

Remote I/O Control Function User Guide

Contents

1 OVERVIEW.....	5
2 INTRODUCTION OF ROBOT BUS ADDRESSES	5
3 CONFIGURATION THROUGH SOFTWARE INTERFACE.....	5
3.1 Configuration via InoRobotLab	6
3.1.1. Fieldbus Switch Settings	6
3.1.2. Address Allocation Settings.....	11
3.1.3. I/O Mapping Settings	17
3.1.4. Project Number Configuration.....	38
3.2 Configuration through the Teach Pendant.....	41
3.2.1. Fieldbus Switch Settings	41
3.2.2. Address Allocation Settings.....	46
3.2.3. I/O Mapping Configuration	46
3.2.4. Project Number Configuration.....	51
4 DIFFERENCES BETWEEN TWO REMOTE I/O UNIT CONTROL MODES	54
4.1 Remote I/O Unit (Effective in Both Auto and Manual Modes)	54
4.2 Remote I/O Unit (Only Effective in Auto Mode)	54
4.3 Example of Differences between Two Types of Control Modes.....	60
5 CLASSIFICATION AND USE OF REMOTE CONTROL	61

5.1.1. Basic Remote Control	61
5.1.2. Extended Remote Control	61
6 I/O MONITOR.....	64
6.1 I/O Monitoring on InoRobotLab.....	64
6.1.1. Inputs.....	64
6.1.2. Outputs.....	70
6.1.3. System IO.....	75
6.1.4. Meaning of Colors in I/O Monitor	76
6.2 I/O Monitoring on Teach Pendant	77
6.2.1. IN.....	77
6.2.2. OUT	82
6.2.3. AD/DA.....	83
6.2.4. System I/O	83
6.2.5. Meaning of Colors in I/O Monitor	87
7 USER INSTRUCTIONS FOR READ/Writing THE BUS	88
7.1.1. Example: How to receive data from PLC through instructions?	88
8 CONTROLLING THE ROBOT VIA DIGITAL I/O AND FIELDBUS I/O SIMULTANEOUSLY.....	88
8.1.1. Appendix 1: Fieldbus I/O Correspondence.....	90
9 APPENDIX 2: EXTENDED REMOTE CONTROL COMMAND LIST	115

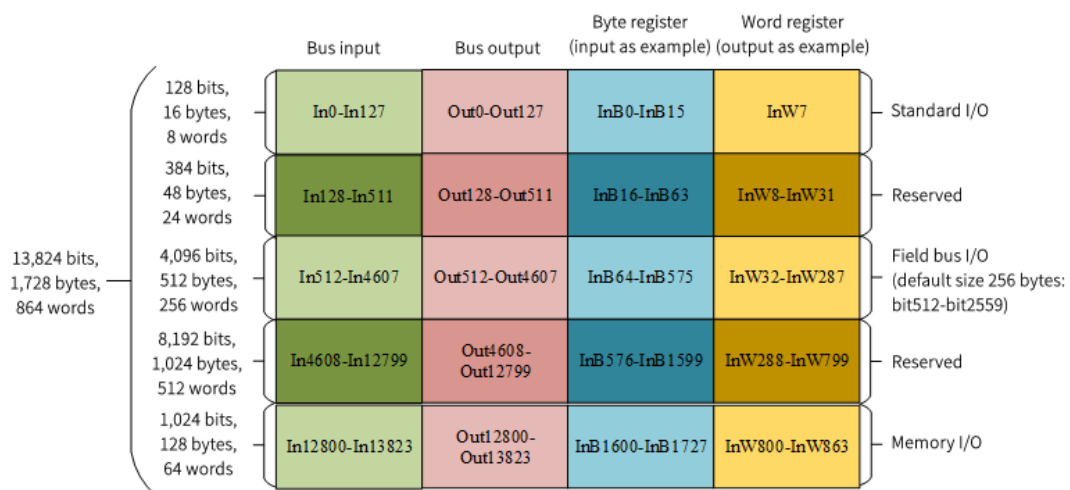
9.1.1. List of Commands	115
9.1.2. System Status Reading and Setting Commands	127
9.1.3. Read/Write-related commands.....	172
9.1.4. System variable-related commands.....	188
9.1.5. System standard I/O-related commands	210
9.1.6. Motion-related commands.....	220
9.1.7. Read the system parameter settings	235
9.1.8. External axis-related commands	244
9.1.9. Interference zone-related commands.....	249
9.1.10. Average load rate and current monitoring.....	271
9.1.11. Multitasking-related commands.....	275
9.1.12. Tracking process-related commands.....	276
10 APPENDIX 3: INSTRUCTIONS FOR SPECIAL BUS TYPES	294
10.1.1. Overview of Endianness	294
10.1.2. Endianness Conversion of Siemens PROFINET Bus.....	296

1 Overview

This guide describes the use of remote control function of the IRCB501 robot controller. It covers basic remote control and extended remote control. The guide describes the bus addresses, interface settings, I/O monitoring, and command operations.

2 Introduction of Robot Bus Addresses

The following describes the concept of the robot bus addresses. The bus addresses of the robot include standard I/Os, fieldbus I/Os, and memory I/Os, as shown below.



Standard I/O: Equivalent to digital I/O, i.e., I/O where the switching state is directly associated with the physical level high or low.

Fieldbus I/O: Currently, the fieldbus I/O of the robot refers to the I/O used by the robot to interact with the master when the robot is acting as a fieldbus slave.

Memory I/O: Equivalent to the robot's internal Bool-type variables, used for internal arithmetic.

3 Configuration through software interface

3.1 Configuration via InoRobotLab

3.1.1. Fieldbus Switch Settings

You can switch on or off five types of buses including Modbus, Ethernet/IP, EtherCAT, MC, and PROFINET, and configure the bus parameters. Note that only one fieldbus can be activated at a time.

Modbus Settings

ModbusRTU and Modbus TCP functions of the robot controller can be enabled simultaneously without conflict.

Regardless of Modbus RTU or Modbus TCP, the robot controller can only be configured on InoRobotLab as Modbus slave, not as Modbus master.

Steps

Go to Peripheral configuration > Fieldbus slave configuration > Switch settings.

