	17
3.4.2. Project.....	18
3.4.3. Program.....	18
3.4.4. Variable File	19
3.5. Variable Module	20
3.5.1. System Variables	20
3.5.2. Global Variables	21
3.5.3. Project Variables	22
3.5.4. Program Variables	23
3.5.5. View, Modify and Save Variables	23
3.5.6. Create/Delete/Copy Variables.....	24
3.5.7. Rename Variables.....	25
3.5.8. Variable Comments	26
3.5.9. Modify Variable Attribute Values	26

3.6.	Program Editing	27
3.7.	Command Navigation	31
3.8.	Display of Running Program	32
3.9.	Program Saving.....	32
3.10.	Workspace, Project and Program Upload/Download.....	33
3.10.1.	Download	33
3.10.2.	Upload	33
3.10.3.	Upload/Download Error Messages	35
4.	Auxiliary Program Functions	36
4.1.	System Output.....	36
4.2.	Error Messages	37
4.3.	Bookmarks.....	38
4.4.	Variable Monitoring.....	41
4.5.	Program List.....	41
4.6.	Search Results.....	42
4.6.1.	Searching within the Workspace	42
4.6.2.	Searching within a Project.....	43
4.6.3.	Searching within Text	43
5.	Graphical Programming.....	45
5.1.	Create a Graphical Project	45
5.2.	Introduction to Graphical Blocks	46
5.2.1.	Command Blocks.....	46
5.2.2.	Assignment and Variable Blocks	49
5.3.	Simple Demo Program Demonstration.....	51
5.4.	GUI Interface.....	58
6.	Settings	62
6.1.	Zero Calibration	62
6.2.	Communication Verification	64
6.2.1.	Socket Communication Verification	65
6.3.	Basic Settings.....	66
6.4.	Tool Coordinate System Calibration.....	66
6.5.	User Coordinate System Calibration.....	68
6.6.	Vibration Suppression	70
7.	Manual Control.....	70
7.1.	Coordinate Display.....	71
7.2.	Manual Control.....	72
7.3.	One-click Motion	72
7.4.	Manual Motion Parameter Settings	73
8.	IO Function	74
8.1.	Digital.....	74
8.2.	Analog.....	75
8.3.	Virtual Digital	75
8.4.	Virtual Analog	76
8.5.	Custom IO	76
9.	3D Function	79

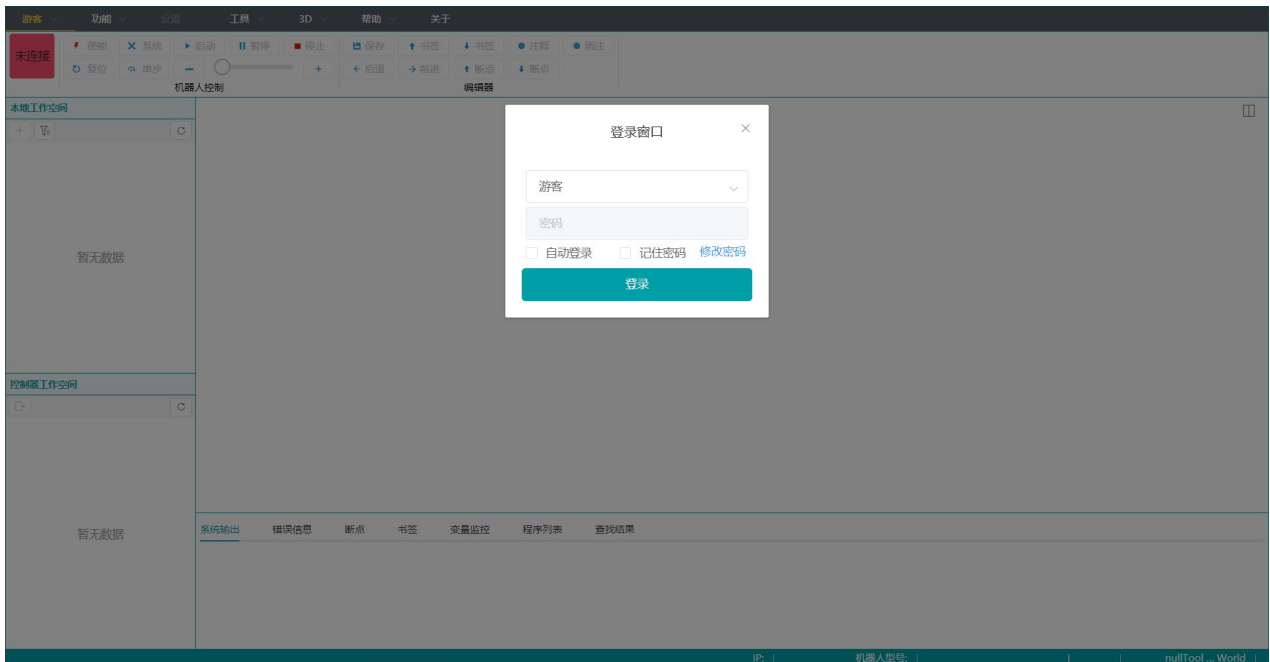
9.1.	Open the 3D Simulation Window	79
9.2.	"File" Menu.....	80
9.2.1.	Create Scene (CTRL+N)	81
9.2.2.	Import Other Models.....	82
9.2.3.	Import End Effector Tool Model	83
9.2.4.	Save Scene (CTRL+S)	84
9.2.5.	Open Scene (CTRL+O)	85
9.2.6.	Save Scene As.....	86
9.2.7.	Close Scene	87
9.3.	"Accessibility" Menu.....	88
9.3.1.	Capture Screen.....	88
9.3.2.	Record Screen	88
9.3.3.	Stop Recording.....	89
9.3.4.	Unit Model Movement (ALT+1,2,3,4,5,6,7).....	89
9.3.5.	Select Slider Axis	94
9.3.6.	Zoom In Base Coordinates (Page Up)	94
9.3.7.	Zoom Out Base Coordinates (Page Down).....	95
9.3.8.	Options	96
9.4.	Toolbar	100
9.4.1.	Front View.....	100
9.4.2.	Rear View.....	100
9.4.3.	Left View.....	101
9.4.4.	Right View	102
9.4.5.	Top View	103
9.4.6.	Bottom View.....	104
9.4.7.	Restore View	105
9.4.8.	Path.....	105
9.4.9.	Always On Top	106
9.4.10.	Modes.....	106
9.4.11.	Clear	107
9.4.12.	Drag	108
9.4.13.	One-Click Fixing.....	110
9.4.14.	Model Dragging.....	111
9.5.	Property Window	112
9.5.1.	Model Name	112
9.5.2.	Set Current Reference Coordinate System	112
9.5.3.	Set Current Robot Tool Coordinate System.....	113
9.5.4.	Set Model Posture	113
9.5.5.	Set Model Display and Hide.....	113
9.5.6.	Set Base Coordinate System Display and Hide.....	114
9.5.7.	Set Model Color	114
9.5.8.	Set Robot Flange Coordinate System Display and Hide.....	115
9.5.9.	Set Robot Tool Coordinate System Display and Hide.....	116
9.5.10.	Copy Model Posture	116
9.5.11.	Paste Model Posture	117

9.5.12.	Select Virtual Robot Motion Reference Coordinate System	117
9.5.13.	Display Current "mode" Value of Virtual Robot	118
9.5.14.	Single Axis Control of Virtual Robot	118
9.6.	Scene Tree	119
9.6.1.	Model List.....	119
9.6.2.	Right-Click on "Models" to Open the Current Scene Space Folder.....	119
9.6.3.	Right-Click Menu for Scene Tree Model Item.....	120
9.7.	Simulation Window	121
9.7.1.	Simulation Window	121
9.7.2.	Robot Data Window.....	122
9.7.3.	Right-Click Menu for Simulation Scene Window.....	122
9.7.4.	Right-Click Robot Model Menu.....	130
9.7.5.	Right-Click General Model Menu	142
9.7.6.	Right-click on the Tool Model Menu	146
9.7.7.	Right-click on the Point Model Menu	147
9.8.	External Axis (Ground Track Axis) Simulation.....	148
9.8.1.	Configure the robot's config file	148
9.8.2.	Build the scene	148
9.8.3.	Run the program to observe the simulation effect.....	150
9.9.	Create Simulation Points	150
9.9.1.	Create Arbitrary Simulation Points for Models.....	150
9.9.2.	Create Vertex Simulation Points for Models	150
9.9.3.	Select Point Window	151
9.10.	Collision Detection.....	156
9.11.	Window Status Bar	156
10.	Log Functionality.....	158
10.1.	Open Log.....	158
10.2.	Log Path	158
11.	Third-Party Programs.....	158
11.1.	Open Machine Vision	158
11.2.	Open Scripting Tool.....	159
12.	Software Settings.....	160
12.1.	System Settings.....	161
12.2.	Robot Settings	161
12.3.	Log	162
13.	Annex.....	162
13.1.	View Command Manual	162
13.2.	Software User Manual.....	162
13.3.	About	163
13.4.	Teach Pendant Permission Allocation.....	163
13.5.	Modbus TCP Control Interface Data Table.....	165
13.6.	Deployment.....	169

1. User Management System

1.1. Login Interface

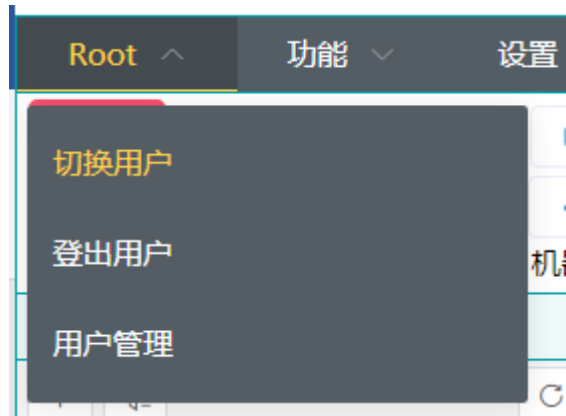
Upon system startup, there is a login window where users can enter their username/password to log in or choose to cancel the login. Canceling the login will result in logging in with limited guest privileges by default.



- Username/Password: The Root account is provided by ESTUN, while other accounts are created by the administrator. For more details, please refer to Section 1.3.
- Auto Login: When selected, the software will automatically log in with the last used account and password the next time it is opened (remember password must also be selected, otherwise logging in without a password will not be possible).
- Remember Password: To save the currently entered username and password.
- Change Password: To allow users to change their password by providing the username and old password.

1.2. Switch User

Clicking the first menu option in the menu bar "Username", you can switch the User, Log Out and User Management (only available for Root users).

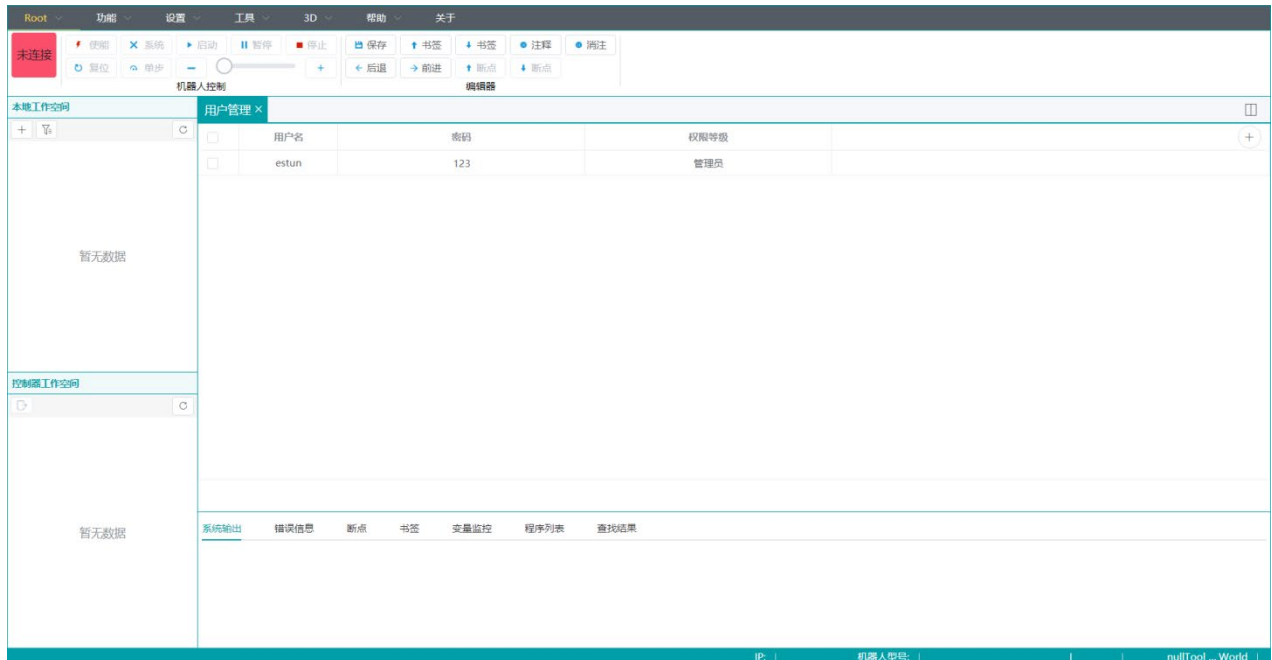


- Switch User: To open the user login window to switch to a different user by entering the username/password.
- Log Out: Log out the currently logged-in user and switch to guest privileges.
- User Management: This option is available only for Root users and allows them to manage user accounts, including adding, deleting, and modifying user information.

1.3. User Management

This module is exclusive to Root users.

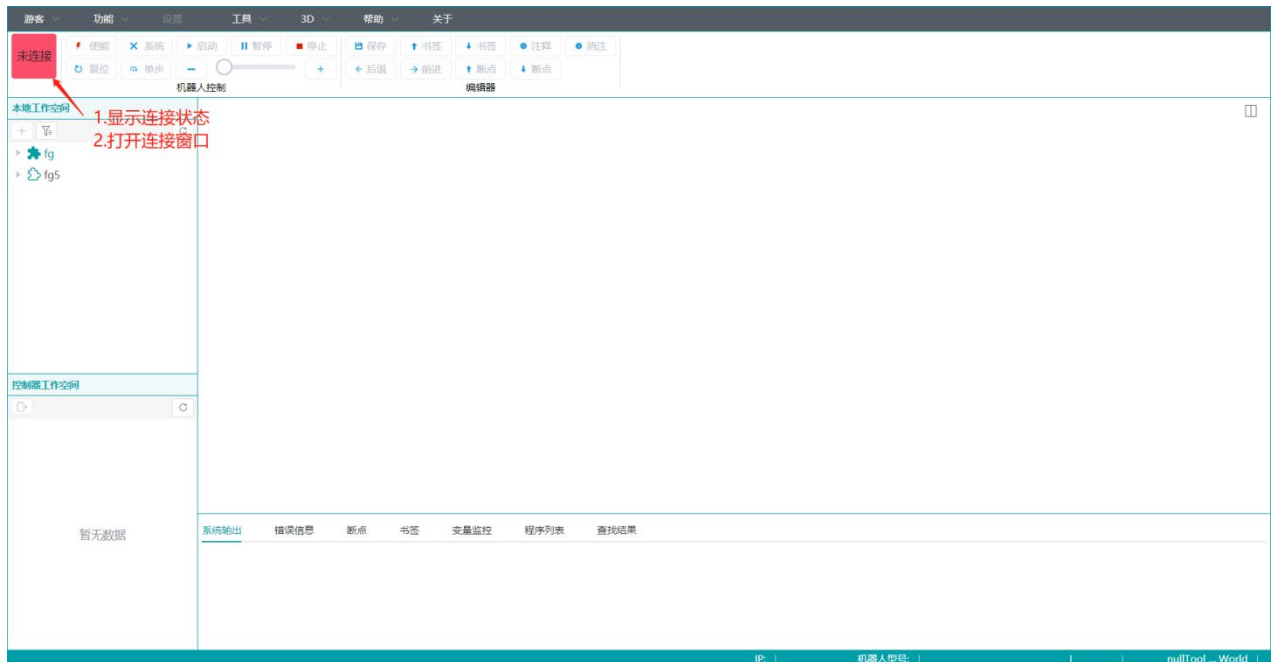
Username: Root Initial Password: 000000



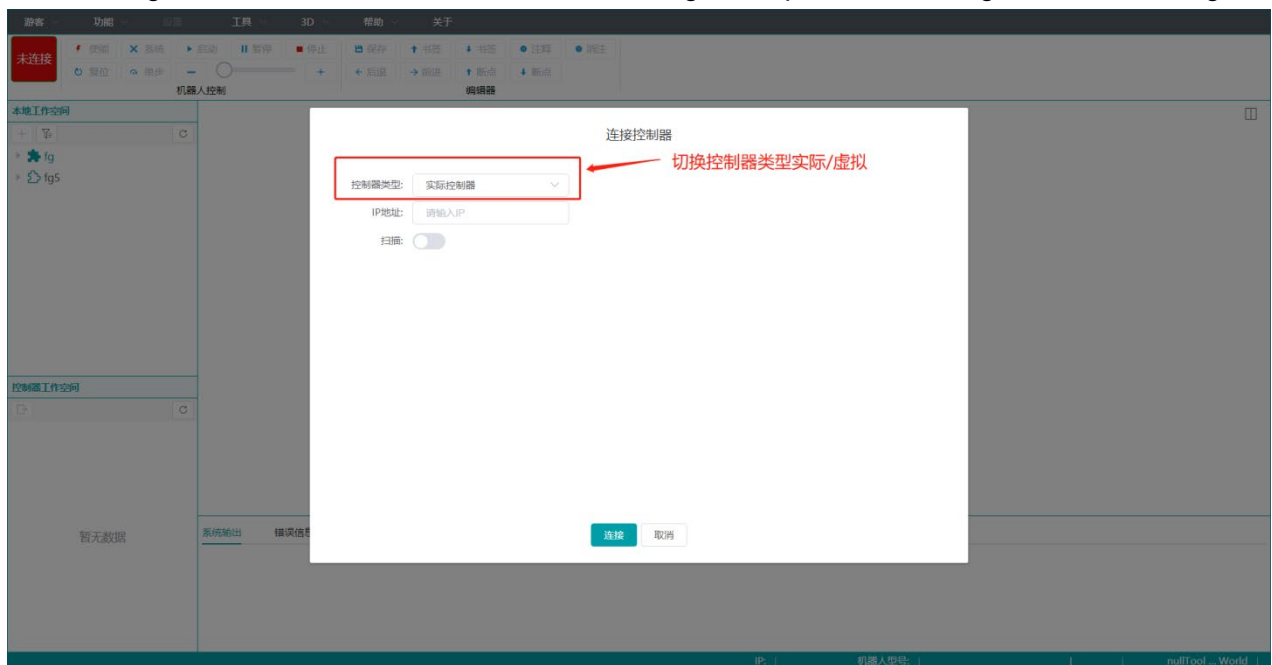
- Add User: To create a new user account. Usernames must be unique.
- Edit User: To allow for modifications to user permissions and passwords.
- Delete User: To delete a specific user account.
- Permission Levels: The following permission levels are defined as follow:
 - Guest:
 - ◆ Editing or viewing workspace content is not allowed.
 - ◆ Operating robot controls is not allowed.
 - ◆ Operating simulation models is not allowed.
 - Operator:
 - ◆ Same restrictions as the Guest level.
 - Engineer:
 - ◆ No user management is allowed, and full access to other features.
 - Administrator:
 - ◆ No user management is allowed, and full access to other features.
 - ◆ Root users have user management privileges.

2.Controller Module

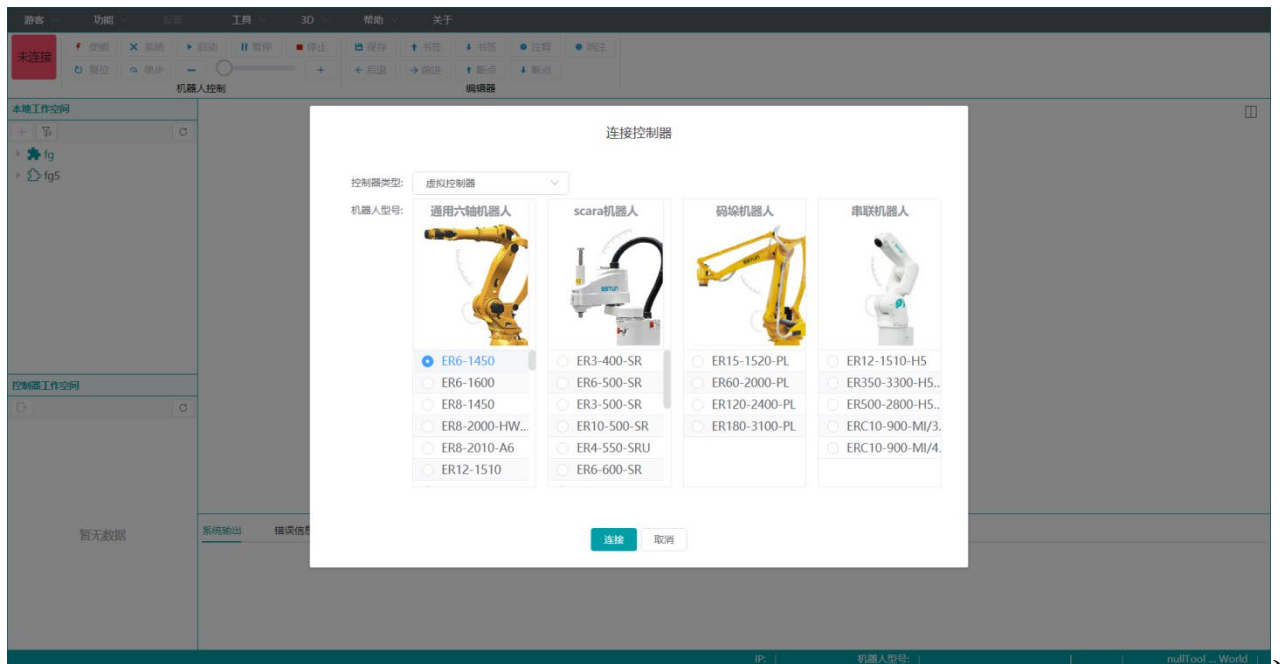
2.1. Controller Connection



Clicking on the red button circled in the above image will open the following connection dialog.

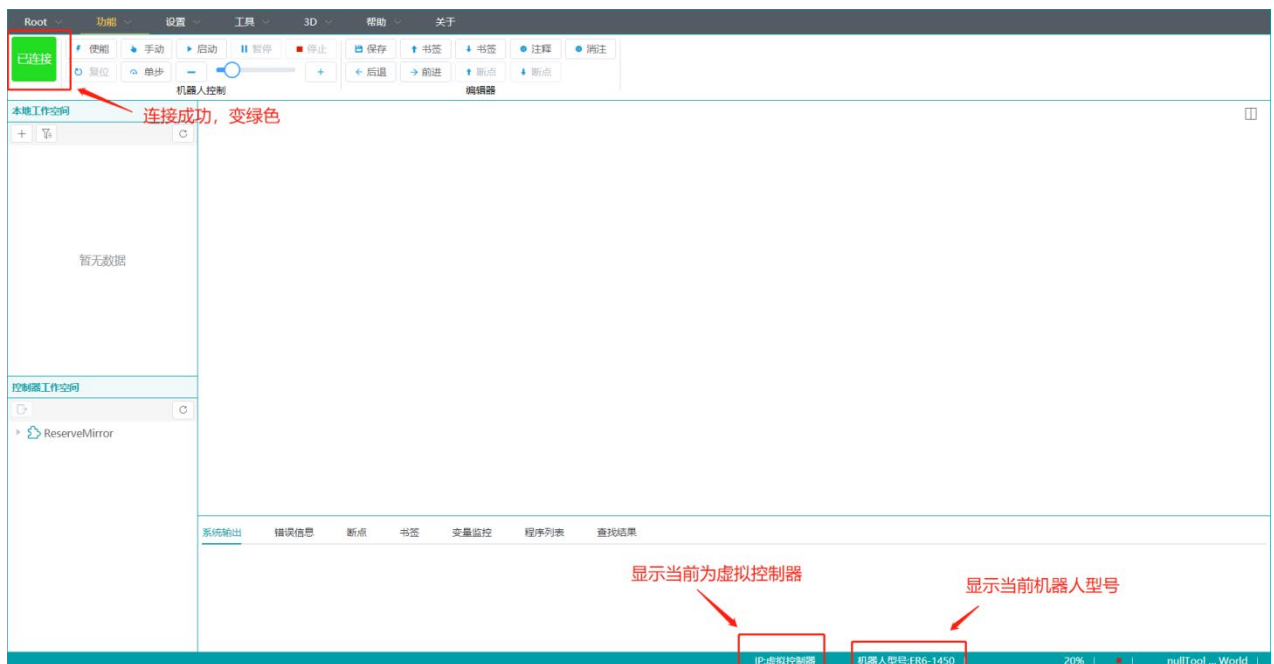


2.1.1.Virtual Controller



Choose the model according to needs and click the "Select" button to establish a connection. The startup time for the virtual controller is longer compared to an actual controller. This is because it requires launching a virtual controller on the computer, whereas with a physical controller, this step is unnecessary.

Successful connection is indicated as shown in the following image

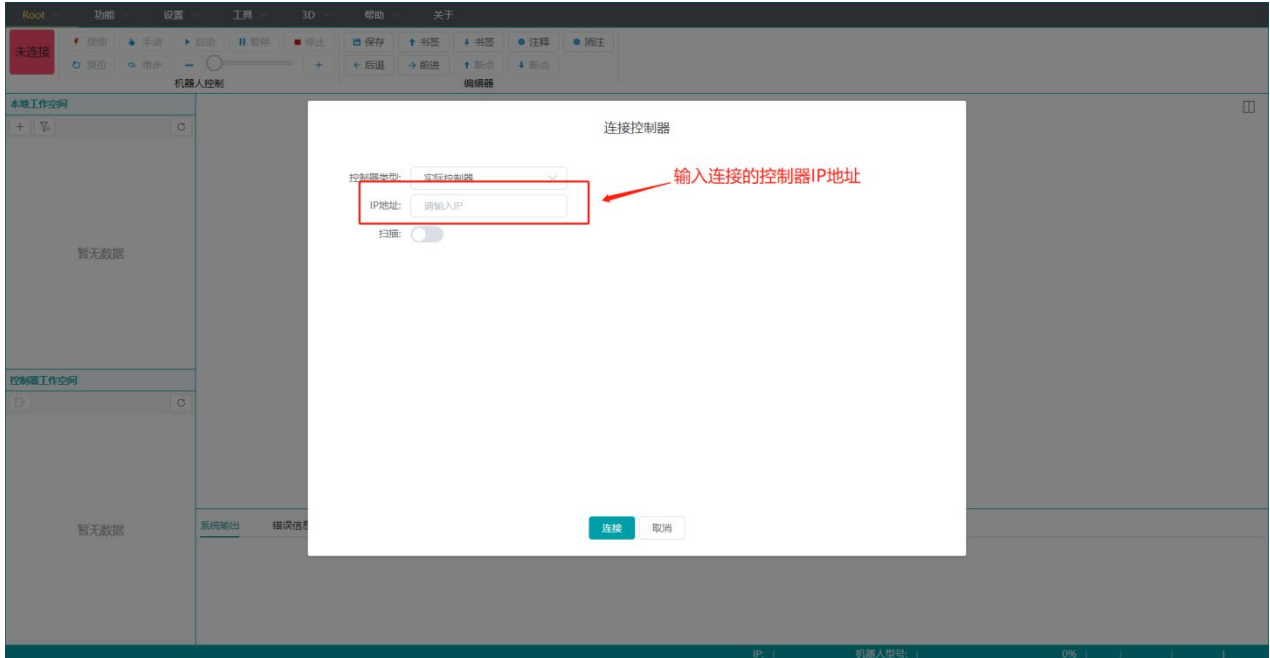


After connecting to the virtual controller, it will automatically enable and switch to manual mode, while adjusting the robot's initial posture.

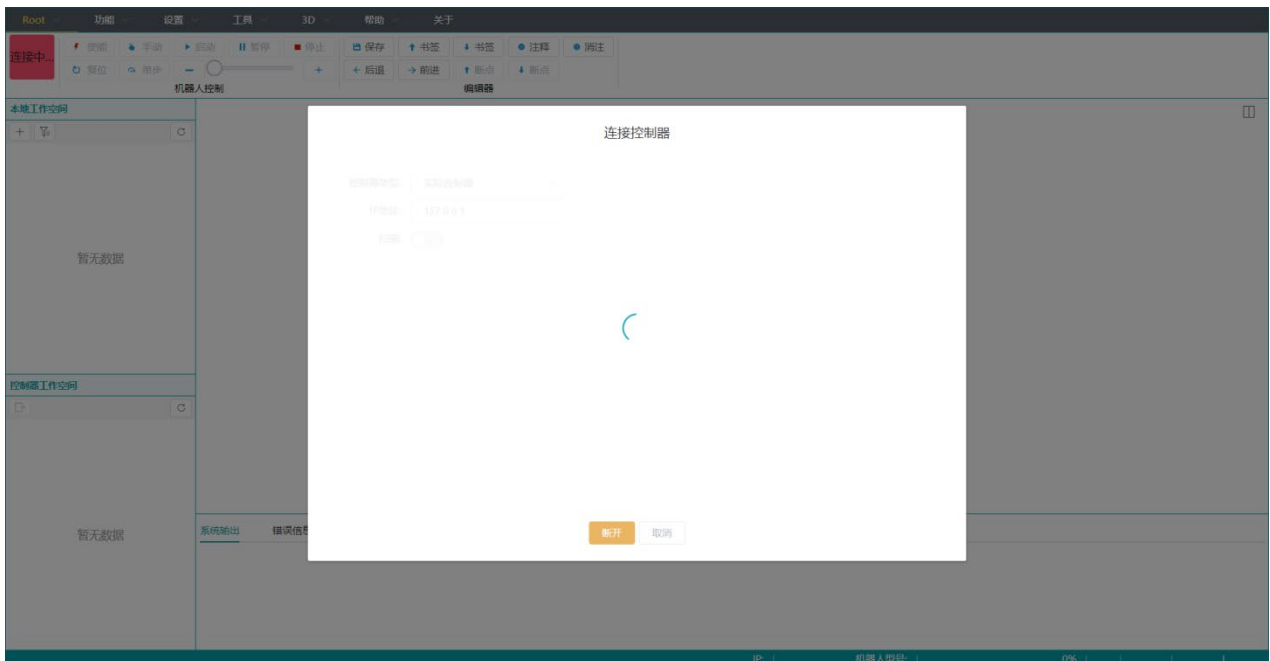
Initialized Axis Coordinates: 0, 0, 0, 0, 90, 0

2.1.2. Actual Controller

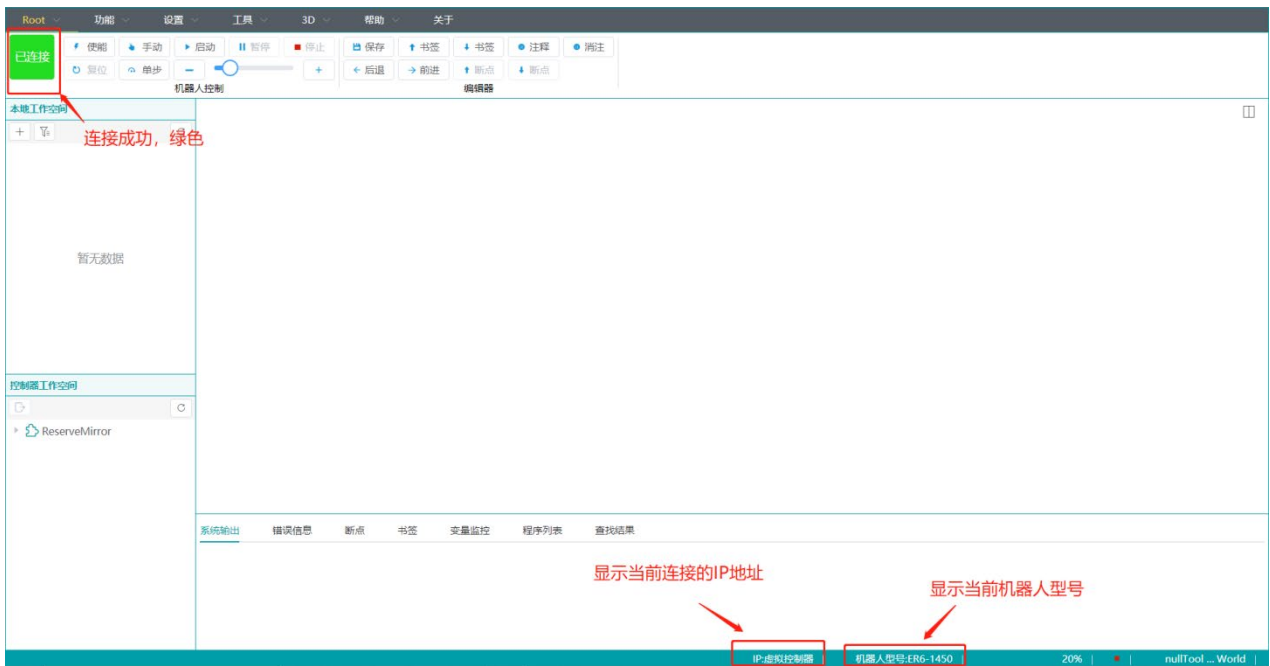
For an actual controller, modify the IP address of the controller and click "OK".



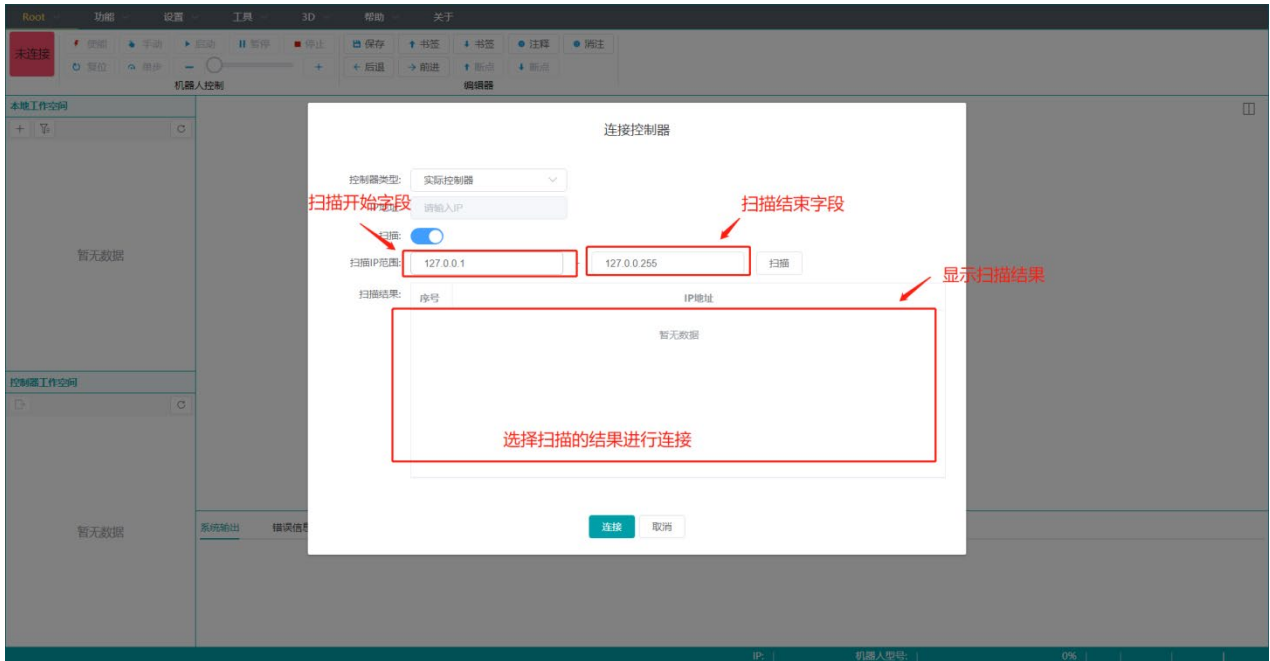
If the IP address is correct, wait a few seconds for the connection to succeed.



After a successful connection, the connection button will turn green, and some buttons will become available.



Scan Controller: The scan range can be modified.



2.2. Controller Disconnection

After establishing a connection with the controller, you can click the "Connected" button to disconnect from the controller. If it is a virtual controller, the background virtual controller will also be closed.



After disconnecting, the status is as follows:



2.3. Robot Control Module

After establishing a connection with the controller, the robot control module allows you to operate the robot. The robot control module, along with the software's bottom status bar, displays the current status of the controller.

The controller operation module includes the following buttons:

"Enable": To enable or disable the controller.

"Reset": To reset any errors in the controller.

"System": To switch between manual and automatic mode.

"Single Step/Cycle": To specify whether to run in single step mode or cycle mode.

"Start": To start the program execution.

"Pause": To pause the program execution.

"Stop": To stop the execution and unloads the program.



The status bar displays the following information:

1 Controller error messages. The "Reset" button above is used to reset any errors in the controller.

2 Controller IP address. (Shows "Virtual Controller" when connected to a virtual controller or the current connected IP address for an actual controller.)

3 Controller model.

4 Controller speed.

5 Controller running status, which can be divided as "Run", "Pause" or "Stop". The "Start", "Pause", and "Stop" buttons are associated with this running status.

6 Controller tool coordinate system, which can be set manually or within the program.

7 Controller user coordinate system, which can be set manually or within the program.



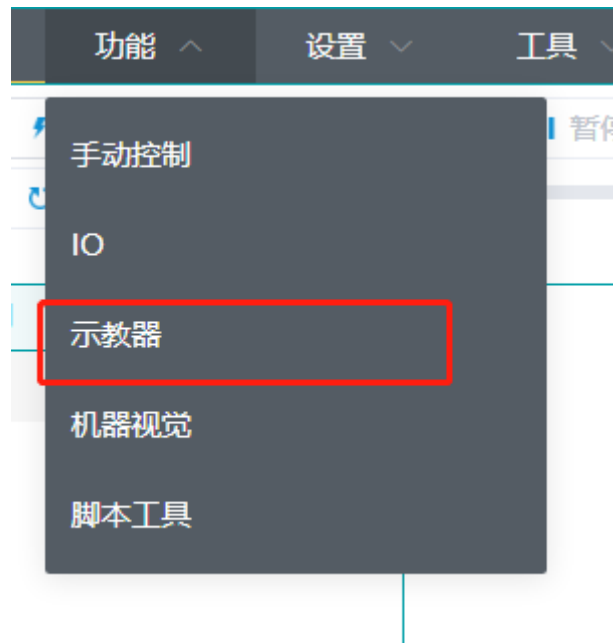
2.4. Connect the Teach Pendant

Ensure that the controller is already connected.

1. Ensure that the controller is already connected.



2. Start the Teach Pendant.

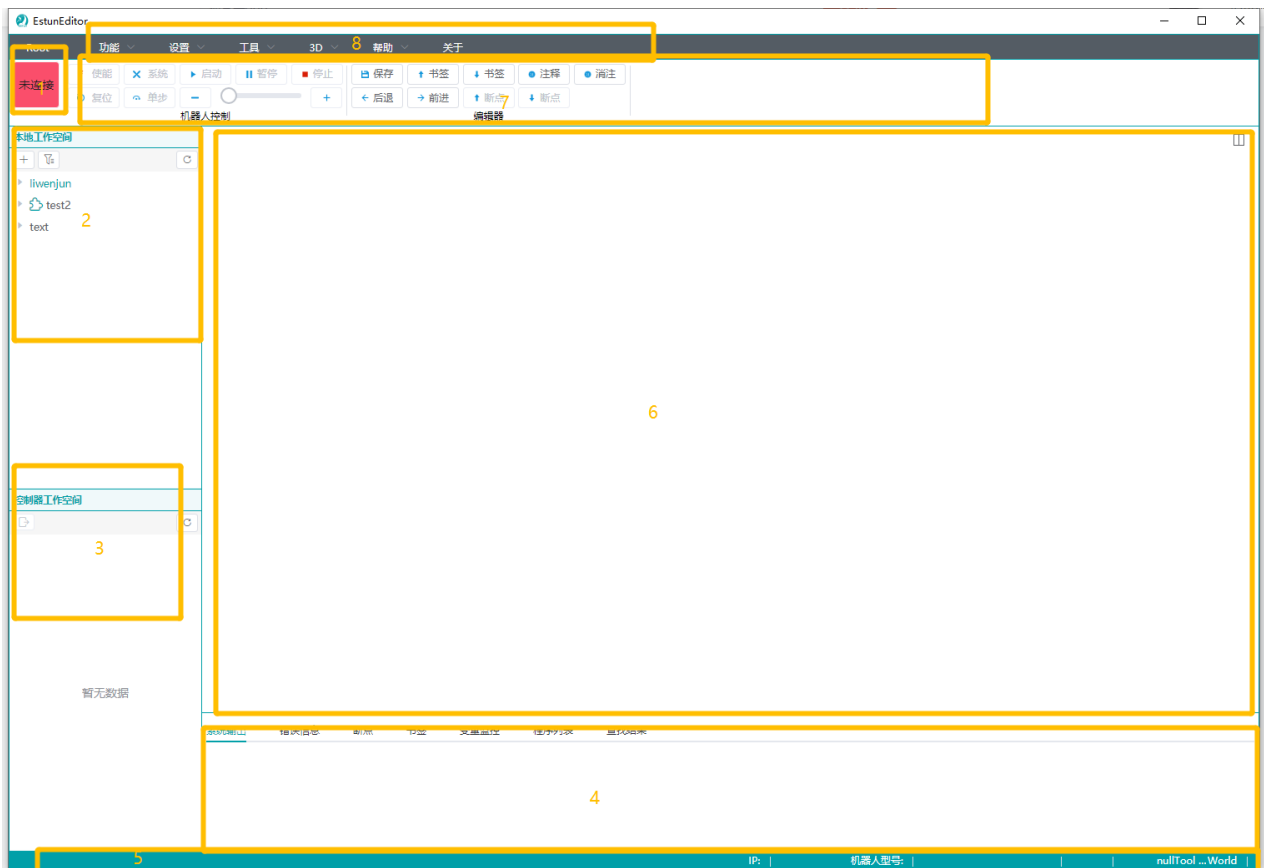


3. Open the Teach Pendant.



2.5. Introduction to the Main UI Functions of the Editor Software

The following image shows the main UI interface of the software:

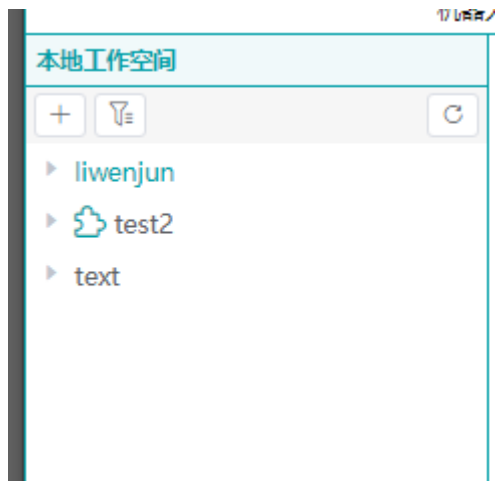


1. Tab 1: Controller Connection, including physical controllers and virtual controllers.
2. Tab 2: Local Programs, including text-based programs and graphical programs.
3. Tab 3: Programs on the controller.
4. Tab 4: Used primarily for debugging information, displaying error messages, breakpoints during program execution, bookmarks for code search, variable monitoring during program execution, program lists, and search results for specific keywords, distributed across each tab.
5. Tab 5: Status Bar Functions, primarily displaying warning messages, IP address, robot model, speed, program execution status, and coordinate parameters.
6. Tab 6: Used primarily for text editing, graphical editing of IO, 3D simulation display, and manual control.
7. Tab 7: Contains various operation buttons for robot control, editor, and 3D simulation functions.
8. Tab 8: Primarily consists of drop-down menus, which display corresponding function lists based on the selected item in the menu. It includes functions such as manual control, IO, 3D display, starting the Teach Pendant, and other 3D operations.

3.Functions of Project Management

When opening the EditorP software, all locally existing programs will be listed.

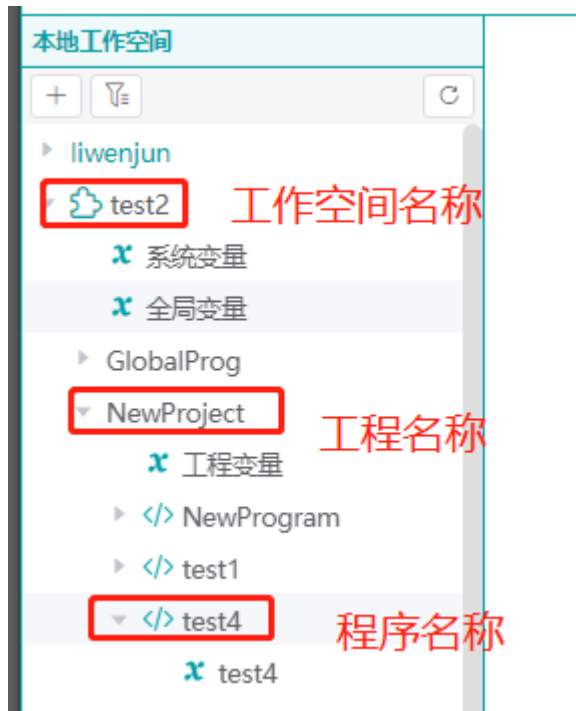
The function pages are shown in the following image:



After connecting to the controller, the programs on the controller will also be listed, as shown in the image below:



1. Workspace expansion



2. Right-click menu functions of the Workspace, as shown below:



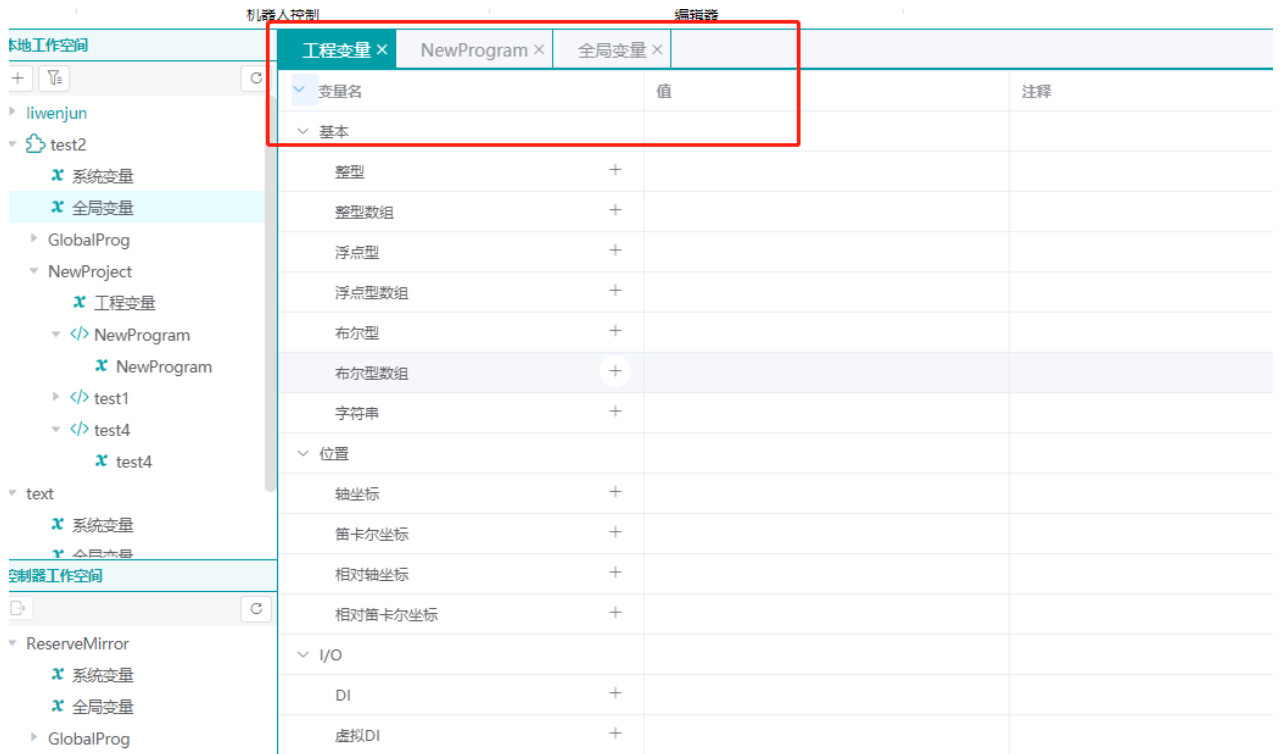
3. Right-click menu functions of the Project, as shown below:



4. Right-click menu functions of the Program, as shown below:



5. Double-clicking on a node (global variable, system variable, project variable, program, program variable, other nodes not supported) will display it in a tab, as shown in the image below:



If it is a graphical function, the program will display a graphical interface.