Controller parameter configuration

Robot settings
‣ Zero settings
‣ Installation parameters
‣ Peripheral configuration
‣ Fieldbus slave configuration
‣ Switch settings
‣ Address allocation settings
‣ I/O mapping settings
‣ Project No. configuration
‣ Point file configuration
‣ IRLink settings
‣ Mechanical unit configuration
‣ Fieldbus master configuration
‣ Motion parameters
‣ Control parameters
‣ Workspace
‣ System settings
‣ Debug

Switch settings

Modbus Ethernet/IP MC Profinet

ModbusRTU

Switch ☒ Open

Status OFF

COM configuration

Baud rate 9600

Parity check Even parity check

Data bit 8

Stop bit 1

Station configuration

Station number 1

Frame interval (ms) 5

Timeout (0.1s) 0

ModbusTCP

Switch ☒ Open

Status OFF

Port 502

Frame interval (ms) 1

Connection status

Connection status	IP address	Port

Export file Import file

Toggle the switch to turn on or off the ModbusRTU and ModbusTCP function.

In the Modbus RTU function, the frame interval depends on the baud rate. The larger the baud rate, the smaller the frame interval. If the baud rate is changed, the frame interval will be automatically changed accordingly.

In the ModbusTCP function, the port number is fixed to 502 and the frame interval can be set as needed.

The order of toggle switch operation and parameter setting is not limited. The settings are saved to the controller only when you click the Save button.

For the ModbusTCP function, you can monitor the connection status on the configuration interface.

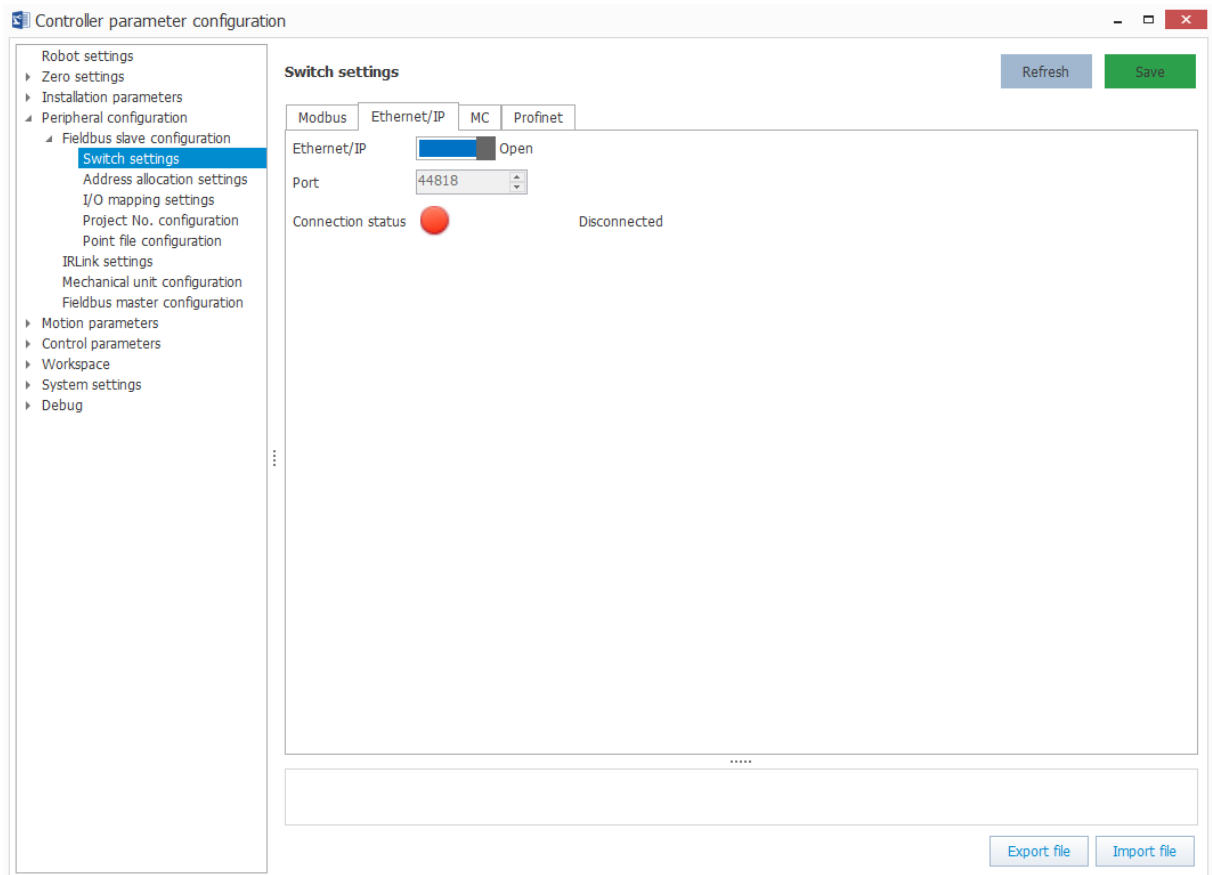
Results

After the configuration is complete, you can verify the configuration through communication with the Modbus client.

For details on the use of Modbus functions, see Modbus User Guide of Inovance Robot.

EtherNet/IP Settings

You can enable or disable the Ethernet/IP slave function by toggling the switch and clicking the Save button in the upper right corner. The interface also displays the port number and connection status of the slave. When no connection exists, the indicator is red. When a master is connected, the indicator is green. The IP address and port number of the master are displayed.



For details on the use of Ethernet/IP functions, see EthernetIP User Guide of Inovance Robot.

EtherCAT Settings

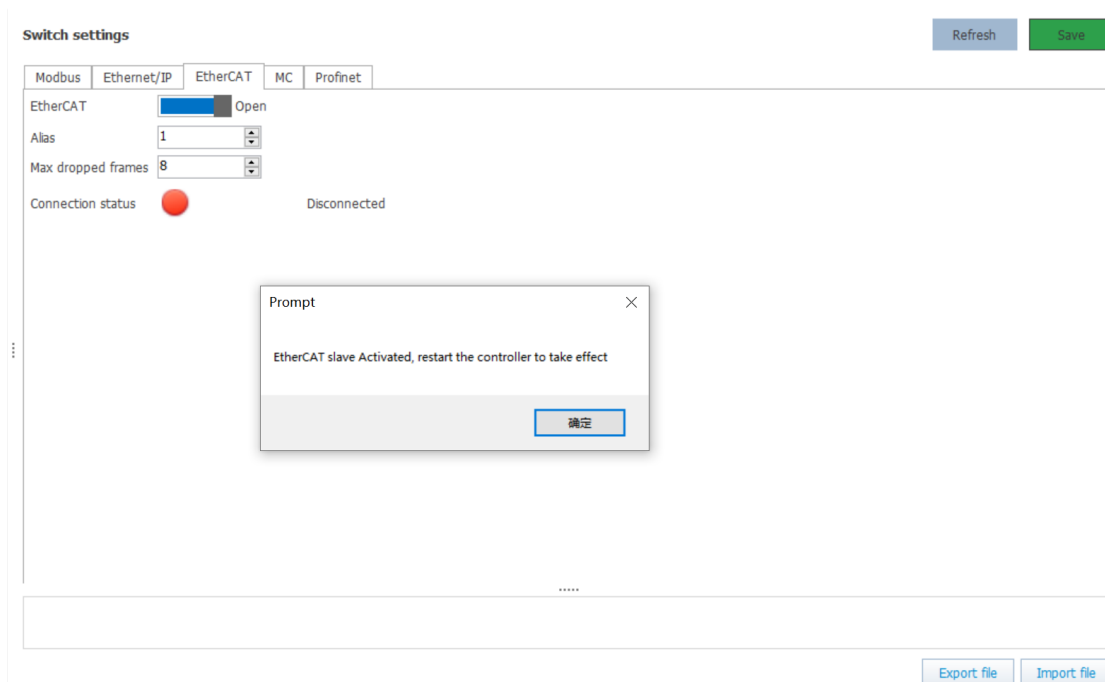
The EtherCAT function is optional. It can only be used on controllers that support the EtherCAT function.