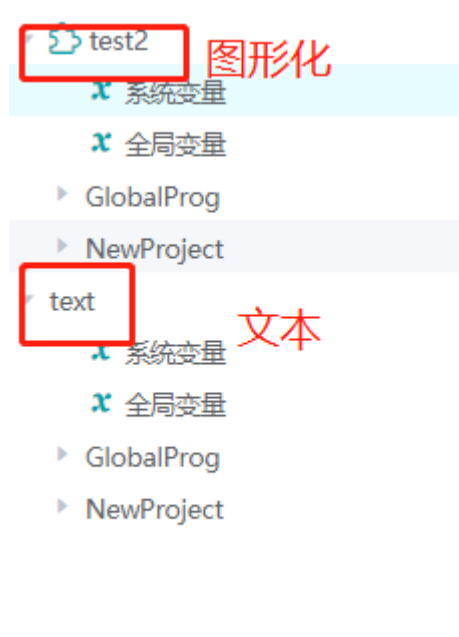


For the right-click menu of global variables, system variables, project variables and program files, it will be opened using the Windows self-contained program, as shown in the image below:



3.1. Differentiate Icons in Project Management

1. Text files and graphical labels are distinguished by an icon.



3.2. Global Project

Each workspace has a unique global project named "GlobalProg". It cannot be deleted, renamed, or copied. It does not have project variables and supports the following operations. These operations are the same as regular projects, and all other projects within the workspace can use its programs.



3.3. Create a New Workspace

Click the "+" button to create a new graphical workspace by default. After removing the checkmark, you can choose to create a text project or a graphical project using templates. The default creation for programs is a "graphical workspace".



3.3.1. Create a New Text Workspace



3.3.2. Create Text and Graphical Workspaces Based on Templates

Create the graphical workspace



Create the text, as shown below



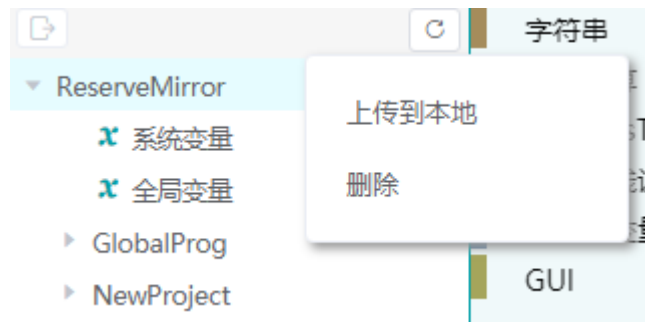
3.4. Right-Click Menu on the Project Tree

3.4.1. Workspace

Local workspace supports the following operations:



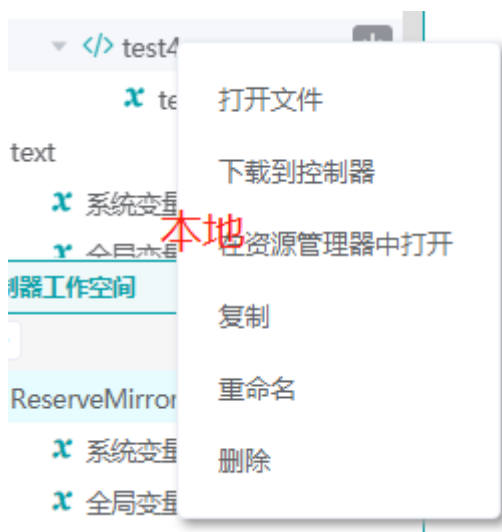
Server workspace supports the following operations:

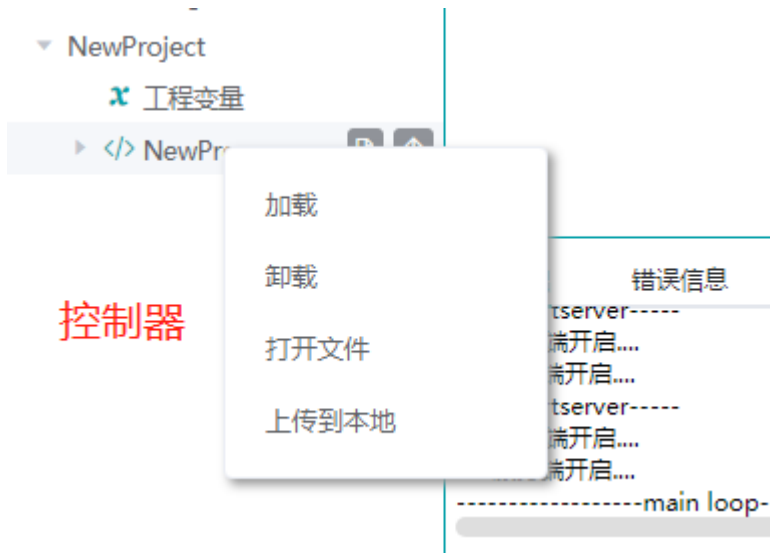


3.4.2.Project



3.4.3.Program





3.4.4. Variable File





3.5. Variable Module

The variable module includes system variables, global variables, project variables, and program variables. These system variables cannot be edited, and each variable type has its own set of permissible variable creations.

3.5.1. System Variables

System variables cannot be edited, but can only be viewed. Double-clicking on the system variable node in any workspace opens it. Programs throughout the workspace can use these variables, as shown in figure below:

系统变量 ×		
变量名	值	注释
基本		
整型		
整型数组		
浮点型		
浮点型数组		
布尔型		
布尔型数组		
字符串		
位置		
轴坐标		
笛卡尔坐标		
相对轴坐标		
相对笛卡尔坐标		
轴坐标数组		
笛卡尔坐标数组		
I/O		
DI		
虚拟DI		
DO		

3.5.2.Global Variables

Global variables encompass all variable types, support adding, modifying, copying, and deleting functions. Programs throughout the workspace can use these variables.

系统变量 ×	全局变量 ×	值	注释	属性
变量名				
基本				
整型	+			
INT0		0		
SYSTEM_INNER_COUNT		0	用于赋值过程中循环计数	
SYSTEM_INNER_ITEM_STRING_LEN		0	已处理的字符串长度	
SYSTEM_INNER_RUN_RESULT		0	指令执行结果	
SYSTEM_INNER_SOCKET_READ_INT0		0	socket客户端接收字符串数据成功与否的标记	
SYSTEM_INNER_SOCKET_STRING_LEN		0	整个字符串长度	
整型数组	+			
IntOneArray0		0		
IntOneArray1		0		
IntOneArray1		0		
浮点型	+			
浮点型数组	+			
SYSTEM_INNER_SPEED		0	用于给速度变量赋值的中间变量	
布尔型	+			
BOOL0		false		
SYSTEM_INNER_SWITCH_PARAMS		false	用于切换产品参数	
布尔型数组	+			

暂无数据

保存

3.5.3. Project Variables

Some variables can be added, but only programs within the current project can use them.

机器人控制 编辑器

系统变量 ×	全局变量 ×	工程变量 ×	值	注释
变量名				
基本				
整型		+		
整型数组		+		
浮点型		+		
浮点型数组		+		
布尔型		+		
布尔型数组		+		
字符串		+		
位置				
轴坐标		+		
笛卡尔坐标		+		
相对轴坐标		+		
相对笛卡尔坐标		+		
I/O				
DI		+		
虚拟DI		+		
DO		+		
虚拟DO		+		
AI		+		

3.5.4. Program Variables

Only the current program can use these variables.

机器人控制 编辑器

系统变量 ×	全局变量 ×	工程变量 ×	NewProgram ×	值	注释
变量名					
基本					
整型				+	
整型数组				+	
浮点型				+	
浮点型数组				+	
布尔型				+	
布尔型数组				+	
字符串				+	
位置					
轴坐标				+	
笛卡尔坐标				+	
相对轴坐标				+	
相对笛卡尔坐标				+	
I/O					
DI				+	
虚拟DI				+	
DO				+	
虚拟DO				+	
AI				+	

3.5.5. View, Modify and Save Variables

After opening or creating a workspace, double click on the corresponding variable node icon in the resource tree to open the UI page for that variable file on the right side.

人控制 编辑器

系统变量 ×	全局变量 ×	工程变量 ×	NewProgram ×
变量名		值	注释
基本			
整型	+		
INT0		0	
整型数组	+		
浮点型	+		
浮点型数组	+		
布尔型	+		
布尔型数组	+		
字符串	+		
位置			
轴坐标	+		
笛卡尔坐标	+		
相对轴坐标	+		
相对笛卡尔坐标	+		
I/O			
DI	+		
虚拟DI	+		
DO	+		
虚拟DO	+		

属性

变量名: INTO

变量值: - 0 +

掉电保存:

注释: 请输入内容

保存

3.5.6.Create/Delete/Copy Variables

Variable Creation, Copying and Deletion

人控制 编辑器

系统变量 ×	全局变量 ×	工程变量 ×	NewProgram ×
变量名		值	注
基本			
整型	+		
INT0		0	
整型数组	+		
浮点型	+		
浮点型数组	+		
布尔型	+		
布尔型数组	+		
字符串	+		

新增

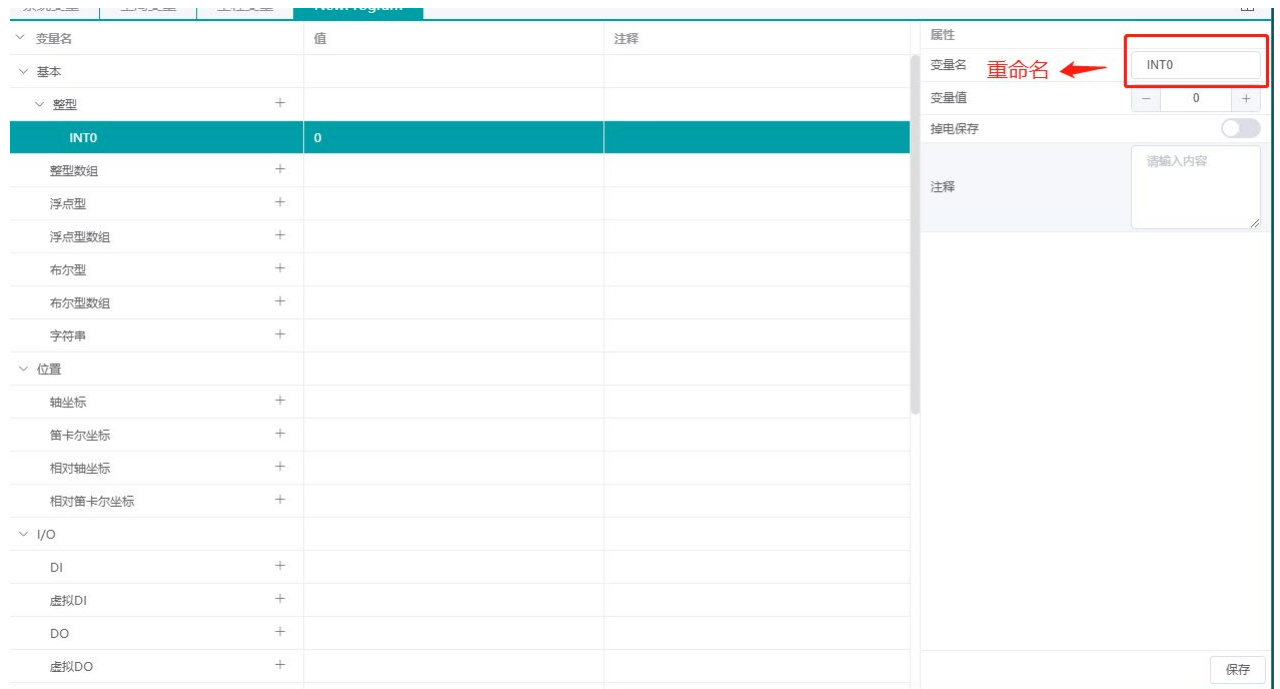
复制

删除

Rename variables

3.5.7.Rename Variables

To rename a variable, select the variable in the table, edit its name, and click "Save".



变量名	值	注释
INT0	0	
整型数组	+	
浮点型	+	
浮点型数组	+	
布尔型	+	
布尔型数组	+	
字符串	+	
位置		
轴坐标	+	
笛卡尔坐标	+	
相对轴坐标	+	
相对笛卡尔坐标	+	
I/O		
DI	+	
虚拟DI	+	
DO	+	
虚拟DO	+	

属性

变量名 **重命名** ← INT0

变量值 - 0 +

掉电保存

注释 请输入内容

保存

3.5.8.Variable Comments

The screenshot shows a configuration window for a variable. It has a title bar with a close button. Below the title bar, there are several sections:

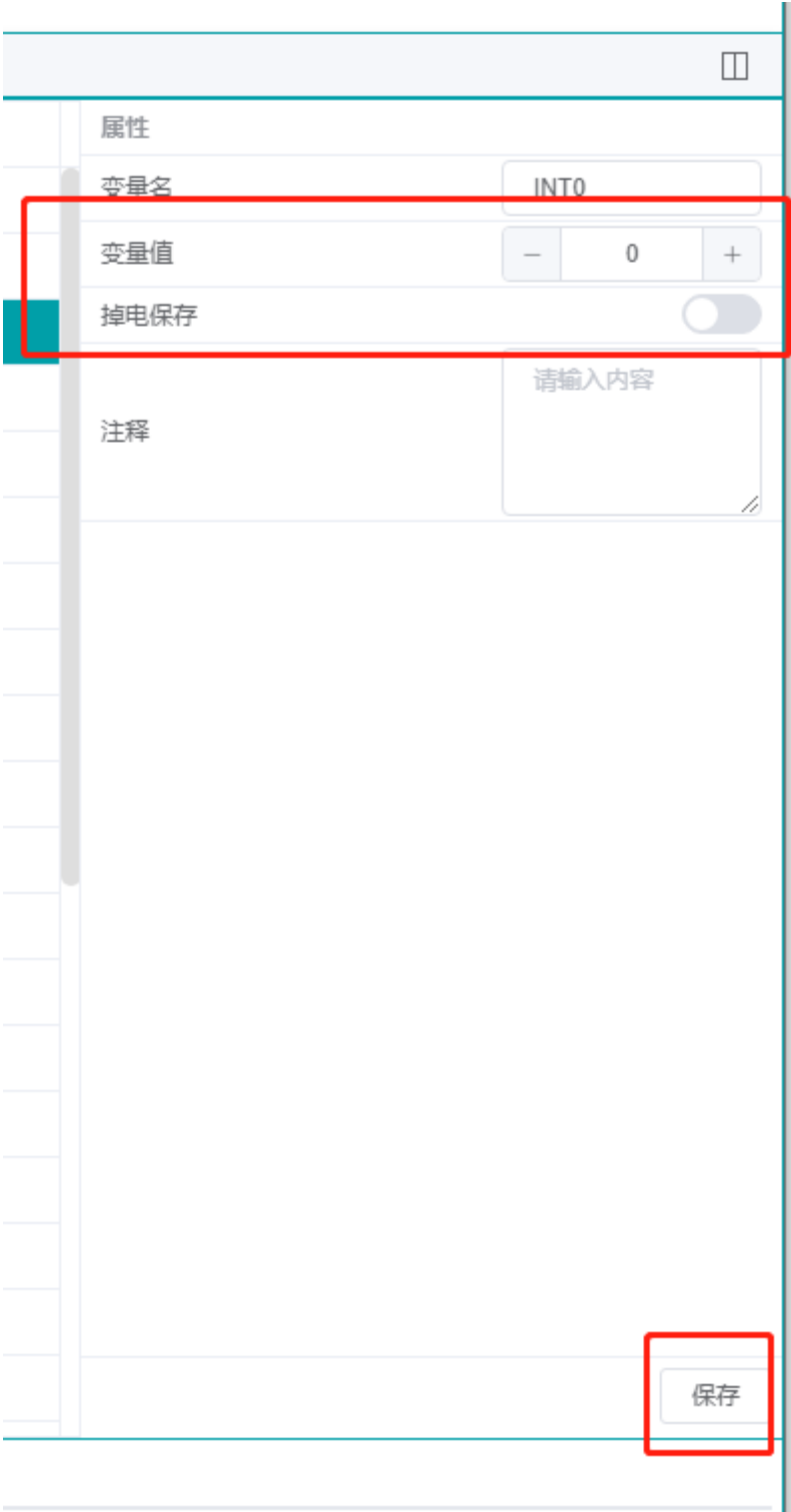
- 属性 (Attributes):** A section containing:
 - 变量名 (Variable Name):** A text input field containing "INT0".
 - 变量值 (Variable Value):** A numeric input field with a value of "0" and minus/plus buttons.
 - 掉电保存 (Power-off Save):** A toggle switch that is currently turned off.
 - 注释 (Comment):** A text area with a placeholder "请输入内容" (Please enter content) and a red box around it.
- 保存 (Save):** A button at the bottom right, also highlighted with a red box.

To add comments to a variable, select the variable in the table and enter the comments in the "Variable Comment" section on the right. Click "Save" to save the comments. The comments will be visible when the project is opened.

3.5.9.Modify Variable Attribute Values

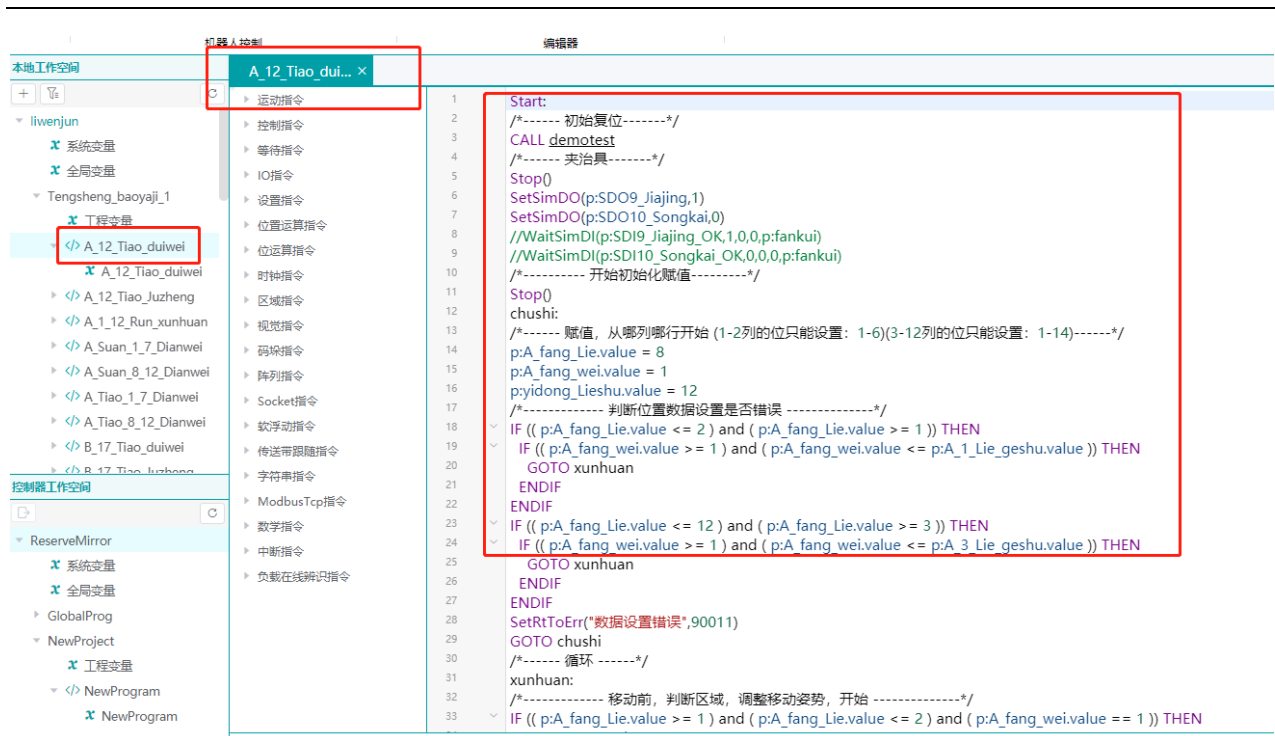
Click on a variable row in the table, and its current attribute values will be displayed on the

right-hand side. Modify the desired attributes in the "Attribute" page. After making the modifications, click the "Save" button to update the variable table with the new attribute values, as shown in figure below. Please note that clicking the "Save" button is necessary for the changes to take effect.

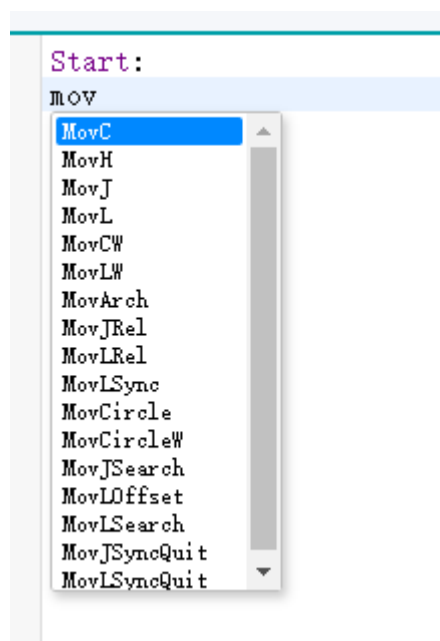


3.6. Program Editing

Users can conveniently edit and modify programs using this software. The program editing UI is displayed as follows:

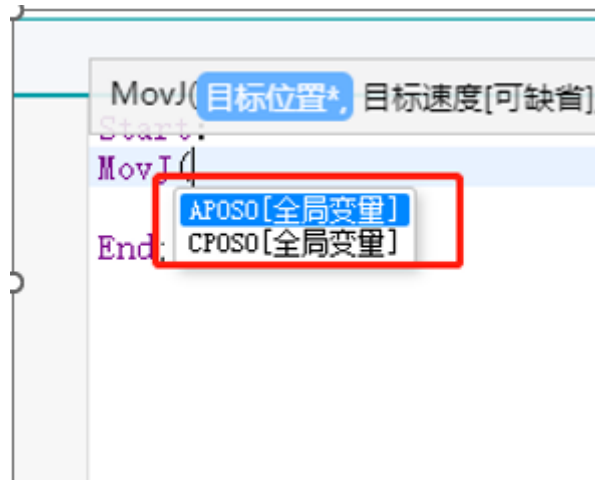


1. Double-clicking on a program node in the project tree opens the corresponding program for editing.
2. The program editing area provides flexible and convenient text programming editing operations. Common text shortcuts are supported, such as Ctrl+C for copy, Ctrl+X for cut, Ctrl+V for paste, Ctrl+Z for undo, and Ctrl+Y for redo. Users can also use the toolbar in the program editing UI to perform corresponding operations.
3. Program commands and keywords are highlighted for easy visibility.
4. Auto-suggestion functionality is available for code input (variables, commands, etc.) within the project scope. Tips are displayed to guide users in selecting the desired input options.

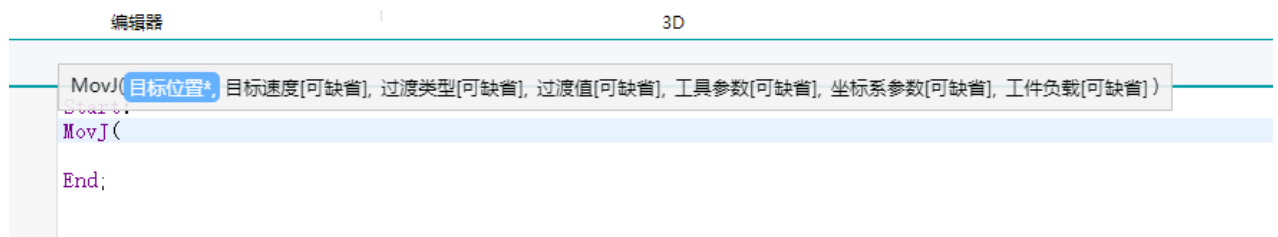


5. When entering parameters for command functions and typing a left parenthesis, a parameter input

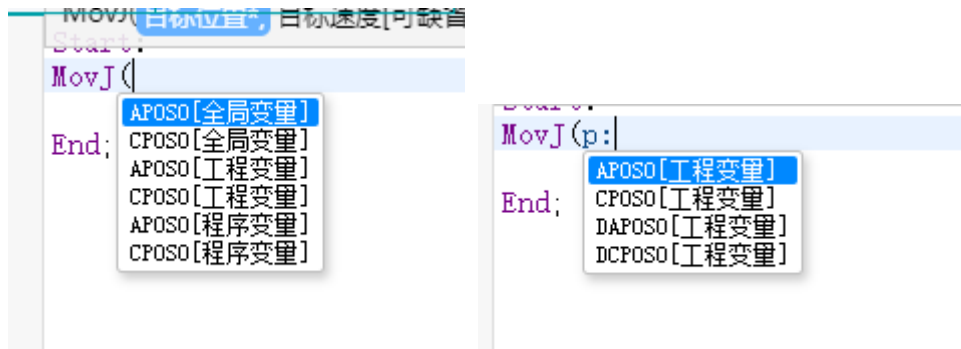
prompt will appear along with an automatically filtered selection list for the current input. Each time a comma is entered for parameter input, the prompt list for the current command parameters is updated, and the corresponding parameter in the function prompt box is highlighted to assist users in inputting the correct values.



6. For commands with multiple parameter combinations, such as movJ, movL, etc., various optional and mandatory parameters are included (although optional, the order of parameters for each parameter type is dependent). After entering each parameter, the editor updates the input prompt list for the available parameters and highlights all currently available parameters in the function prompt window. This approach efficiently guides users in editing commands with such parameter combinations.




On the PC software interface, there is a difference in how variables are displayed compared to the teach pendant programming UI. For example, when selecting a variable from the input prompt box and entering it in the editor, it should be displayed in the form of s:, p:, g:, or l: as a prefix. s: represents system variables, p: represents project variables, g: represents global variables, and l: represents program variables. To facilitate the filtering of variables from different domains, users can manually input s:, p:, g:, or l: to automatically update the input prompt box and display variables from the corresponding domain for selection.

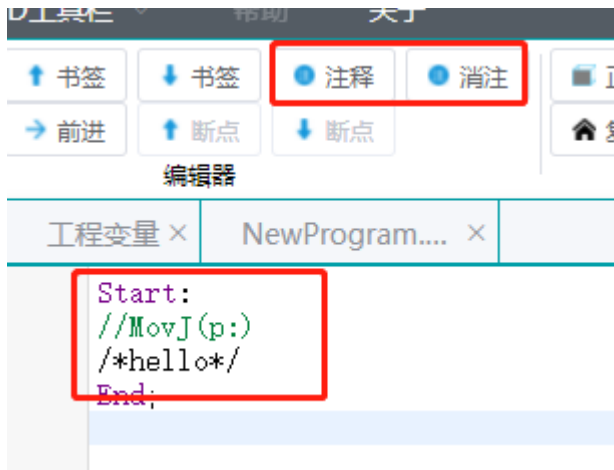


7. The program editor can provide real-time error detection and display basic error messages while the user is typing. Error information is displayed in the compilation and debugging area below or highlighted in red on the error line for easy identification.



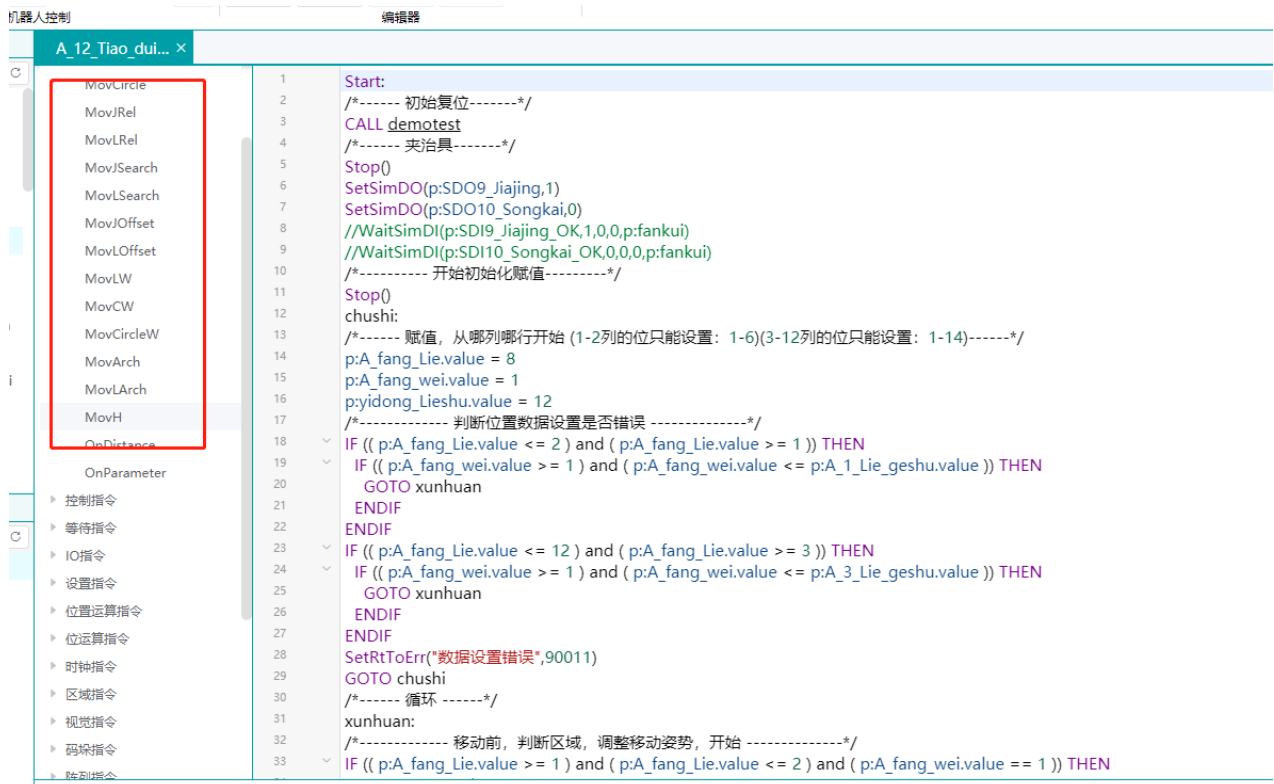
8. Once the editing is complete, clicking the  icon allows for the compilation and saving of the currently edited program. At this point, syntax errors are also checked. If any errors are displayed, the save operation will not be successful, and the user needs to make the necessary program modifications as prompted. After verifying that there are no errors, the program can be successfully compiled and saved.

9. Code comments can be added in the editing area using either `"// "` or `"/ * */`.

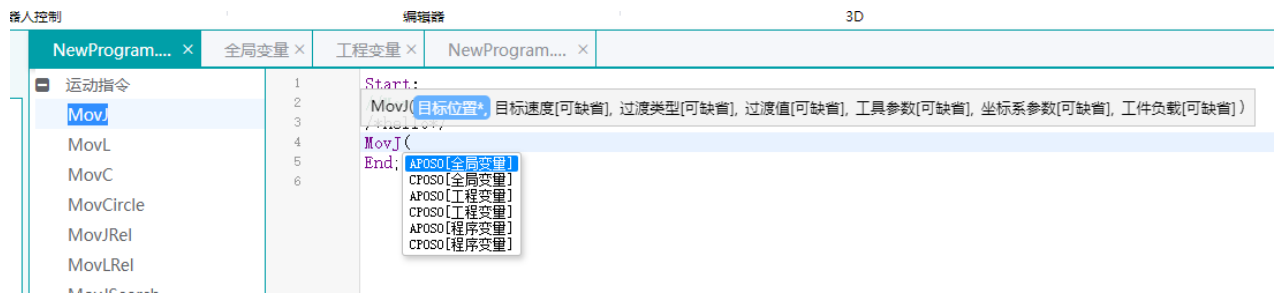


3.7. Command Navigation

By clicking the button as shown in the following image, the command navigation window is opened.

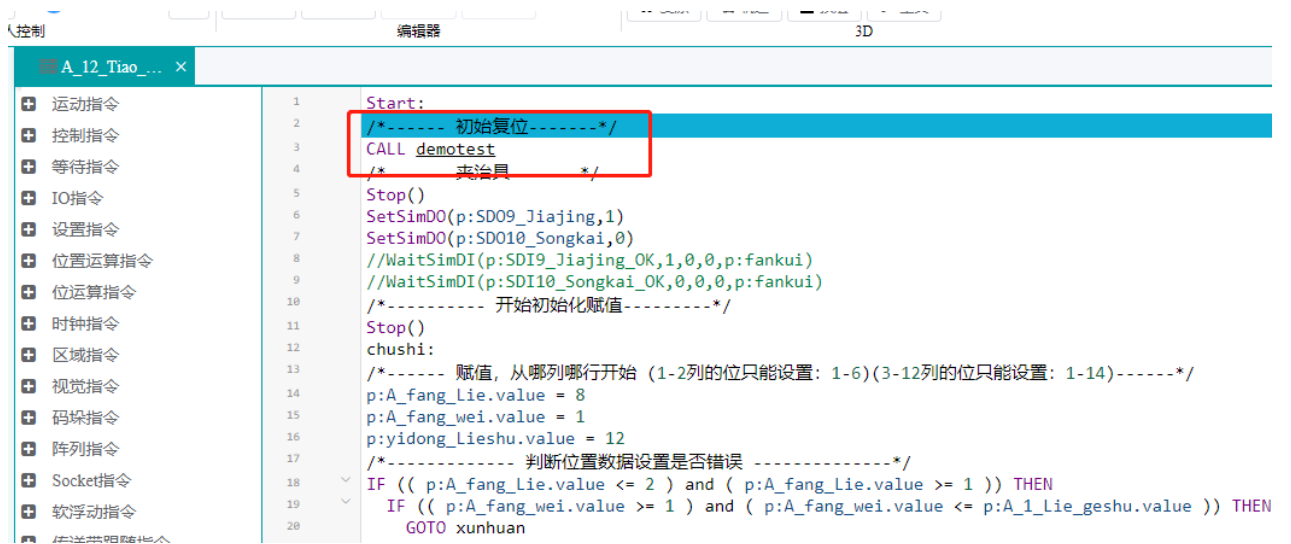


Double-clicking on the nodes in the expanded command list will display the corresponding commands. Moving the cursor to the desired position in the editing area and double-clicking on the command will quickly add it to the program.



3.8. Display of Running Program

During single-step or continuous program execution, the currently running program line is highlighted.



The virtual teach pendant can be opened during program execution to synchronize and compare the displayed pointer line for any differences.

3.9. Program Saving

1. Click the icon in the toolbar to save the modified program locally.

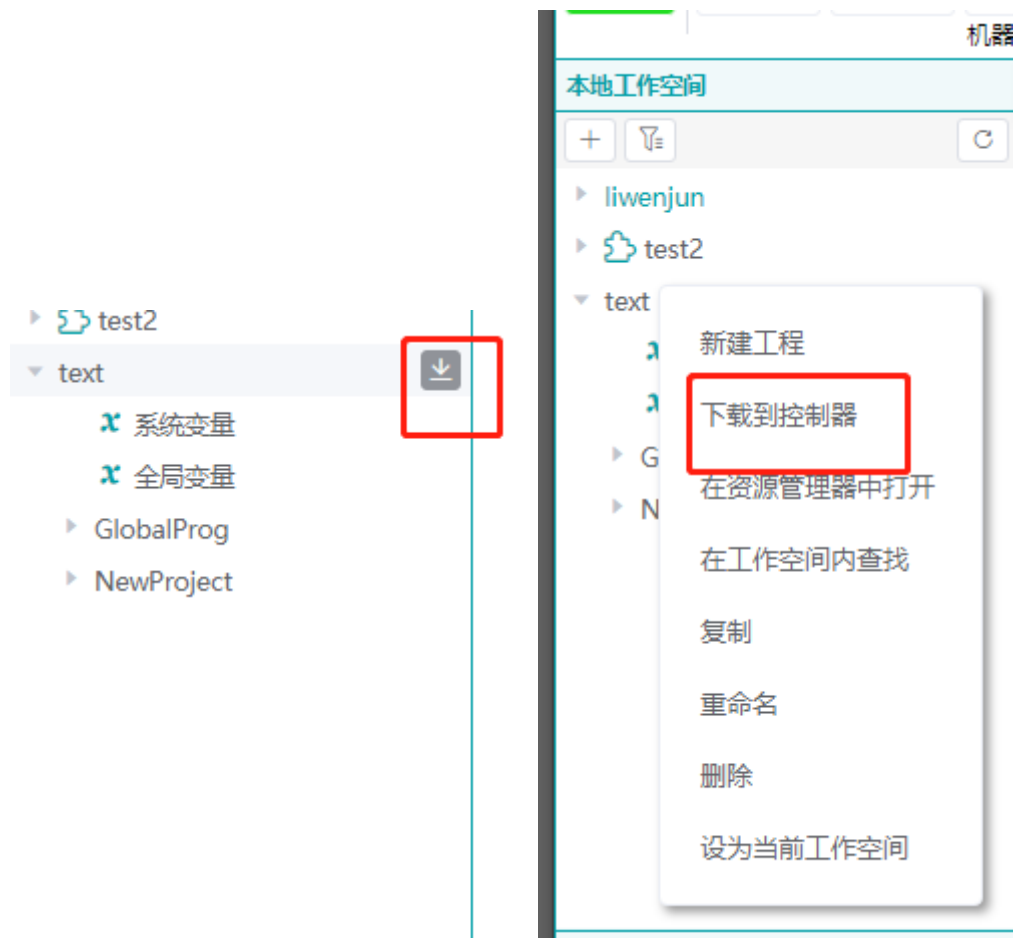


3.10. Workspace, Project and Program Upload/Download

This functionality requires a connection to the controller. Local programs can be downloaded to the controller, and controller programs can be uploaded to the local environment. It is also possible to selectively upload or download a node from the workspace tree. When clicking on a node in an independent workspace, it is important to ensure that the workspace exists either locally or on the controller; otherwise, an error will occur.

3.10.1. Download

Select the local "text" -> click the "Download" button.



3.10.2. Upload

Select the "GlobalProg" on the server -> Upload.



If there are differences between the local and controller versions, a prompt will appear, allowing the user to decide whether to overwrite the controllers file.



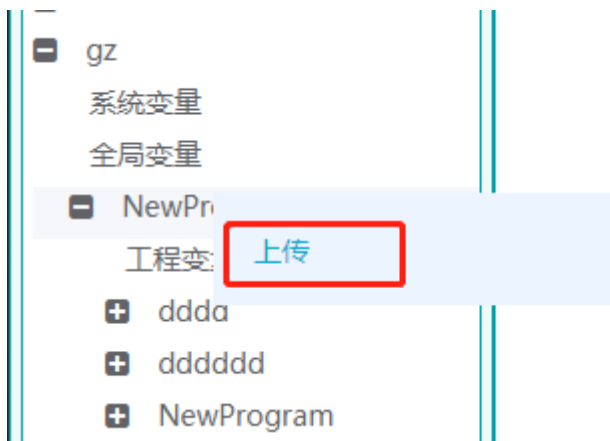
3.10.3. Upload/Download Error Messages

If an independent unit under the workspace is selected for upload/download and the workspace does not exist locally or on the controller, the following error will be reported.

1. Download: If the workspace where the project resides does not exist on the server, the following error will be reported.



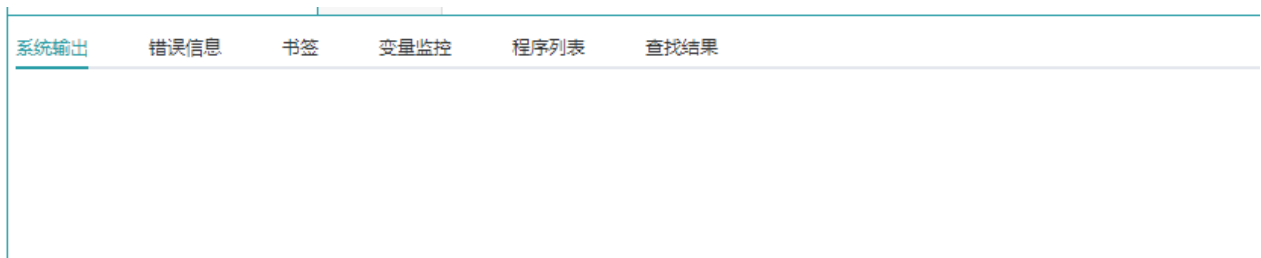
2. Upload: If a project is selected from any workspace on the server, right-clicked, and then uploaded, and the corresponding workspace does not exist locally, the upload will fail, as shown in the following image.





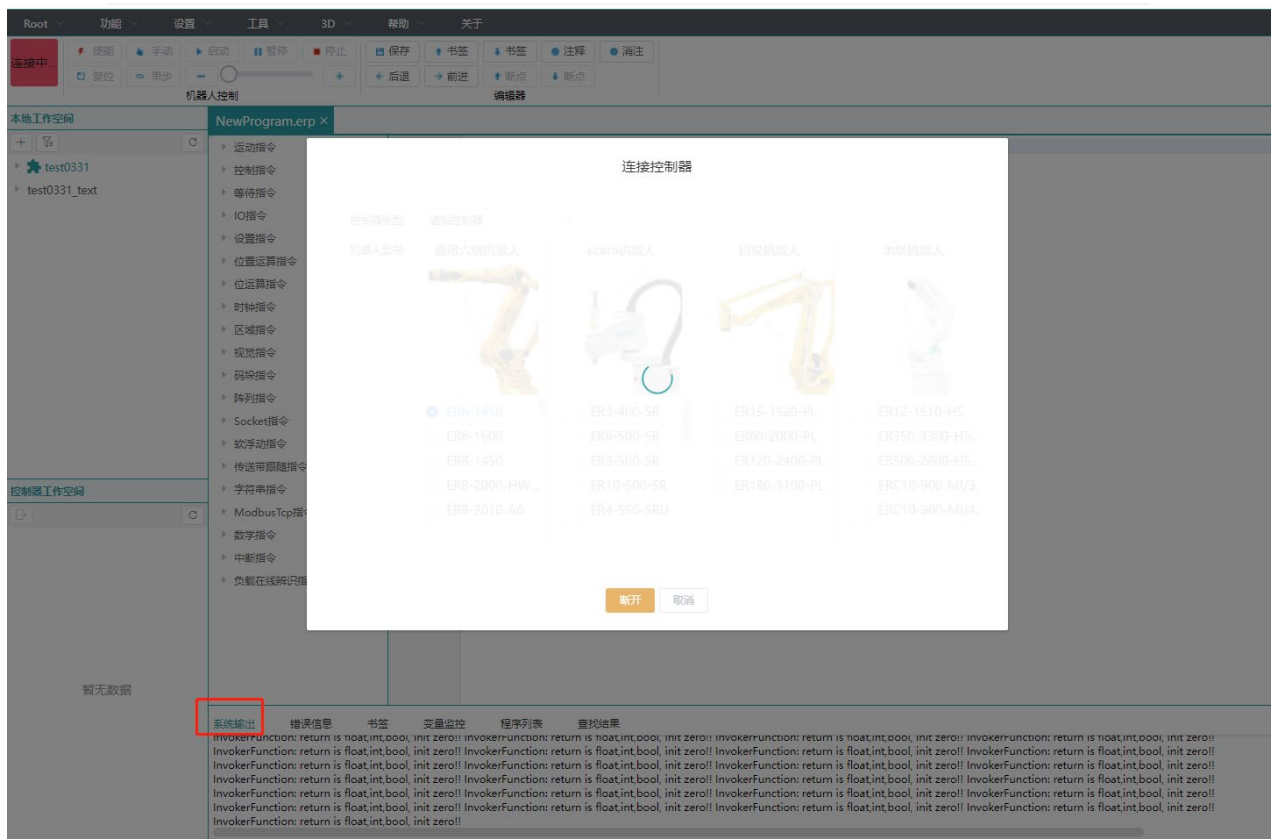
4. Auxiliary Program Functions

Each tab represents a specific function and includes the following functionalities:



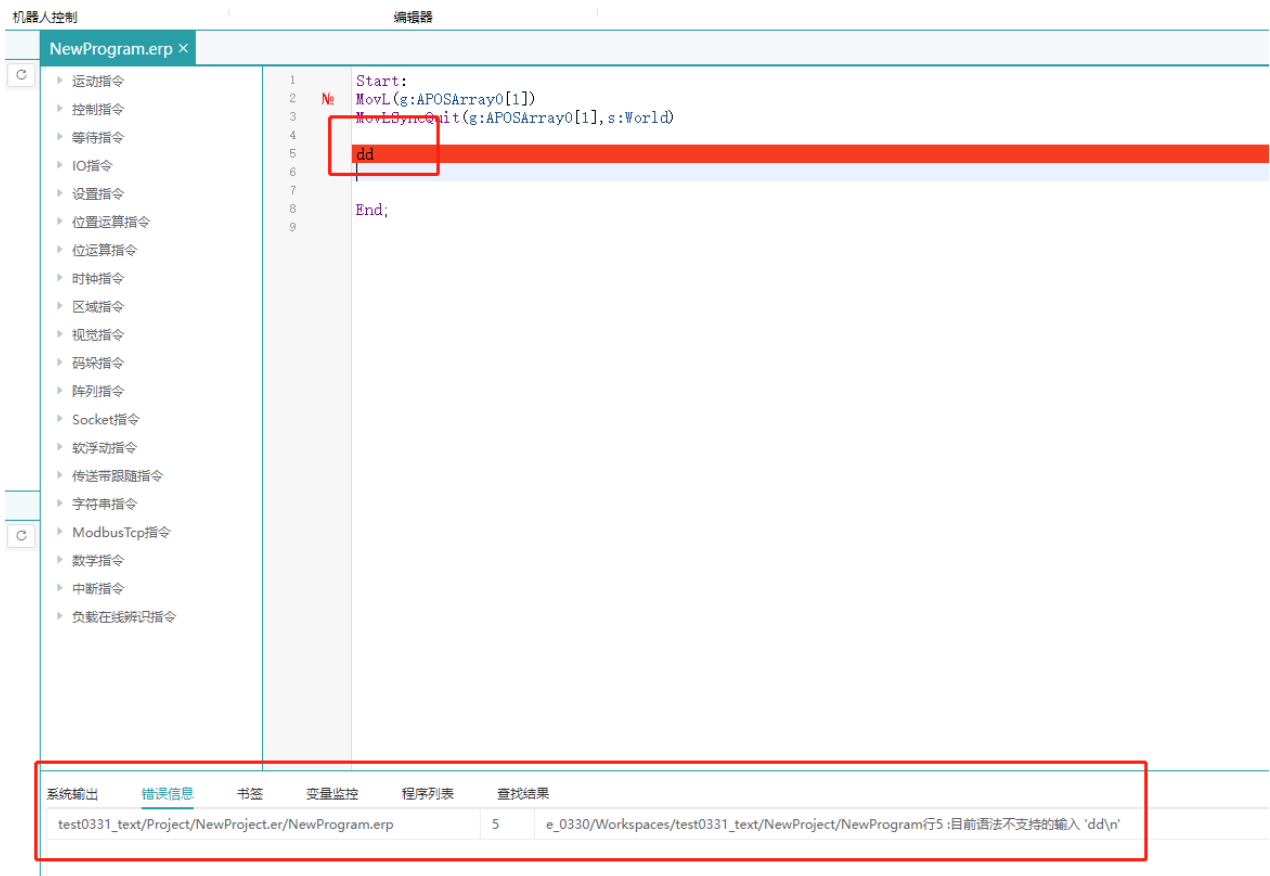
4.1. System Output

It primarily displays controller information and outputs user operations, such as connecting to the controller.