You can enable or disable the EtherCAT slave function and configure the related parameters.

You can enable or disable the EtherCAT slave function by toggling the switch and clicking the Save button in the upper right corner. You can also configure the alias of the slave and the maximum number of dropped frames.

The interface also displays the connection status of the EtherCAT slave. When no connection exists, the indicator is red. When a master is connected, the indicator is green.

After the alias is modified, the robot needs to be powered on again to make the modification take effect.



For details on the use of EtherCAT functions, see Ethernet/IP User Guide of Omron PLC and Inovance Robot.

MC Settings

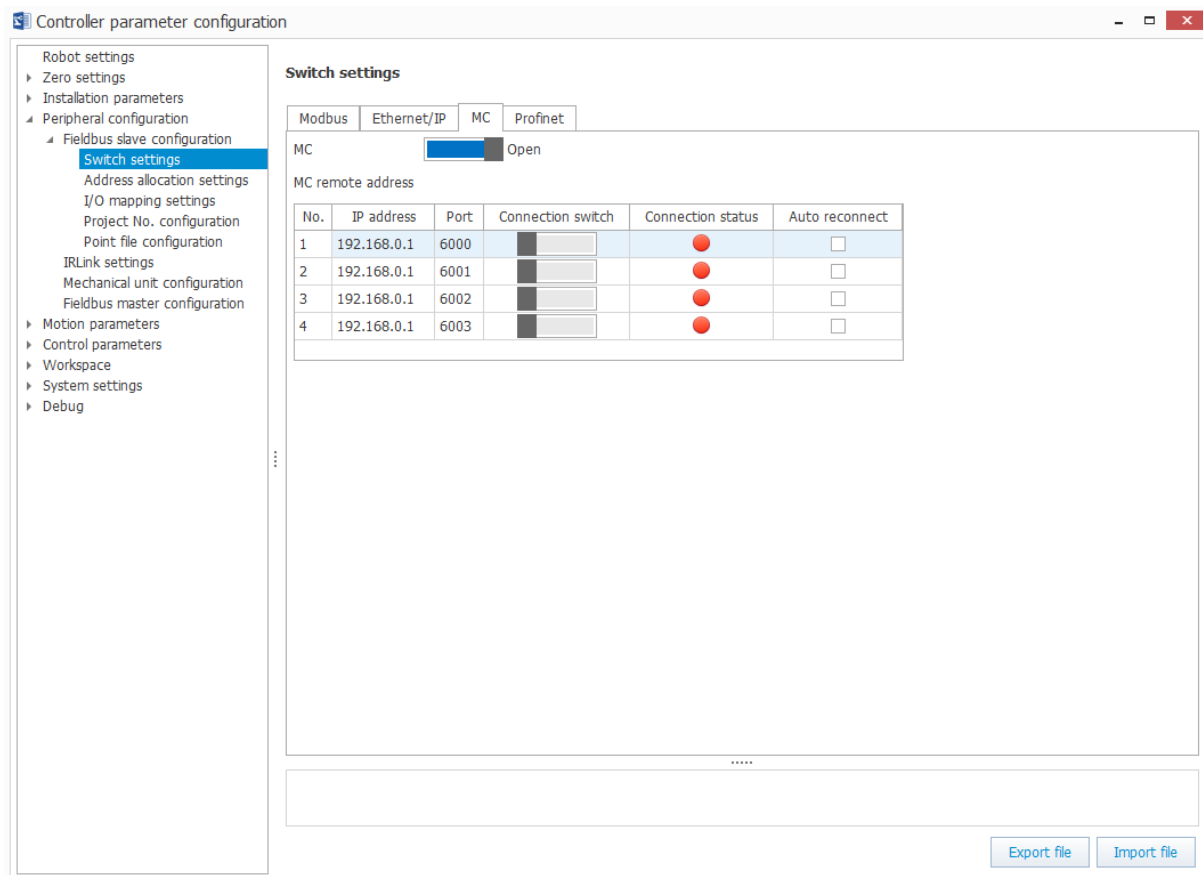
You can enable the MC function of the robot controller. The robot acts as a slave.

Steps

Go to Peripheral configuration > Fieldbus slave configuration > Switch settings.

In contrast to the previous three protocols, the MC function can be enabled or disabled directly through the toggle switch. The interface displays the IP address, port number, connection switch, connection status, and automatic re-connection switch of the four masters. You can establish a connection to the master by entering the IP address and port number of the master and then clicking the connection switch. The indicator is red when there is no master connection, and green when there is a master connection.

Note: After the master connection is successful, the IP and port numbers of the master cannot be modified. The auto re-connect option can be checked only when the master connection is successful. When the auto re-connect option is checked, the IP address, port number, and connection switch cannot be modified.



Results

After the configuration is complete, you can verify the configuration through communication with the MC client.

For details on the use of MC functions, see the MC Communication Guide between Mitsubishi PLC and Inovance Robot.

PROFINET Settings

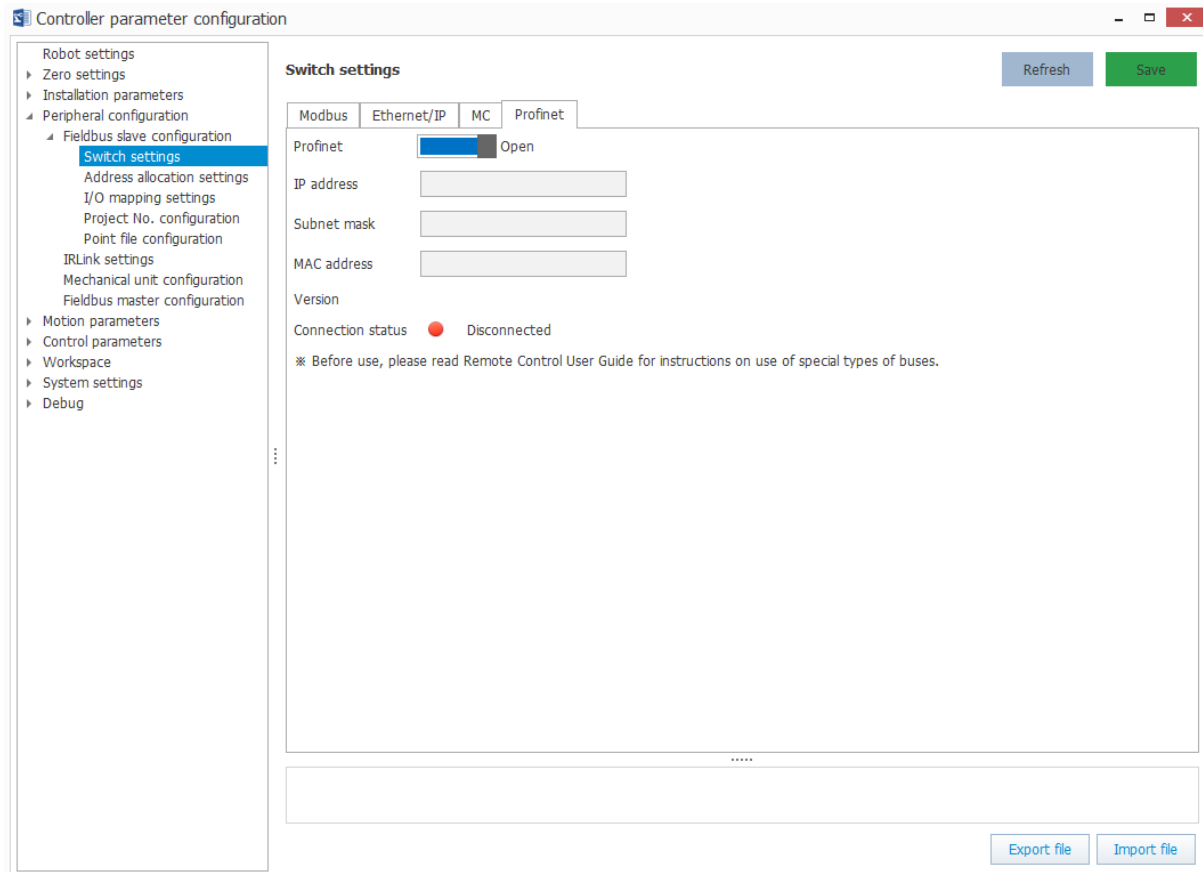
It allows you to configure the PROFINET slave function of the robot.

You can enable or disable the PROFINET slave function by toggling the switch and clicking the Save button in the upper right corner.

The interface also displays the connection status of the PROFINET slave, the IP address, subnet mask, MAC address, and software version of the slave expansion card. The connection status indicator is red when the PROFINET slave function is not enable or communication with the master fails. When communication with the master is normal, the connection status indicator is green.

Note:

To use this function, the controlled must be installed with an external PROFINET slave expansion card.



For details on the use of PROFINET functions, see PROFINET User Guide for Siemens PLC and Inovance Robot.

3.1.2. Address Allocation Settings

Before using the address allocation function, you need to understand the concept of the robot bus addresses first. See Introduction of Robot Bus Addresses.

The so-called address allocation is to specify the range of fieldbus I/Os for communication with the master. Only I/O with an assigned address can interact with the master (PLC or HMI in most cases) to input and output data. The following takes Modbus, Ethernet/IP, EtherCAT, MC and PROFINET functions as examples to describe the address allocation.

Modbus Address Allocation

When the ModbusRTU or ModbusTCP function is activated, the current bus type is displayed as Modbus.

You can change the number of bytes of the allocated coil and register. The bytes are automatically added to the total size of the input address. By default, the size of coil is 26 bytes and the size of the register is 230 bytes. The relationship between the Modbus address table and the robot bus address is as follows when the default configuration is used.

Modbus address	Robot address
Coil 4096-4303 (208 coils, 26 bytes)	In512-In719 (208 bits, 26 bytes)
Register 34800-34914 (115 registers, 230 bytes)	In720-In2559 (1840 bits, 230 bytes)
Coil 0-207 (208 coils, 26 bytes)	Out512-Out719 (208 bits, 26 bytes)
Register 2048-2162 (115 registers, 230 bytes)	Out720-Out2559 (1840 bits, 230 bytes)

Controller parameter configuration

Robot settings

- Zero settings
- Installation parameters
- Peripheral configuration
 - Fieldbus slave configuration
 - Switch settings
 - Address allocation settings**
 - I/O mapping settings
 - Project No. configuration
 - Point file configuration
 - IRLink settings
 - Mechanical unit configuration
 - Fieldbus master configuration
- Motion parameters
- Control parameters
- Workspace
- System settings
- Debug

Address allocation settings

Current bus type: Modbus

Input

Size: 256 Byte

Coil: 26 Byte

Register: 230 Byte

Output

Size: 256 Byte

Coil: 26 Byte

Register: 230 Byte

Export configuration Import configuration Restore defaults

Refresh Save

.....

Ethernet/IP Address Allocation

When the Ethernet/IP function is activated, the current bus type is displayed as Ethernet/IP.

You can change the number of bytes of the input and output addresses. By default, the size of input/output address is 256 bytes. The relationship between the Ethernet/IP address table and the robot bus address is as follows when the default configuration is used.

(m is the start word address of the data transmitted to the robot by the Ethernet/IP master, and n is the start word address of the data transmitted to the Ethernet/IP master by the robot.)

Ethernet/IP address	Robot address
m to m+127 (128 words, 256 bytes)	In512-In2559 (2048 bits, 256 bytes)
n to n+127 (128 words, 256 bytes)	Out512-Out2559 (2048 bits, 256 bytes)

EtherCAT Address Allocation

When the EtherCAT function is activated, the current bus type is displayed as EtherCAT.