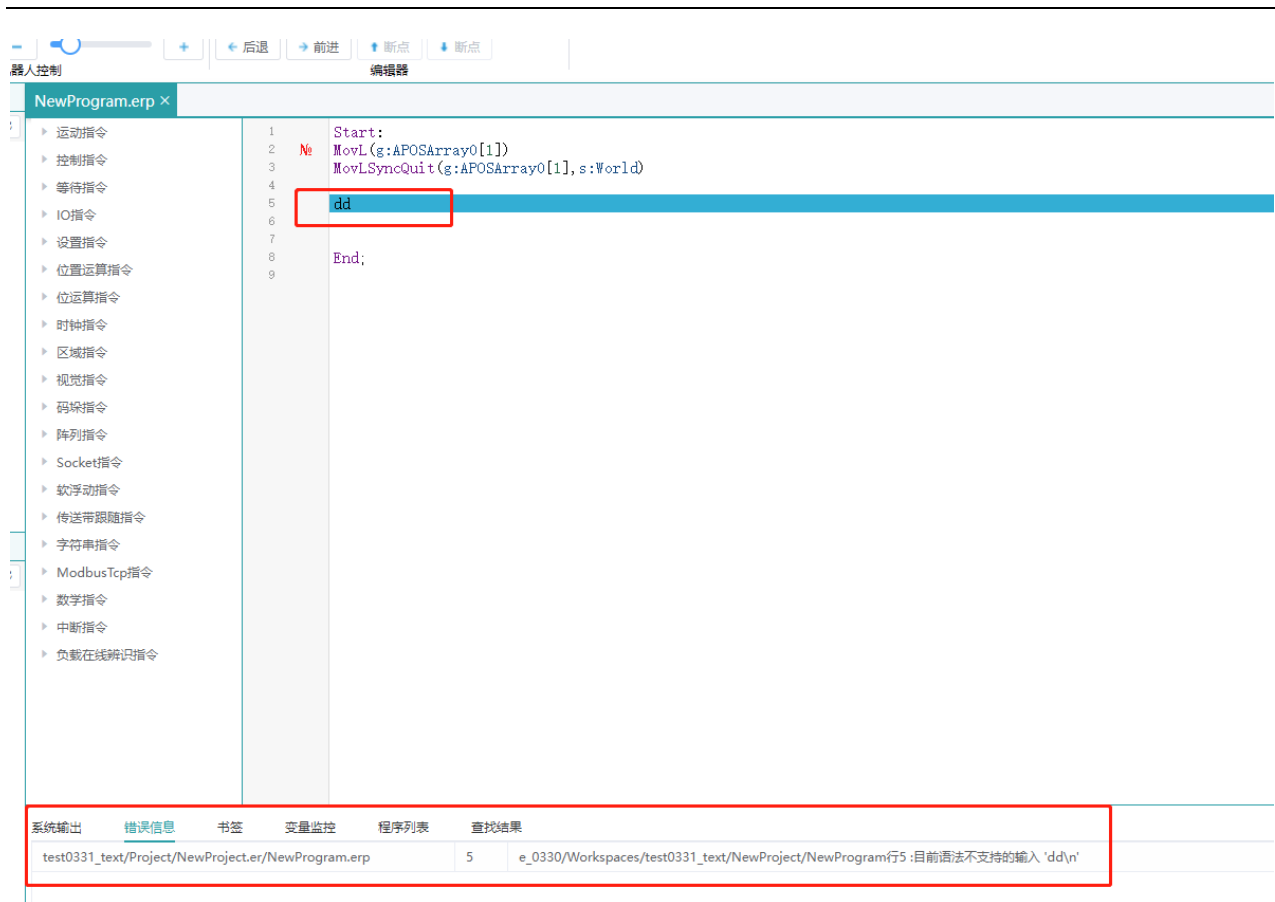


4.2. Error Messages

This feature provides error notifications during program development.



Double-clicking on an error will navigate to the corresponding error line in the text. For example, double-clicking on a specific line in the "Error Messages" will jump to the corresponding error line.



4.3. Bookmarks

Used to add bookmarks in the program for easy reference and navigation. When a line in the program is double-clicked at its beginning position, a bookmark indicator will appear as shown below, indicating the successful addition of a bookmark.

机器人控制 编辑器

NewProgram.erp ×

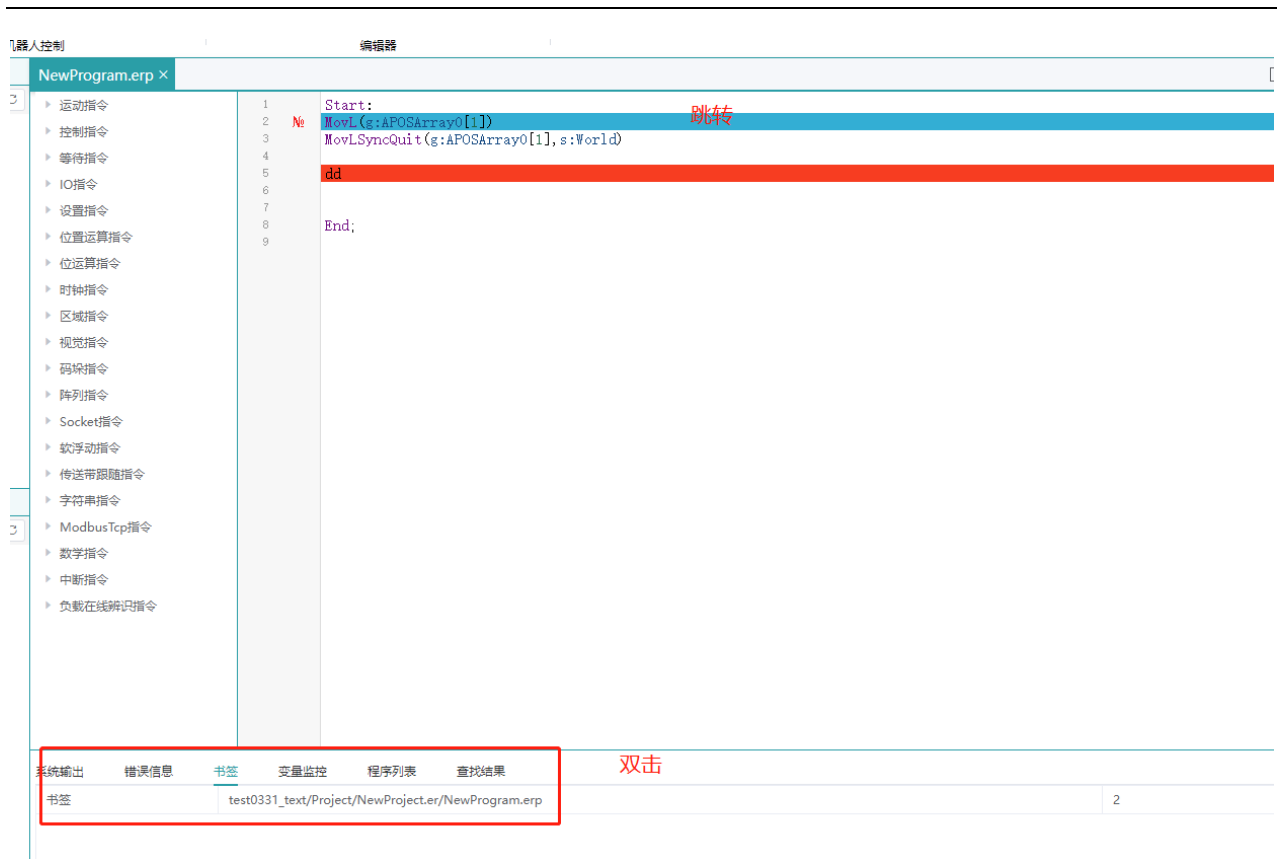
- 运动指令
- 控制指令
- 等待指令
- IO指令
- 设置指令
- 位置运算指令
- 位运算指令
- 时钟指令
- 区域指令
- 视觉指令
- 码垛指令
- 阵列指令
- Socket指令
- 软浮动指令
- 传送带跟随指令
- 字符串指令
- ModbusTcp指令
- 数学指令
- 中断指令
- 负载在线辨识指令

```
1 Start;  
2 Ne MovL(g:APOSArray0[1])  
3   MovL.SyncQuit(g:APOSArray0[1],s:World)  
4  
5  
6  
7 End;  
8
```

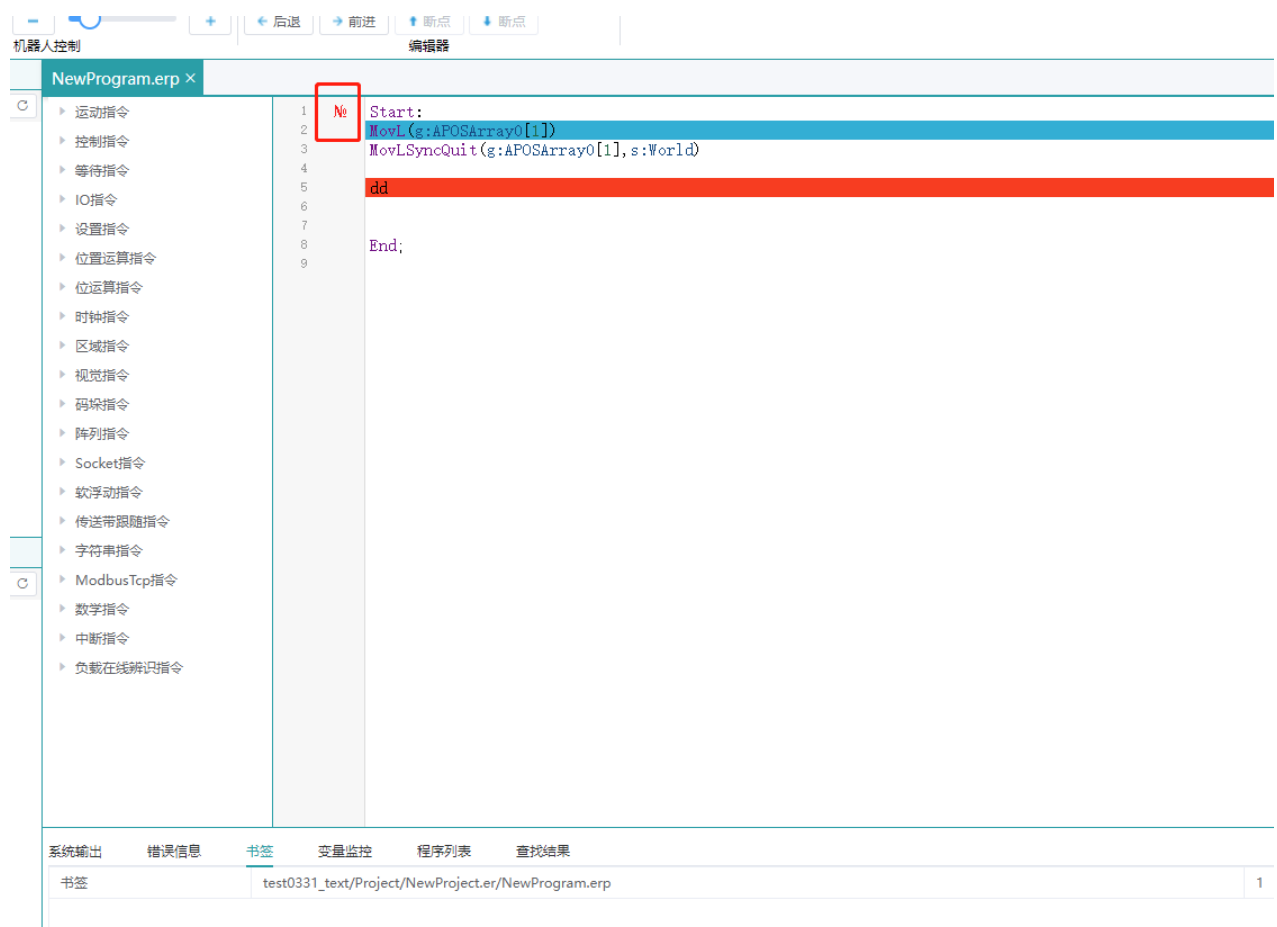
系统输出 错误信息 书签 变量监控 程序列表 查找结果

书签 test0331_text/Project/NewProject.er/NewProgram.erp

Double-clicking on a line in the bookmark bar can also jump to the specified line in the text.

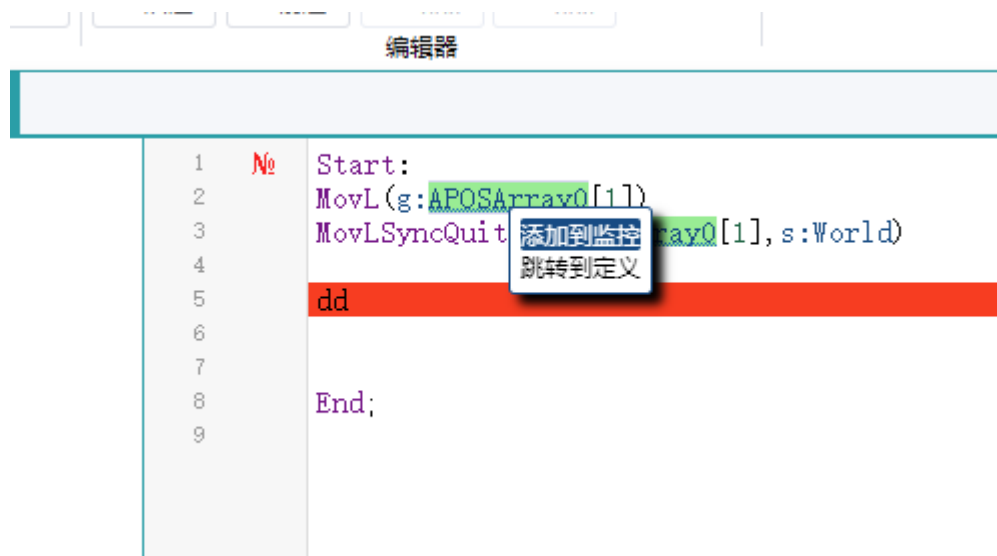


To remove a bookmark, simply double-click on the small tag associated with it.

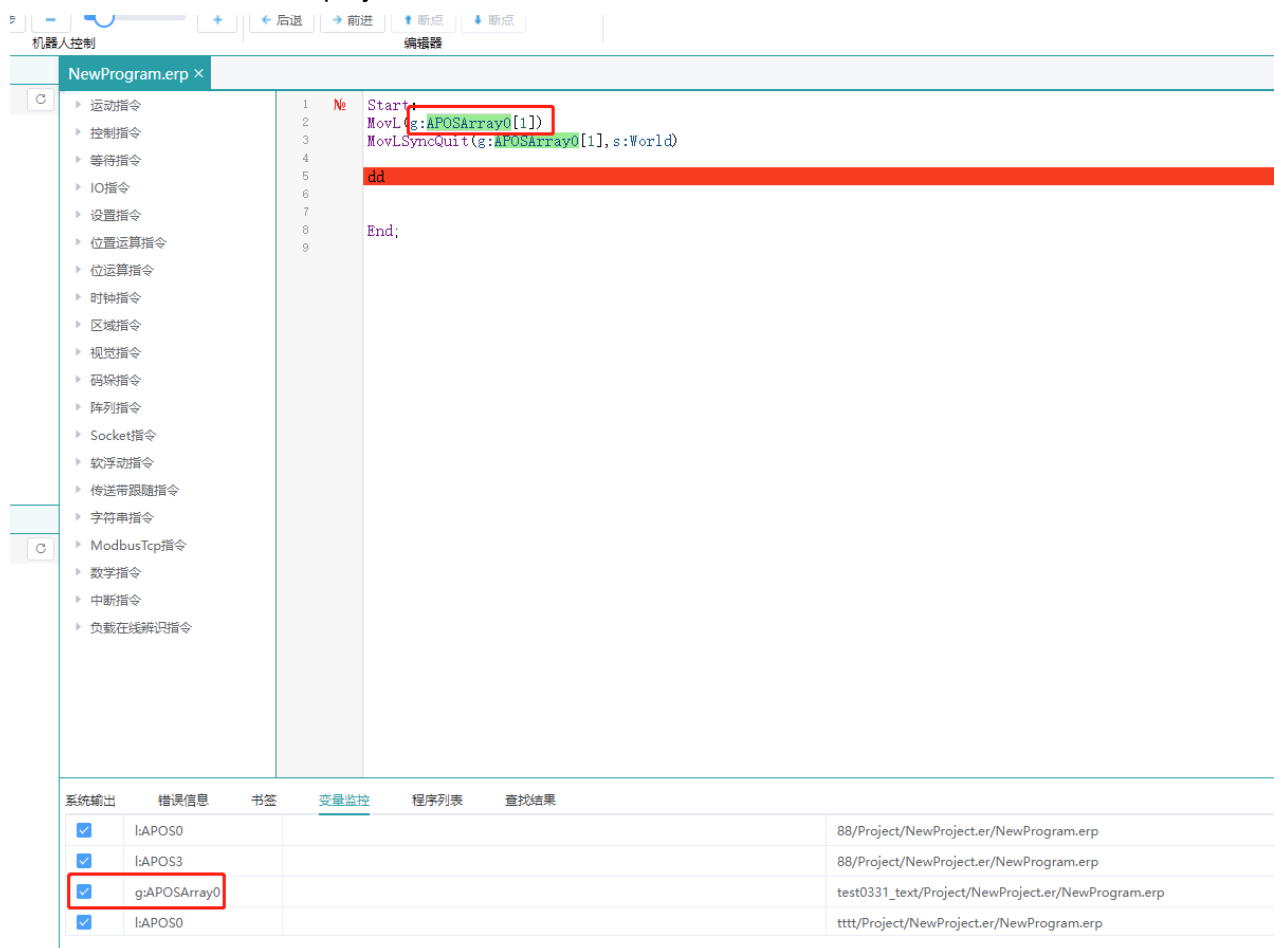


4.4. Variable Monitoring

In a text program, selecting a variable and right-clicking on it allows the user to choose "Add Monitoring" to add the variable to the monitoring list.



Successful addition is displayed as follows:



4.5. Program List

This feature displays the programs being called in real-time during program execution.

4.6. Search Results

This feature is primarily used for searching within the workspace and projects in the project management tree. It supports case-sensitive and whole-word matching, but does not support regular expressions.

4.6.1. Searching within the Workspace

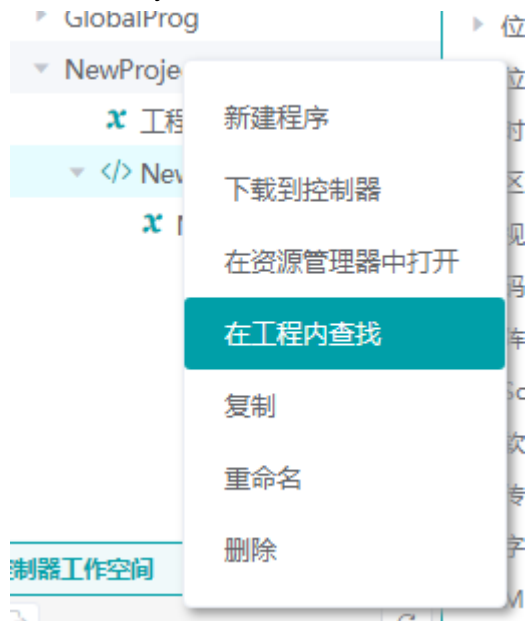


Search results

系统输出	错误信息	书签	变量监控	程序列表	查找结果
1				test0331_text/Project/NewProject.er/NewProgram.erp	
2				test0331_text/Project/NewProject.er/NewProgram.erp	
					MovL(g:APOSArray0[1])
					MovLSyncQuit(g:APOSArray0[1],s:World)

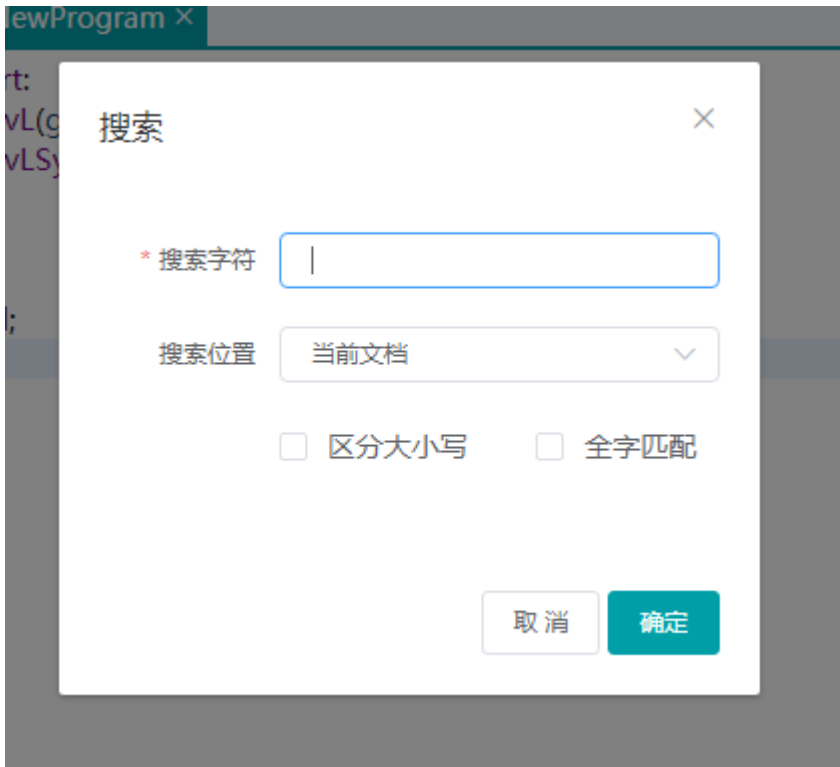
4.6.2. Searching within a Project

Functionality similar to 4.6.1.



4.6.3. Searching within Text

Opening a text editor and using the shortcut Ctrl+F brings up the search box as shown below.



Search location options include: current document, project of the document, and workspace of the document.



Search results are displayed under the "Search Results" tab.

搜索 ×

* 搜索字符

搜索位置 ▼

区分大小写 全字匹配

机器人控制
编辑器

C

NewProgram.erp ×

- ▶ 运动指令
- ▶ 控制指令
- ▶ 等待指令
- ▶ IO指令
- ▶ 设置指令
- ▶ 位置运算指令
- ▶ 位运算指令
- ▶ 时钟指令
- ▶ 区域指令
- ▶ 视觉指令
- ▶ 码垛指令
- ▶ 阵列指令
- ▶ Socket指令
- ▶ 软浮动指令
- ▶ 传送带跟随指令
- ▶ 字符串指令

- ▶ ModbusTcp指令
- ▶ 数字指令
- ▶ 中断指令
- ▶ 负载在线辨识指令

```

1  Start:
2  MovL(g:APOSArray0[1])
3  MovLSyncQuit(g:APOSArray0[1],s:World)
4
5  dd
6
7
8  End;
9

```

系统输出	错误信息	书签	变量监控	程序列表	查找结果
1		test0331_text/Project/NewProject.er/NewProgram.erp		2	MovL(g:APOSArray0[1])
2		test0331_text/Project/NewProject.er/NewProgram.erp		3	MovLSyncQuit(g:APOSArray0[1],s:World)

5. Graphical Programming

5.1. Create a Graphical Project

Refer to Section 3.3 for creating a graphical workspace.

5.2. Introduction to Graphical Blocks

5.2.1. Command Blocks

Each command is represented by a graphical block that can be dragged out to implement its functionality independently.



When a block is dragged out, only the required parameters are displayed, and non-required parameters are collapsed by default. Users can expand to select the required parameters, as shown in

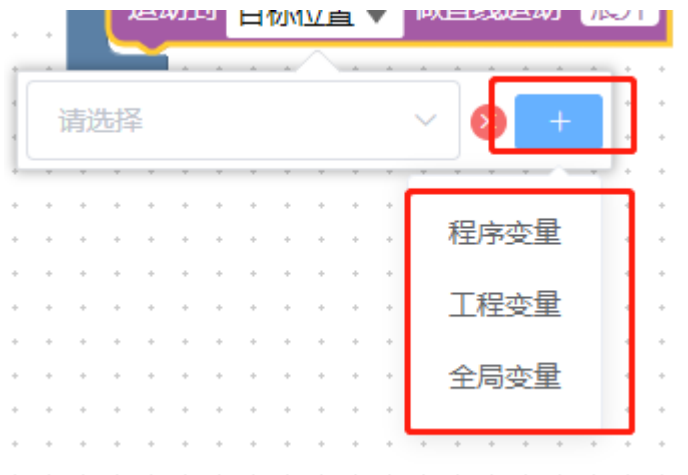
the example.



Each input is filtered based on the variable type required.



If the desired parameters are not available, users can click the "+" button to add variables. By selecting the desired variable type, they will be directed to the corresponding file to add the required type.



Special blocks for certain commands are displayed as shown below:



The following is an example of a block that can be concatenated:





5.2.2. Assignment and Variable Blocks

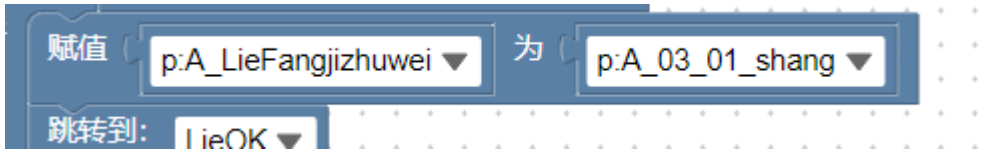
1. Variable Block



The Set/Assignment Block is primarily used to assign values to variables.



In the Assignment Block, you can select one variable to assign its value to another variable.



There are three concatenation blocks for String, Boolean, and Numeric types.



5.3. Simple Demo Program Demonstration

1. Create a new graphical workspace.

Please refer to Section 3.4 for the steps to create a new graphical workspace. Below is an example of a newly created demo.

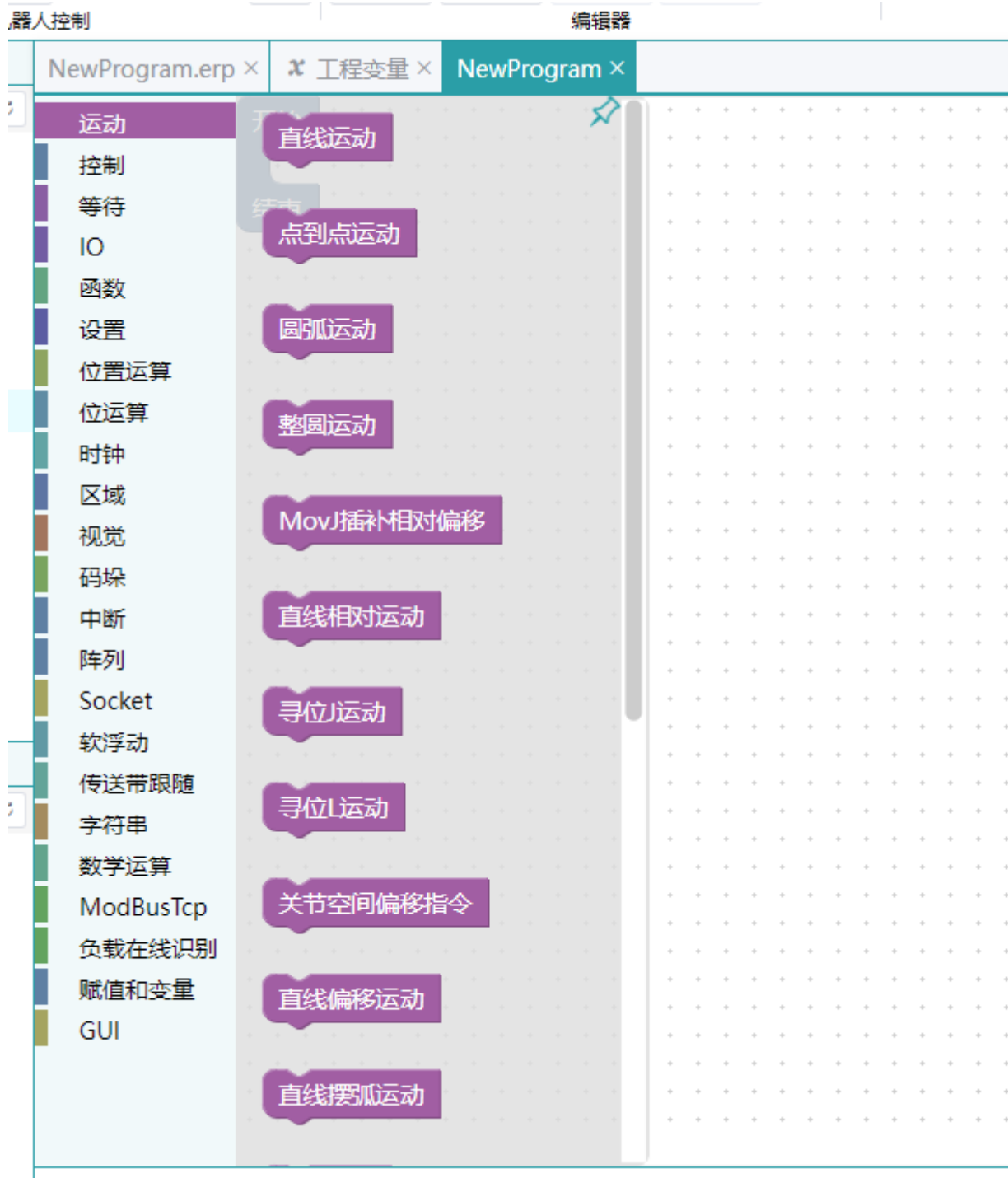


2. Double-click to open "NewProgram"

By default, it has a "Start" and an "End" block.



3. Click on the command tree on the left side and select any command. For example, let's choose the "Motion" command. Drag and drop a graphical block between "Start" and "End".



Select a block for linear motion, as shown in the image.



4. For the "Target Position" dropdown in the block above, select a parameter variable.

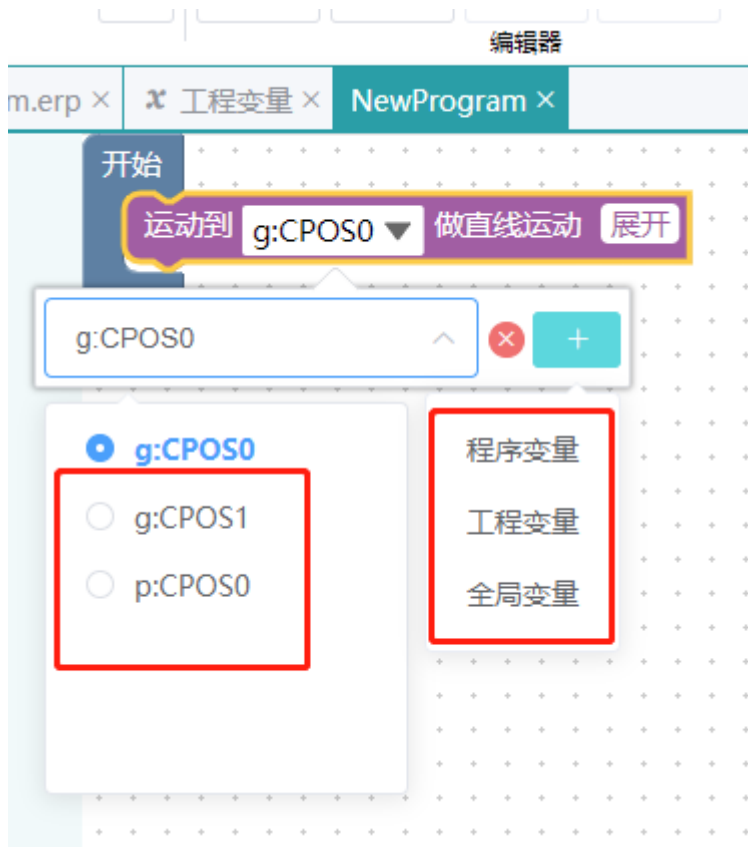


If there are no variables in the dropdown, you need to add a new variable.

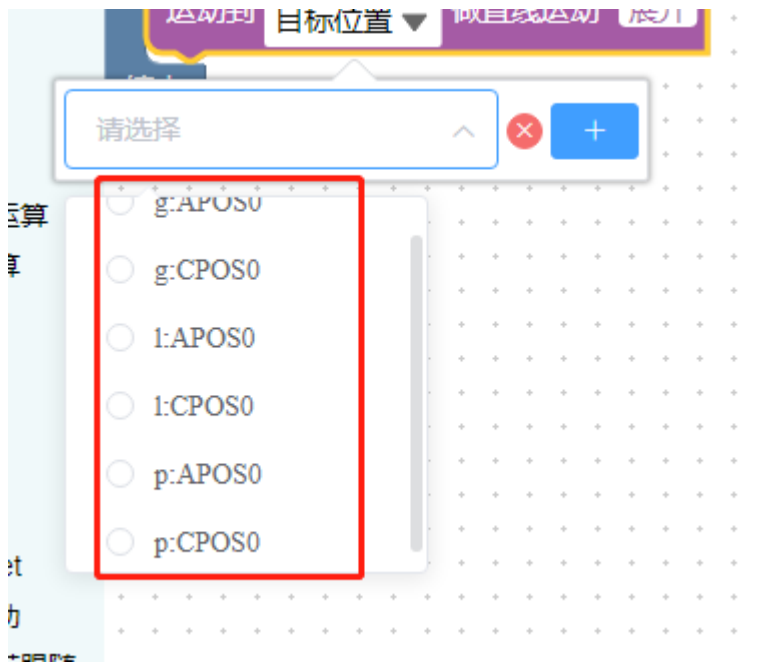
5. Click the "+" button to add a new variable.



For example, if you select "Program Variable", it will take you to the program variables file where you can add a new "Target Position" variable.



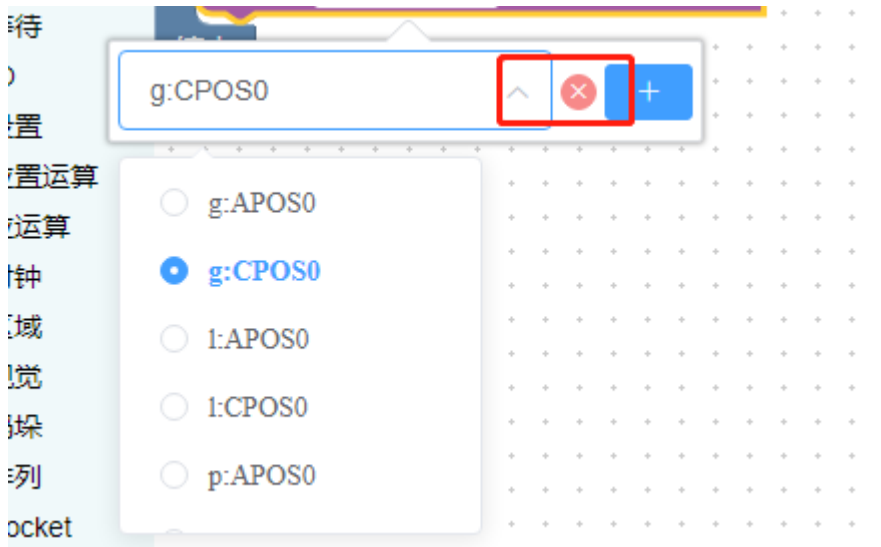
Once you add the variable, it will appear in the dropdown list when you click on the "Target Position", as shown in the figure below.



After selecting a variable, it will be displayed as shown in the figure.



If you select the wrong variable, you can click the "x" clear button in the dropdown to remove the selection and choose another variable.

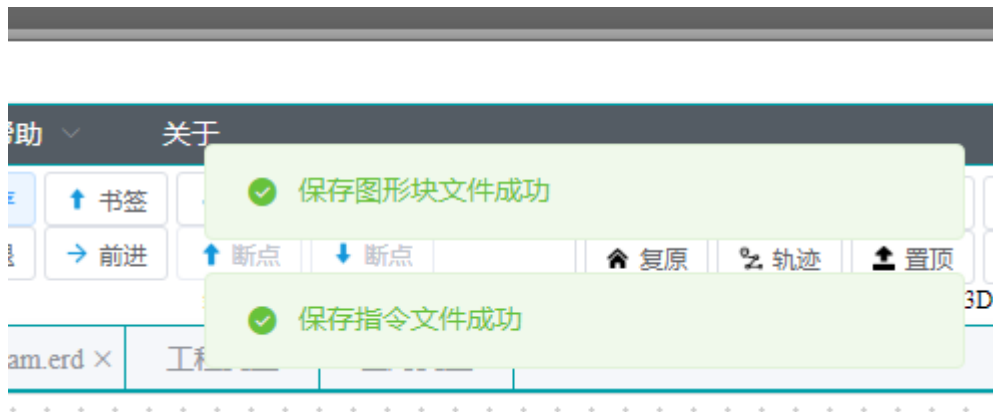


After making the new selection, it will be displayed as shown in the figure.



- Click "Save" to save the graphical program.
In this manner, the graphical project is edited and completed. Similar steps can be followed for other commands as well.





7. A simple Demo graphical program
Graphical Program Implementation:



Text Program Implementation:



5.4. GUI Interface

The GUI interface is a tool provided to users for designing a customized interface according to their needs. It helps users display the programs status, control the robots start /stop operations, and switch program runtime parameters efficiently.

1. Create a graphical project using the "demo_gui" template:



2. Open the newly created graphical program and click on "Design GUI Interface".

GUI界面



3. In the opened GUI interface, click on "Initialize Parameters". Initializing parameters involves extracting the basic variables used in the program and placing them within this GUI module.
4. Drag and drop the corresponding components onto the canvas based on your requirements. Lets take the " Stateful Component" as an example. Drag and drop a stateful component onto the canvas.



5. Clicking on the stateful component on the canvas will open a properties panel, as shown in the figure.

配置

组件Id: dinrrya30h

宽度

400

高度

130

组件标题

状态标题名称666

状态标题1

myStart



状态描述1

开始

状态标题2

Pick



状态描述2

抓

状态标题3

Place



状态描述3

放

添加状态

组件大小

请选择



When you need to highlight a specific status, drag the "Send Data to GUI Component" block into the program, as shown in the figure.



Here, "dinrrya30h" is the GUI components ID selected from the dropdown, and "Place" is the string sent to this component.

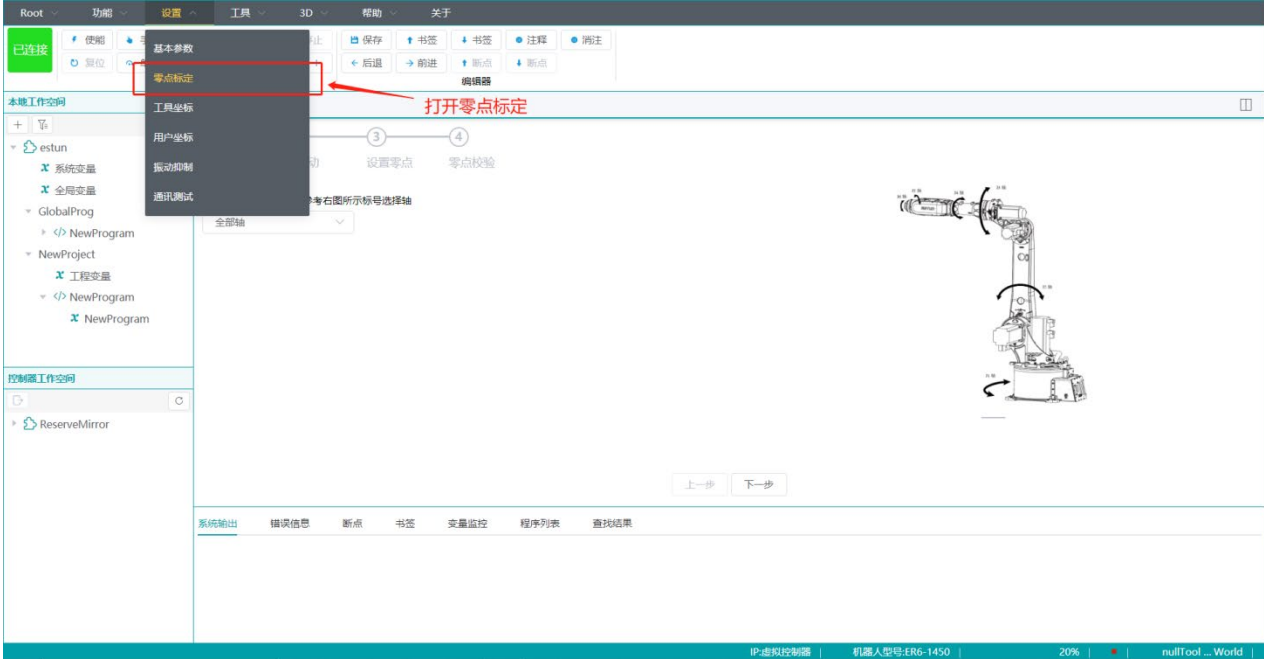
6. Click the "Save" button in the top left corner to save the designed GUI interface.
7. Launch the program and open the GUI interface to observe the changes in the stateful component.

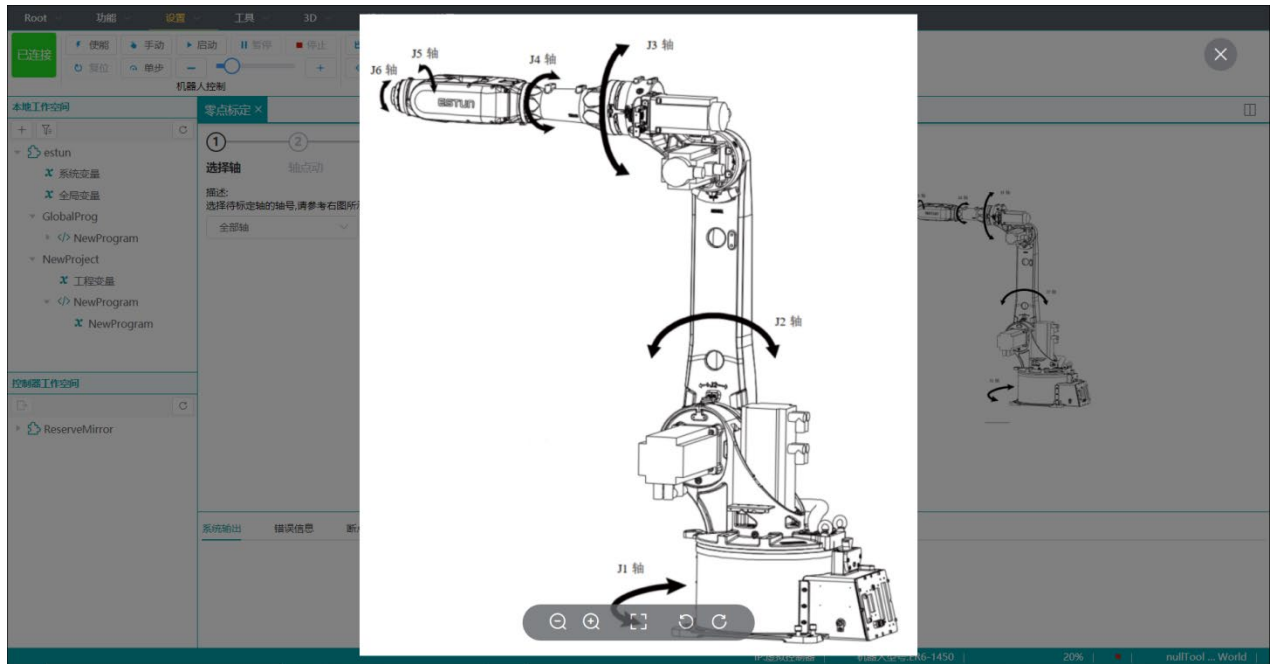
6.Settings

6.1. Zero Calibration

If the robot loses its zero point and cannot return to the correct position, you can perform zero calibration to obtain the zero point.

Open the calibration page





Axis jogging



Set the zero point



Zero calibration



Complete the zero calibration process.

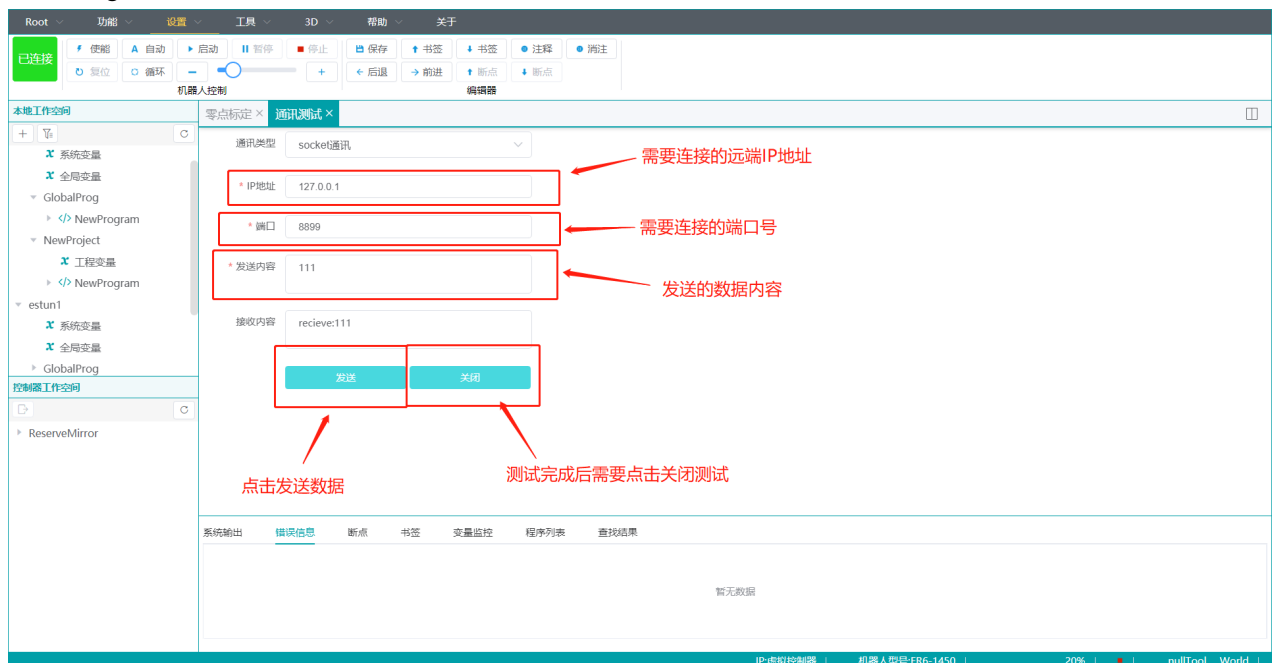
6.2. Communication Verification

This feature is used to verify the hardware environment of the communication channel. You can access the communication verification page as shown in the image:



6.2.1.Socket Communication Verification

Select the socket communication type and fill in the IP address, port number, and the content to be sent. Clicking "Send" will send the data to the server, and if the receiving window receives the data, it indicates that the communication is working correctly and can be used for sending and receiving communication with the remote end.



6.3. Basic Settings

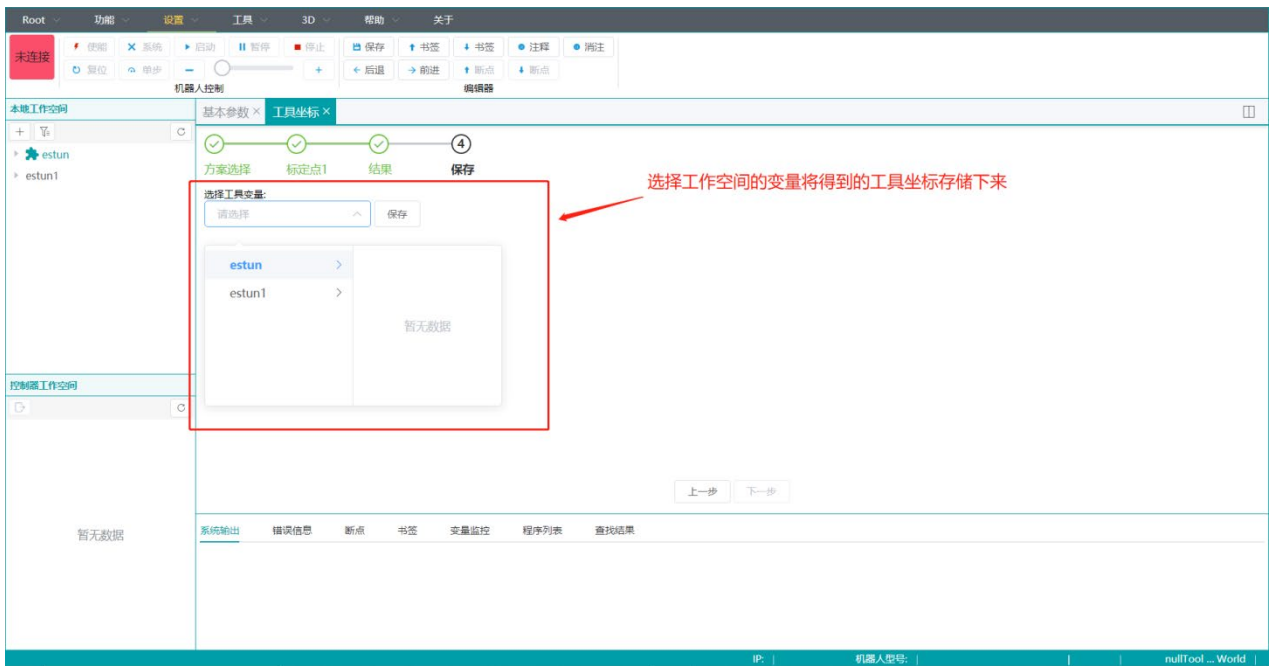


Set default parameters for the robot.

6.4. Tool Coordinate System Calibration



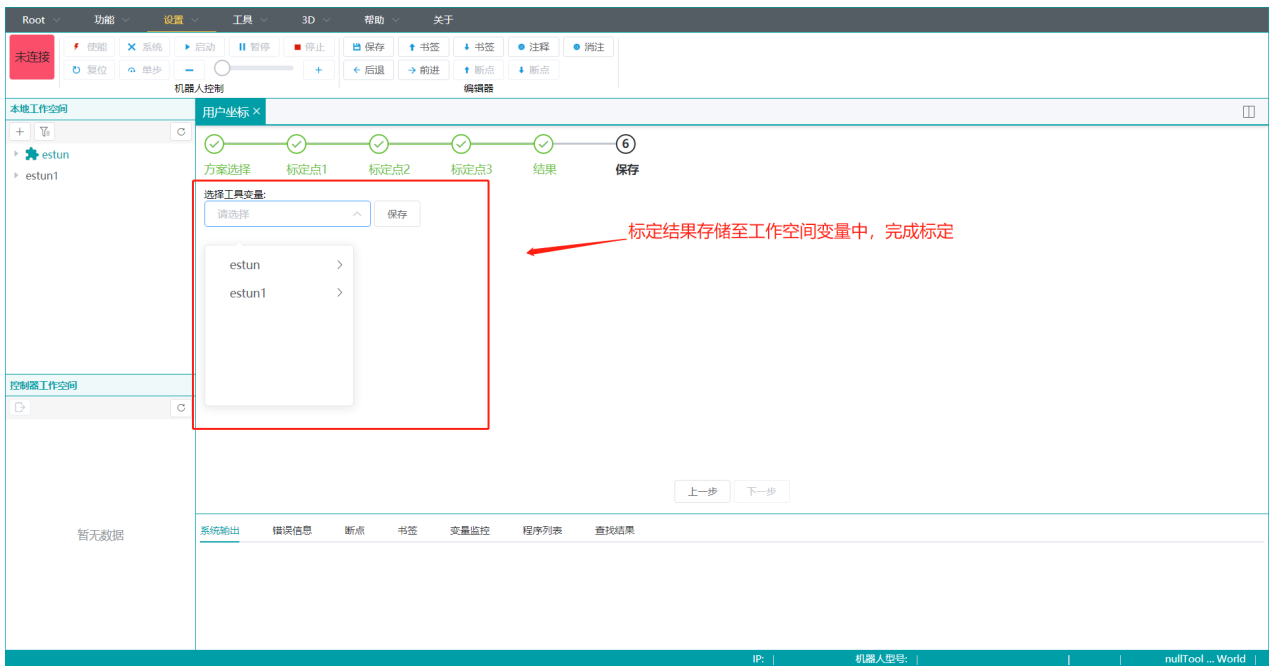




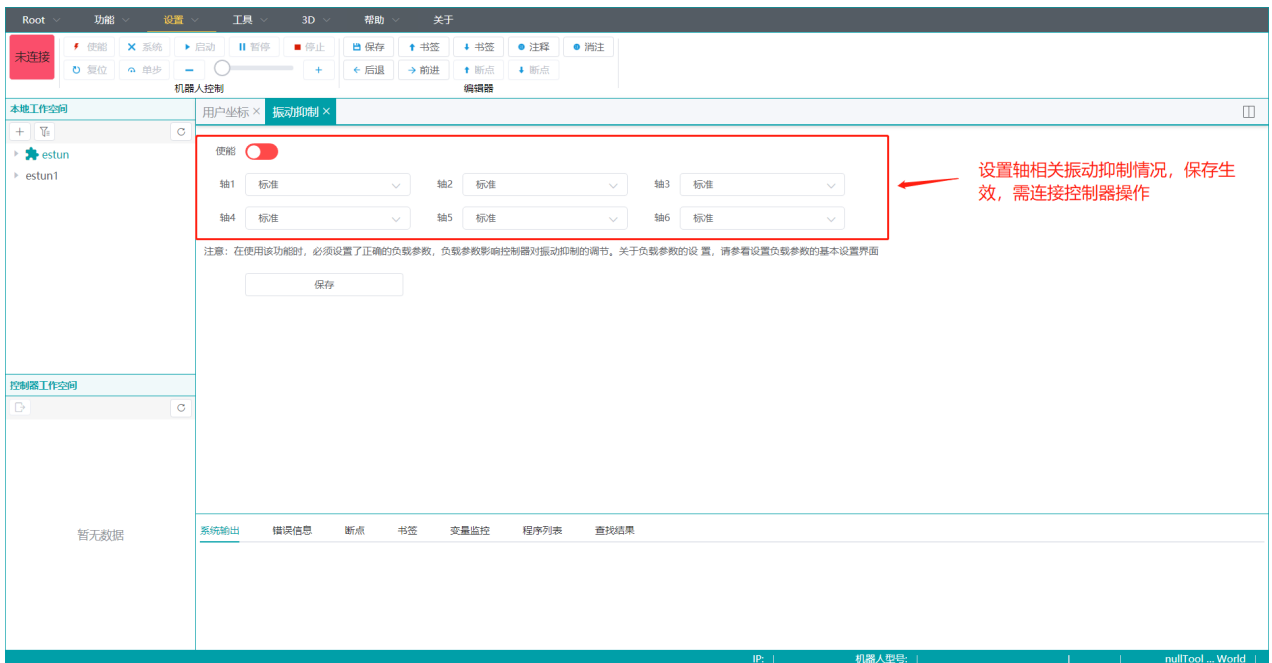
6.5. User Coordinate System Calibration







6.6. Vibration Suppression



7. Manual Control

To enter the Manual Control page, follow the steps: Menu bar - Function - Manual Control. This will take you to the Manual Control page.

Note: The Manual Control page is only available for robot models with suffixes -SR, -MI, -MI/. Other models cannot access this page.

Refer to the following figure:



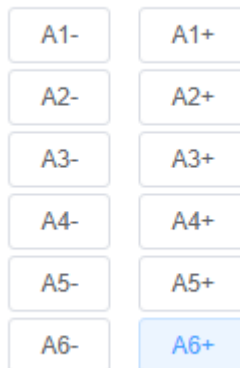
7.1. Coordinate Display

The left side displays the robots world coordinates, and the right side displays the robots joint coordinates.



7.2. Manual Control

The two columns of buttons control the positive and negative movements of each axis.



7.3. One-click Motion

1. Select a waypoint from a variable file.
2. Adjust the waypoint data if necessary.
3. Choose the motion mode: Linear or Joint.
4. Choose the motion direction: Forward Upward Tilt, Forward Downward Tilt, Backward Upward Tilt, Backward Downward Tilt, etc.
5. Save the modified data back to the selected waypoint.
6. Click on One-click Motion to move the robot to the specified waypoint using the configured settings.

A screenshot of a motion control software interface. At the top, there is a dropdown menu showing 'APOS0' and a '保存' (Save) button. Below this are six axis position inputs labeled A1 through A6, each with a value of '0.000' and a degree symbol. Underneath the axes is a '运动模式' (Motion Mode) section with two radio buttons: '直线' (Linear) which is selected, and '关节' (Joint). Below that is a '位姿' (Pose) dropdown menu showing '当前姿态' (Current Pose). At the bottom, there are two buttons: '启动' (Start) and '停止' (Stop). Red boxes highlight the 'APOS0' dropdown, the '启动' button, and the '当前姿态' dropdown.

7.4. Manual Motion Parameter Settings

1. Select the object to be configured: Local or External Axes.
2. Set the tool coordinate system, which is the tool coordinate system of the currently loaded project in the controller.
3. Set the user coordinate system, which is the user coordinate system of the currently loaded project in the controller.
4. Set the jog mode: Jogging or Continuous.
5. Set the motion mode: Axis Coordinates (Joint Motion) or World Coordinates (Path Motion).

A screenshot of the manual motion parameter settings interface. At the top, there is a '位姿' (Pose) dropdown menu showing '0'. Below this are four dropdown menus: '设备' (Device) set to '本体' (Body), '坐标系' (Coordinate System) set to '轴坐标' (Axis Coordinate), '工具坐标' (Tool Coordinate) set to 'nullTool', and '用户坐标' (User Coordinate) set to 'World'. Below these is a '点动模式' (Jog Mode) dropdown menu set to '连续' (Continuous). A red box highlights the '工具坐标' and '用户坐标' dropdown menus.

8.IO Function

Click on "Function" in the menu bar and select "IO" to enter the IO Detection page.

Refer to the following figure. The IO-related data is transmitted from the main interface.

名称	状态	功能	名称	状态	功能	名称	状态	功能	名称	状态	功能
DI1	●		DI17	●		DO1	■		DO17	■	
DI2	●		DI18	●		DO2	■		DO18	■	
DI3	●		DI19	●		DO3	■		DO19	■	
DI4	●		DI20	●		DO4	■		DO20	■	
DI5	●		DI21	●		DO5	■		DO21	■	
DI6	●		DI22	●		DO6	■		DO22	■	
DI7	●		DI23	●		DO7	■		DO23	■	
DI8	●		DI24	●		DO8	■		DO24	■	
DI9	●		DI25	●		DO9	■		DO25	■	
DI10	●		DI26	●		DO10	■		DO26	■	
DI11	●		DI27	●		DO11	■		DO27	■	
DI12	●		DI28	●		DO12	■		DO28	■	
DI13	●		DI29	●		DO13	■		DO29	■	
DI14	●		DI30	●		DO14	■		DO30	■	
DI15	●		DI31	●		DO15	■		DO31	■	
DI16	●		DI32	●		DO16	■		DO32	■	

8.1. Digital

Upon entering the IO Detection page, the default view is the "Digital IO" list, where you can check the status of the IOs.

Users can view the IO status on the control module: Green indicates a signal, and gray indicates no signal.

名称	状态	功能	名称	状态	功能	名称	状态	功能	名称	状态	功能
DI1	●		DI17	●		DO1	■		DO17	■	
DI2	●		DI18	●		DO2	■		DO18	■	
DI3	●		DI19	●		DO3	■		DO19	■	
DI4	●		DI20	●		DO4	■		DO20	■	
DI5	●		DI21	●		DO5	■		DO21	■	
DI6	●		DI22	●		DO6	■		DO22	■	
DI7	●		DI23	●		DO7	■		DO23	■	
DI8	●		DI24	●		DO8	■		DO24	■	
DI9	●		DI25	●		DO9	■		DO25	■	
DI10	●		DI26	●		DO10	■		DO26	■	
DI11	●		DI27	●		DO11	■		DO27	■	
DI12	●		DI28	●		DO12	■		DO28	■	
DI13	●		DI29	●		DO13	■		DO29	■	
DI14	●		DI30	●		DO14	■		DO30	■	
DI15	●		DI31	●		DO15	■		DO31	■	
DI16	●		DI32	●		DO16	■		DO32	■	

D1-D8: Not allowed for output. Double-clicking on D1-D8 will display the following:



Users can check the actual IO status on this page.

8.2. Analog

Users can check the actual analog status on this page.

名称	值	功能	名称	值	功能	名称	值	功能	名称	值	功能
AI1	0		AI17	0		AO1	0		AO17	0	
AI2	0		AI18	0		AO2	0		AO18	0	
AI3	0		AI19	0		AO3	0		AO19	0	
AI4	0		AI20	0		AO4	0		AO20	0	
AI5	0		AI21	0		AO5	0		AO21	0	
AI6	0		AI22	0		AO6	0		AO22	0	
AI7	0		AI23	0		AO7	0		AO23	0	2.6
AI8	0		AI24	0		AO8	0		AO24	0	
AI9	0		AI25	0		AO9	0		AO25	0	
AI10	0		AI26	0		AO10	0		AO26	0	
AI11	0		AI27	0		AO11	0		AO27	0	
AI12	0		AI28	0		AO12	0		AO28	0	
AI13	0		AI29	0		AO13	0		AO29	0	
AI14	0		AI30	0		AO14	0		AO30	0	
AI15	0		AI31	0		AO15	0		AO31	0	
AI16	0		AI32	0		AO16	0		AO32	0	

8.3. Virtual Digital

Users can check the status of virtual IOs on this page.

IO ×												
数字IO	名称	状态	功能	名称	状态	功能	名称	状态	功能	名称	状态	功能
模拟IO	SDI1	<input type="radio"/>	<input type="text"/>	SDI17	<input type="radio"/>	<input type="text"/>	SDO1	<input type="checkbox"/>	<input type="text"/>	SDO17	<input type="checkbox"/>	<input type="text"/>
虚拟数字IO	SDI2	<input type="radio"/>	<input type="text"/>	SDI18	<input type="radio"/>	<input type="text"/>	SDO2	<input type="checkbox"/>	<input type="text"/>	SDO18	<input type="checkbox"/>	<input type="text"/>
虚拟模拟IO	SDI3	<input type="radio"/>	<input type="text"/>	SDI19	<input type="radio"/>	<input type="text"/>	SDO3	<input type="checkbox"/>	<input type="text"/>	SDO19	<input type="checkbox"/>	<input type="text"/>
自定义IO	SDI4	<input type="radio"/>	<input type="text"/>	SDI20	<input type="radio"/>	<input type="text"/>	SDO4	<input type="checkbox"/>	<input type="text"/>	SDO20	<input type="checkbox"/>	<input type="text"/>
	SDI5	<input type="radio"/>	<input type="text"/>	SDI21	<input type="radio"/>	<input type="text"/>	SDO5	<input type="checkbox"/>	<input type="text"/>	SDO21	<input type="checkbox"/>	<input type="text"/>
	SDI6	<input type="radio"/>	<input type="text"/>	SDI22	<input type="radio"/>	<input type="text"/>	SDO6	<input type="checkbox"/>	<input type="text"/>	SDO22	<input type="checkbox"/>	<input type="text"/>
	SDI7	<input type="radio"/>	<input type="text"/>	SDI23	<input type="radio"/>	<input type="text"/>	SDO7	<input type="checkbox"/>	<input type="text"/>	SDO23	<input type="checkbox"/>	<input type="text"/>
	SDI8	<input type="radio"/>	<input type="text"/>	SDI24	<input type="radio"/>	<input type="text"/>	SDO8	<input type="checkbox"/>	<input type="text"/>	SDO24	<input type="checkbox"/>	<input type="text"/>
	SDI9	<input type="radio"/>	<input type="text"/>	SDI25	<input type="radio"/>	<input type="text"/>	SDO9	<input type="checkbox"/>	<input type="text"/>	SDO25	<input type="checkbox"/>	<input type="text"/>
	SDI10	<input type="radio"/>	<input type="text"/>	SDI26	<input type="radio"/>	<input type="text"/>	SDO10	<input type="checkbox"/>	<input type="text"/>	SDO26	<input type="checkbox"/>	<input type="text"/>
	SDI11	<input type="radio"/>	<input type="text"/>	SDI27	<input type="radio"/>	<input type="text"/>	SDO11	<input type="checkbox"/>	<input type="text"/>	SDO27	<input type="checkbox"/>	<input type="text"/>
	SDI12	<input type="radio"/>	<input type="text"/>	SDI28	<input type="radio"/>	<input type="text"/>	SDO12	<input type="checkbox"/>	<input type="text"/>	SDO28	<input type="checkbox"/>	<input type="text"/>
	SDI13	<input type="radio"/>	<input type="text"/>	SDI29	<input type="radio"/>	<input type="text"/>	SDO13	<input type="checkbox"/>	<input type="text"/>	SDO29	<input type="checkbox"/>	<input type="text"/>
	SDI14	<input type="radio"/>	<input type="text"/>	SDI30	<input type="radio"/>	<input type="text"/>	SDO14	<input type="checkbox"/>	<input type="text"/>	SDO30	<input type="checkbox"/>	<input type="text"/>
	SDI15	<input type="radio"/>	<input type="text"/>	SDI31	<input type="radio"/>	<input type="text"/>	SDO15	<input type="checkbox"/>	<input type="text"/>	SDO31	<input type="checkbox"/>	<input type="text"/>
	SDI16	<input type="radio"/>	<input type="text"/>	SDI32	<input type="radio"/>	<input type="text"/>	SDO16	<input type="checkbox"/>	<input type="text"/>	SDO32	<input type="checkbox"/>	<input type="text"/>

8.4. Virtual Analog

Users can check the status of virtual analog IOs on this page.

IO ×												
数字IO	名称	值	功能	名称	值	功能	名称	值	功能	名称	值	功能
模拟IO	SAI1	<input type="text" value="0"/>	<input type="text"/>	SAI17	<input type="text" value="0"/>	<input type="text"/>	SAO1	<input type="text" value="0"/>	<input type="text"/>	SAO17	<input type="text" value="0"/>	<input type="text"/>
虚拟数字IO	SAI2	<input type="text" value="0"/>	<input type="text"/>	SAI18	<input type="text" value="0"/>	<input type="text"/>	SAO2	<input type="text" value="0"/>	<input type="text"/>	SAO18	<input type="text" value="0"/>	<input type="text"/>
虚拟模拟IO	SAI3	<input type="text" value="0"/>	<input type="text"/>	SAI19	<input type="text" value="0"/>	<input type="text"/>	SAO3	<input type="text" value="0"/>	<input type="text"/>	SAO19	<input type="text" value="0"/>	<input type="text"/>
自定义IO	SAI4	<input type="text" value="0"/>	<input type="text"/>	SAI20	<input type="text" value="0"/>	<input type="text"/>	SAO4	<input type="text" value="0"/>	<input type="text"/>	SAO20	<input type="text" value="0"/>	<input type="text"/>
	SAI5	<input type="text" value="0"/>	<input type="text"/>	SAI21	<input type="text" value="0"/>	<input type="text"/>	SAO5	<input type="text" value="0"/>	<input type="text"/>	SAO21	<input type="text" value="0"/>	<input type="text"/>
	SAI6	<input type="text" value="0"/>	<input type="text"/>	SAI22	<input type="text" value="0"/>	<input type="text"/>	SAO6	<input type="text" value="0"/>	<input type="text"/>	SAO22	<input type="text" value="0"/>	<input type="text"/>
	SAI7	<input type="text" value="0"/>	<input type="text"/>	SAI23	<input type="text" value="0"/>	<input type="text"/>	SAO7	<input type="text" value="0"/>	<input type="text"/>	SAO23	<input type="text" value="0"/>	<input type="text"/>
	SAI8	<input type="text" value="0"/>	<input type="text"/>	SAI24	<input type="text" value="0"/>	<input type="text"/>	SAO8	<input type="text" value="0"/>	<input type="text"/>	SAO24	<input type="text" value="0"/>	<input type="text"/>
	SAI9	<input type="text" value="0"/>	<input type="text"/>	SAI25	<input type="text" value="0"/>	<input type="text"/>	SAO9	<input type="text" value="0"/>	<input type="text"/>	SAO25	<input type="text" value="0"/>	<input type="text"/>
	SAI10	<input type="text" value="0"/>	<input type="text"/>	SAI26	<input type="text" value="0"/>	<input type="text"/>	SAO10	<input type="text" value="0"/>	<input type="text"/>	SAO26	<input type="text" value="0"/>	<input type="text"/>
	SAI11	<input type="text" value="0"/>	<input type="text"/>	SAI27	<input type="text" value="0"/>	<input type="text"/>	SAO11	<input type="text" value="0"/>	<input type="text"/>	SAO27	<input type="text" value="0"/>	<input type="text"/>
	SAI12	<input type="text" value="0"/>	<input type="text"/>	SAI28	<input type="text" value="0"/>	<input type="text"/>	SAO12	<input type="text" value="0"/>	<input type="text"/>	SAO28	<input type="text" value="0"/>	<input type="text"/>
	SAI13	<input type="text" value="0"/>	<input type="text"/>	SAI29	<input type="text" value="0"/>	<input type="text"/>	SAO13	<input type="text" value="0"/>	<input type="text"/>	SAO29	<input type="text" value="0"/>	<input type="text"/>
	SAI14	<input type="text" value="0"/>	<input type="text"/>	SAI30	<input type="text" value="0"/>	<input type="text"/>	SAO14	<input type="text" value="0"/>	<input type="text"/>	SAO30	<input type="text" value="0"/>	<input type="text"/>
	SAI15	<input type="text" value="0"/>	<input type="text"/>	SAI31	<input type="text" value="0"/>	<input type="text"/>	SAO15	<input type="text" value="0"/>	<input type="text"/>	SAO31	<input type="text" value="0"/>	<input type="text"/>
	SAI16	<input type="text" value="0"/>	<input type="text"/>	SAI32	<input type="text" value="0"/>	<input type="text"/>	SAO16	<input type="text" value="0"/>	<input type="text"/>	SAO32	<input type="text" value="0"/>	<input type="text"/>

8.5. Custom IO

All signals can be assigned labels. Users can select Digital IO, Analog IO, Virtual Digital IO, or Virtual Analog IO and add them to Custom IO.

数字IO	名称	状态	功能	名称	值	功能	名称	状态	功能	名称	值	功能
模拟IO	DI26		<input type="text"/>	AO4	0	<input type="text"/>	SDO12		<input type="text"/>	SAO5	0	<input type="text"/>
虚拟数字IO	DO12		<input type="text"/>									
虚拟模拟IO												
自定义IO												

Implementing Custom IO: Select an IO, right-click, and choose "Add to Custom".

数字IO	名称	状态	功能	名称	状态	功能	名称	状态	功能	名称	状态	功能
模拟IO	DI1		<input type="text"/>	DI17		<input type="text"/>	DO1		<input type="text"/>	DO17		<input type="text"/>
虚拟数字IO	DI2		<input type="text"/>	DI18		<input type="text"/>	DO2		<input type="text"/>	DO18		<input type="text"/>
虚拟模拟IO	DI3		<input type="text"/>	DI19		<input type="text"/>	DO3		<input type="text"/>	DO19		<input type="text"/>
自定义IO	DI4		<input type="text"/>	DI20		<input type="text"/>	DO4		<input type="text"/>	DO20		<input type="text"/>
	DI5		<input type="text"/>	DI21		<input type="text"/>	DO5		<input type="text"/>	DO21		<input type="text"/>
	DI6		<input type="text"/>	DI22		<input type="text"/>	DO6		<input type="text"/>	DO22		<input type="text"/>
	DI7		<input type="text"/>	DI23		<input type="text"/>	DO7		<input type="text"/>	DO23		<input type="text"/>
	DI8		<input type="text"/>	DI24		<input type="text"/>	DO8		<input type="text"/>	DO24		<input type="text"/>
	DI9		<input type="text"/>	DI25		<input type="text"/>	DO9		<input type="text"/>	DO25		<input type="text"/>
	DI10		<input type="text"/>	DI26		<input type="text"/>	DO10		<input type="text"/>	DO26		<input type="text"/>
	DI11		<input type="text"/>	DI27		<input type="text"/>	DO11		<input type="text"/>	DO27		<input type="text"/>
	DI12		<input type="text"/>	DI28		<input type="text"/>	DO12		<input type="text"/>	DO28		<input type="text"/>
	DI13		<input type="text"/>	DI29		<input type="text"/>	DO13		<input type="text"/>	DO29		<input type="text"/>
	DI14		<input type="text"/>	DI30		<input type="text"/>	DO14		<input type="text"/>	DO30		<input type="text"/>
	DI15		<input type="text"/>	DI31		<input type="text"/>	DO15		<input type="text"/>	DO31		<input type="text"/>
	DI16		<input type="text"/>	DI32		<input type="text"/>	DO16		<input type="text"/>	DO32		<input type="text"/>

The added IO can be seen in the definition.

数字IO	名称	状态	功能	名称	值	功能	名称
模拟IO	DI26		<input type="text"/>	AO4	0	<input type="text"/>	SDO12
虚拟数字IO	DO12		<input type="text"/>				
虚拟模拟IO	DI3		<input type="text"/>				
自定义IO							

In Custom IO, you can also delete individual IOs or remove all added IOs.

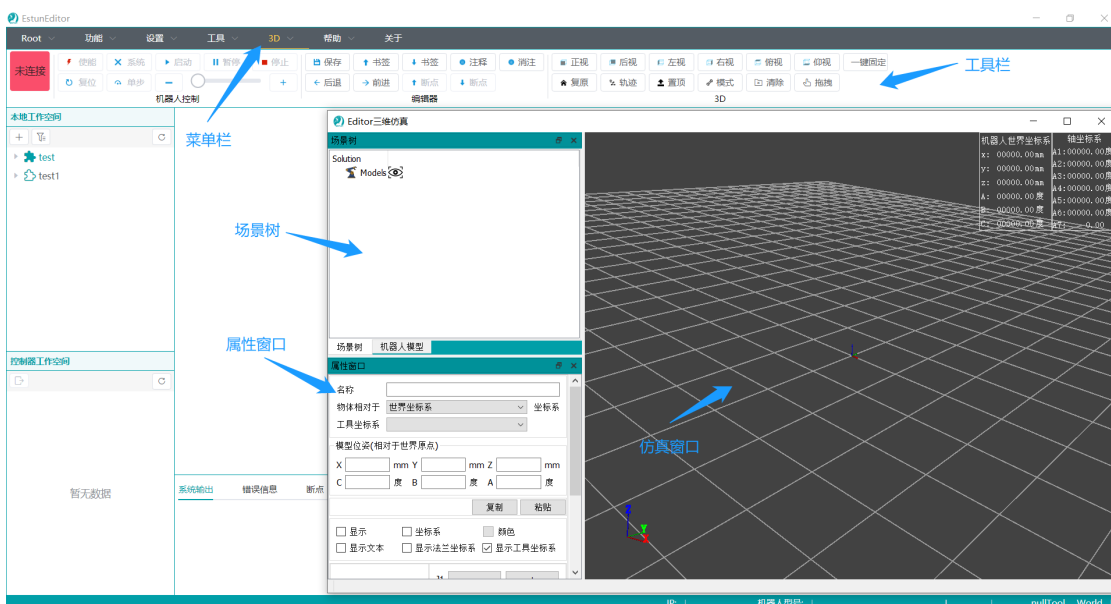
名称	状态	功能	名称	值	功能	名称	状态	功能	名称	值	功能
数字IO											
模拟IO	DI26	<input type="checkbox"/>		AO4	0		SDO12	<input checked="" type="checkbox"/>		SAO5	0
虚拟数字IO	DO12	<input type="checkbox"/>									
虚拟模拟IO	DI3	<input type="checkbox"/>									
自定义IO											

删除自定义IO
 删除所有自定义IO

9.3D Function

The 3D simulation includes the 3D menu, toolbar, property window, scene tree, and simulation window.

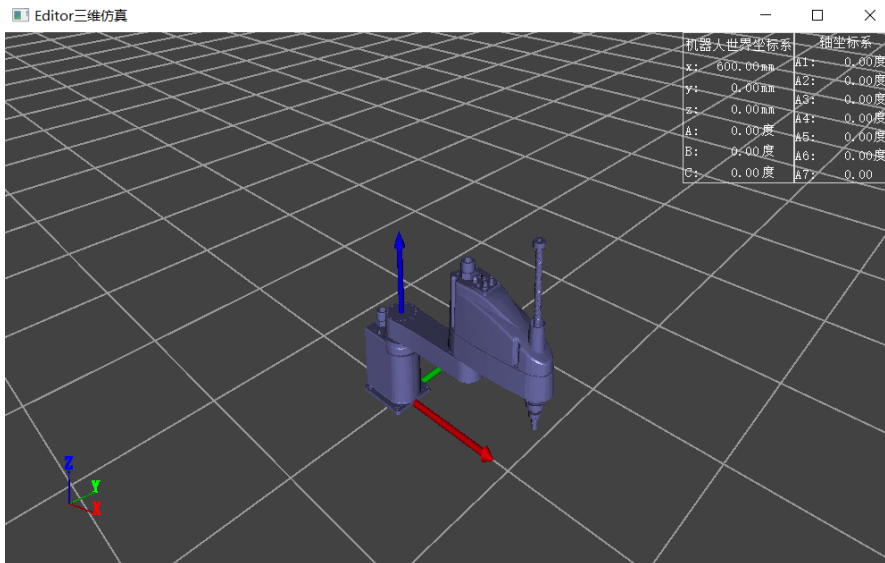
Left-click to rotate the scene, middle-click to pan the scene, and scroll the mouse wheel to zoom in or out.



9.1. Open the 3D Simulation Window

Click on "Open 3D Window" to load the 3D simulation window.





Note: The window data in the top right corner shows the robots world coordinate system, which is the data relative to the center point of the robots base surface.

Click on "Collision Detection" to open the collision detection point list window. Further details on the collision detection module will be explained later.



9.2. "File" Menu

Click on the "File" option in the 3D menu to display the "File" menu.

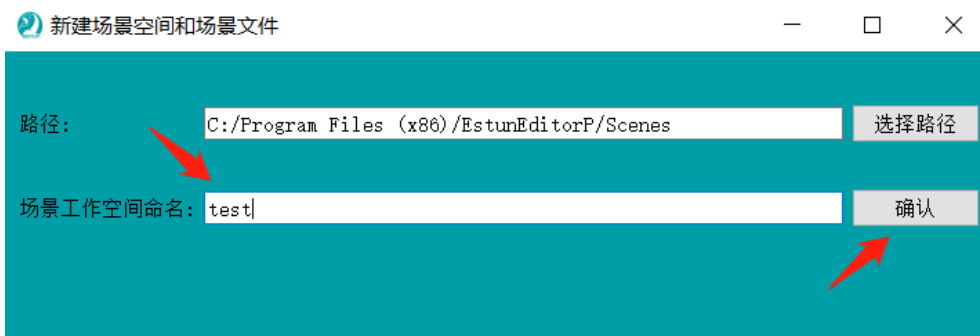


9.2.1. Create Scene (CTRL+N)

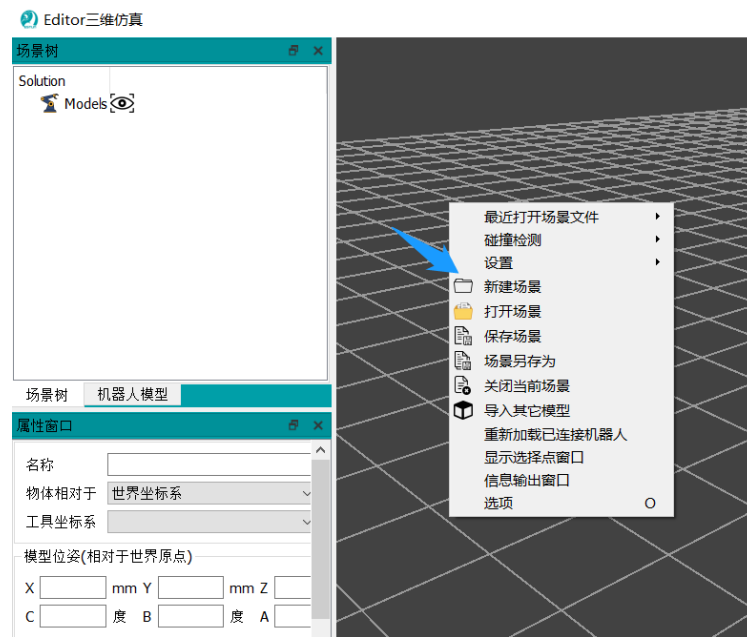
Prerequisite: If you only want to view the motion of a single robot without any scene, there is no need to create a new scene. However, if you want to include other models, you need to create a new scene.

Shortcut key (CTRL+O).

Click on the 3D menu -> Click on File -> Click on Create Scene to create a new scene, which includes creating a scene space and a scene file.



Alternatively, right-click on an empty space in the 3D simulation page and choose "Create Scene".

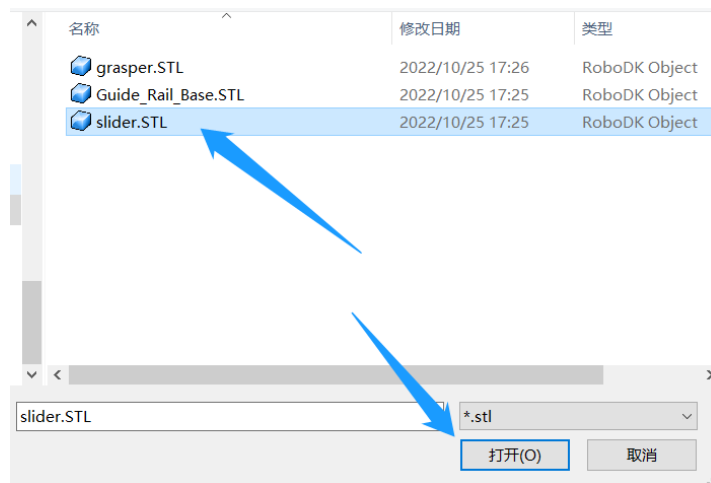
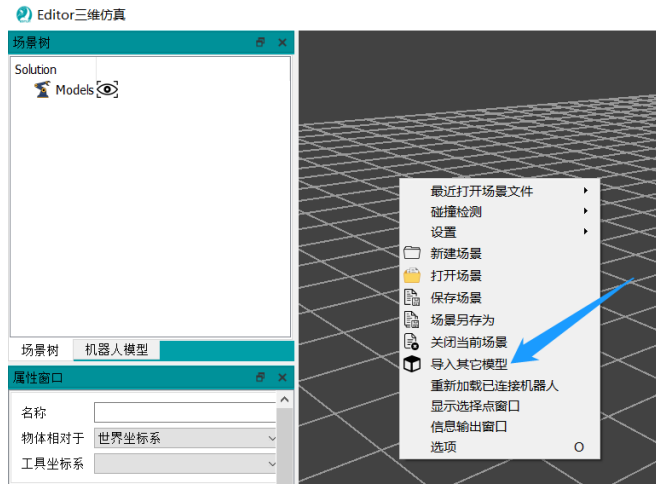


9.2.2.Import Other Models

Click on the 3D menu -> Click on File -> Click on Import Other Models to import models other than the robot model and robot tool model.



Alternatively, right-click on an empty space in the 3D simulation page and choose "Import Other Models".

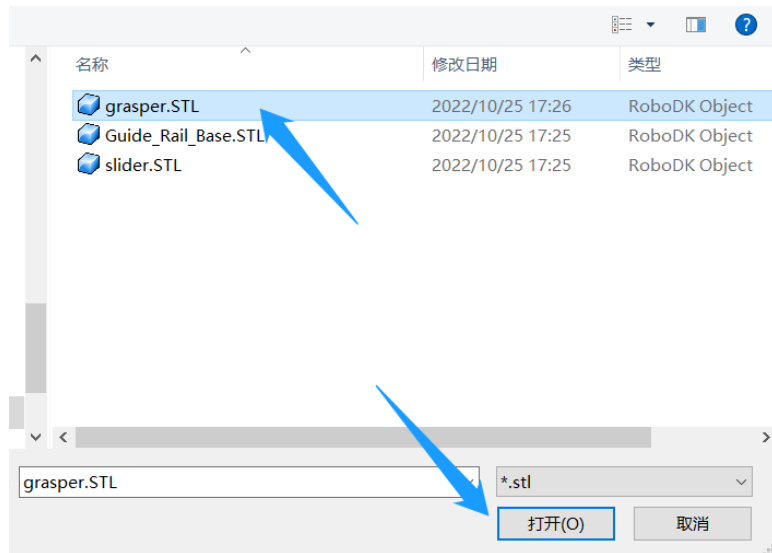


Note: Currently, the supported model format is .stl format. Please ensure that the size does not exceed 150MB. If the size exceeds 150MB, it may affect the smoothness of the display.

9.2.3.Import End Effector Tool Model

Click on the 3D menu -> Click on File -> Click on End Effector Tool Model to import the model of the robots tool.





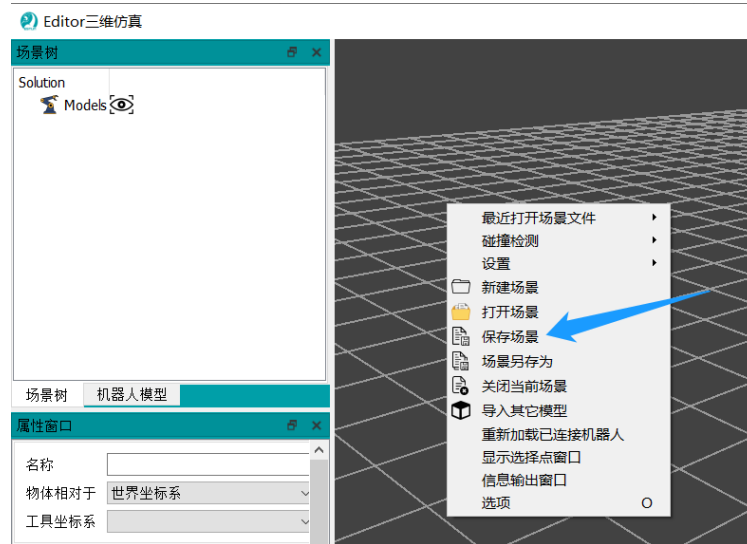
Note: Currently, the supported model format is .stl format. Please ensure that the size does not exceed 150MB. If the size exceeds 150MB, it may affect the smoothness of the display.

9.2.4. Save Scene (CTRL+S)

Click on the 3D menu -> Click on File -> Click on Save Scene to save the current scene.

Shortcut key (CTRL+S).





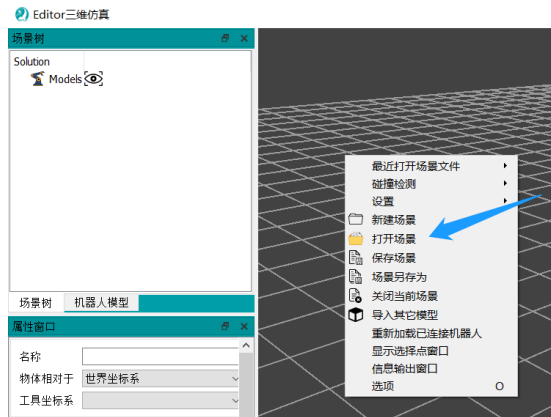
9.2.5. Open Scene (CTRL+O)

Click on the 3D menu -> Click on File -> Click on Open Scene to open a 3D scene file.

Shortcut key (CTRL+O).

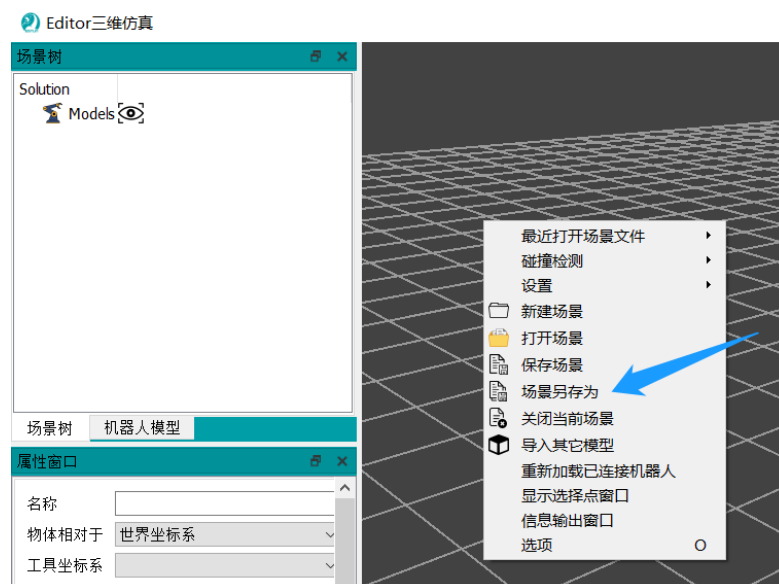


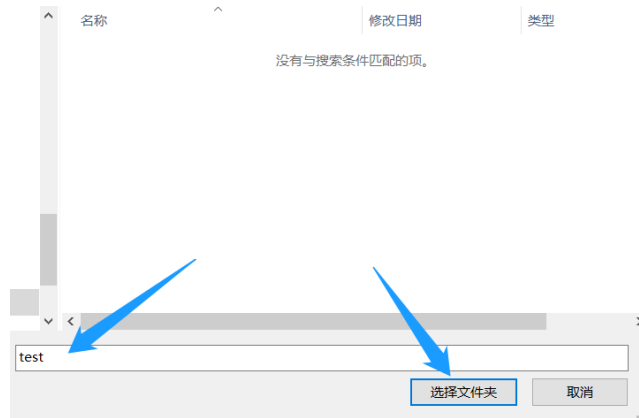
Alternatively, right-click on an empty space in the 3D simulation page and choose "Open Scene".



9.2.6. Save Scene As

Click on the 3D menu -> Click on File -> Click on Save Scene As to save the scene workspace files to a different folder.

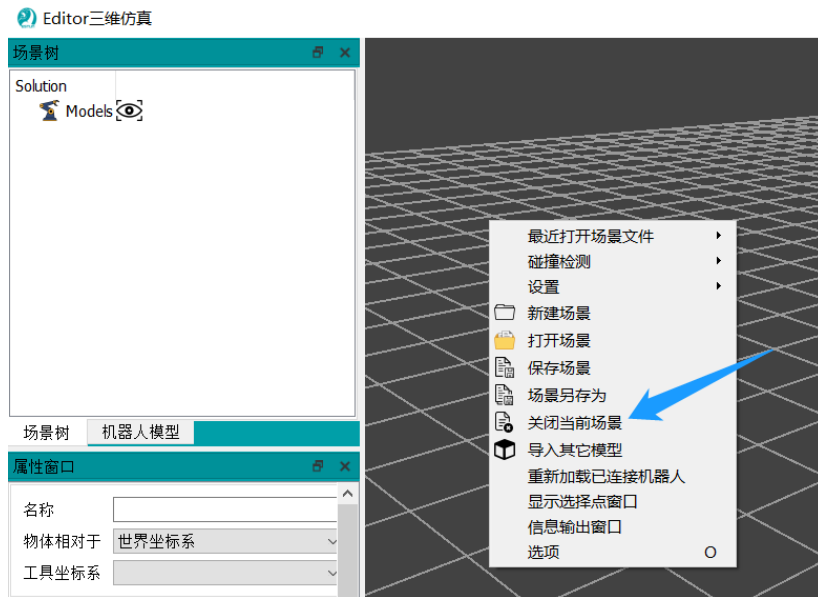




9.2.7.Close Scene

Click on the 3D menu -> Click on File -> Click on Close Scene to close the currently opened scene.





9.3. "Accessibility" Menu

9.3.1. Capture Screen

Click on the 3D menu -> Click on Accessibility -> Click on Capture Screen to save a screenshot of the current simulation page.



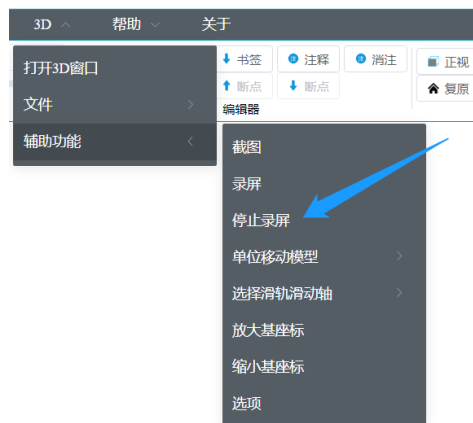
9.3.2. Record Screen

Click on the 3D menu -> Click on Accessibility -> Click on Record Screen to record a video of the current simulation page.



9.3.3. Stop Recording

Click on the 3D menu -> Click on Accessibility -> Click on Stop Recording to stop the current screen recording of the simulation page.

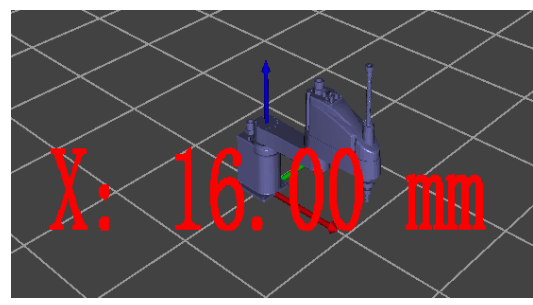
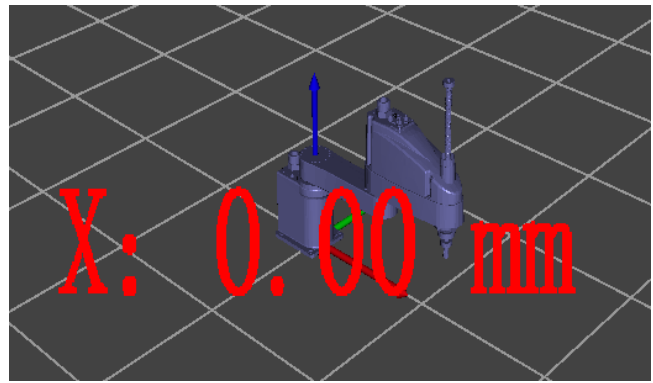
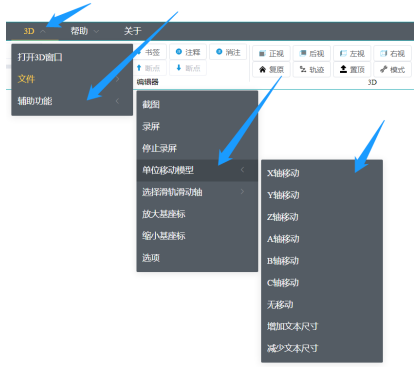


9.3.4. Unit Model Movement (ALT+1,2,3,4,5,6,7)

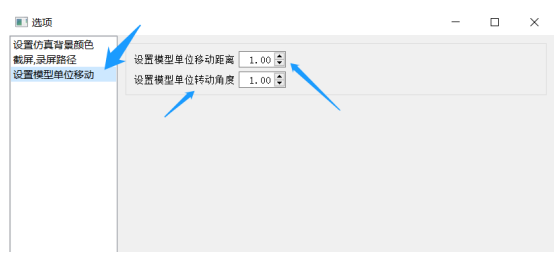
Click on the 3D menu -> Click on Accessibility -> Click on Unit Model Movement -> Choose XYZABC axis to move the model.

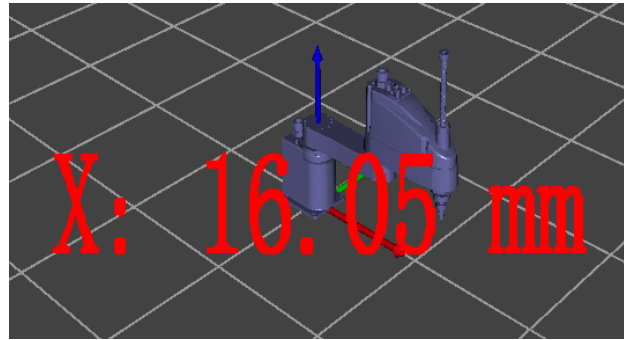
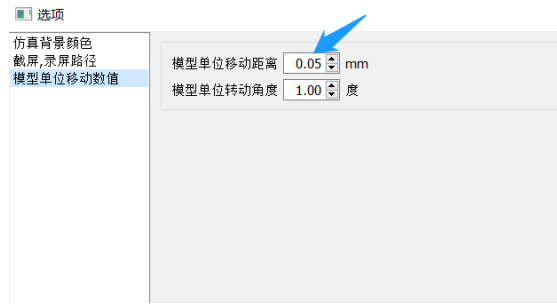
1. Select X-axis: Corresponds to the translation axis X of the model. After selection, there will be text prompts in the scene. Press the UP arrow key on the keyboard to increase the value of the X-axis, and press the DOWN arrow key to decrease the value of the X-axis.

Shortcut key (ALT+1)



The default unit value added is 1, and you can set the unit movement length in the options.