You can change the number of bytes of the input and output addresses. By default, the size of input/output address is 256 bytes. The relationship between the EtherCAT address table and the robot bus address is as follows when the default configuration is used.

(p is the first object of RxPDO in the EtherCAT protocol, and q is the first object of TxPDO in the EtherCAT protocol.)

EtherCAT address	Robot address
p to p+127 (128 RxPDOs, 256 bytes)	In512-In2559 (2048 bits, 256 bytes)
q to q+127 (128 TxPDOs, 256 bytes)	Out512-Out2559 (2048 bits, 256 bytes)

The screenshot shows a software window titled "Controller parameter configuration". On the left is a tree view with categories like "Robot settings", "Zero settings", "Installation parameters", "Peripheral configuration", "Switch settings", "Address allocation settings" (which is selected and highlighted in blue), "I/O mapping settings", "Project No. configuration", "Point file configuration", "IRLink settings", "Mechanical unit configuration", "Fieldbus master configuration", "Safety I/O action", "Motion parameters", "Control parameters", "Workspace", "System settings", and "Debug".

The main area of the window is titled "Address allocation settings". It includes a "Refresh" button and a green "Save" button in the top right corner. Below the title, it says "Current bus type: EtherCAT". There are two main sections: "Input" and "Output". Each section has a "Size:" label followed by a numeric input field set to "256" and a unit dropdown menu set to "Byte". At the bottom of the settings area, there are three buttons: "Export configuration", "Import configuration", and "Restore defaults".

MC Address Allocation

When the MC function is activated, the current bus type is displayed as MC. In addition, an MC connection ID is displayed, indicating the number of the current master.

You can change the number of bytes of the start address and D register for the input and output. By default, the size of input/output address is 256 bytes. The size of the input/output D register is between 2 and 256 bytes. The size must be an even number. The sum of the number of bytes of the start address and the D register of the input must be smaller than the start address of the output. The relationship between the MC address table and the robot bus address is as follows

when the default configuration is used.

MC address	Robot address
D register D0-D255 (128 registers, 256 bytes)	In512-In2559 (2048 bits, 256 bytes)
D register D1000-D1255 (128 registers, 256 bytes)	Out512-Out2559 (2048 bits, 256 bytes)

Note: According to technical data of Mitsubishi PLC, the maximum number of soft components is 40,000. Therefore, the sum of the number of bytes of the start address and the output D register should be less than or equal to 40,000. The configuration page only limits that the input/output start address is less than or equal to 40,000, and the user need to ensure on their own that the address size is correct. Input start address + Input D register $\leq$ Output start address < Output start address + Output D register $\leq$ 40000.

Controller parameter configuration

Address allocation settings

MC connection ID: 1

Current bus type: MC

Input

Max. configuration: 128 Size: 256 Word

Start address: 0 Coil: 26

D register size: 128 Register: 230 Word

Output

Max. configuration: 128 Size: 256 Word

Start address: 1000 Coil: 26

D register size: 128 Register: 230 Word

Export configuration Import configuration Restore defaults

Refresh Save

PROFINET Address Allocation

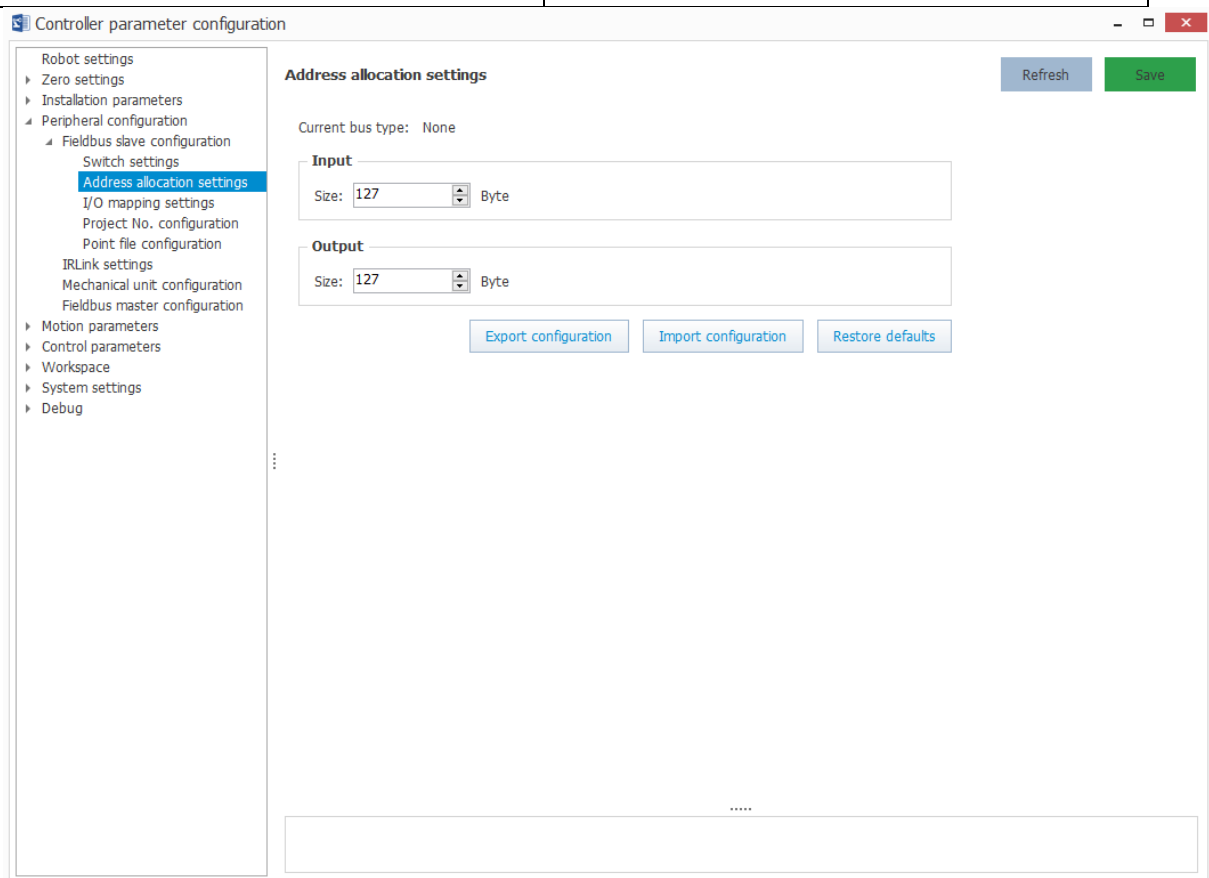
When the PROFINET function is activated, the current bus type is displayed as PROFINET.