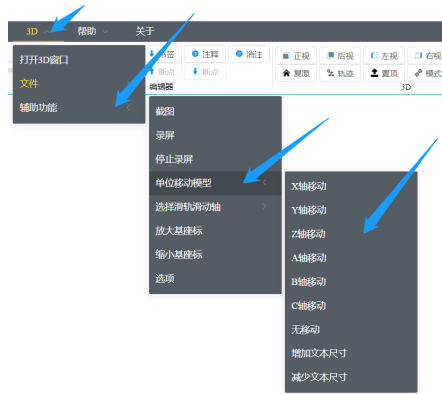
2. Select Y-axis: Corresponds to the translation axis Y of the model. After selection, there will be text prompts in the scene. Press the UP arrow key on the keyboard to increase the value of the Y-axis, and press the DOWN arrow key to decrease the value of the Y-axis.

Shortcut key (ALT+2)



3. Select Z-axis: Corresponds to the translation axis Z of the model. After selection, there will be text prompts in the scene. Press the UP arrow key on the keyboard to increase the value of the Z-axis, and press the DOWN arrow key to decrease the value of the Z-axis.

Shortcut key (ALT+3)



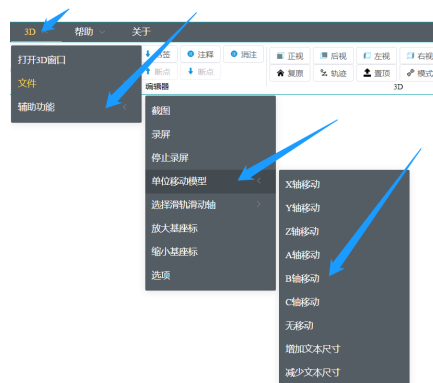
4. Select A-axis: Corresponds to the rotation axis A of the model. After selection, there will be text prompts in the scene. Press the UP arrow key on the keyboard to increase the value of the A-axis, and press the DOWN arrow key to decrease the value of the A-axis.

Shortcut key (ALT+4)



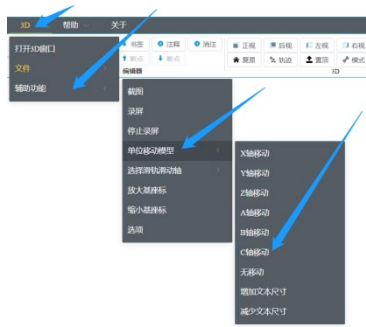
5. Select B-axis: Corresponds to the rotation axis B of the model. After selection, there will be text prompts in the scene. Press the UP arrow key on the keyboard to increase the value of the B-axis, and press the DOWN arrow key to decrease the value of the B-axis.

Shortcut key (ALT+5)



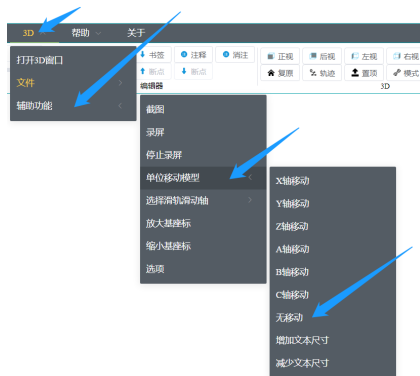
6. Select C-axis: Corresponds to the rotation axis C of the model. After selection, there will be text prompts in the scene. Press the UP arrow key on the keyboard to increase the value of the C-axis, and press the DOWN arrow key to decrease the value of the C-axis.

Shortcut key (ALT+6)



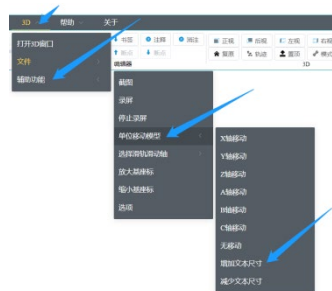
7. Select "No Movement" axis: Cancel the movement axis of the model.

Shortcut key (ALT+7)



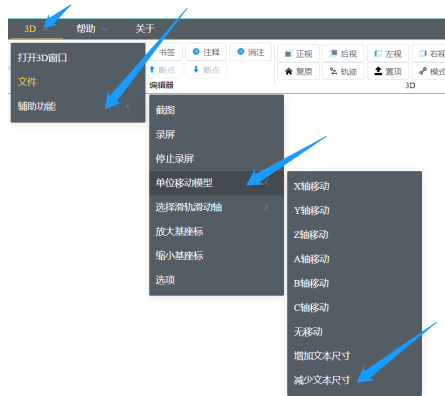
8. Click on "Increase Text Size": Enlarges the text of the models movement axis.

Shortcut key (ALT+E)



9. Select "Decrease Text Size": Reduces the text size of the models movement axis.

Shortcut key (ALT+R)



9.3.5. Select Slider Axis

Click on the 3D menu -> Click on Accessibility -> Click on Slider Axis.

Selecting the X-axis means that both the slider and the slider robot will move in the X-axis direction of the simulation world coordinate system.



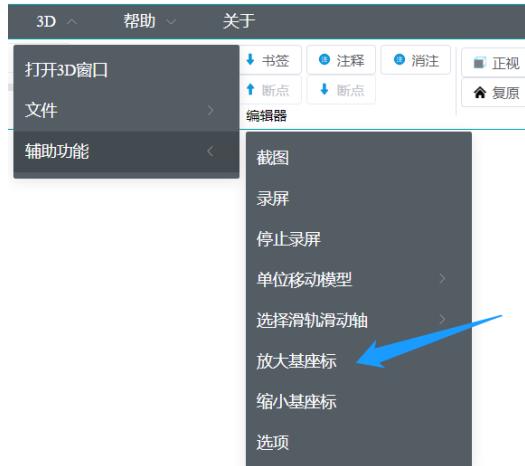
Selecting the Y-axis means that both the slider and the slider robot will move in the Y-axis direction of the simulation world coordinate system.



9.3.6. Zoom In Base Coordinates (Page Up)

Click on the 3D menu -> Click on Accessibility -> Click on Zoom In Base Coordinates to zoom in on the base coordinates of the current model.

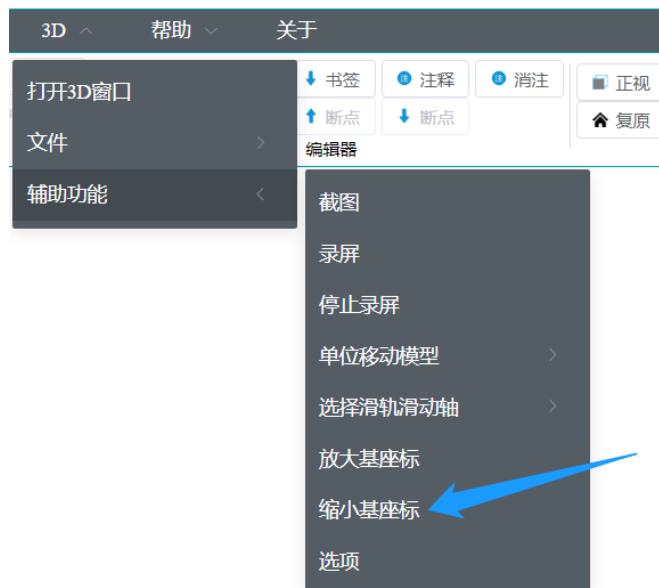
Shortcut key (Page Up)



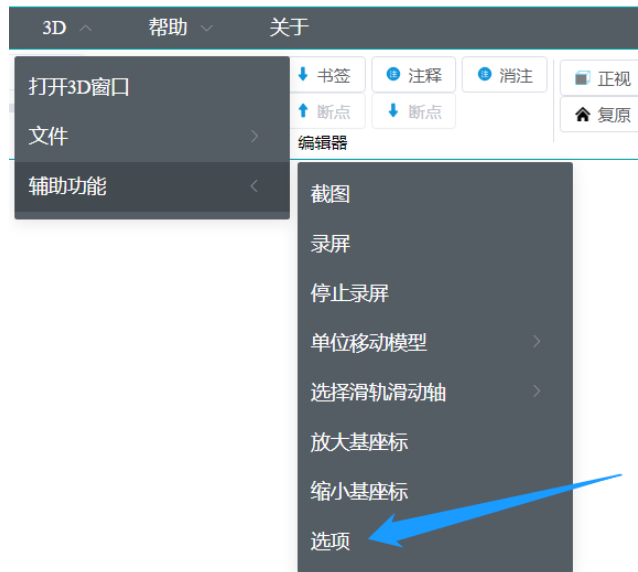
9.3.7.Zoom Out Base Coordinates (Page Down)

Click on the 3D menu -> Click on Accessibility -> Click on Zoom Out Base Coordinates to zoom out of the base coordinates of the current model.

Shortcut key (Page Down)



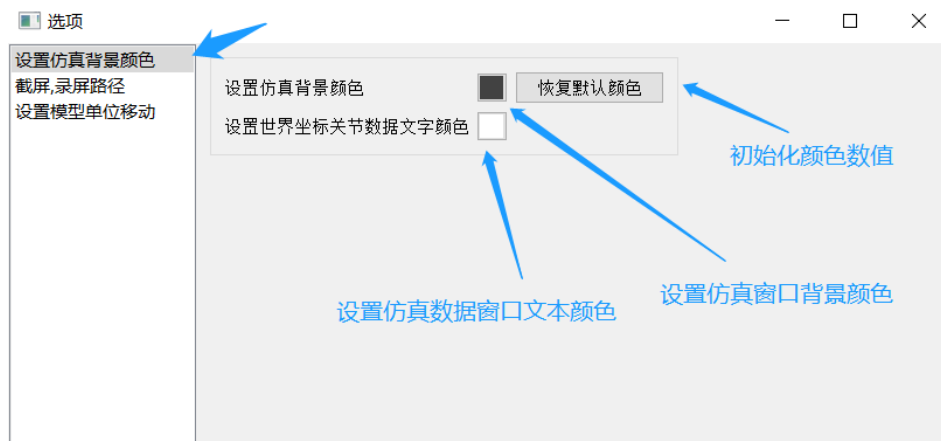
9.3.8.Options



Click on the 3D menu -> Click on Accessibility -> Click on Options to open the options settings window.



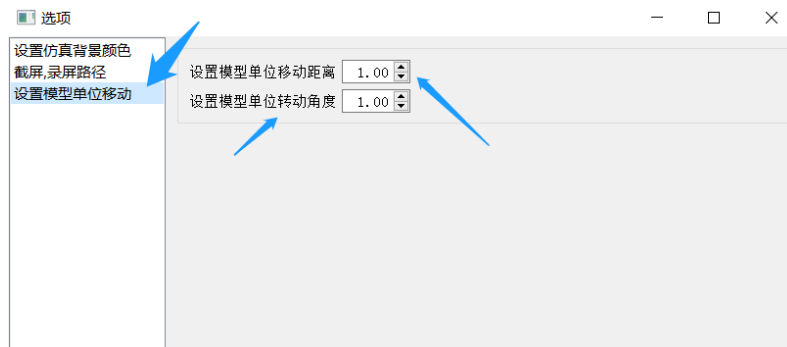
First item: Set simulation background color and text color in the data window.



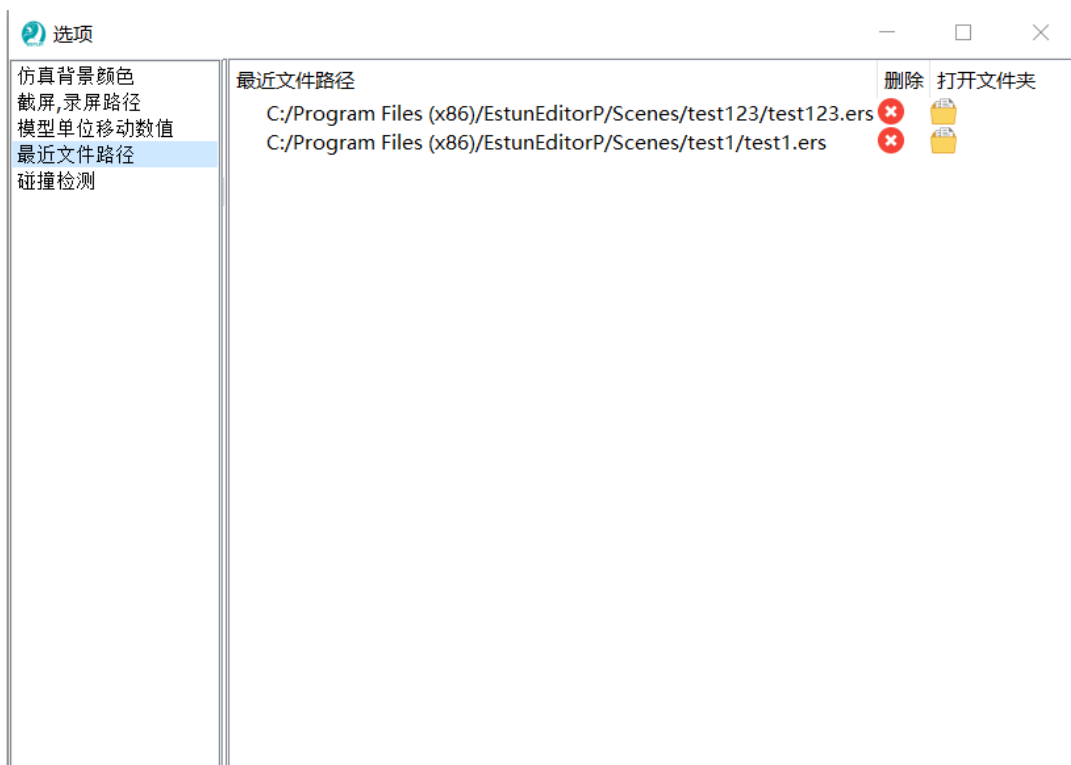
Second item: Open the folder for saving screenshots and recorded screens.





Third item: Set the value for unit movement of the model.



Fourth item: Recent file paths.



Manage the recently opened file paths. Click  删除 to delete a file path record, and click  打开文件夹 to open the folder of this path.

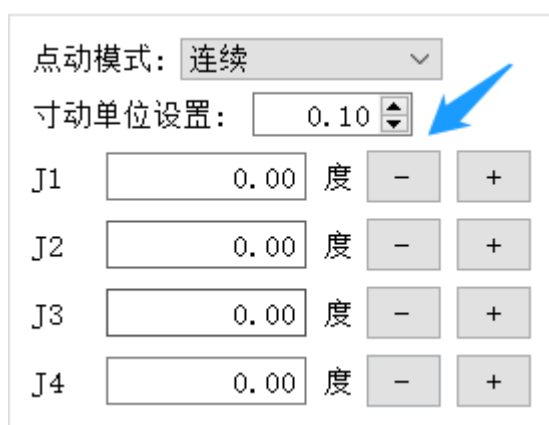
Fifth item: Collision Detection

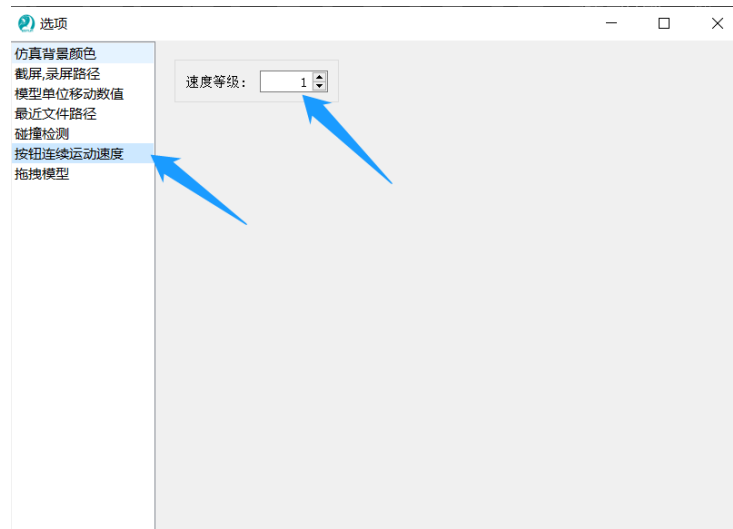
Set this parameter to adjust the time interval for collecting collision points in collision detection.



Sixth item: Button Continuous Movement Speed

Set the speed of robot movement controlled by buttons. The greater the number, the faster the speed.





Seventh item: Dragging Model

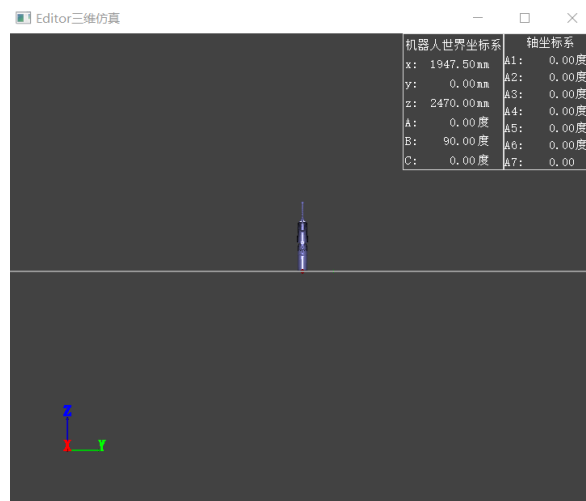
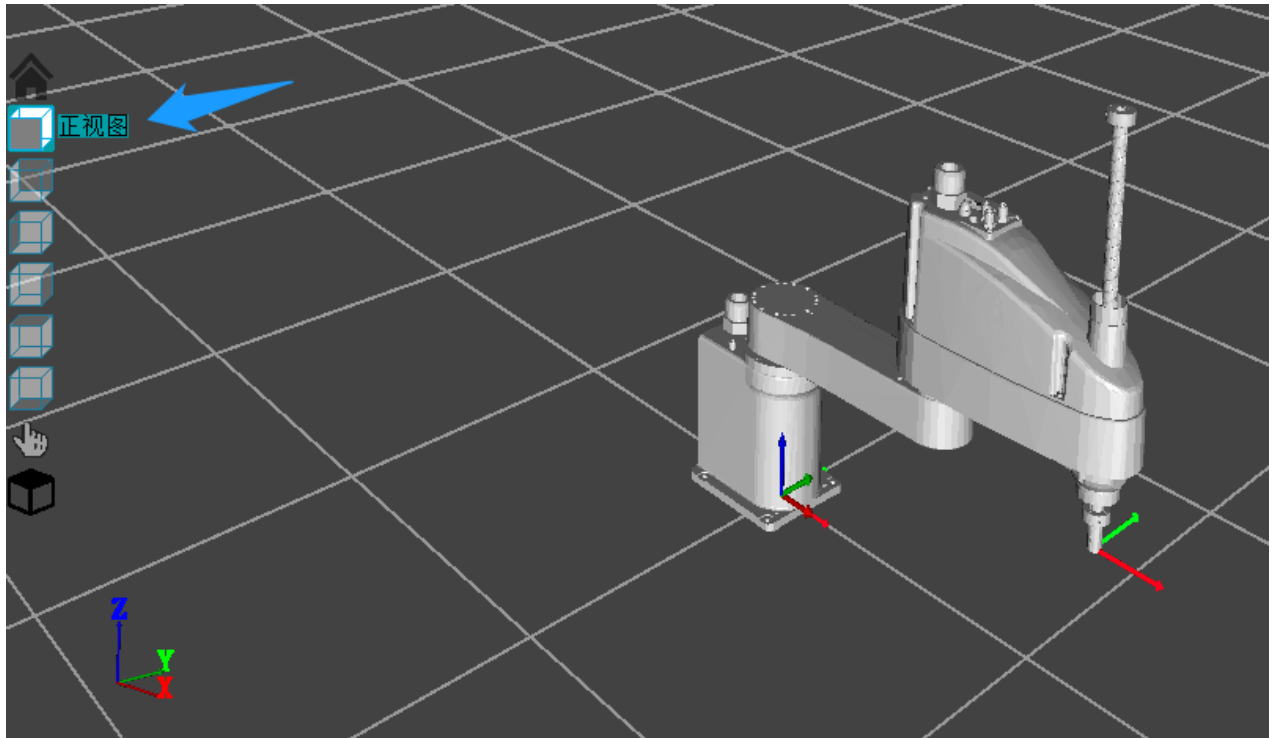
Set the speed of dragging the model and the size of the coordinate system for dragging the model.



9.4. Toolbar

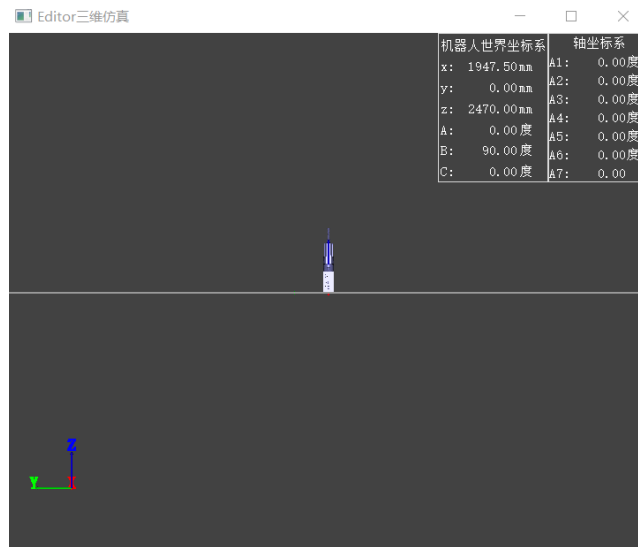
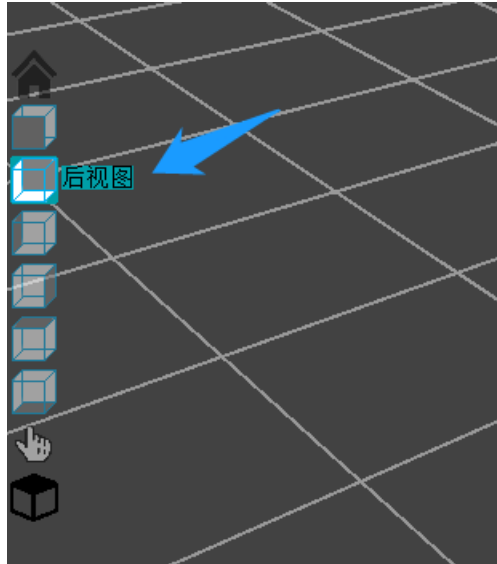
9.4.1. Front View

To set the front view of simulation window.



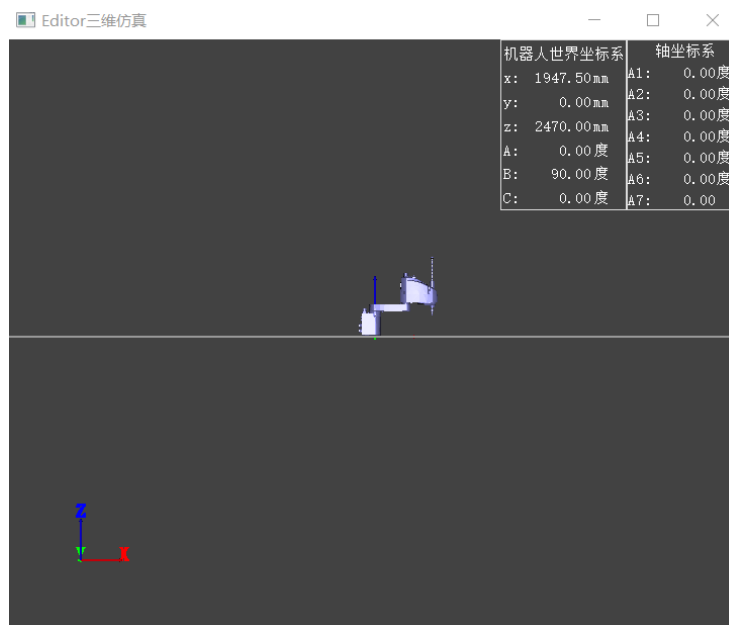
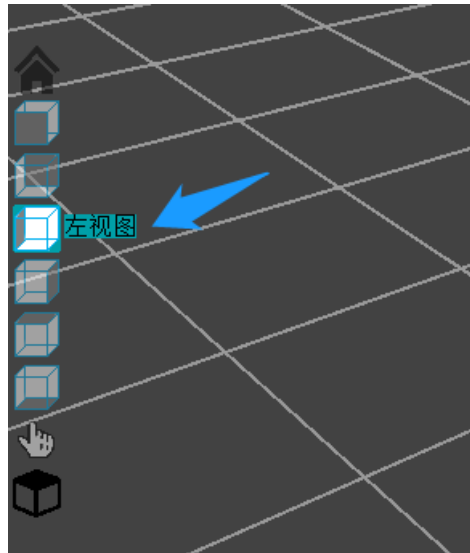
9.4.2. Rear View

To set the rear view of simulation window.



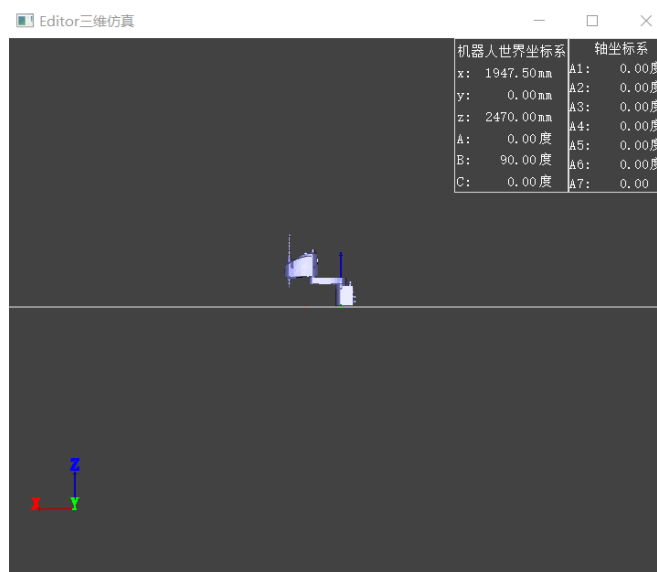
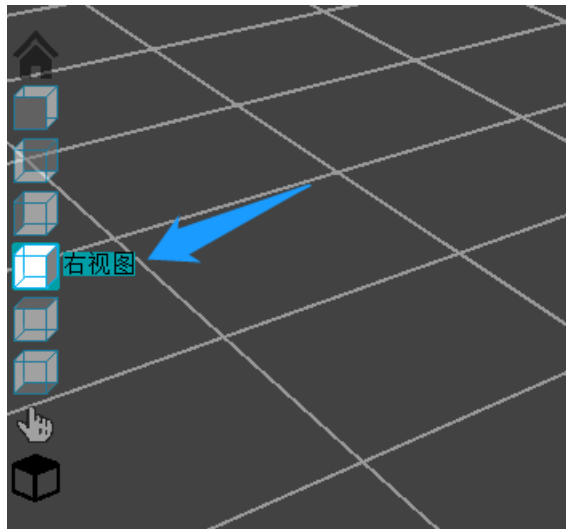
9.4.3. Left View

To set the left view of simulation window.



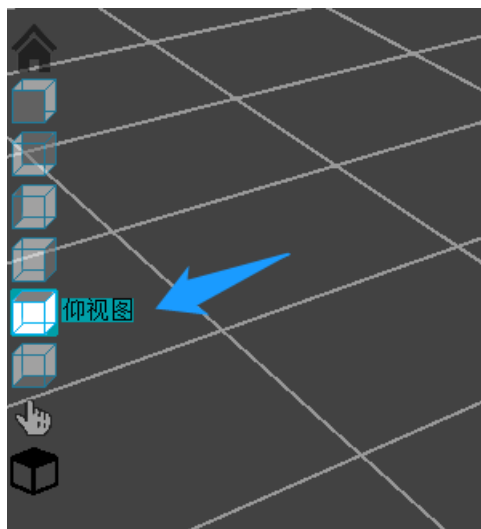
9.4.4.Right View

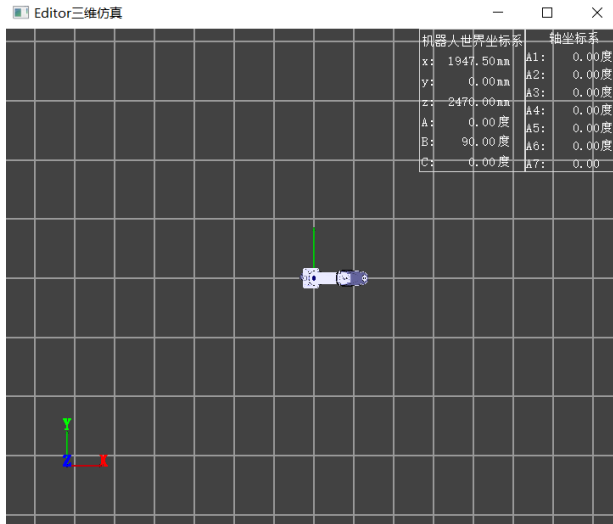
To set the right view of simulation window.



9.4.5. Top View

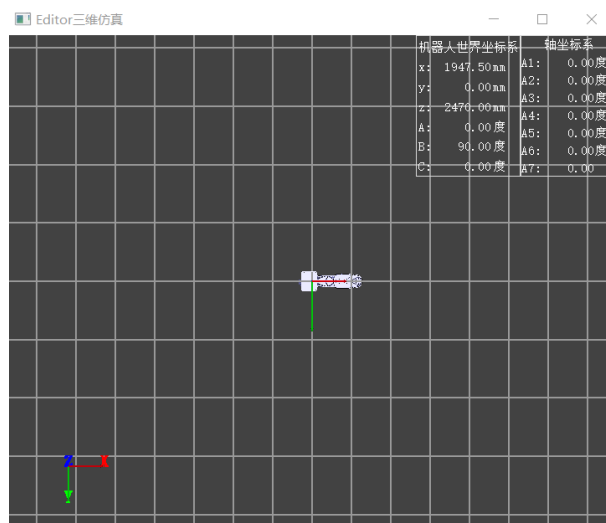
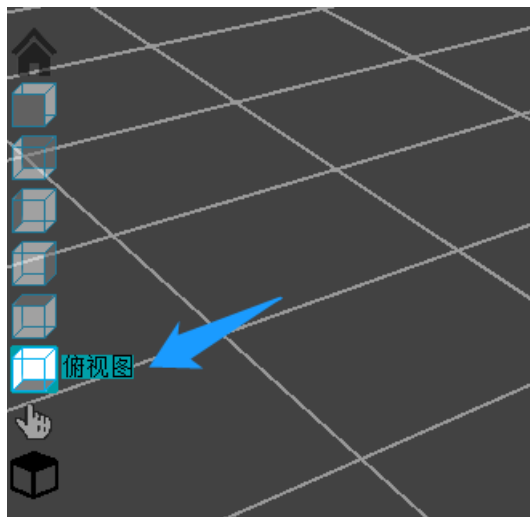
To set the top view of simulation window.





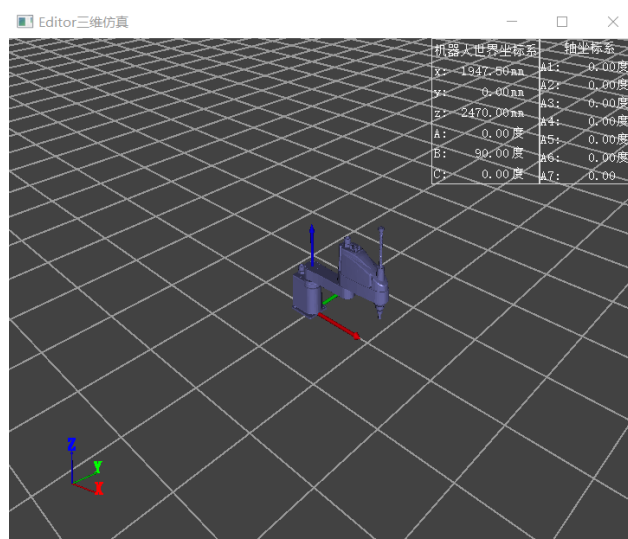
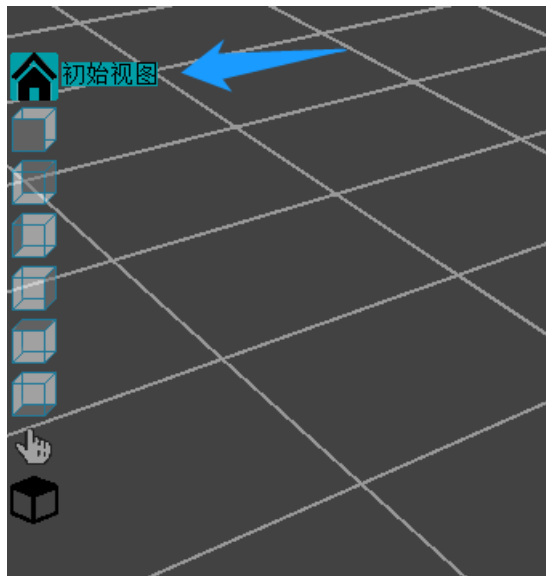
9.4.6. Bottom View

To set the bottom view of simulation window.



9.4.7.Restore View

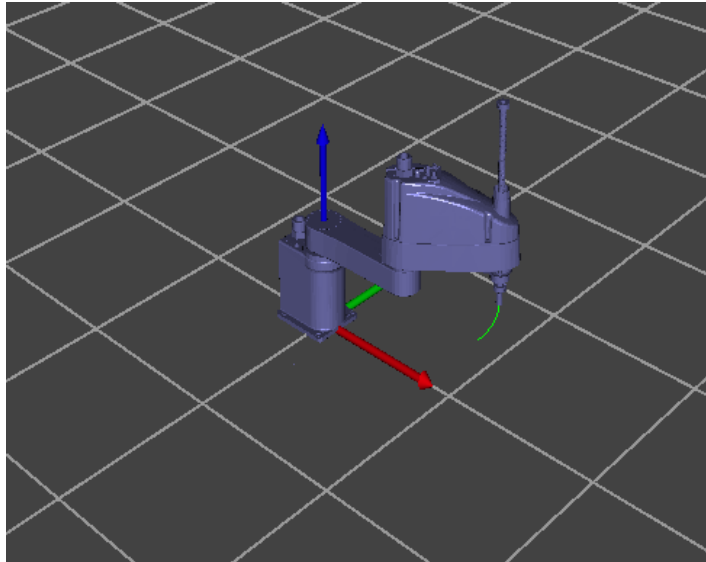
To set the restore view of simulation window.



9.4.8.Path

To set the path of simulation window.





Note: This path is relative to the center point of the robot base. Therefore, in the case of a 7th-axis slider simulation, the displayed path is only for the robot and does not include the path of the slider.

9.4.9. Always On Top

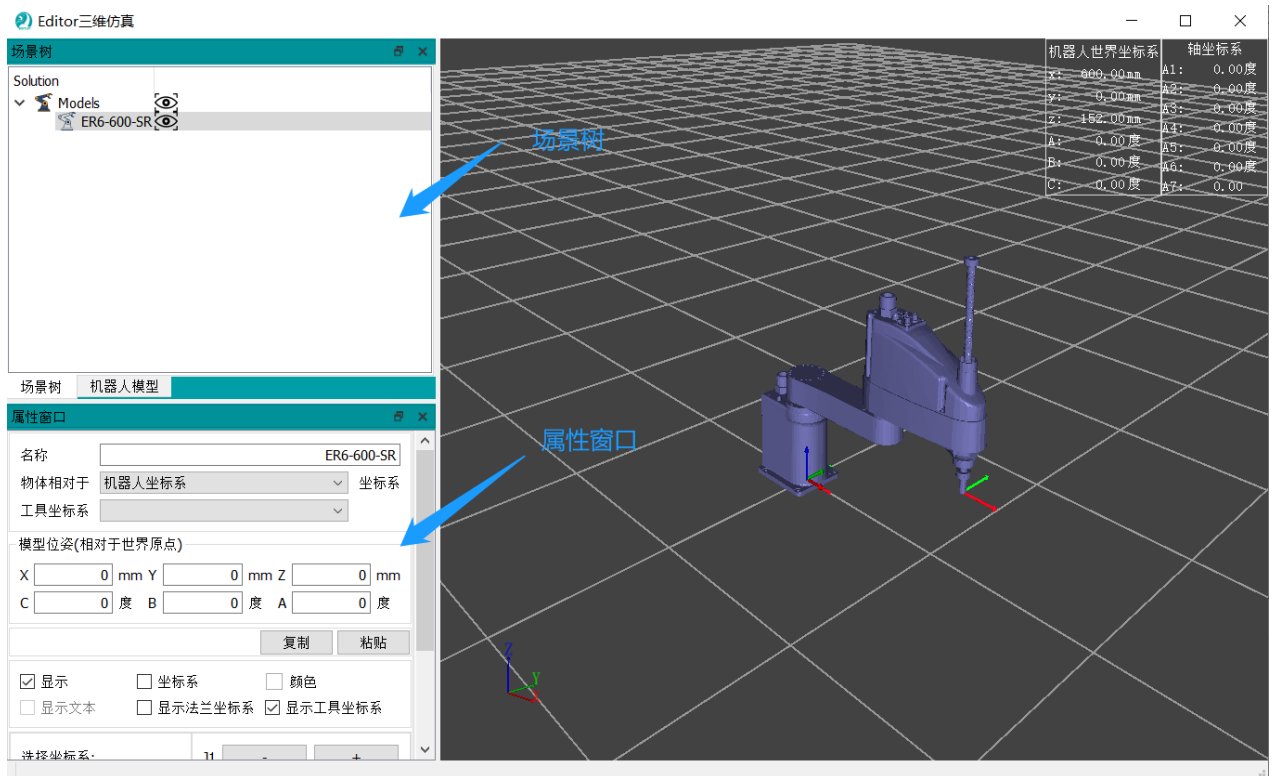
To set the simulation window to be always on top.



9.4.10. Modes

Opens or closes the scene tree and property window in the simulation window.



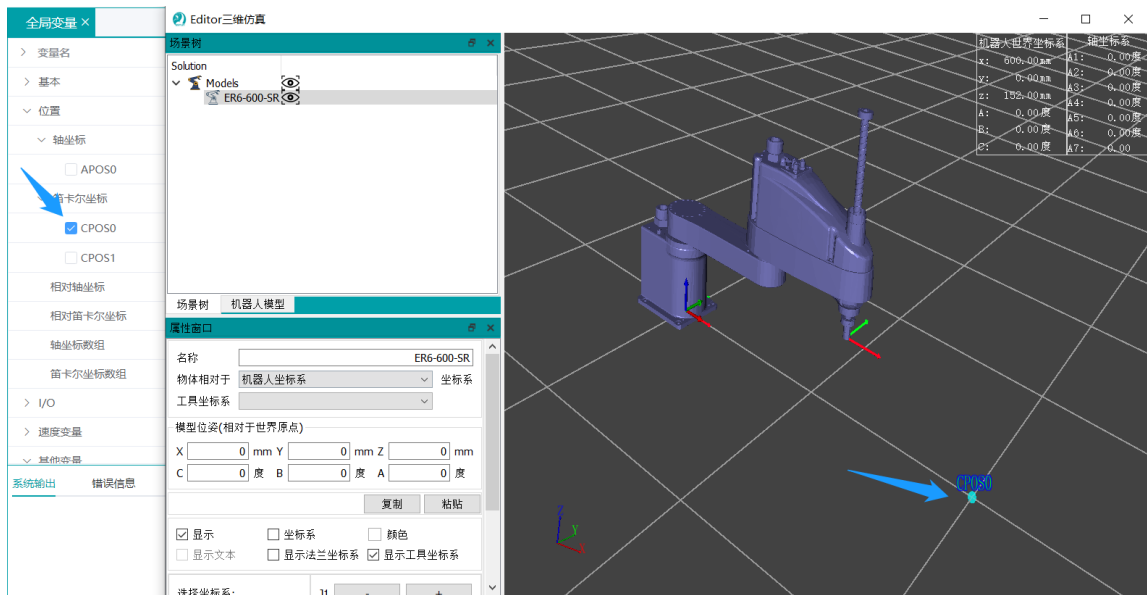


9.4.11. Clear

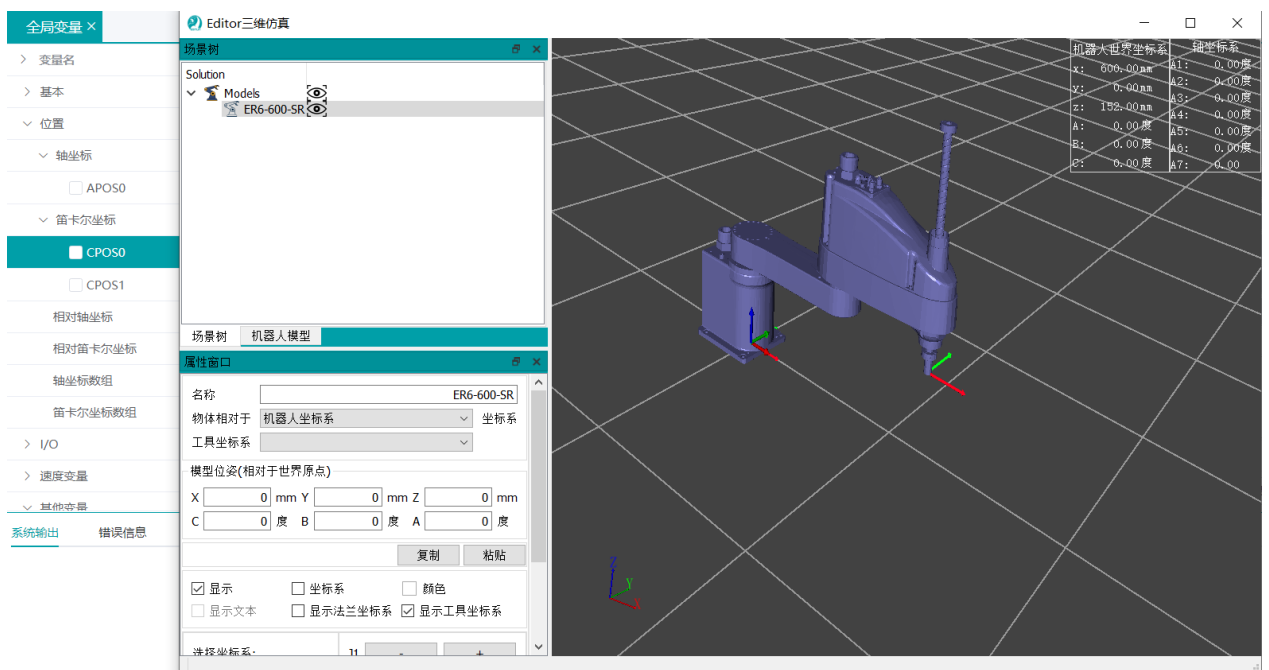
Clears the display of all selected variables in the 3D simulation of the current project. Currently, the variables that can be displayed in 3D include position variables: axis coordinates (APOS) and Cartesian coordinates (CPOS), area variables (AEAR), user coordinates (USERCOOR), and tool center point coordinates (TOOL).



Example: After selecting variables in the project, they are displayed in the 3D simulation.



Clicking the Clear button will remove all variables that are currently displayed in the 3D simulation.



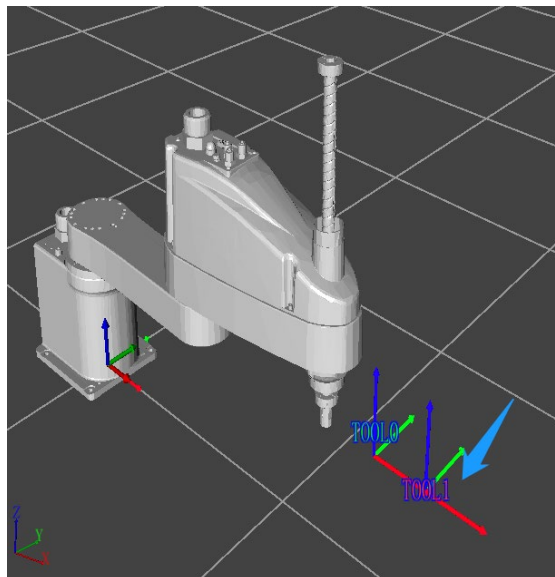
9.4.12. Drag

The dragging mode is displayed at the end current robots tool coordinate system, allowing you to perform virtual robot axis dragging movements.

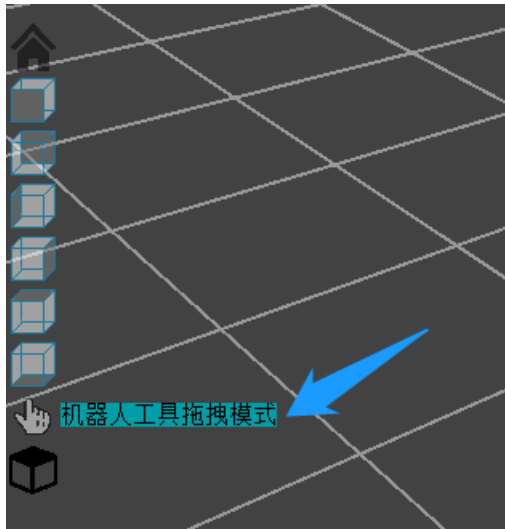
First, set the project as the current project: Right-click on the project name and select "Set as Current Project Space".



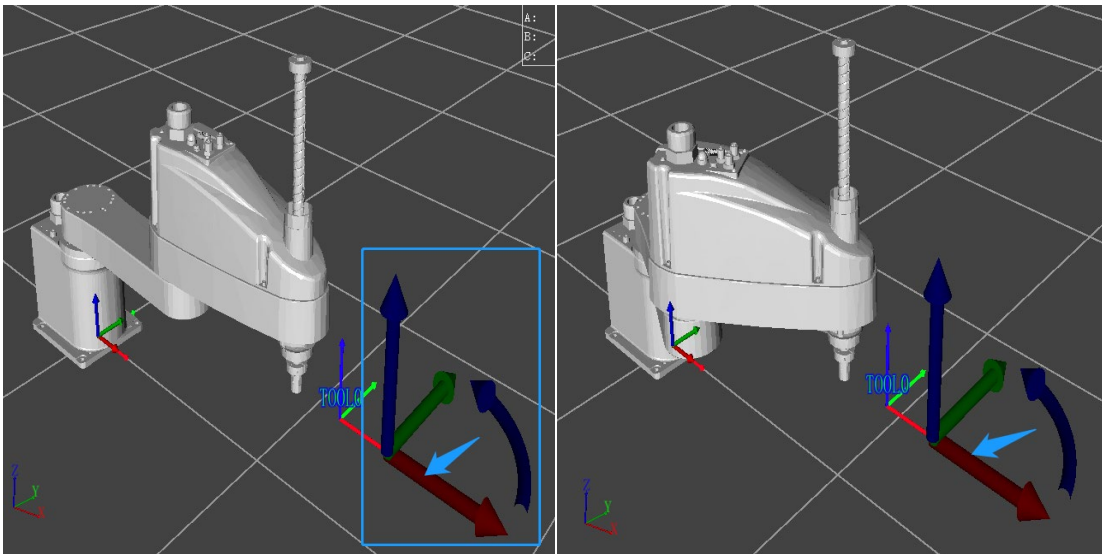
In the Property Window, select the current tool coordinate system.



Click on "Drag".



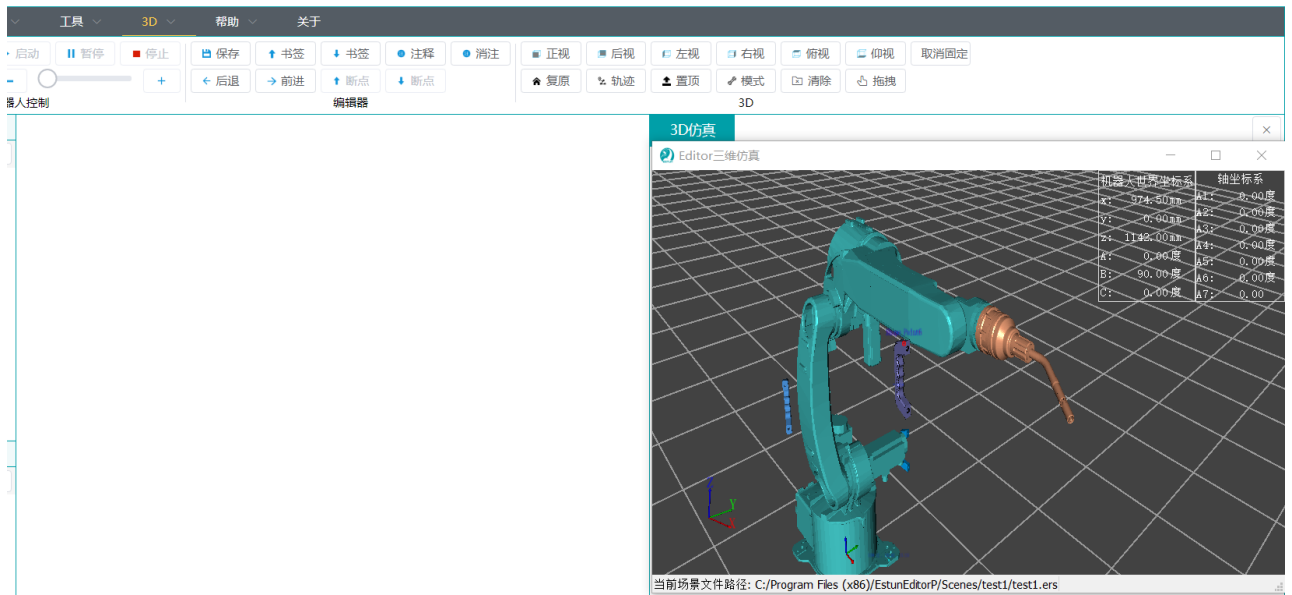
A dragging model will appear at the end of the robots tool. Place the mouse over the corresponding axis and drag it along the axis.



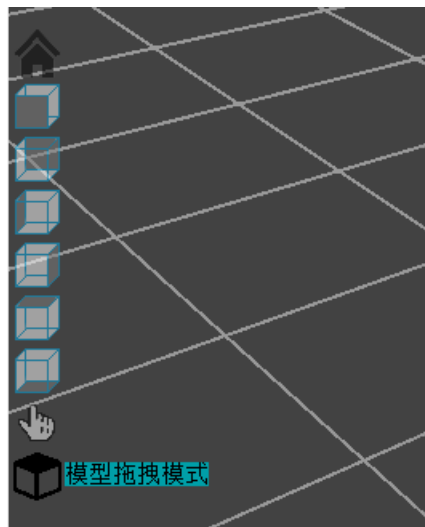
9.4.13. One-Click Fixing

Fixes the 3D simulation window in the split-screen position. After opening the 3D window, click on "Always On Top" first, and then click on "One-Click Fixing."

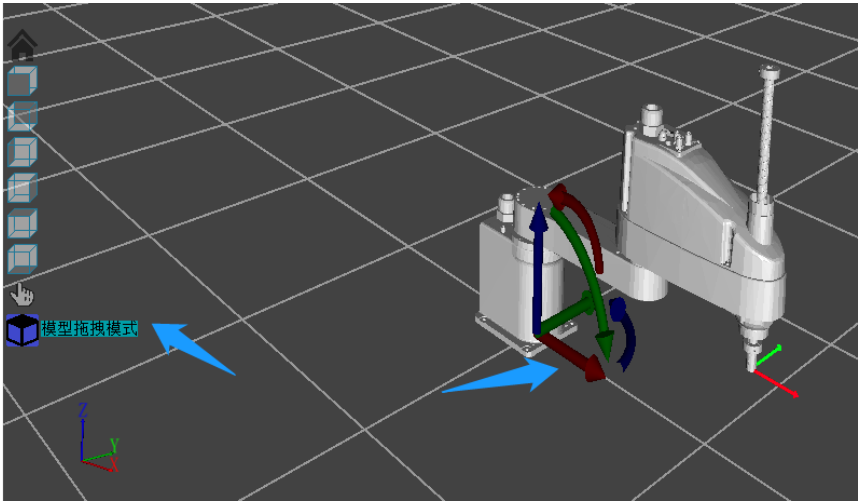




9.4.14. Model Dragging



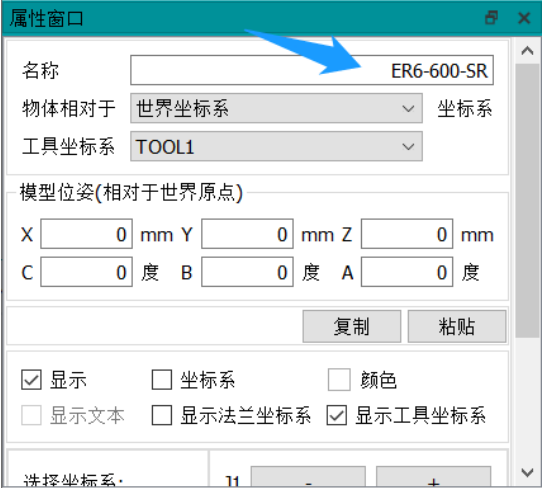
After selecting a model, click on the "Drag Model" button. A coordinate system will appear, and you can manually move the model by dragging the coordinate system.



9.5. Property Window

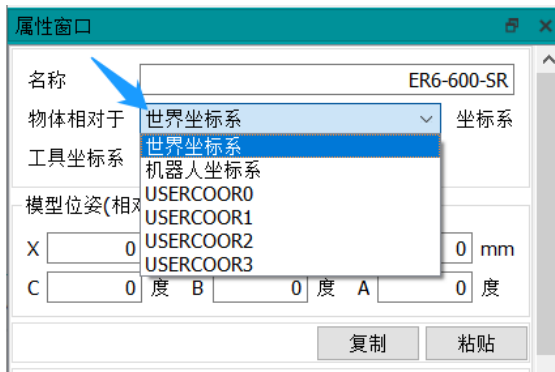
9.5.1. Model Name

To display current models name.



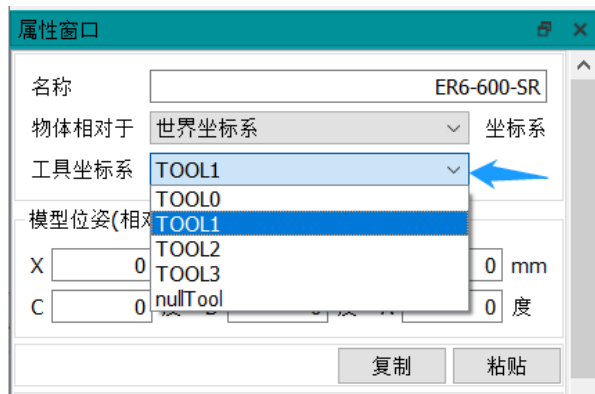
9.5.2. Set Current Reference Coordinate System

When in the selection point mode, the coordinate data of the simulation points will change according to the data of the reference coordinate system. Here, you can set the reference coordinate system.



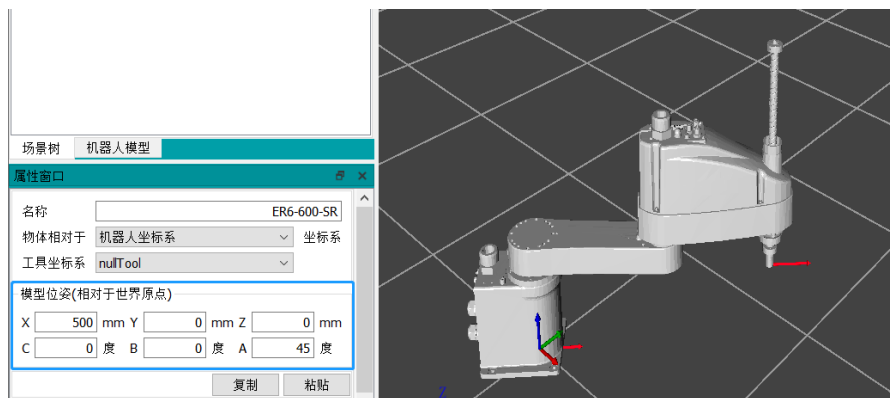
9.5.3. Set Current Robot Tool Coordinate System

To select the current virtual robots end-of-arm tool coordinate system.



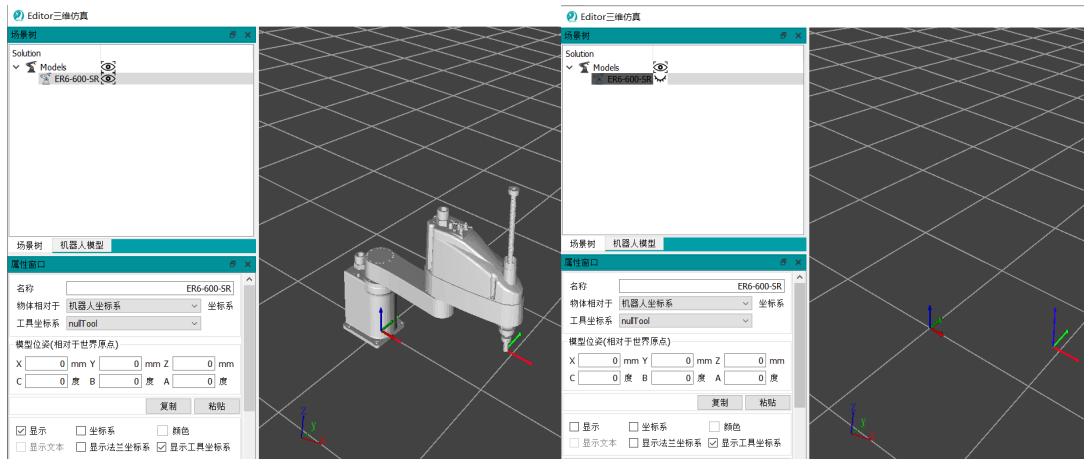
9.5.4. Set Model Posture

To set the current models posture in the current simulation scene.



9.5.5. Set Model Display and Hide

To set the visibility of the model in the simulation page.

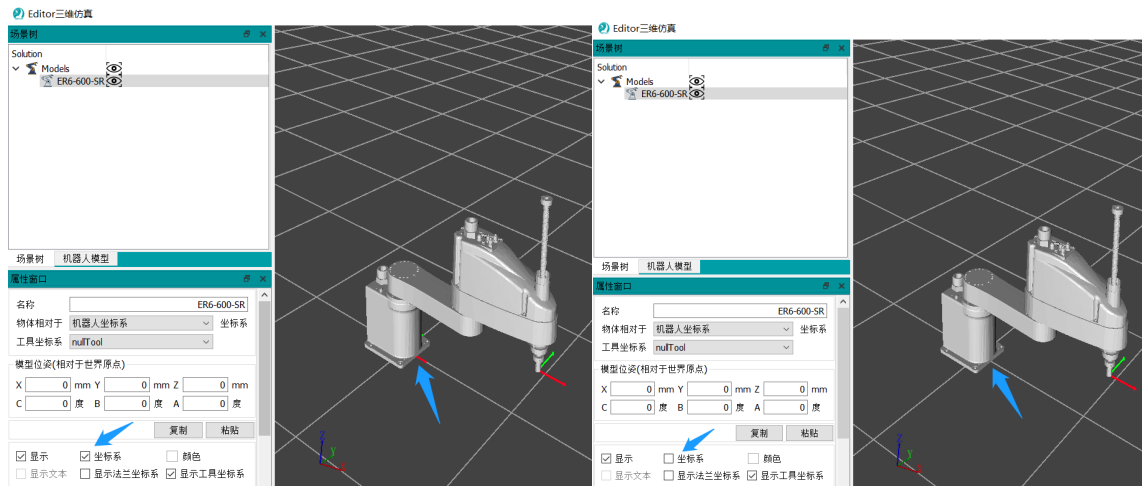


(Show Model)

(Hide Model)

9.5.6. Set Base Coordinate System Display and Hide

To set the visibility of the models base coordinate system in the simulation page.

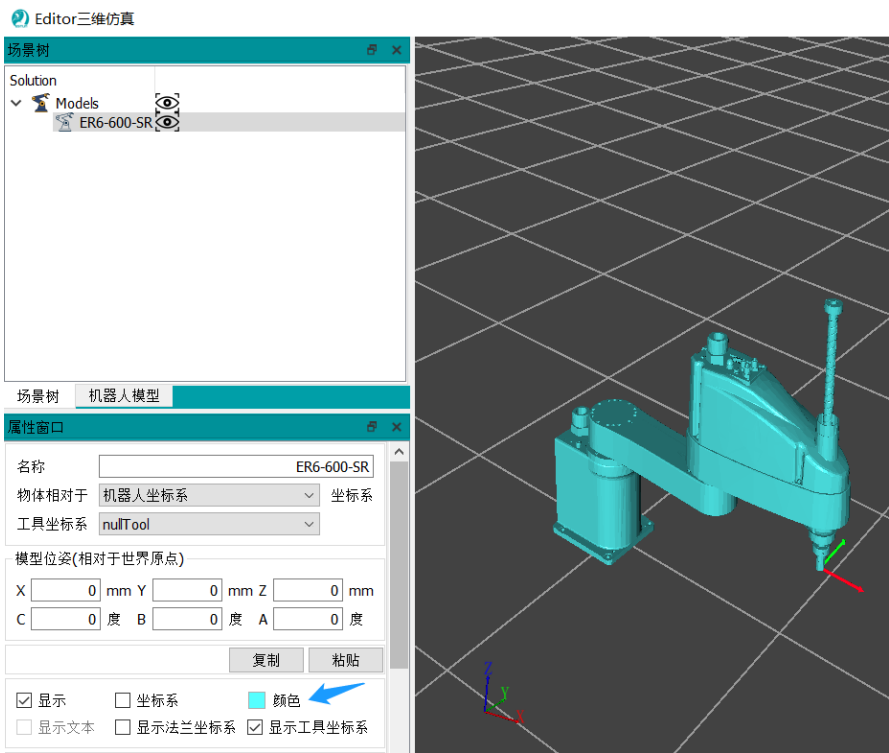
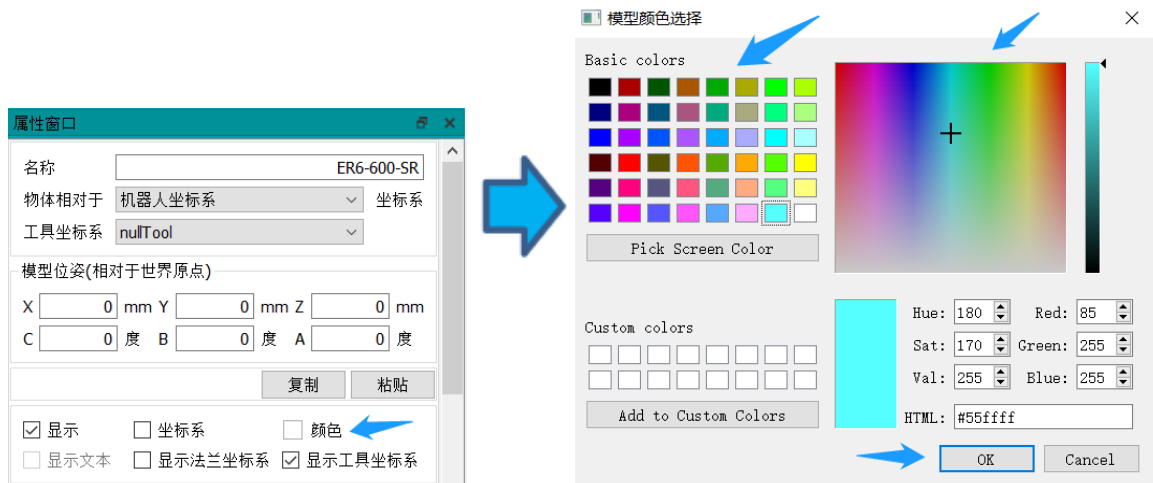


(Show Base Coordinate System)

(Hide Base Coordinate System)

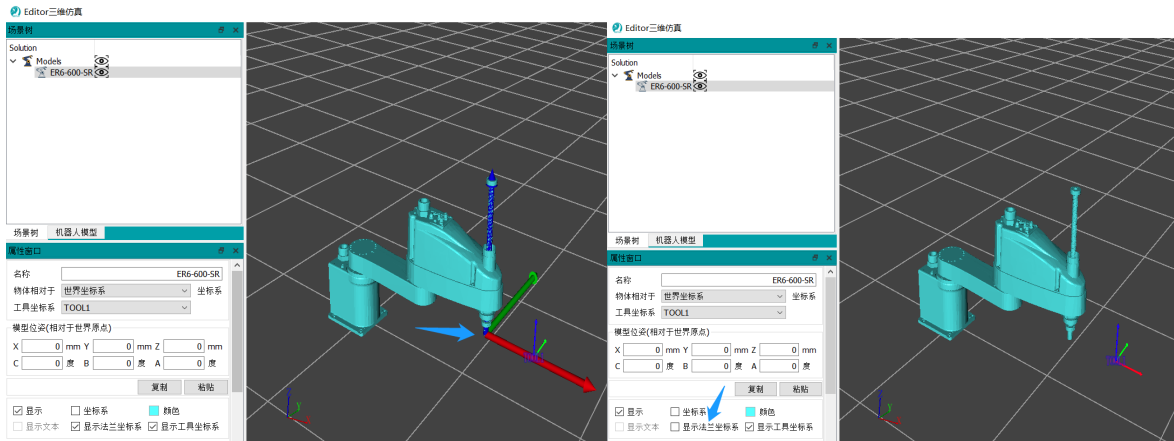
9.5.7. Set Model Color

To set the models color. Click on the Color button and select a color.



9.5.8. Set Robot Flange Coordinate System Display and Hide

To set the visibility of the robots flange coordinate system in the simulation page.

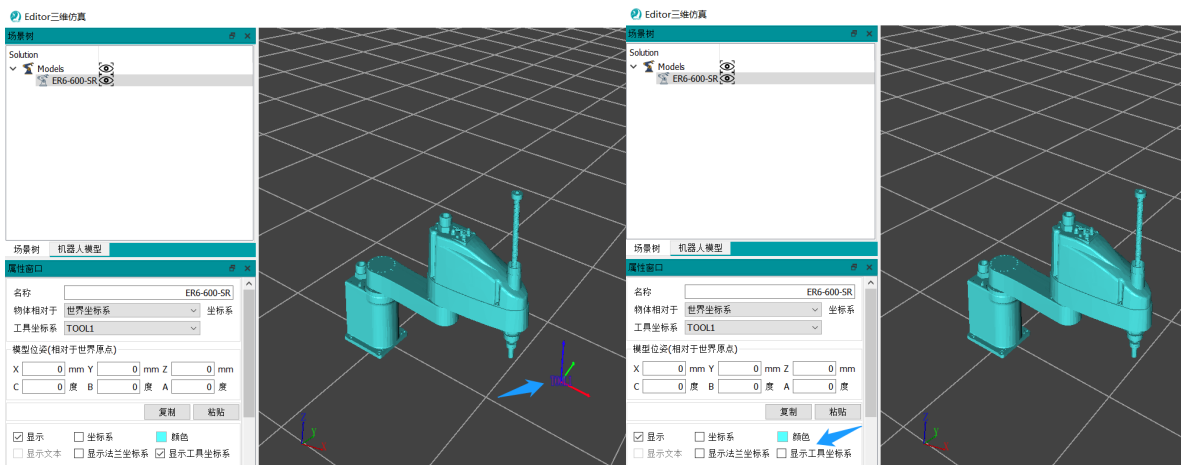


(Show Current Tool Coordinate System)

(Hide Current Tool Coordinate System)

9.5.9. Set Robot Tool Coordinate System Display and Hide

To set the visibility of the robots tool coordinate system in the simulation page.



(Show Current Tool Coordinate System)

(Hide Current Tool Coordinate System)

9.5.10. Copy Model Posture

To copy the posture data of the current model.



9.5.11. Paste Model Posture

To paste the copied pose data to the current model.



9.5.12. Select Virtual Robot Motion Reference Coordinate System

To specify the coordinate system that the virtual robot uses as a reference for motion. The default initialization is the axis coordinate system.



9.5.13. Display Current "mode" Value of Virtual Robot



9.5.14. Single Axis Control of Virtual Robot

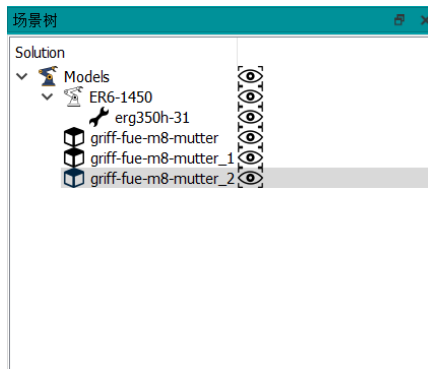
Depending on the selected coordinate system, the axis control buttons will switch to control different axes. The initial setting is the axis coordinate system, and the axis control allows continuous movement.



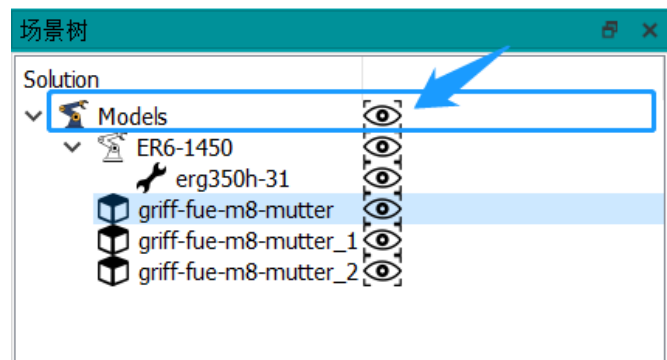
9.6. Scene Tree

9.6.1. Model List

To list the models in the scene. The model name is on the left, and the control for showing or hiding the model is on the right.



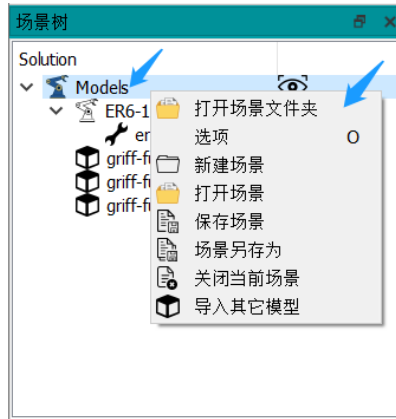
The first row of "Models" controls the visibility of all models in the current scene.



9.6.2. Right-Click on "Models" to Open the Current Scene Space

Folder

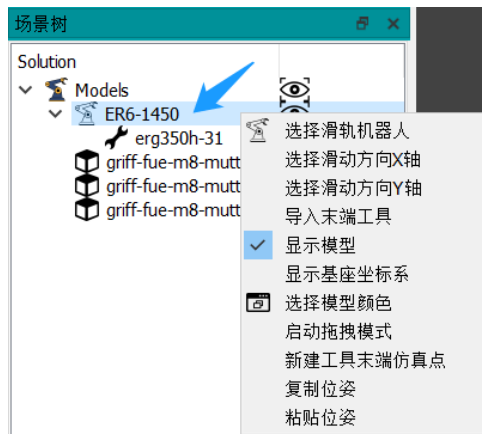
Right-click on "Models" to open the current scene space folder.



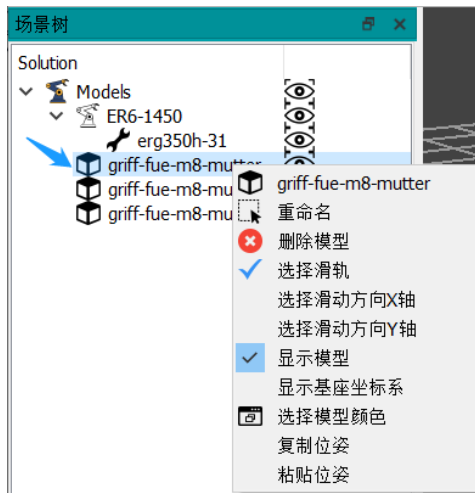
"Options" Menu: Clicking on "Options" opens the settings window for the 3D simulation. The tools in this menu are the same as the ones in the other menu bars and the "File" menu in Section 8.2. Right-clicking here is for convenience.

9.6.3. Right-Click Menu for Scene Tree Model Item

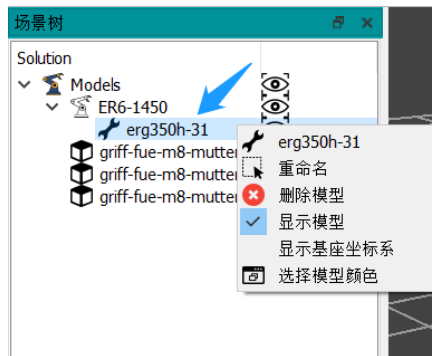
Right-clicking on a model item in the scene tree opens a menu. If the model is a robot, the menu options are the same as those in "8.7.4. Right-Click Robot Model Menu". For specific details, refer to "8.7.4. Right-Click Robot Model Menu".



If the model is a regular model, a menu will pop up with options. The functionality of the menu options with the same names as in "8.7.5. Right-Click Model Menu" is the same. For specific details, refer to "8.7.5. Right-Click Model Menu".

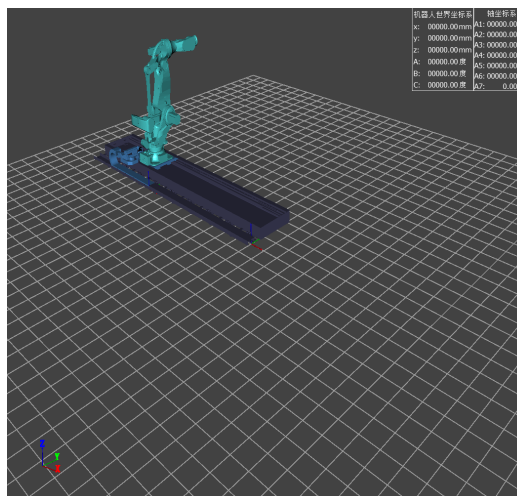


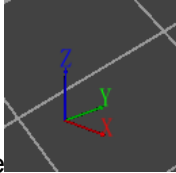
If the model is a robot end-of-arm tool model, a menu will pop up with options. The functionality of the menu options with the same names as in "8.7.6. Right-Click Tool Model Menu" is the same. For specific details, refer to "8.7.6. Right-Click Tool Model Menu".

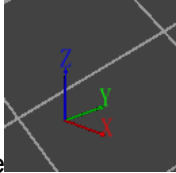


9.7. Simulation Window

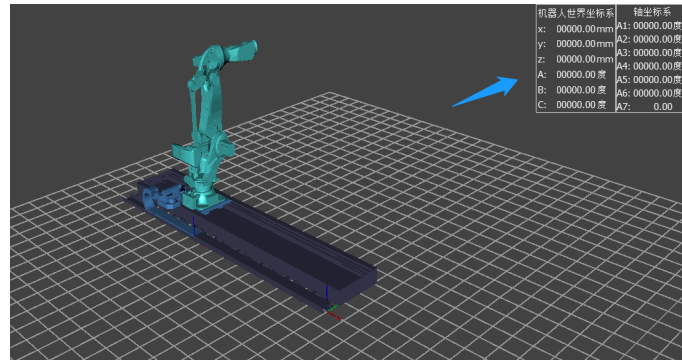
9.7.1. Simulation Window





The  at bottom-left corner represents the pose of the world coordinate system.

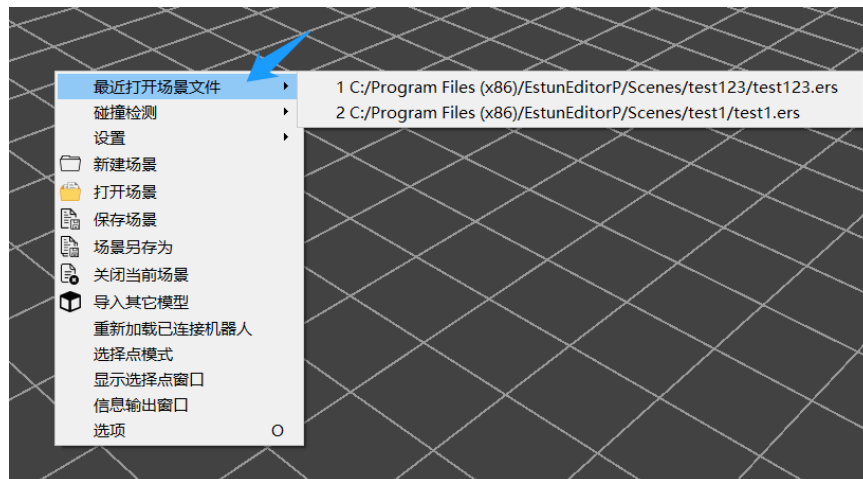
9.7.2. Robot Data Window



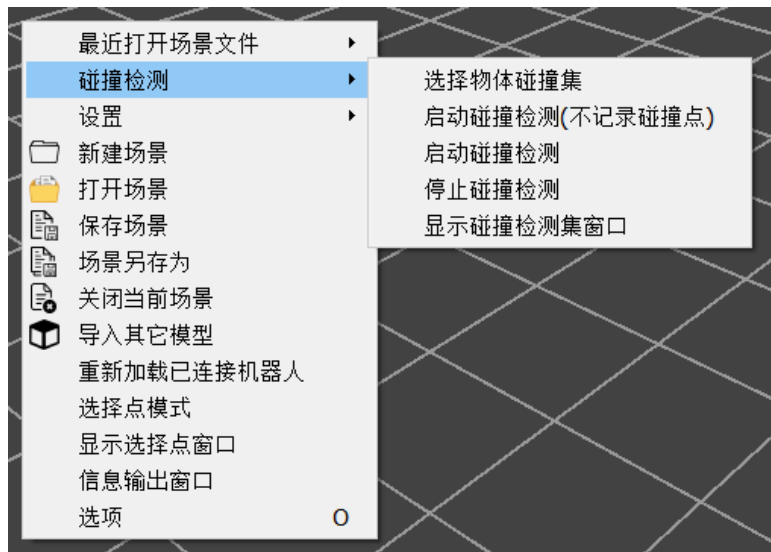
9.7.3.Right-Click Menu for Simulation Scene Window

9.7.3.1 Recently Opened Scene Files Menu

Records the recently opened scene files for quick selection.

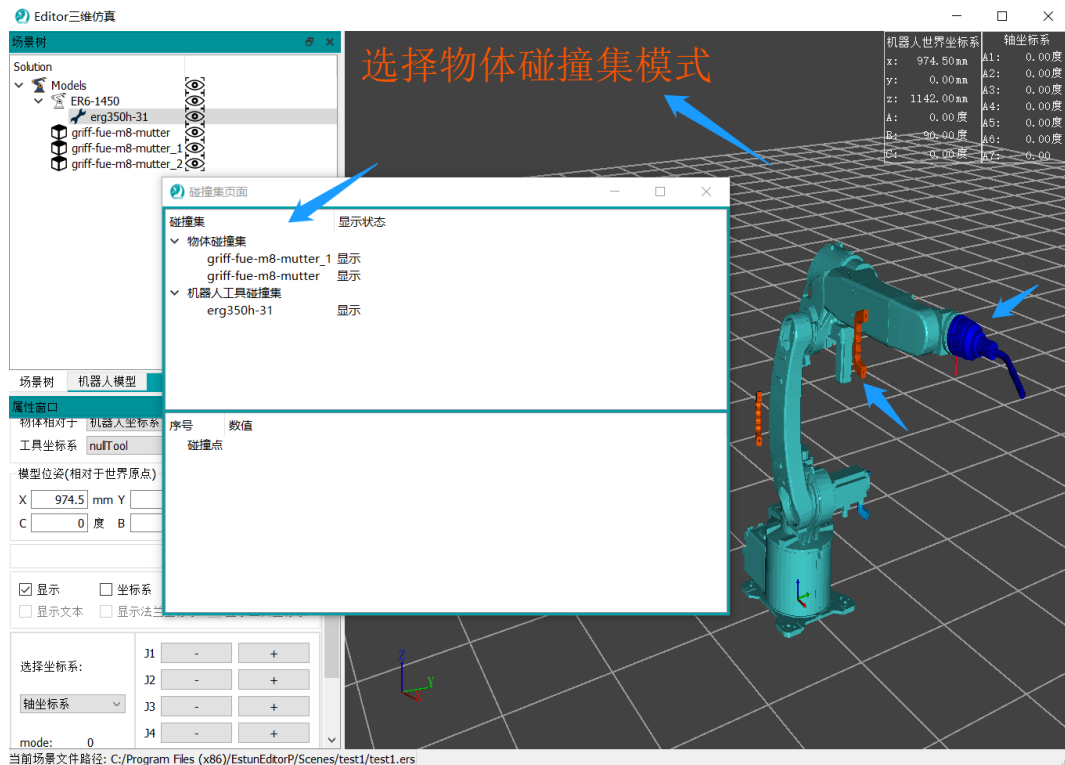


9.7.3.2 Collision Detection



9.7.3.2.1 Select Object Collision Sets

To select the object collision sets, which are the models to be included in the collision detection. When clicking this option, a collision set page will appear as shown in the figure. The collision sets are divided into object collision sets and robot tool collision sets. The object collision sets include regular models that need to participate in collision detection, excluding the models related to the robot. The robot tool collision sets include the tool models that the robot needs to participate in collision detection.



To select models for collision detection, simply click on them. When selecting regular

models, they will appear in orange-red color, and when selecting tool models, they will appear in dark blue.

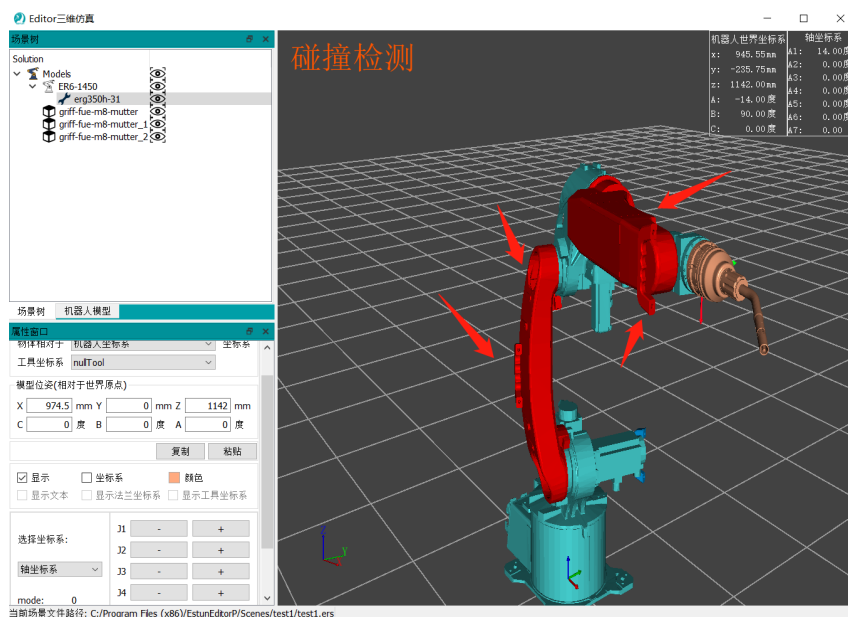
Additionally, joint models on the robot (such as pallet models or other balance bar models, which are not currently included in collision detection) are automatically included in the collision detection.

The top half of the collision set page displays the names of the currently selected models for collision detection and their display status.

The bottom half is used for collecting collision points after activating the "Start Collision Detection" function, enabling the collection of collision points at regular intervals. By clicking on the collected collision points, it is possible to quickly navigate the virtual robot and examine the collision situation.

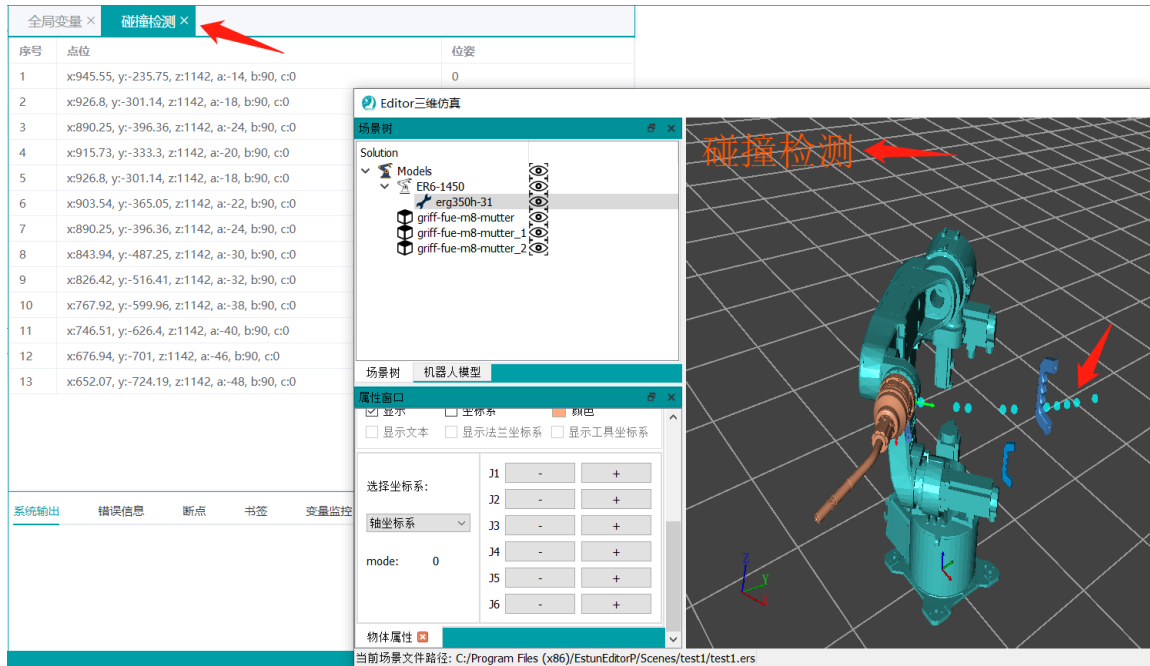
9.7.3.2.2 Start Collision Detection (Without Recording Collision Points)

Clicking this function starts the collision detection thread, which performs collision detection on the models in the collision set. During the movement of the virtual robot, if there is a collision with any model in the collision set, the model will turn red as shown in the figure. To activate the "Start Collision Detection" function, you need to click on the "Stop Collision Detection" function.

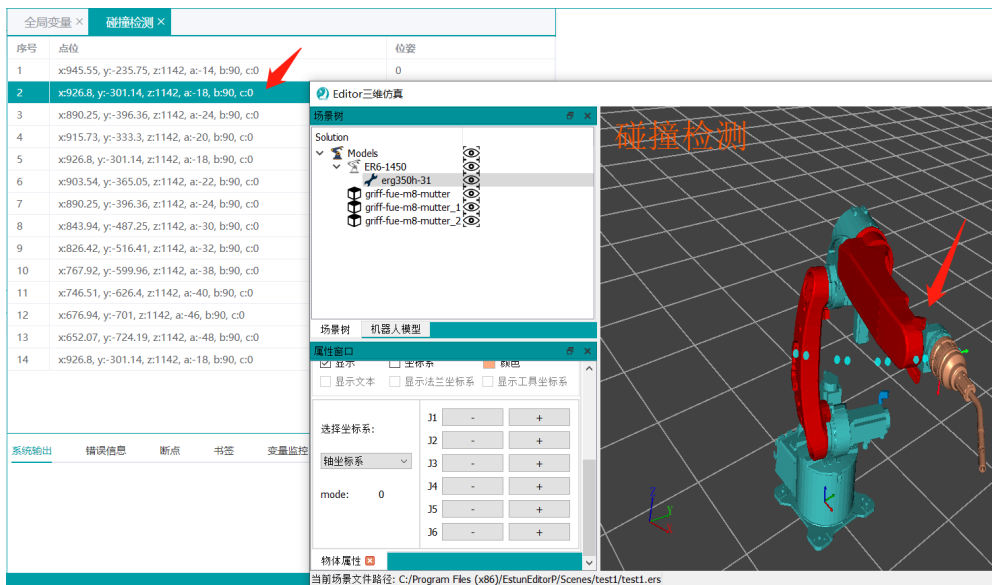


9.7.3.2.3 Start Collision Detection

Clicking this function starts the collision detection thread, which performs collision detection on the models in the collision set. During the movement of the virtual robot, if there is a collision with any model in the collision set, the model will turn red. Additionally, while moving the robot, the system will periodically check and record collision points at the locations of collisions, as shown in the figure.



By clicking on the recorded collision points on the collision detection page, it is possible to quickly move the robot to the collision points and examine the collision detection situation.



9.7.3.2.4 Stop Collision Detection

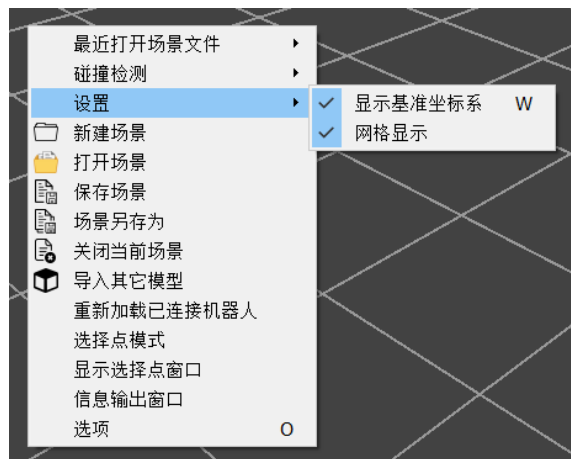
Stops the collision detection thread.

9.7.3.2.5 Display Collision Detection Set Window

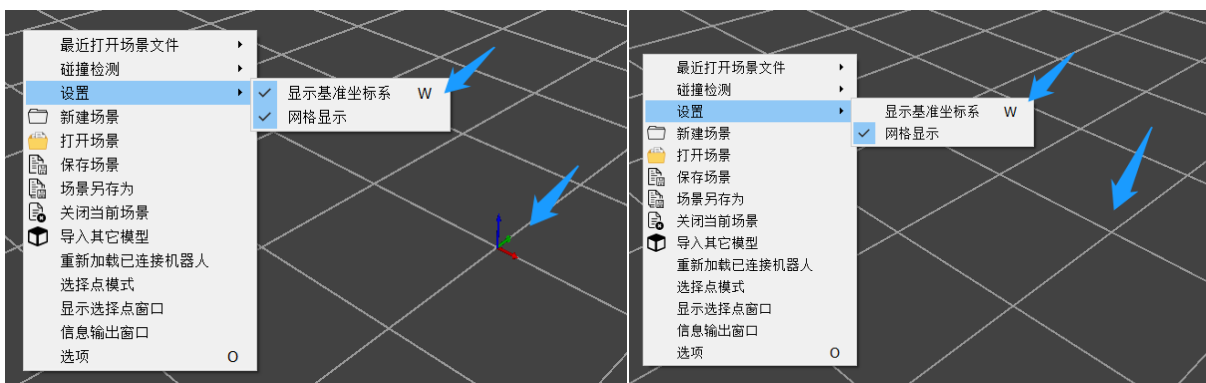
If the collision detection set window is closed, clicking this function will reopen the selected model collision set.



9.7.3.3 Settings



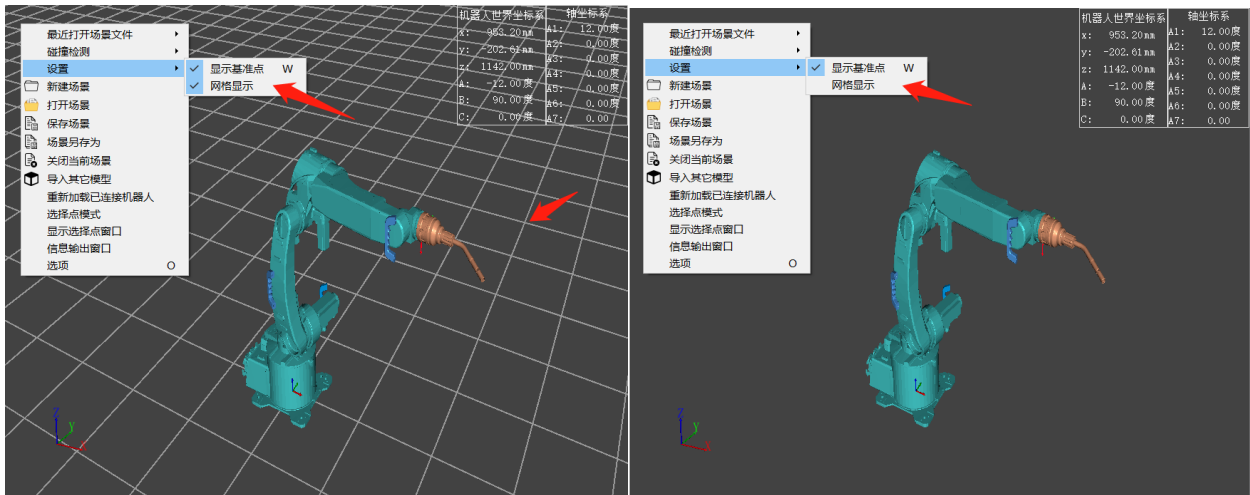
Display Reference Coordinate System: Clicking this function will show or hide the reference coordinate system model.



(Show Reference Coordinate System)

(Hide Reference Coordinate System)

Grid Display: Clicking this function will show or hide the grid.



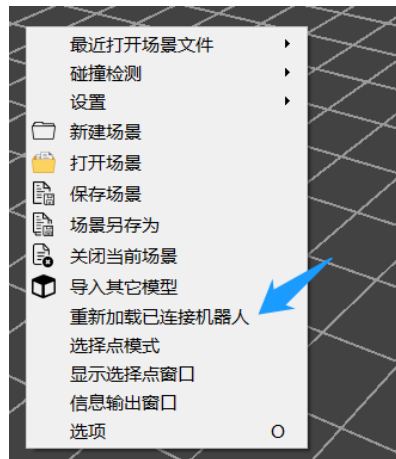
(Grid Display)

(Hide Grid)

The functionality of opening and closing scenes is the same as the corresponding tools in the "File" menu in section 8.2. Please refer to the functionality of the corresponding tools in the "File" menu in section 8.2. This is provided for ease of use.

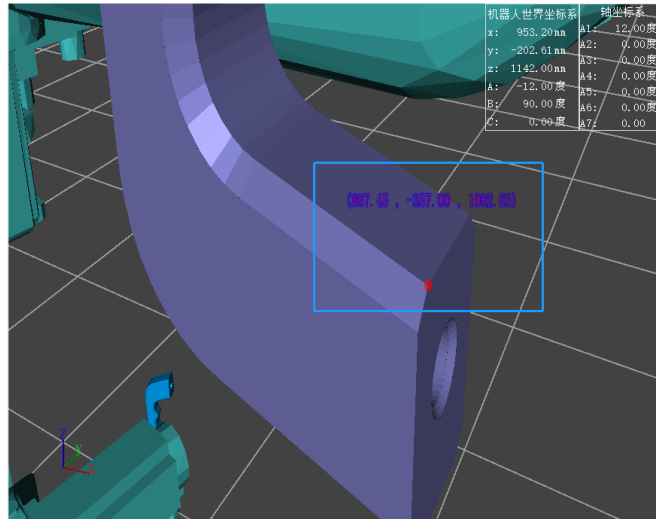
9.7.3.4 Reload Connected Robot

This function is used when, in the connected state, clicking on close scene will also close the robot model. If you want to display the current robot model again without switching to another robot model, you can click this function.

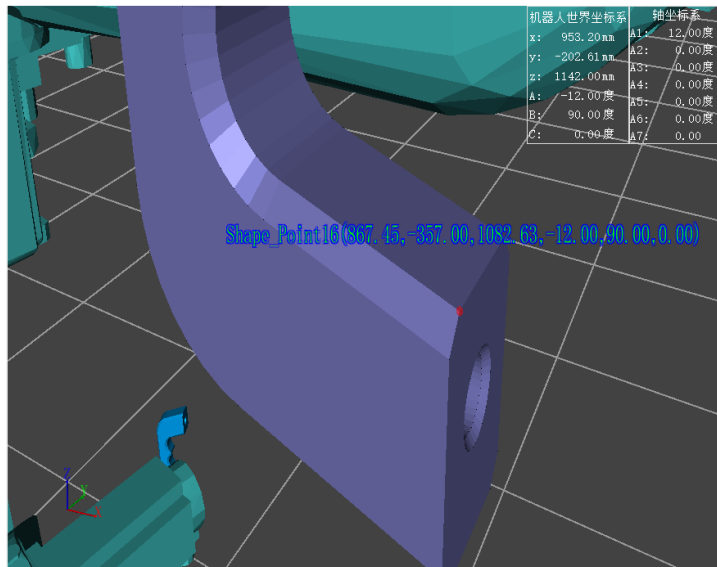


9.7.3.5 Select Point Mode

Enables the selection of model vertices to quickly create vertices on the model, making it convenient to move the robot end-of-arm tool to that vertex for adjustment of point data. When selecting point mode, you need to click on the model to be selected, then right-click on the model and select the "Reset Center Point" function. Then zoom in on the model and select the vertices of the model. When the color of the mouse sphere turns red, it means that the point is a vertex of the model. Use CTRL + left-click to create a simulation point for the model vertex.