You can change the number of bytes of the input and output addresses. By default, the size of

input/output address is 127 bytes. The relationship between the PROFINET address table and the robot bus address is as follows when the default configuration is used.

(In Siemens S300, S1200, and S1500 series PLCs, Q is the first object of the PROFINET output register, and I is the first object of the PROFINET input register.)

EtherCAT address	Robot address
Q to Q+126 (127 registers, 254 bytes)	In512-In2543 (2032 bits, 254 bytes)
I to I+126 (127 registers, 254 bytes)	Out512-Out2543 (2032 bits, 254 bytes)



Note: To ensure the integrity of the PROFINET communication data, ensure that the address length of the master is the same with that of the robot. When an address length difference is detected, H3049 alarm (which cannot be cleared) will be displayed on the robot and a prompt message is printed on the InoRobotLab interface. To clear the alarm, eliminate the address length difference.

For the convenience of identification, the fieldbus I/O assigned with addresses are displayed in blue, while those not assigned with addresses are displayed in black.

Query	I/O monitor	Name	Labels	Status	Force	Description
Standard I/O	Input	In[000]		OFF	Not forced	
Bit	Bit	In[001]		OFF	Not forced	
Byte	Byte	In[002]		OFF	Not forced	
Word	Word	In[003]		OFF	Not forced	
Output	Output	In[004]		OFF	Not forced	
Bit	Bit	In[005]		OFF	Not forced	
Byte	Byte	In[006]		OFF	Not forced	
Word	Word	In[007]		OFF	Not forced	
Fieldbus slave I/O	Input	In[008]	D004	OFF	Not forced	
Bit	Bit	In[009]		OFF	Not forced	
Byte	Byte	In[010]		OFF	Not forced	
Word	Word	In[011]		OFF	Not forced	
Output	Output	In[012]		OFF	Not forced	
Bit	Bit	In[013]		OFF	Not forced	
Byte	Byte	In[014]		OFF	Not forced	
Word	Word	In[015]		OFF	Not forced	
Fieldbus master I/O	Input	In[016]		OFF	Not forced	
Bit	Bit	In[017]		OFF	Not forced	
Byte	Byte	In[018]		OFF	Not forced	
Word	Word	In[019]		OFF	Not forced	
Output	Output	In[020]		OFF	Not forced	
Bit	Bit	In[021]		OFF	Not forced	
Byte	Byte	In[022]		OFF	Not forced	
Word	Word	In[023]		OFF	Not forced	
Memory I/O	Input	In[024]		OFF	Not forced	
Bit	Bit	In[025]		OFF	Not forced	
Byte	Byte	In[026]		OFF	Not forced	
Word	Word	In[027]		OFF	Not forced	
Output	Output	In[028]		OFF	Not forced	
Bit	Bit	In[029]		OFF	Not forced	
Byte	Byte	In[030]		OFF	Not forced	
Word	Word	In[031]		OFF	Not forced	
		In[032]		OFF	Not forced	

Query	I/O monitor	Name	Labels	Status	Description
Bit	Bit	Out[000]		OFF	
Byte	Byte	Out[001]		OFF	
Word	Word	Out[002]		OFF	
Output	Output	Out[003]		OFF	
Bit	Bit	Out[004]		OFF	
Byte	Byte	Out[005]		OFF	
Word	Word	Out[006]		OFF	
Fieldbus slave I/O	Input	Out[007]		OFF	
Bit	Bit	Out[008]		OFF	
Byte	Byte	Out[009]		OFF	
Word	Word	Out[010]		OFF	
Output	Output	Out[011]		OFF	
Bit	Bit	Out[012]		OFF	
Byte	Byte	Out[013]		OFF	
Word	Word	Out[014]		OFF	
Fieldbus master I/O	Input	Out[015]		OFF	
Bit	Bit	Out[016]		OFF	
Byte	Byte	Out[017]		OFF	
Word	Word	Out[018]		OFF	
Output	Output	Out[019]		OFF	
Bit	Bit	Out[020]		OFF	
Byte	Byte	Out[021]		OFF	
Word	Word	Out[022]		OFF	
Memory I/O	Input	Out[023]		OFF	
Bit	Bit	Out[024]		OFF	
Byte	Byte	Out[025]		OFF	
Word	Word	Out[026]		OFF	
Output	Output	Out[027]		OFF	
Bit	Bit	Out[028]		OFF	
Byte	Byte	Out[029]		OFF	
Word	Word	Out[030]		OFF	
System I/O	Input	Out[031]		OFF	
		Out[032]		OFF	

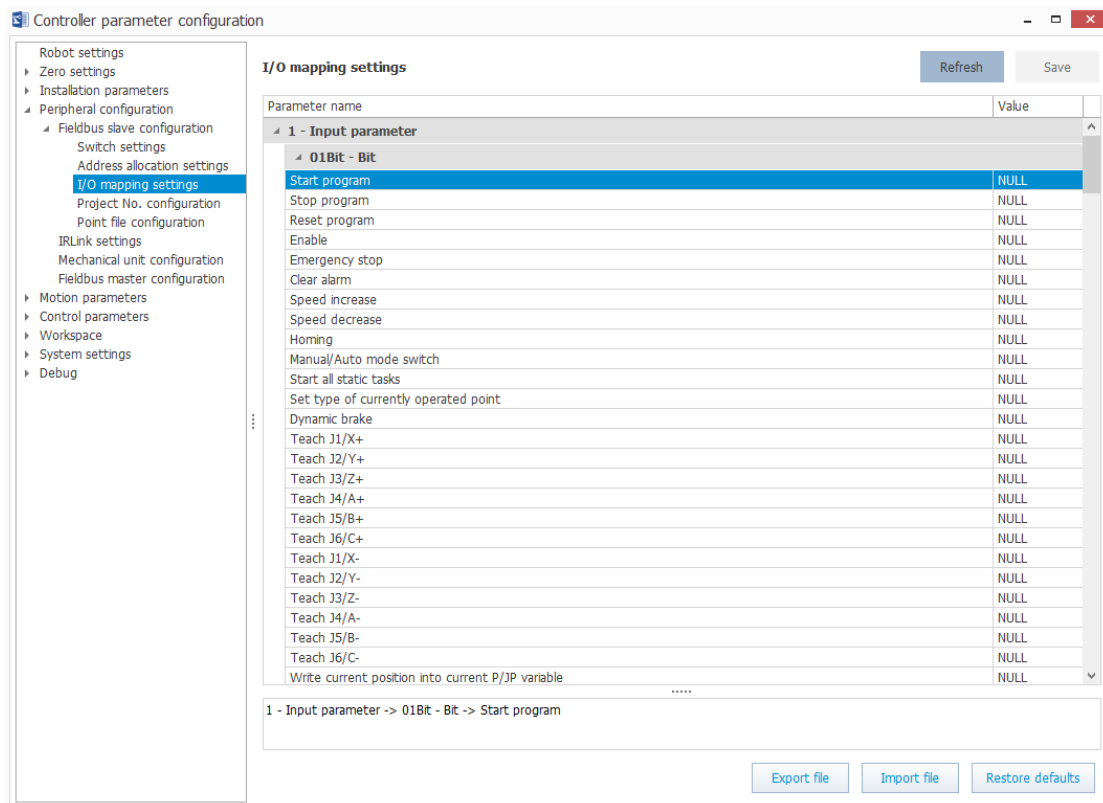
3.1.3. I/O Mapping Settings

Remote I/O control allows you to control program start/stop, reset, and emergency stop of the robot via I/Os (including digital I/Os, fieldbus I/Os, and memory I/Os). You can also monitor the program running and fault state of the robot.

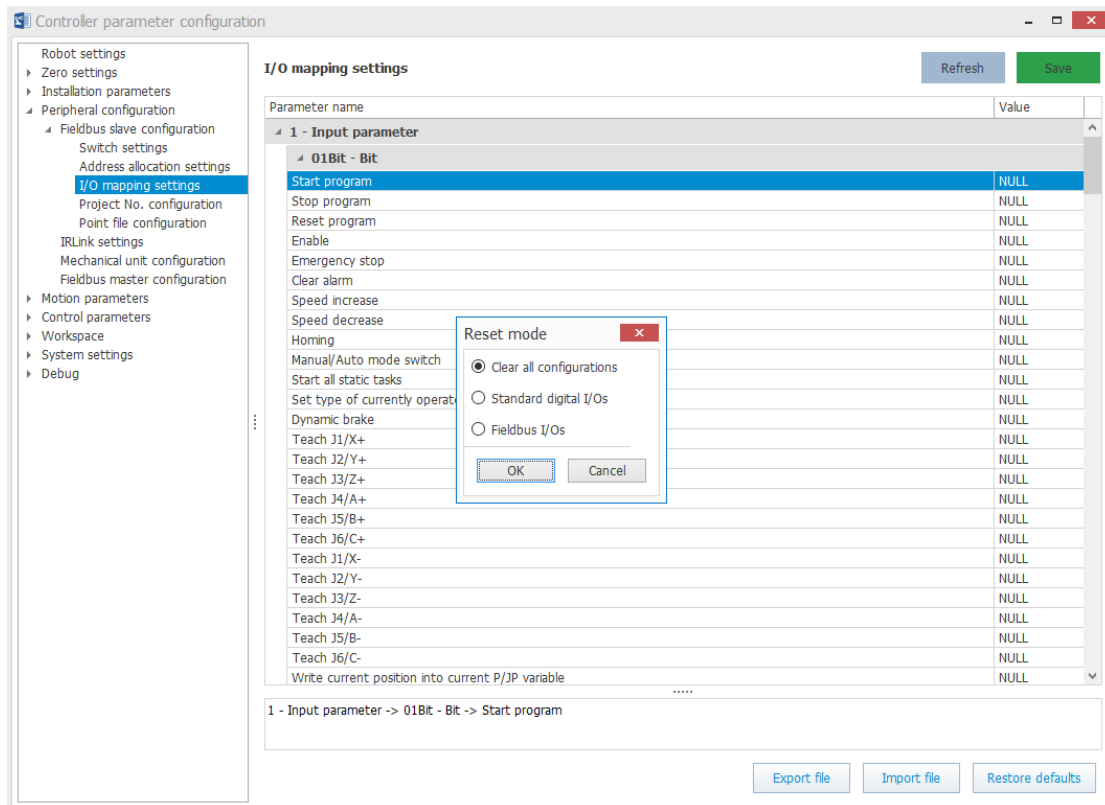
The I/O mapping is to bind some commands of the remote I/O control function to the input signals (In) of the robot, and the status of the robot to the output signals (Out). In this way, you can control the robot using the input signals and monitor the robot using the output signals.

Steps

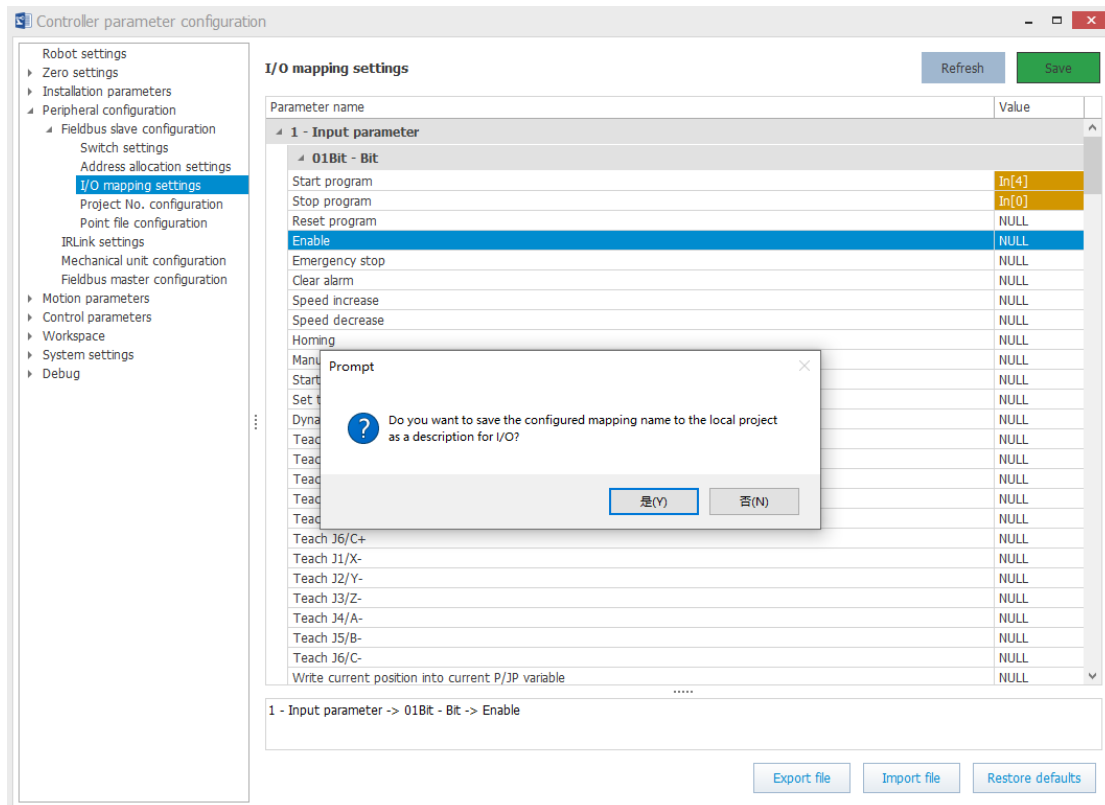
Go to Peripheral configuration > Fieldbus slave configuration > I/O mapping settings.