(Select Model Vertex)



(Create Simulation Point for Model Vertex)

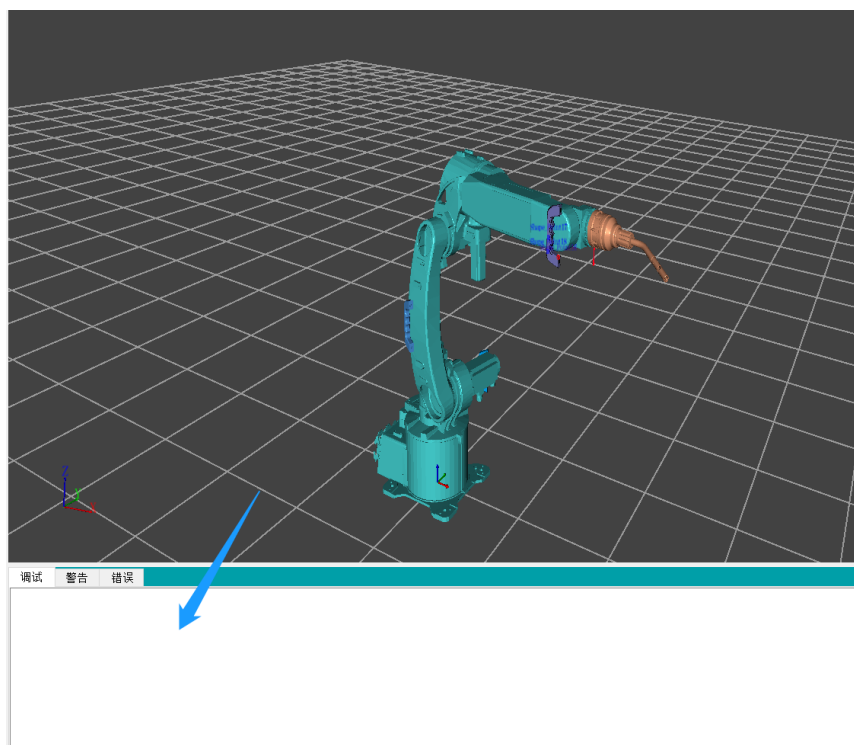
9.7.3.6 Display Select Point Window

Clicking this function opens the select point page, which records the selected simulation points or the midpoints and centers created based on simulation points. Please refer to section 8.9 for information on how to create simulation points.



9.7.3.7 Information Output Window

Clicking this function opens or closes the information output window. This is used to view debugging, warning, or alarm information in the 3D simulation.



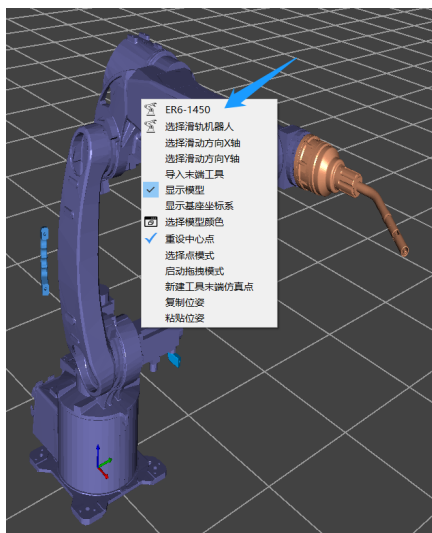
9.7.3.8 Options

Clicking this function opens the options window.



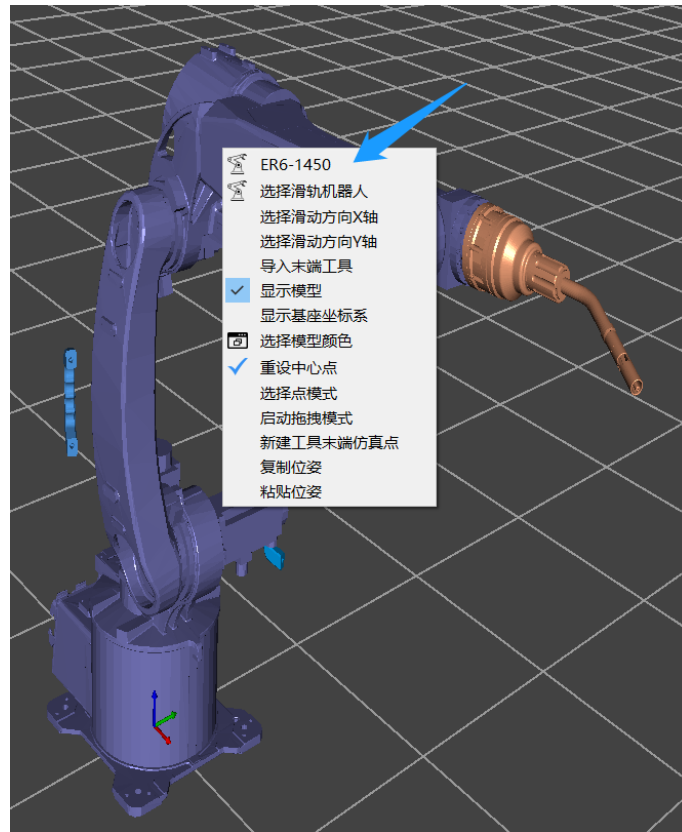
9.7.4.Right-Click Robot Model Menu

Right-clicking on the model will bring up a menu that allows you to set the models properties.



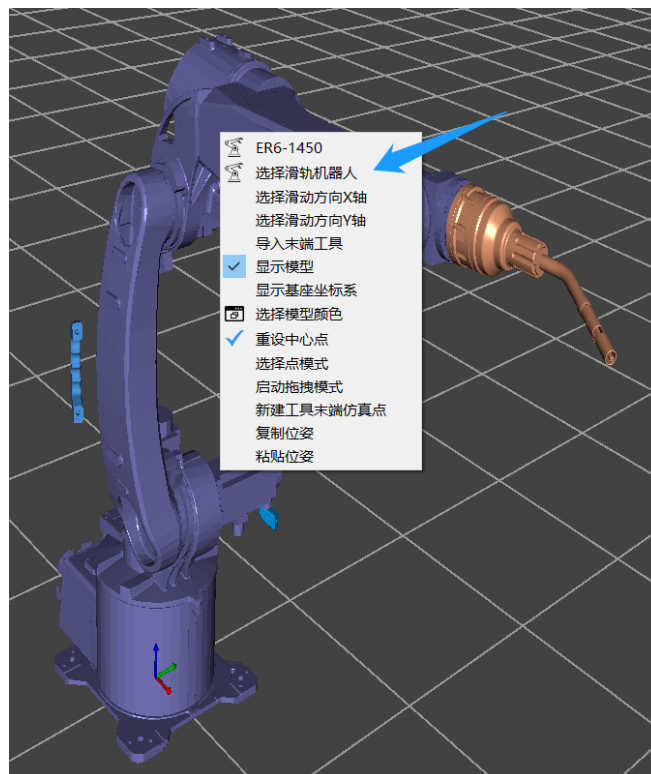
9.7.4.1 Robot Model Name

Displays only the name, no effect if clicking.

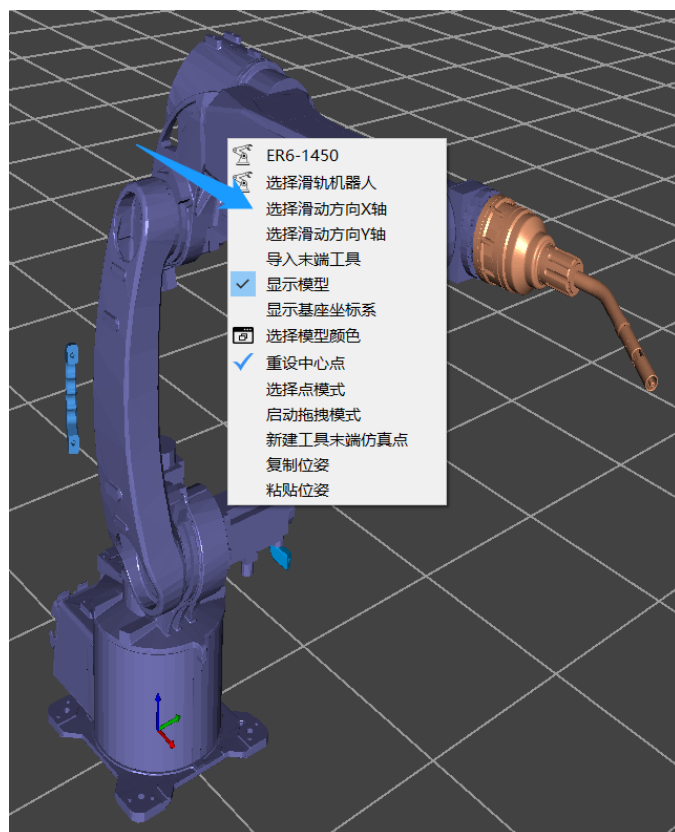


9.7.4.2 Select Robot Model on Slider

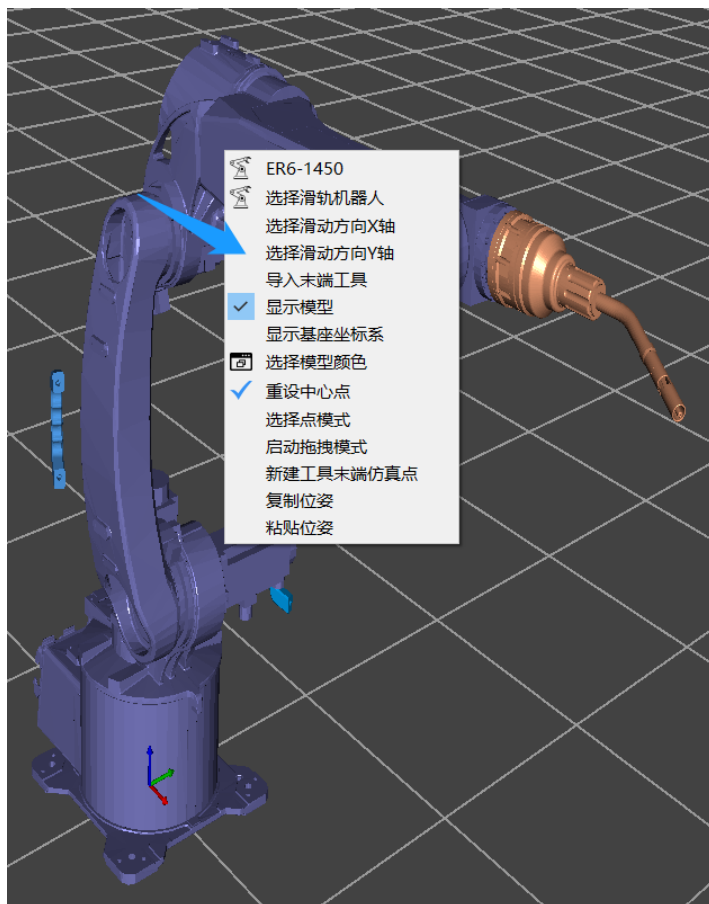
Clicking this option allows you to select the robot model on the slider.



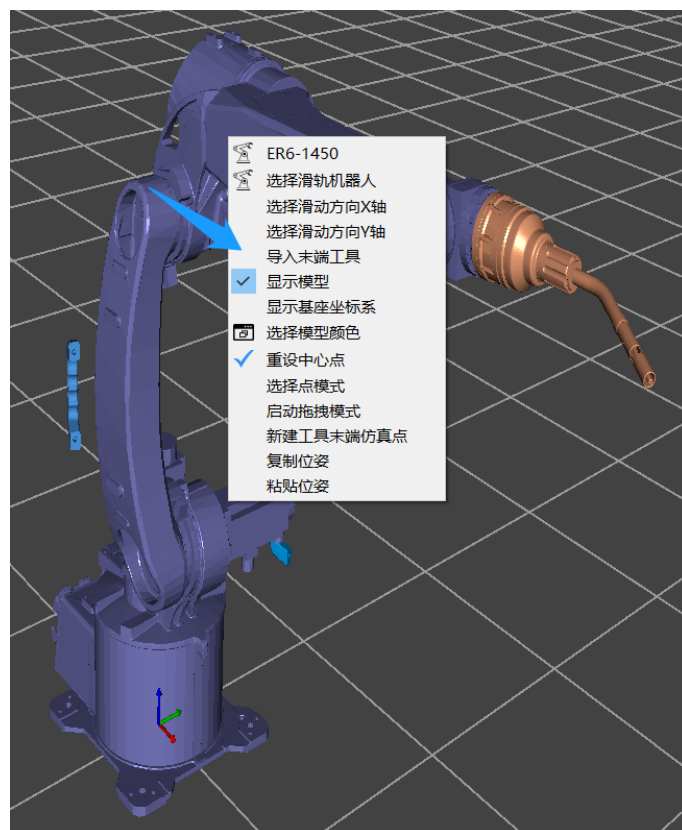
9.7.4.3 Select X-axis Movement on Slider for the Robot



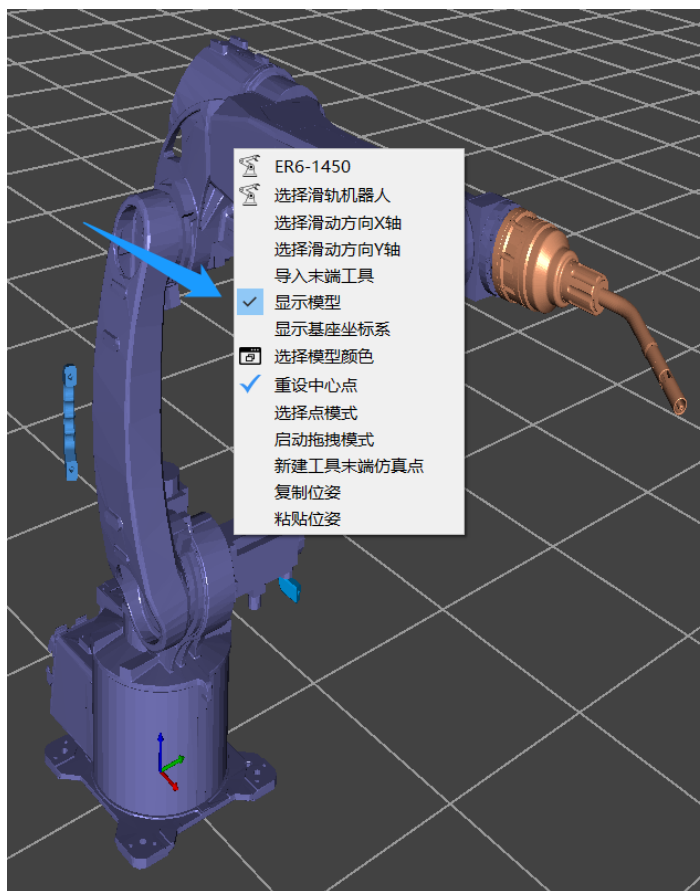
9.7.4.4 Select Y-axis Movement on Slider for the Robot



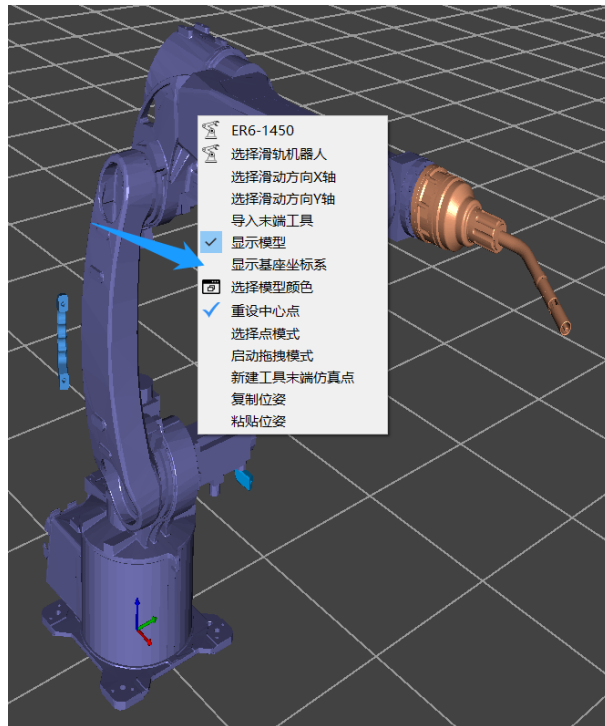
9.7.4.5 Import Robot End-of-Arm Tool Model



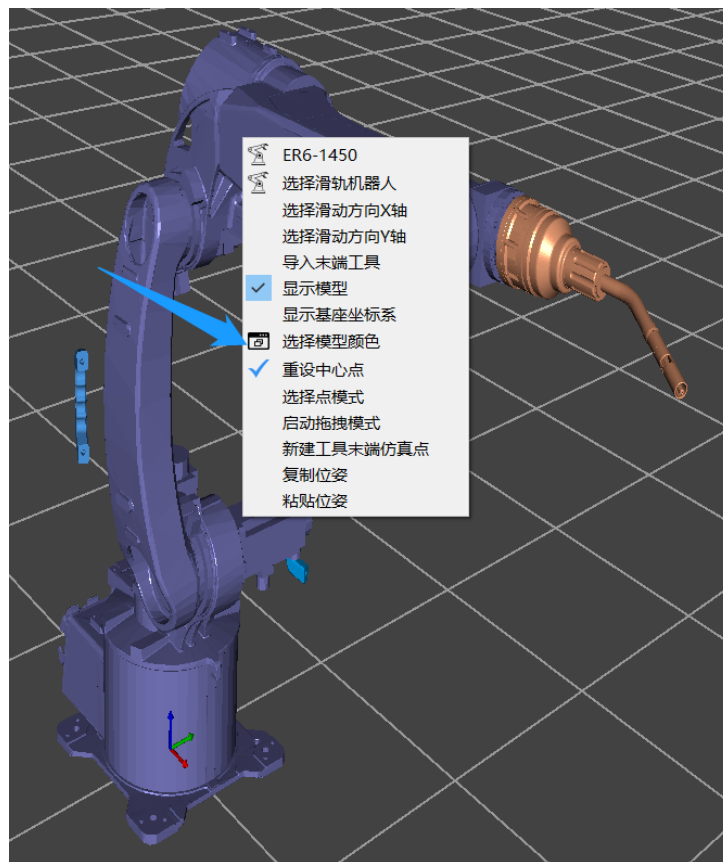
9.7.4.6 Show Robot Model



9.7.4.7 Select Robot Base Coordinate System



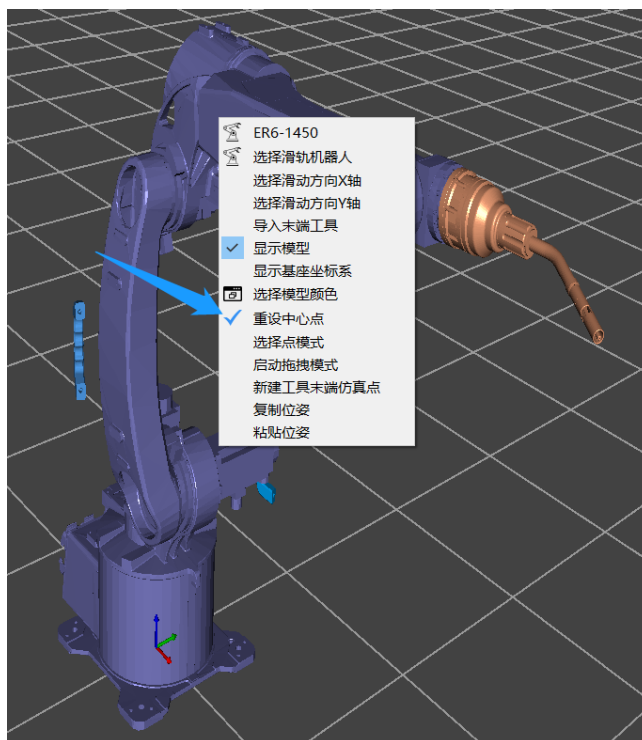
9.7.4.8 Select Robot Model Color



9.7.4.9 Reset Center Point

To set the rotation and zoom center position of the scene to the location clicked by

the mouse. This position is initially set to the center position (0,0,0) of the world coordinate system.



9.7.4.10 Select Point Mode

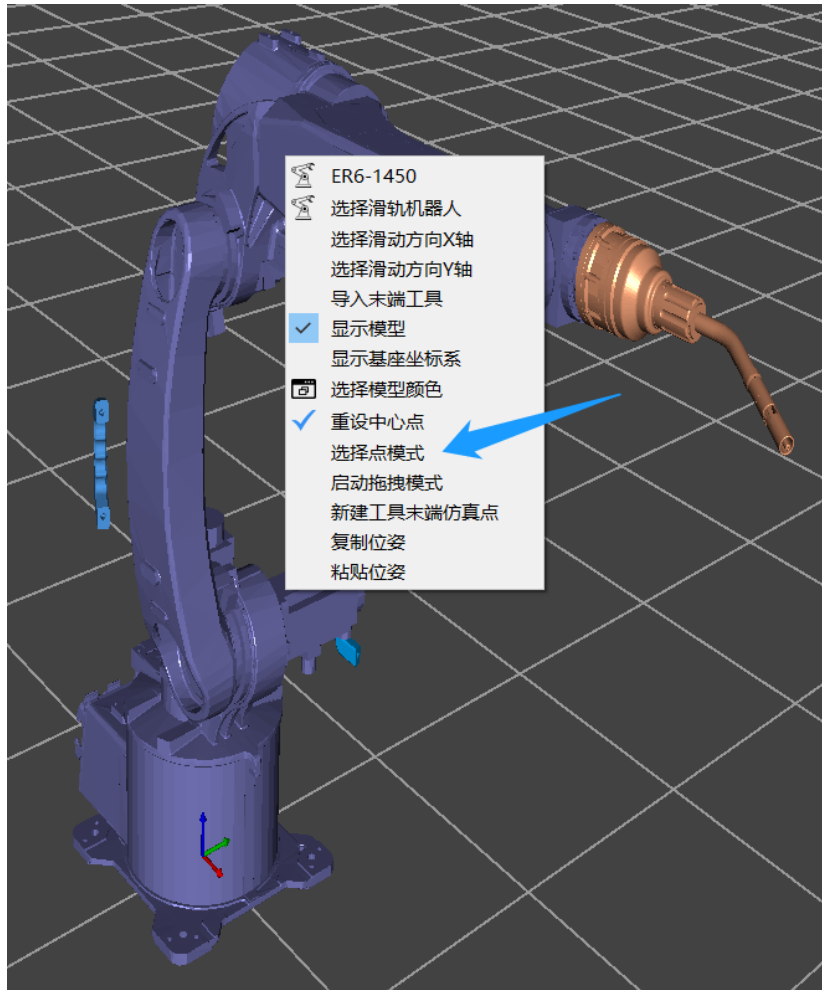
Enabling this mode allows you to select vertices on models other than the robot model. When the mouse moves over the vertices of a model, the color of the current mouse sphere turns red. Use CTRL + left-click to create a simulation point relative to the reference coordinate system at the vertex position on the model. The default reference coordinate system is the world coordinate system.



The reference coordinate system can be set to the world coordinate system, robot coordinate system, or other user-defined coordinate systems.

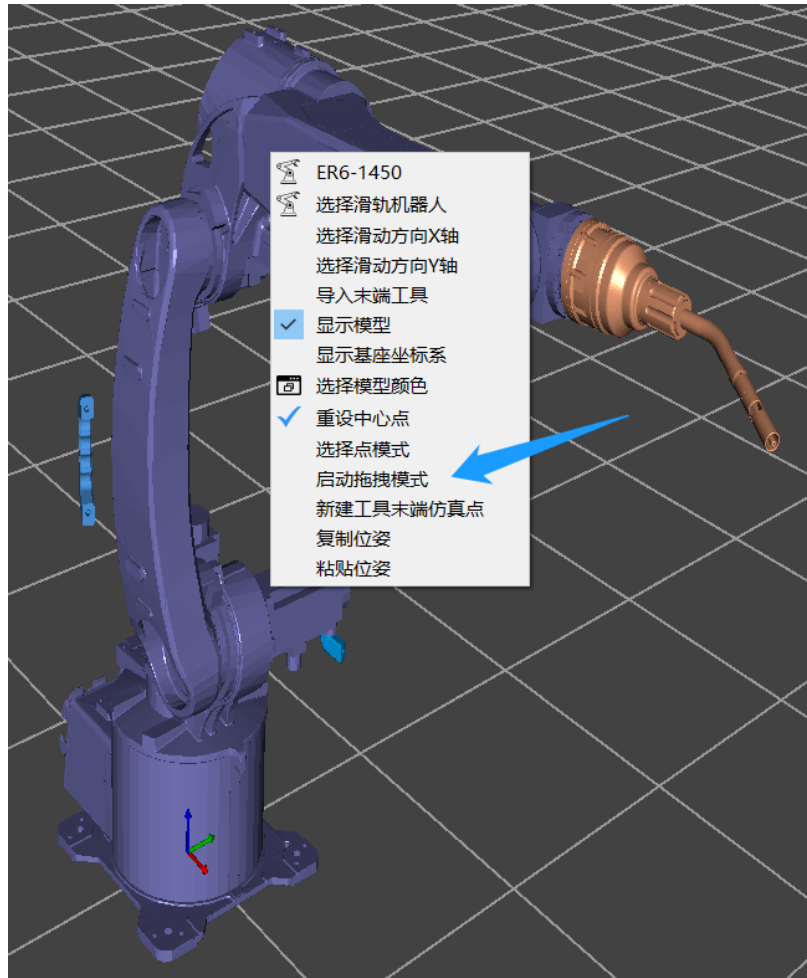
Creating simulation points allows you to quickly move the robot end tool to that simulation point or create CPOS variable points.

Note: The robot will move to the simulation point with the current posture. Similarly, when creating a CPOS variable point, it is based on the XYZ values of that simulation point and the robots current posture values. If there is a requirement for posture, the robot needs to be moved to that point, and then the robots posture values should be adjusted for teaching.



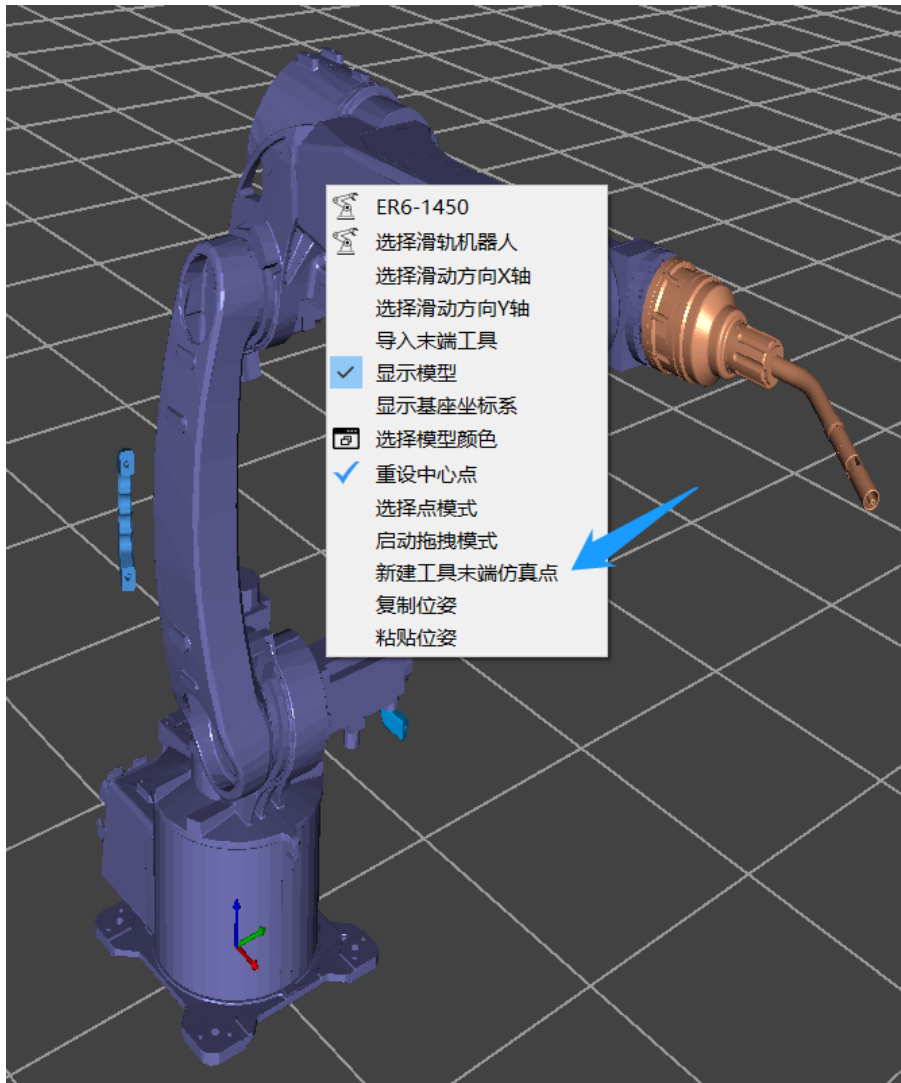
9.7.4.11 Select Drag Mode

Enabling this mode will display the drag model under the current tool coordinate system variable of the robot. It includes XYZABC six-axis models. When you click and drag this model on the robot, it represents single-axis movement of the robot based on the tool coordinate system as the reference coordinate system.



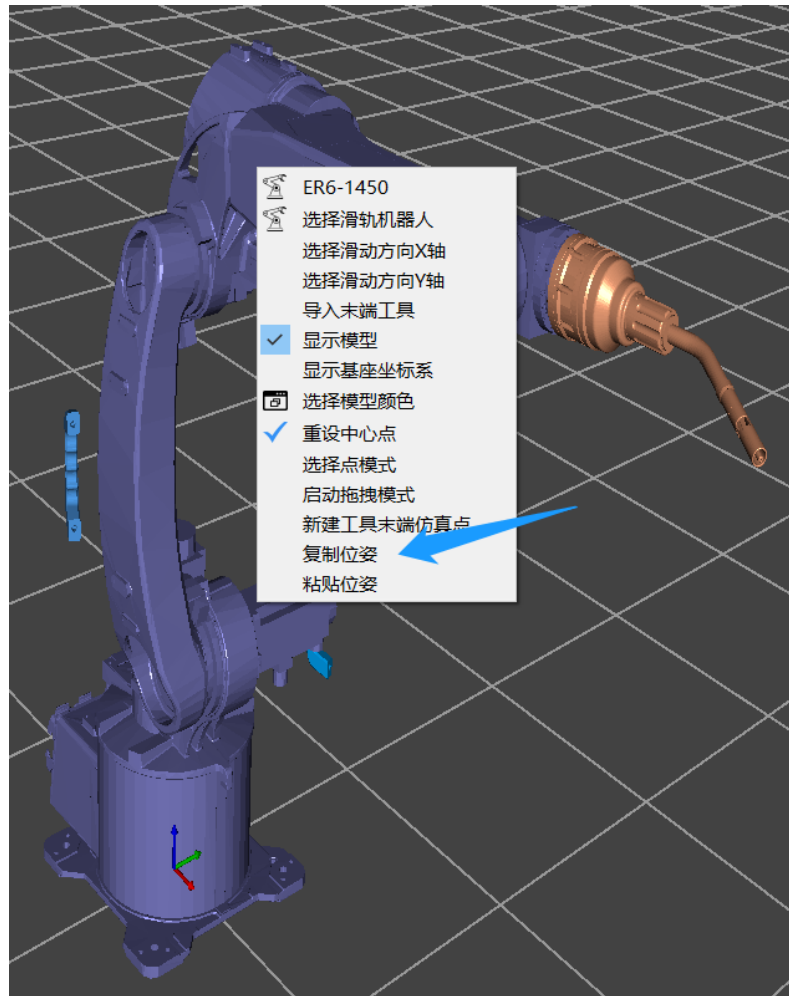
9.7.4.12 Create Tool End Simulation Point

Using the robot coordinate system as the reference coordinate system and under the current tool variable of the robot, you can create simulation points for the robots end-of-arm tool variable. This is used to record points that may be needed or to quickly move the robot between such points.



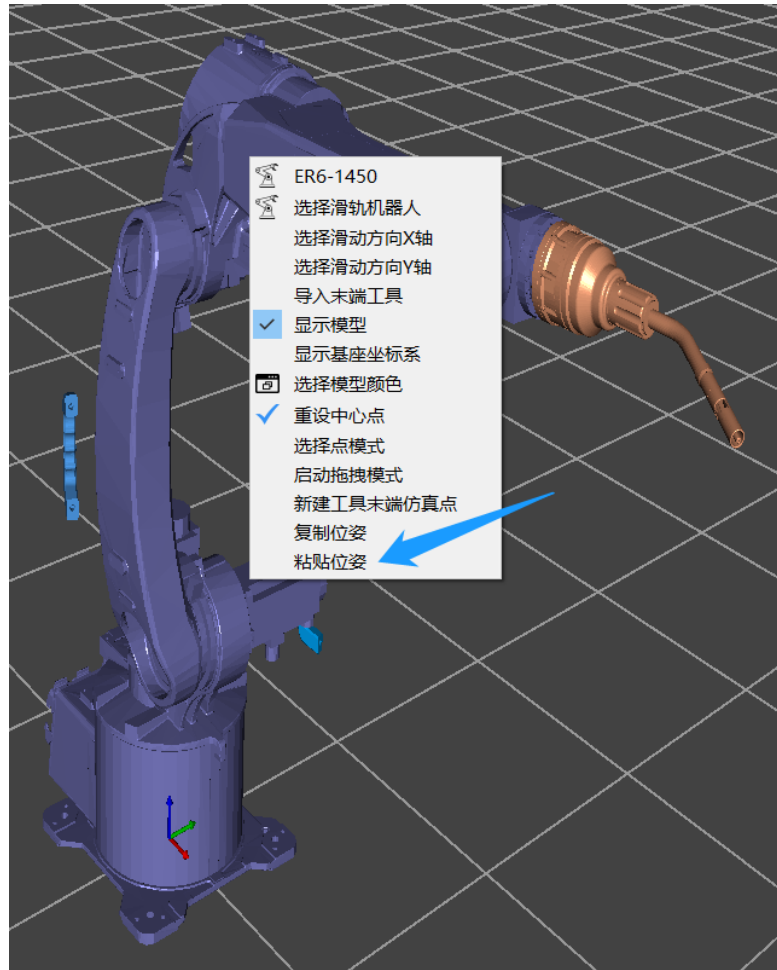
9.7.4.13 Copy Posture

The copy posture and paste posture functions are used together. Clicking this function will copy the posture data of the current model.

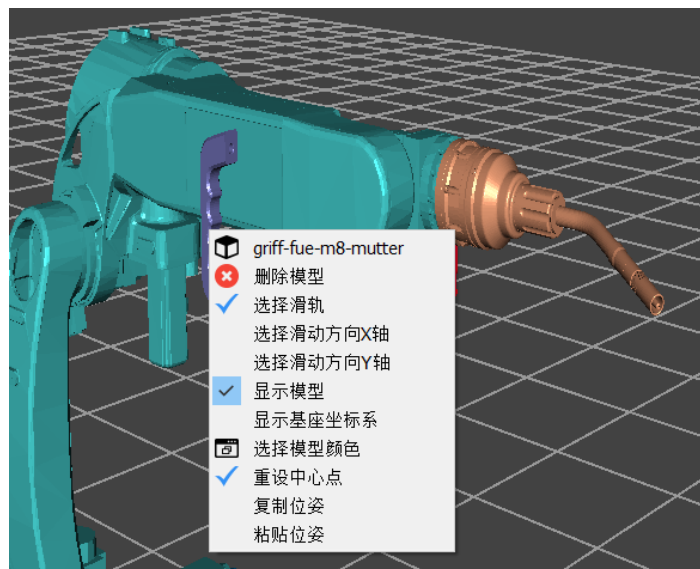


9.7.4.14 Paste Posture

Pasting the posture copies the saved pose data of another model and pastes it into the target model to apply it, allowing for quick placement of models and scene setup.



9.7.5.Right-Click General Model Menu

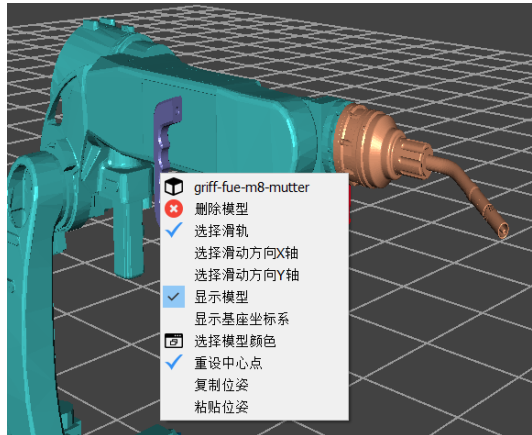


9.7.5.1 Model Name

The first column in the menu displays the model name.

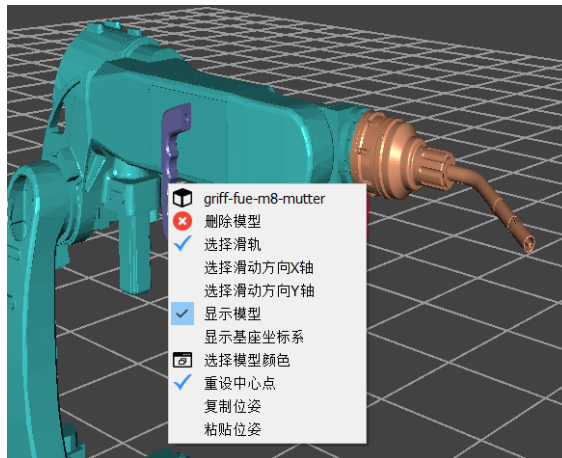
9.7.5.2 Delete Model

Clicking this function will delete the model.



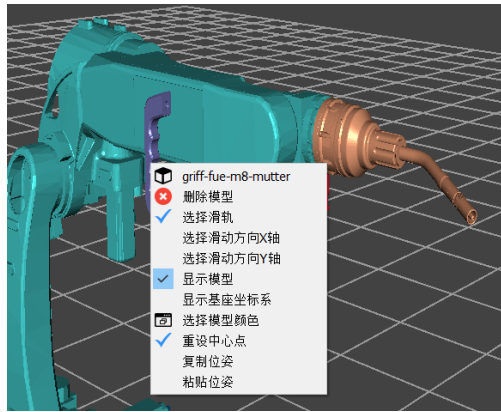
9.7.5.3 Select Slider

Click this function to set the model as a slider model. It is used for setting up the seventh-axis ground track model.



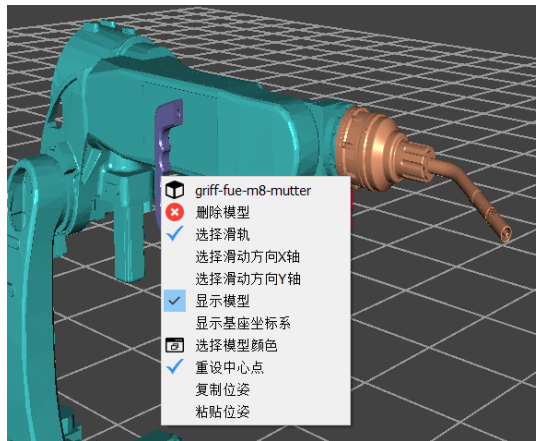
9.7.5.4 Select X-axis Slide Direction

By clicking on this function, the motion direction of the rail model, which has already been configured, can be set to either the X-axis or the Y-axis.



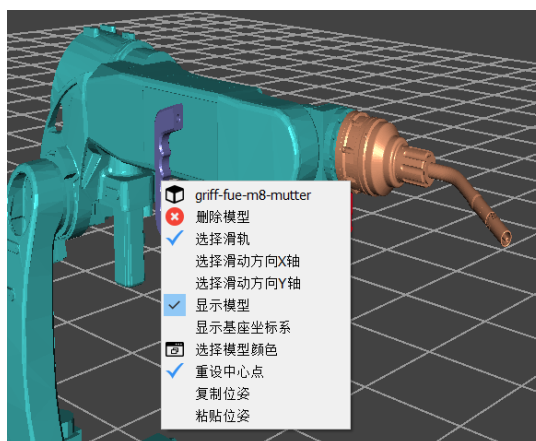
9.7.5.5 Select Y-axis Slide Direction

By clicking on this function, the motion direction of the rail model, which has already been configured, can be set to either the X-axis or the Y-axis.



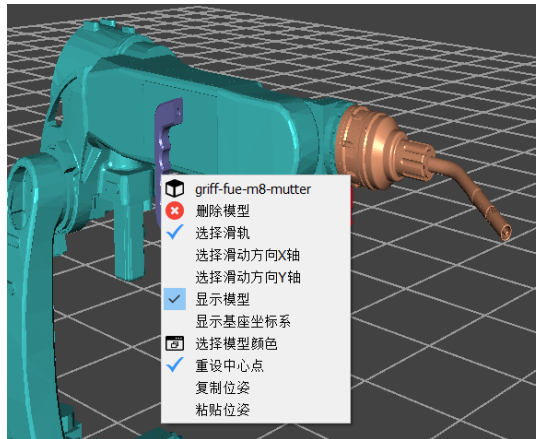
9.7.5.6 Show Model

Clicking this function will show or hide the model.



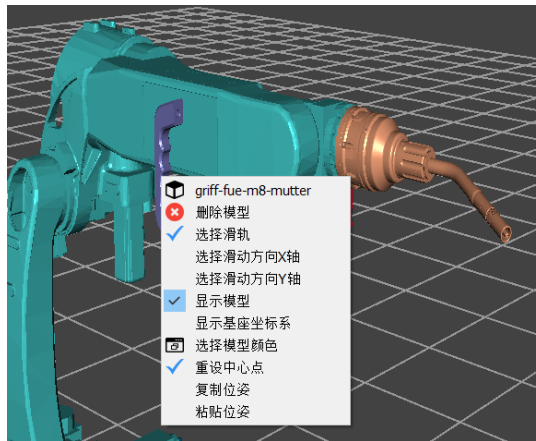
9.7.5.7 Show Base Coordinate System

Clicking this function will show or hide the base coordinate system of the model.



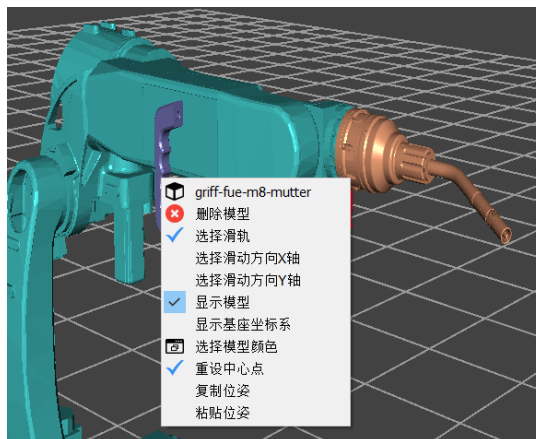
9.7.5.8 Select Model Color

Clicking this function allows you to set the color of the model.



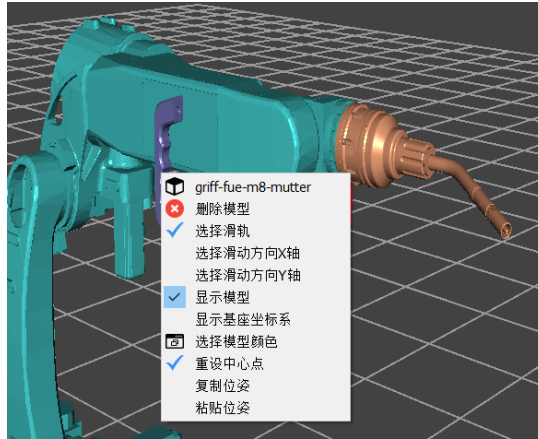
9.7.5.9 Reset Center Point

Clicking this function allows you to set the current mouse position as the center point for rotation and zooming.



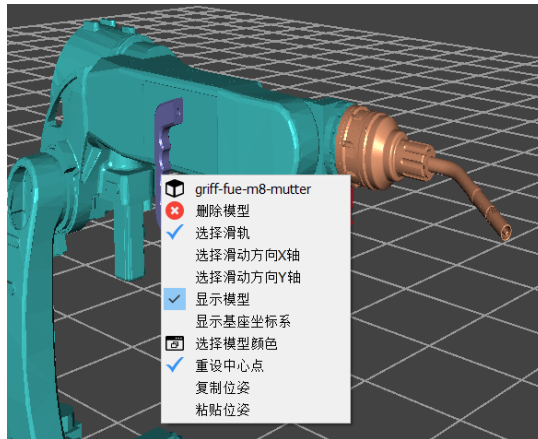
9.7.5.10 Copy Posture

Clicking on this function allows the current posture data of the model to be copied.

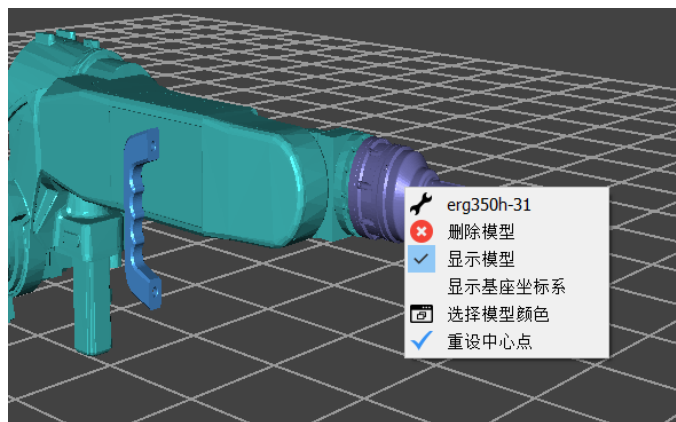


9.7.5.11 Paste Posture

Clicking on this function allows the current posture data to be pasted onto the current model, enabling quick placement of the model.



9.7.6. Right-click on the Tool Model Menu



9.7.6.1 Model Name

The first column of the menu displays the model name.

9.7.6.2 Delete Model

Clicking on this function deletes the model.

9.7.6.3 Show Model

Clicking on this function shows or hides the model.

9.7.6.4 Show Base Coordinate System

Clicking on this function shows or hides the base coordinate system of the model.

9.7.6.5 Select Model Color

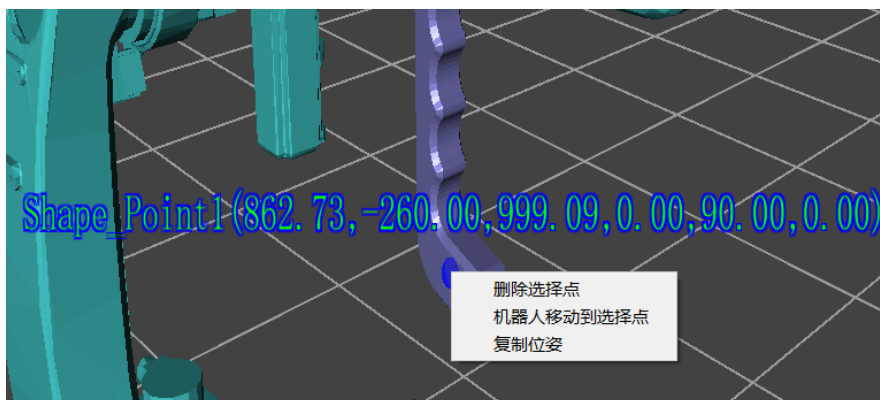
Clicking on this function allows setting the model color.

9.7.6.6 Reset Center Point

Clicking on this function sets the current mouse position as the center point for rotation, zooming in, and zooming out.

9.7.7. Right-click on the Point Model Menu

When right-clicking on the point model, a menu will pop up.



9.7.7.1 Delete Selected Point

Clicking on this function deletes the current simulation point.

9.7.7.2 Move Robot to Selected Point

Clicking on this function quickly moves the robots current tool coordinate system end position to that point. The posture data is the current robots posture data. The robot may not be able to move to any position, depending on whether the points data is within the robots inverse solution range.

9.7.7.3 Copy Posture

Clicking on this function copies the posture data of this point.

9.8. External Axis (Ground Track Axis) Simulation

9.8.1. Configure the robots config file

步骤 3: 添加附加轴参数 (参数以地轨轴为例)

路径: runtime->configFiles
这里讲述添加一个附加轴的配置方式。

1、复制原来机型对应的文件夹“config_***”，粘贴至 configFiles 文件夹中，如下图：

config_ER50_A0	2015/2/28 7:12	文件夹
config_ER50_A6	2015/2/28 7:12	文件夹
config_ERC6_A6	2015/2/28 7:12	文件夹
config_ERC6_A6 - 副本	2019/6/5 10:23	文件夹
config_ERC10_A3	2015/2/28 8:15	文件夹

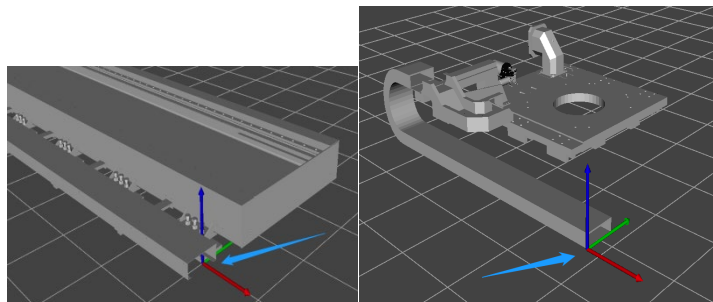
2、将粘贴的文件命名为“config_***E1”，注意，这里可以将名字分为两部分“config_”加“***E1”，可以看出，“***E1”即为步骤 2 中新增机型，如下图。

config_ER50_A6	2015/2/28 7:12	文件夹
config_ERC6_A6	2015/2/28 7:12	文件夹
config_ERC6_A6E1	2019/6/5 10:23	文件夹
config_ERC10_A3	2015/2/28 8:15	文件夹
config_ERC10_A4	2015/2/28 7:12	文件夹

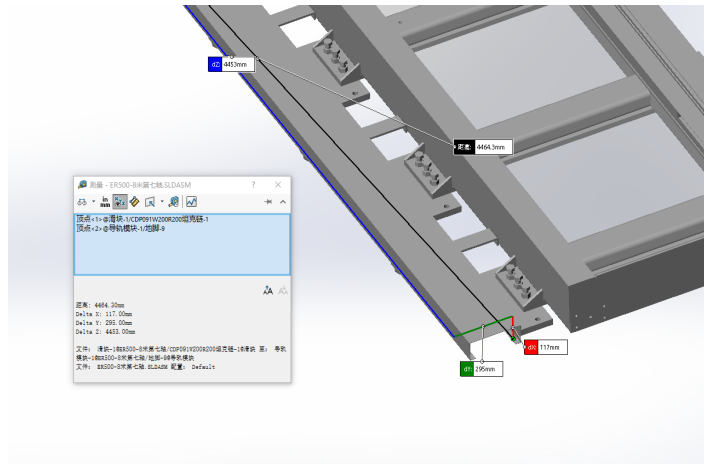
9.8.2. Build the scene

1. Create a new scene.
2. Select the robot model.
3. Import the slider and rail base models.

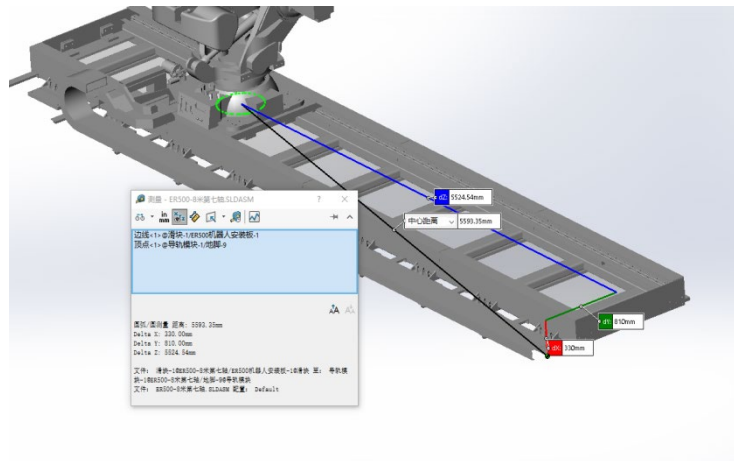
Note: The world origin coordinate system for the SolidWorks base and slider models should be set to the bottom-left corner.



4. Obtain the coordinates of the slider relative to the base origin using SolidWorks.



5. Obtain the coordinates of the center point of the robot base surface relative to the slider base origin using SolidWorks.

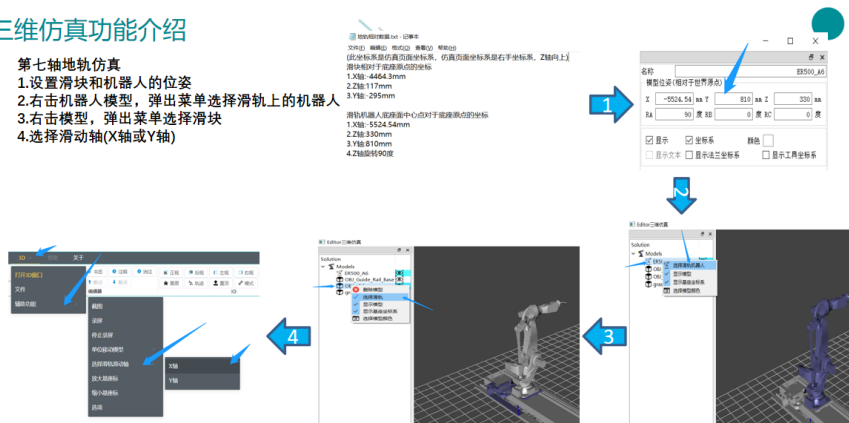


6. Manually record the data in a text file and input the data into the corresponding models posture. Set the translation direction for the slider and rail robot.

三维仿真功能介绍

第七轴地轨仿真

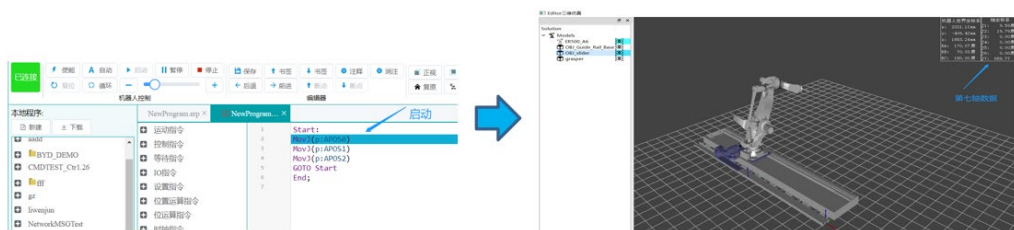
1. 设置滑块和机器人的位置
2. 右击机器人模型，弹出菜单选择滑轨上的机器人
3. 右击模型，弹出菜单选择滑块
4. 选择滑动轴(X轴或Y轴)



9.8.3.Run the program to observe the simulation effect

三维仿真场景演示

1.创建文本程序->2.编写程序,下载程序,启动程序->3.看仿真效果

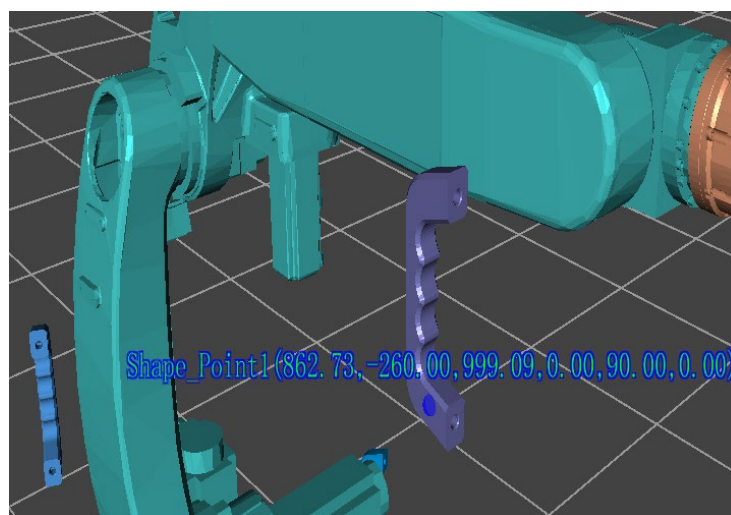


9.9. Create Simulation Points

9.9.1.Create Arbitrary Simulation Points for Models

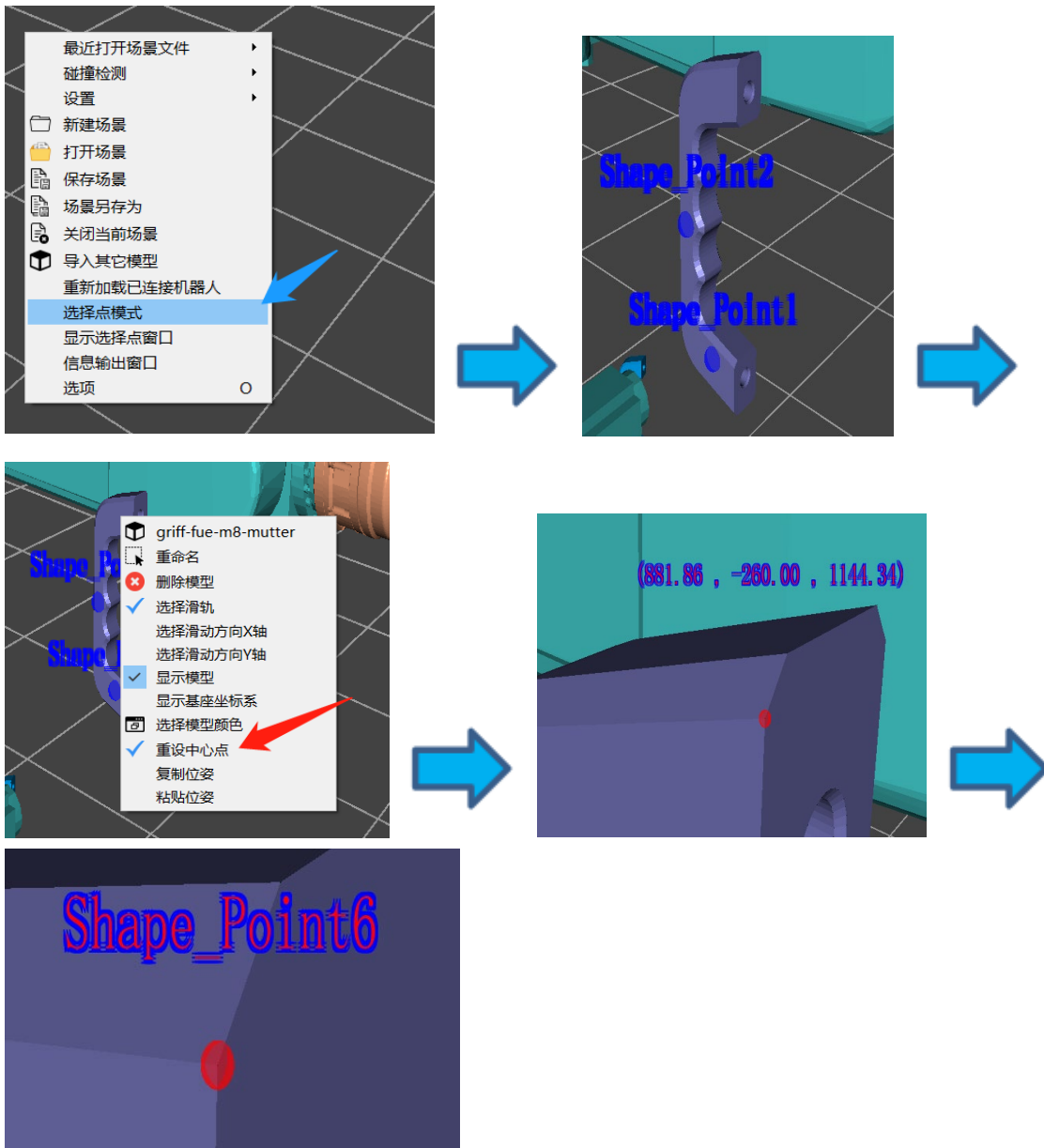
Move the mouse over the model to the desired position for creating a new simulation point, then press CTRL + left-click to create an arbitrary simulation point.

Arbitrary simulation points are displayed in blue color as shown in the figure.



9.9.2. Create Vertex Simulation Points for Models

Right-click on the blank area of the simulation window to open the menu, select "Select Point Mode", and enable it. Click on the desired model, then right-click on the model to open the menu and select "Reset Center Point". The mouse pointer and the text will turn red, indicating the model's vertex. Press CTRL + left-click to create a vertex simulation point. After using the point selection mode, click on "Select Point Mode" again to disable it for smooth 3D simulation operation.

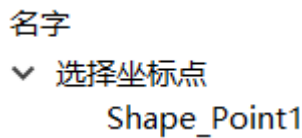


9.9.3. Select Point Window

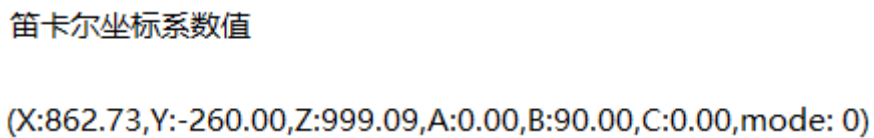
In the blank area of the simulation window, right-click and select "Show Selected Point Window" to open the point selection window.



In this window, you can manage the created simulation points. The Name column displays the name of the simulation point, which is currently not editable.



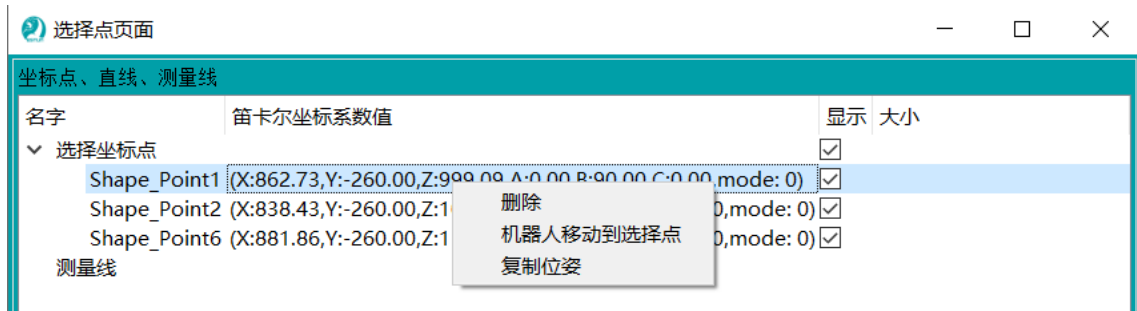
The Cartesian Coordinate System Value column displays the values of the simulation point, which are currently not editable.



The Display column controls the visibility of the simulation point.



Right-clicking on a simulation point opens a context menu.



The functionality is consistent with the features described in section 9.7.7.

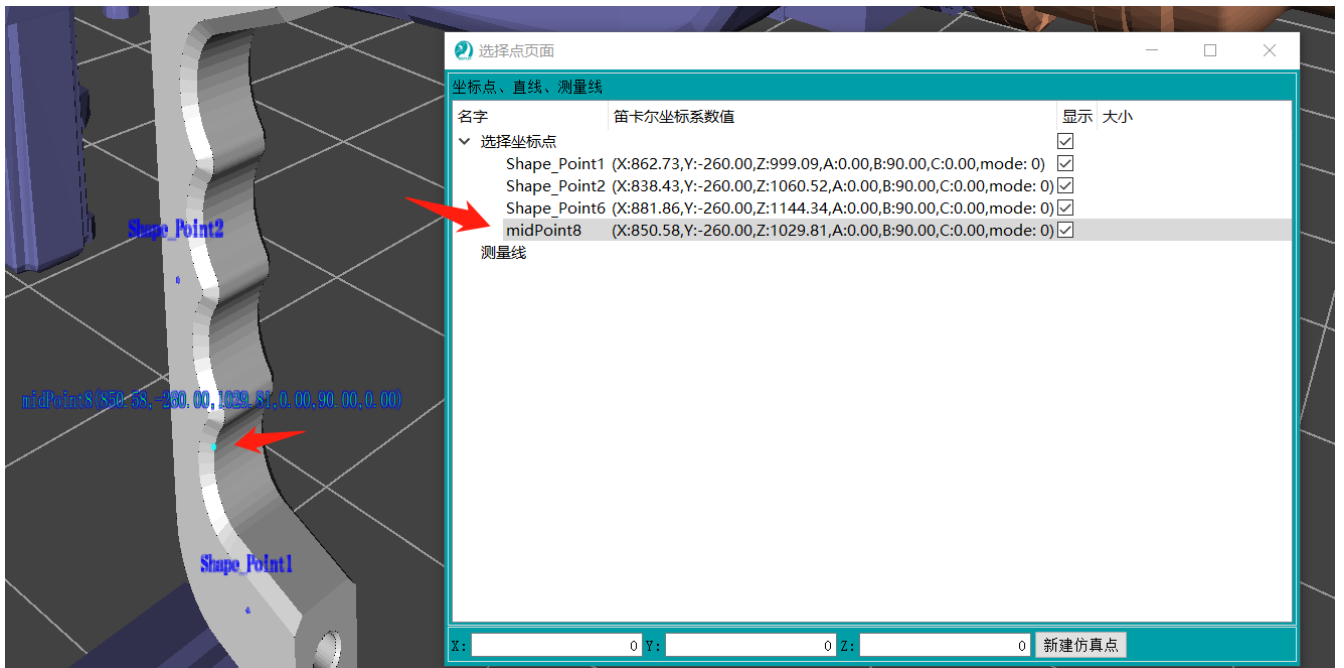
Press CTRL + left-click to select multiple data points.

When there are two selected points, a right-click context menu will appear.

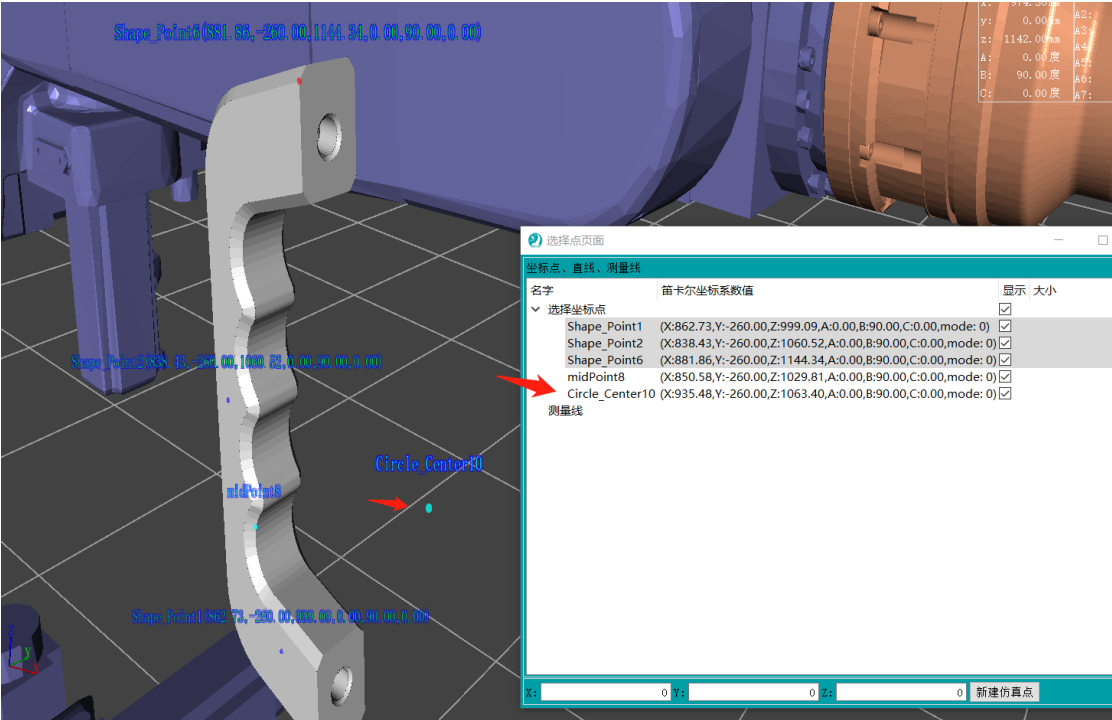


You can create a midpoint, a straight line, a linear measurement line (distance between two points), or delete the selected simulation points between the two points.

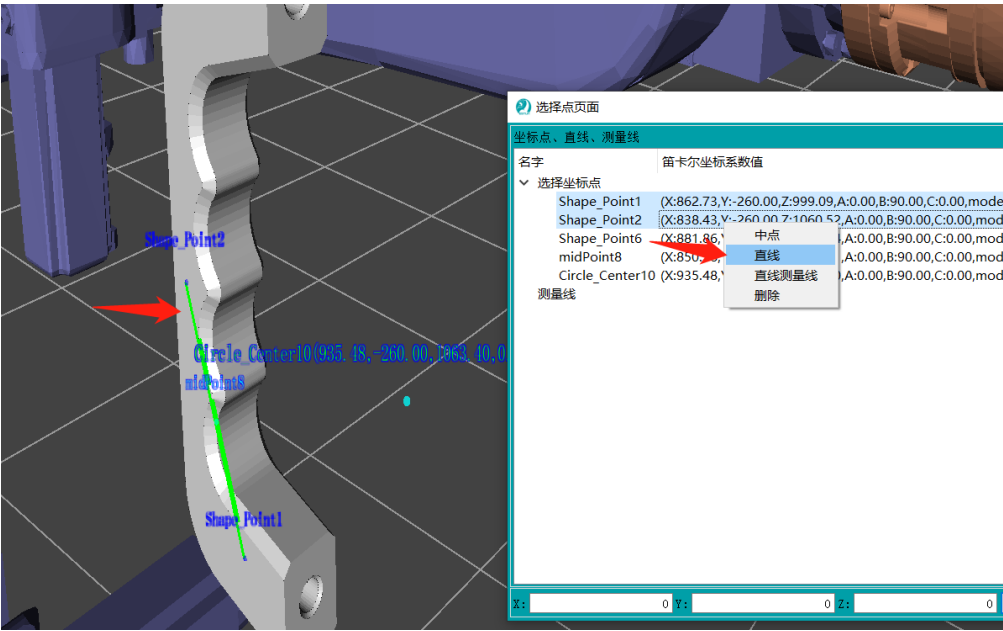
The midpoint between simulation point 1 and simulation point 2.



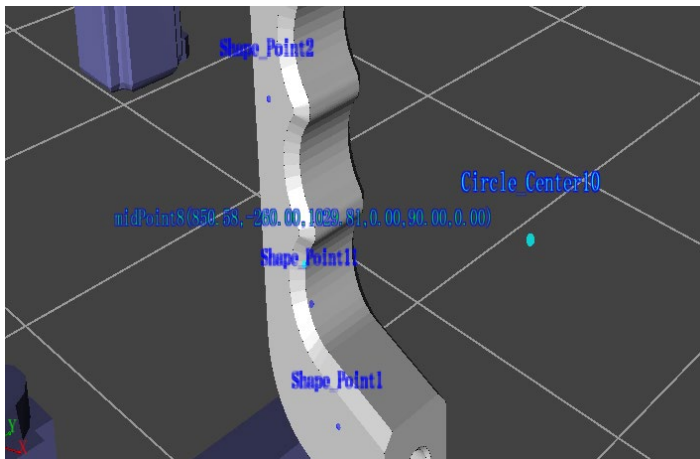
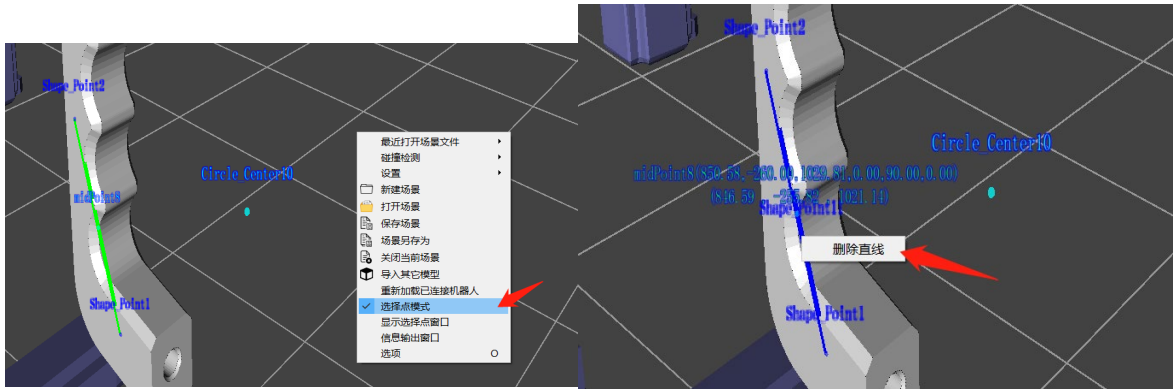
The center point of simulation points 1, 2, and 6.



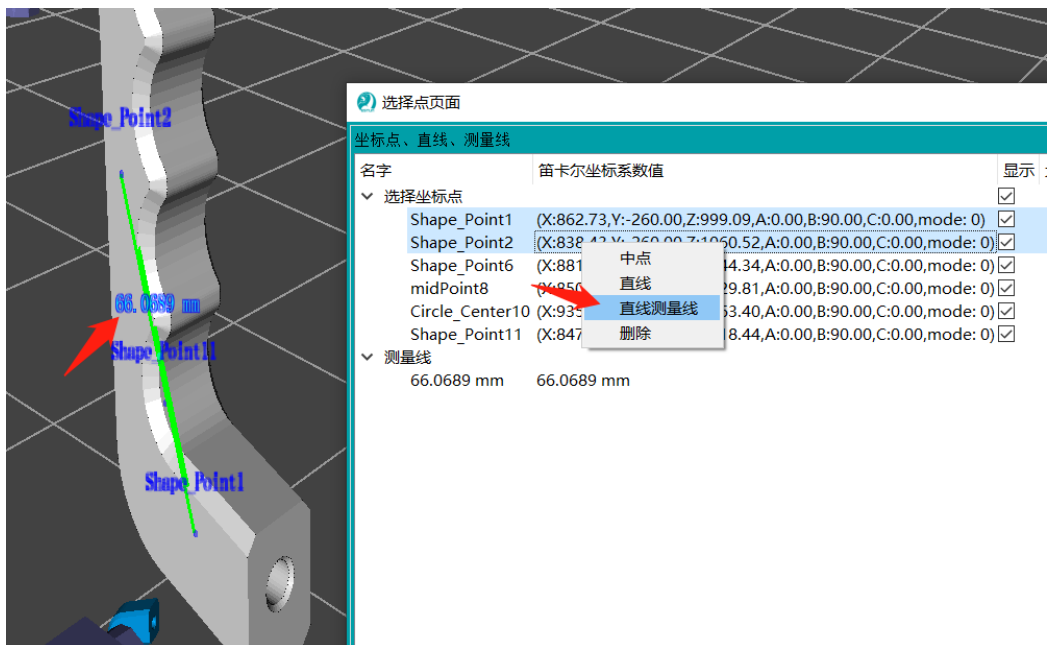
The straight line between simulation points 1 and 2.



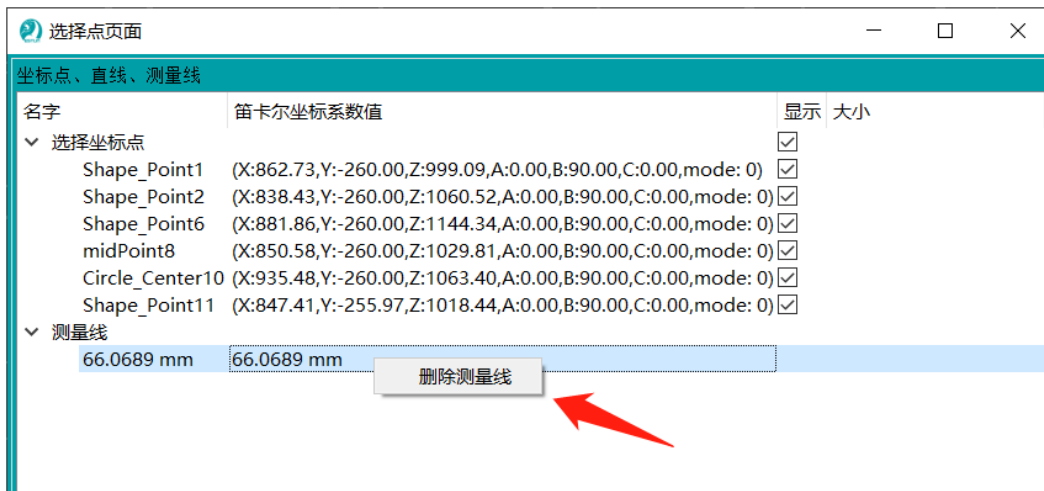
In the "Select Point Mode," right-clicking on a line allows you to delete the line.



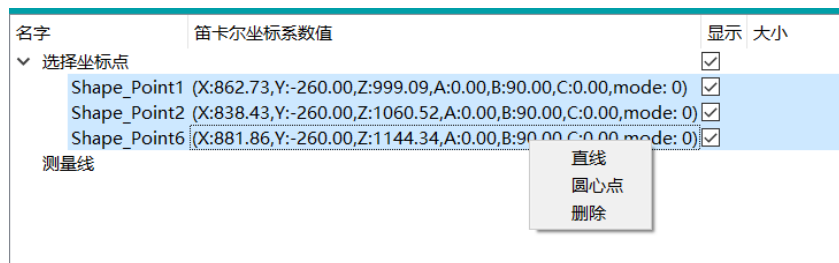
The linear measurement line between simulation points 1 and 2.



Right-clicking on the measurement line allows you to delete the line.



When there are 3 selected points, a right-click context menu will appear.



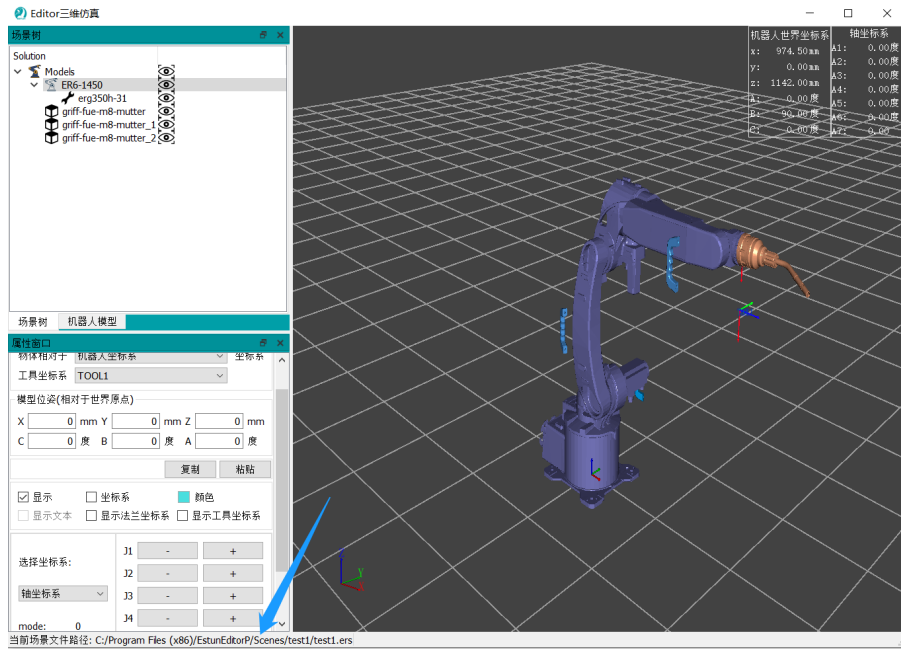
You can connect the 3 selected points in the order of selection with a straight line, create a center point, or delete the selected point models as a whole.

9.10. Collision Detection

For detailed usage of this feature, please refer to section 9.7.3.2.

9.11. Window Status Bar

Displays the current path of the scene file.



10. Log Functionality

The log module records user actions and anomalies, providing relevant prompts to assist users in using the software. It also allows users to provide window prompts for troubleshooting purposes and seek assistance from professionals to resolve issues.

10.1. Open Log

Click on "Tools" -> "Log" to open the log window, where detailed controller messages and local operation messages can be viewed.



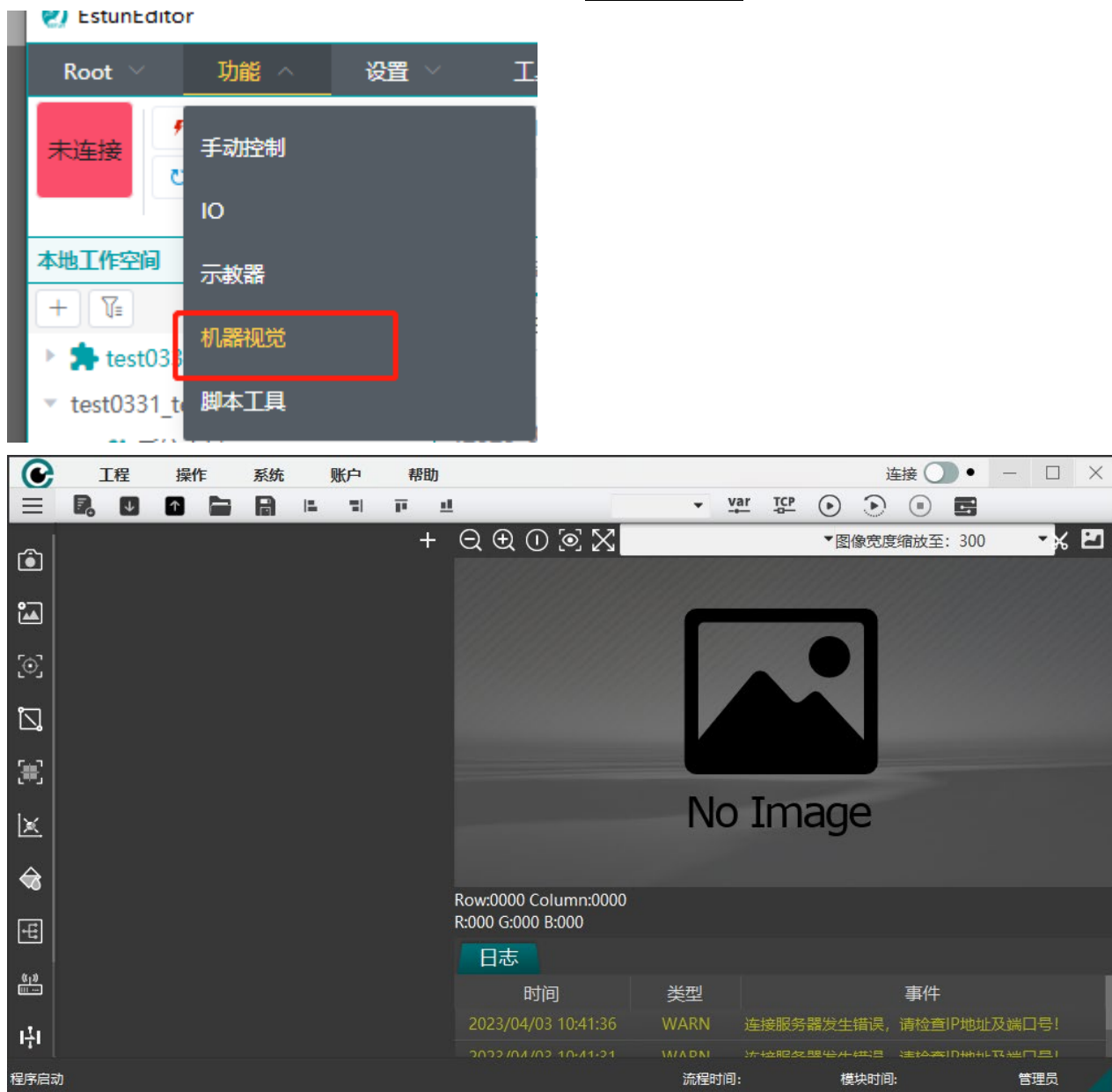
10.2. Log Path

The log path can be used to open the local folder and view log messages.

11. Third-Party Programs

11.1. Open Machine Vision

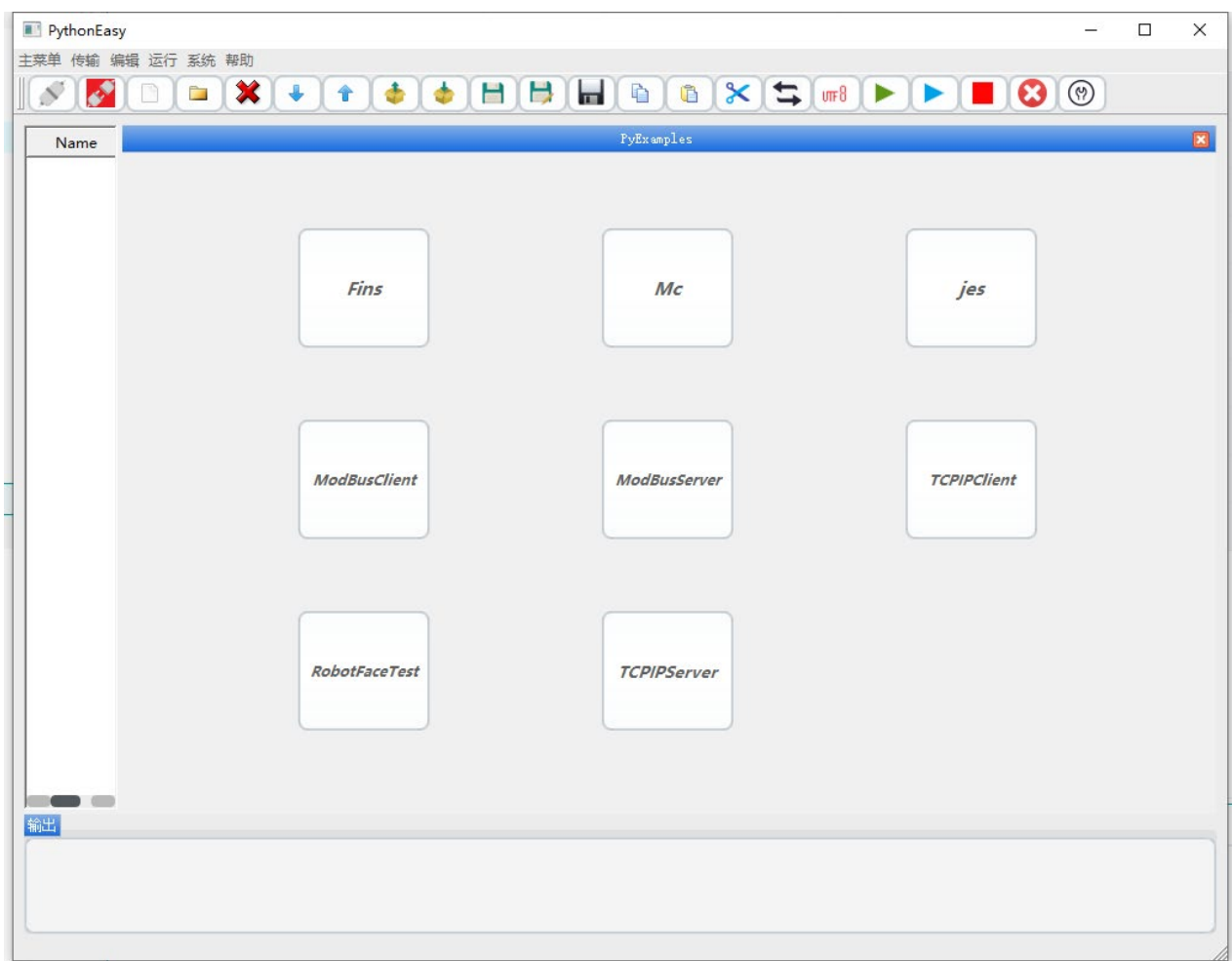
Select "Functions" -> "Machine Vision" to open.



11.2. Open Scripting Tool

Select "Functions" -> "Scripting Tool" to open.

Editor



12. Software Settings

This section primarily deals with basic switches and configurations for various functional operations.

12.1. System Settings



12.2. Robot Settings



12.3. Log



Max File Count: Specifies the maximum number of cached log files.

Max File Size: To set the maximum memory capacity for a single log file.

Max Backup File Count: Determines the maximum number of backup files.

13. Annex

13.1. View Command Manual



13.2. Software User Manual

Select "Help" -> "Software User Manual" to open.



13.3. About

Provides version information about the controller, UI, PLC, kernel, and underlying software being used.



13.4. Teach Pendant Permission Allocation

Function		√Has Permission × No Permission ★Confirmed by Secondary Password			
		Debu g	Administ rator	User	Guest
Penal Keys	E-stop Key	√	√	√	√
	Mode Switch	√	√	√	√
	Jog Key	√	√	√	×
	Interface Switch Key	√	√	√	√
	Function Key	√	√	√	√
Main Interface	Set Global Speed	√	√	√	√
	Clear Alarms	√	√	√	√
	Switch Multi-Axis	√	√	√	√
	Interface Switch Button	√	√	√	√
Project Managem	Create Project	√	√	√	×
	Copy/Paste Project	√	√	√	×

Function		√Has Permission × No Permission ★Confirmed by Secondary Password			
		Debu g	Administ rator	User	Guest
ent	Delete Project	√	√	√	×
	Import/Export Project	√	√	√	×
	Load Project	√	√	√	√
	Logout	√	√	√	√
	Open Project	√	√	√	√
	Set Auto Start	√	√	√	×
	Rename Project	√	√	√	×
	Refresh	√	√	√	√
Program Editing	Create Command (Including Quick Commands)	√	√	√	×
	Modify Command (Including Quick Commands)	√	√	√	×
	Set PC Pointer	√	√	√	×
	Edit Functions (Copy/Paste/Cut/Delete/Comment/Fold)	√	√	√	×
	Monitor	√	√	√	√
	Refresh	√	√	√	√
	Select Command Line (Single/Multiple)	√	√	√	√
	Undo	√	√	√	×
Program Data	Create Data	√	√	√	×
	Delete Data	√	√	√	×
	Modify Data (Including Calibration, etc.)	√	√	√	×
	Refresh	√	√	√	√
	Rename	√	√	√	×
System Log	View Current Alarms	√	√	√	√
	View Historical Alarms	√	√	√	√
	Get Historical Alarms	√	√	√	√
	Clear Alarms	√	√	√	√
Manual Inspection	View Joint Coordinate System	√	√	√	√
	View World Coordinate System	√	√	√	√
	View User Coordinate System	√	√	√	√
	View Motor Torque Values	√	√	√	√
	View Single Turn Values	√	√	√	√
	Set Single Turn Values	√	√	×	×
	Robot Homing	√★	√★	√★	×

Function		√Has Permission × No Permission ★Confirmed by Secondary Password			
		Debu g	Administ rator	User	Guest
	Tool Switching	√	√	√	×
	Coordinate System Switching	√	√	√	×
	Jog Mode Switching	√	√	√	×
	Jog Coordinate System	√	√	√	×
	Jog Settings	√	√	√	×
System Settings	Basic Settings	√	√	√	×
	Collision Detection	√	√	√	×
	IP Settings	√	√	×	×
	Vision Configuration	√	√	√	×
	Follow Configuration	√	√	√	×
	Vibration Suppression	√	√	√	×
	Local Settings	√	√	×	×
	Advanced Settings	×	×	×	×
	System Status	×	×	×	×
	Hardware Testing	×	√	×	×
	Maintenance	√	√	×	×
Debugging Settings	√	×	×	×	
IO Detection	View Physical IO	√	√	√	√
	Modify Physical Outputs	√	√	√	×
	View Virtual IO	√	√	√	√
	Modify Virtual Outputs	√	√	√	×
	View System IO and Trigger Settings	√★	√★	×	×
Plugin Navigation	Create Group	√	×	×	×
	Delete Group	√	×	×	×
	Load Plugin	√	×	×	×
	Unload Plugin	√	×	×	×
	Move	√	×	×	×
	Open	√	×	×	×
Plugin Managem ent	Install	√	×	×	×
	Export	√	×	×	×
	Uninstall	√	×	×	×
	Permission Management	√	×	×	×

13.5. Modbus TCP Control Interface Data Table

	Local Address	Register Address	Definition	Description	Remarks
Send	MBDataBuffer[0]	40001	reserved	Heartbeat detection value	Ranges from 1 to 65535 in

	Local Address	Register Address	Definition	Description	Remarks
					a cyclic pattern
	MBDataBuffer[1]	40002		Global speed	
	MBDataBuffer[2]	40003		Read/write flag response	
	MBDataBuffer[3]	40004	Rob status information	bit0: Manual Operation Mode bit1: Automatic Operation Mode bit2: Remote Operation Mode bit3: Enable Status bit4: Running Status bit5: Error Status bit6: Program Running Status bit7: Robot in Motion	
	MBDataBuffer[4]	40005	Current loaded project name	20 bytes	For example, if the loaded project file name is "estun.test," the values of each register are as follows: [4]0x6573, [5]0x7475, [6]0x6E2E, [7]0x6D61, [8]0x696E,
	MBDataBuffer[5]	40006			
	MBDataBuffer[6]	40007			
	MBDataBuffer[7]	40008			
	MBDataBuffer[8]	40009			
	MBDataBuffer[9]	40010			
	MBDataBuffer[10]	40011			
	MBDataBuffer[11]	40012			
	MBDataBuffer[12]	40013			
	MBDataBuffer[13]	40014			
	MBDataBuffer[14]	40015	SimDout[1-16]	DO 1-16	
	MBDataBuffer[15]	40016	SimDout[17-32]	DO 17-32	
	MBDataBuffer[16]	40017	SimDout[33-48]	DO 33-48	
	MBDataBuffer[17]	40018	SimDout[49-64]	DO 48-64	

	Local Address	Register Address	Definition	Description	Remarks
	MBDataBuffer[18]	40019	Rob Command Execution Status	bit0: Command is 0 bit1: Successful execution of Emergency Stop command bit2: Successful execution of Start command bit3: Successful execution of Stop command bit4: Successful execution of Reset command bit5: Successful execution of Enable Up command bit6: Successful execution of Enable Down command bit7: Successful execution of Load Project command bit8: Successful execution of Logout Project command bit9: Successful execution of Set Global Speed command bit10: Waiting for Control bit11: Waiting for Command bit12: Waiting for Command Execution to Complete bit13: Command Execution Error bit14: Reserved bit15: Reserved	When the command register is 0, bit[0] is 1. When the command register has a command, bit[0] is 0. Upon successful execution of a command, the corresponding success bit is set to 1. When regaining control and the command is 0, the previous success bits are cleared. Therefore, the status code for issuing commands is 0x801.
	MBDataBuffer[19]	40020	Use by User	AO 1-32	
				

	Local Address	Register Address	Definition	Description	Remarks
				
				
	MBDataBuffer[50]	40051			
Receive	MBDataBuffer[51]	40052	Robotic Operation Commands	bit2 (0 → 0x4): Start robot program bit3 (0 → 0x8): Stop robot program bit4 (0 → 0x10): Reset robot errors bit7 (0 → 0x80): Load project file bit8 (0 → 0x100): Logout current project file bit9 (0 → 0x200): Set global speed bit10 (0 → 0x400): Reset command state machine	All commands are triggered on the rising edge and should be used with the read/write flag 0x11. Commands can be sent when the command status bit is 0x801. Note: When encountering a command response failure, it is necessary to reset the state machine using bit10 before sending a new command.
	MBDataBuffer[52]	40053	Global Speed Value		
	MBDataBuffer[53]	40054	Set Project Name	20 bytes	
	MBDataBuffer[54]	40055			
	MBDataBuffer[55]	40056			
	MBDataBuffer[56]	40057			
	MBDataBuffer[57]	40058			
	MBDataBuffer[58]	40059			
	MBDataBuffer[59]	40060			
	MBDataBuffer[60]	40061			
	MBDataBuffer[61]	40062	SimDI[1-16]	DI 1-16	
	MBDataBuffer[62]	40063			
	MBDataBuffer[63]	40064			

	Local Address	Register Address	Definition	Description	Remarks
	MBDataBuffer[64]	40065	SimDI[17-32]	DI 17-32	
	MBDataBuffer[65]	40066	SimDI[33-48]	DI 33-48	
	MBDataBuffer[66]	40067	SimDI[49-64]	DI 48-64	
	MBDataBuffer[67]	40068	Use by User	AI 1-32	
				
				
				
	MBDataBuffer[98]	40099			
	MBDataBuffer[99]	40100	Read/Write Flag		0x11: Open rob Command Issuance Permission (0x11)

13.6. Deployment

The software requires a 64-bit operating system.

Install the software in a directory without Chinese characters.

If the 3D plugin is not functioning properly, it is likely that the graphics card driver needs to be updated.