The default I/O mapping is empty. To facilitate user operation, two sets of default I/O configurations are provided. You can select the default I/O configurations by clicking the Restore defaults button in the lower right corner. One group is standard digital I/Os and the other group is fieldbus I/Os. You can also choose Clear all configurations to clear the existing setting values.



After you select standard digital I/Os or fieldbus I/Os, the default I/O mapping is generated. You can adjust the default mapping as needed and click the Save button in the upper right corner. When a project is currently open in InoRobotLab, a pop-up prompt displays after you click the Save button.



Click Yes to save the settings. Then you can see the auto-generated I/O description on the monitoring interface. You can also view the auto-generated I/O description in the I/O labels of the project file.

The screenshot shows the 'I/O monitor' window. It contains a table with the following columns: Name, Labels, Status, and Description. The table lists various output parameters and their current status and descriptions.

Name	Labels	Status	Description
Out[000]		OFF	Program run status
Out[001]		ON	Program stopped
Out[002]		OFF	Program reset successful
Out[003]		OFF	Enable status
Out[004]		OFF	Emergency stop status
Out[005]		ON	System fault status
Out[006]		OFF	System warning status
Out[007]		OFF	
Out[008]		OFF	
Out[009]		OFF	
Out[010]		OFF	
Out[011]		OFF	
Out[012]		OFF	
Out[013]		OFF	

For the configuration of standard digital I/O mapping and fieldbus I/O mapping, see the description below.

Mapping of Standard Digital I/O

The default standard digital I/O configuration is as follows:

(1) Bus input address mapping table

Robot address	Function	Type	Remarks
In0	Program start	Reset type	
In1	Program stop	Level type	
In2	Program reset	Reset type	
NULL	Enable	Special type	
In3	Emergency stop	Level type	OFF indicates an emergency stop command, and ON indicates a non-emergency stop command
In4	Clear the alarm.	Reset type	
In5	Speed increase	Reset type	
In6	Speed decrease	Reset type	
NULL	Homing (return to origin 0)	Reset type	After this operation is performed, the current direct motion mode changes to Movj.
NULL	Manual/Automatic mode switchover. 0: Manual 1: Automatic	Level type	Note: If the robot is moving at high speed in automatic mode, it stops the motion before switching to manual mode.
NULL	Reserved		

Robot address	Function	Type	Remarks
NULL	Reserved		
NULL	Teach J1/X+	Special type	Change from controlling robot motion to controlling mechanical unit axis motion Note: Switch the mechanical unit through the remote control command 0x0701.
NULL	Teach J2/Y+	Special type	
NULL	Teach J3/Z+	Special type	
NULL	Teach J4/A+	Special type	
NULL	Teach J5/B+	Special type	
NULL	Teach J6/C+	Special type	
NULL	Reserved		
NULL	Reserved		
NULL	Teach J1/X-	Special type	Change from controlling robot motion to controlling mechanical unit axis motion Note: Switch the mechanical unit through the remote control command 0x0701.
NULL	Teach J2/Y-	Special type	
NULL	Teach J3/Z-	Special type	
NULL	Teach J4/A-	Special type	
NULL	Teach J5/B-	Special type	
NULL	Teach J6/C-	Special type	

(2) Bus output address mapping table

Robot address	Function
Out0	Program running state
Out1	Program stop state
Out2	Program reset successful state
Out3	Enable state
Out4	ON indicates the emergency stop state and OFF indicates the non-emergency stop state
Out5	System fault state
NULL	System warning state
NULL	Servo fault state
NULL	Servo warning state
NULL	Safety door warning state
Out6	System startup completed state
NULL	Homing completed state
NULL	Bus communication heartbeat signal

Mapping of Fieldbus I/O

The default fieldbus I/O configuration is as follows:

(1) Bus input address mapping table (basic remote control area)

Robot address	Function	Type	Remarks	Is effective when the control permission is granted to remote I/O unit (only effective in auto mode) and when the robot is in manual mode?
In512	Program start	Reset type		No
In513	Program stop	Reset type		No
In514	Program reset	Reset type		No
In515	Enable	Special type		No
In516	Emergency stop	Level type	OFF indicates an emergency stop command, and ON indicates a non-emergency stop command	No
In517	Clear the alarm.	Reset type		No
In518	Speed increase	Reset type		No
In519	Speed decrease	Reset type		No
In520	Homing	Reset type		No
In521	Manual/Automatic mode switchover 0: Manual 1: Automatic	Level type	If the robot is moving at high speed in automatic mode, it stops the	Yes

			motion before switching to manual mode.	
In522	Start all active static tasks that are stopped due to an exception	Reset type	0->1 start	No
In523	Set the type of currently operated point to P variable	Level type	0: Position point, 1: Joint point	No
In524	Dynamic braking setting	Special type	0: OFF, 1: ON	No
In525- In527	Reserved			No
In528	Teach J1/X+	Special type	Change from controlling robot motion to controlling mechanical unit axis motion Note: Switch the mechanical unit through the remote control command 0x0701.	No
In529	Teach J1/Y+	Special type		No
In530	Teach J3/Z+	Special type		No
In531	Teach J4/A+	Special type		No
In532	Teach J5/B+	Special type		No
In533	Teach J6/C+	Special type		No
In534	Reserved			Yes

In535	Reserved			Yes
In536	Teach J1/X-	Special type	Change from controlling robot motion to controlling mechanical unit axis motion Note: Switch the mechanical unit through the remote control command 0x0701.	No
In537	Teach J2/Y-	Special type		No
In538	Teach J3/Z-	Special type		No
In539	Teach J4/A-	Special type		No
In540	Teach J5/B-	Special type		No
In541	Teach J6/C-	Special type		No
In542	Reserved			Yes
In543	Reserved			Yes
In544	Write the current robot position to the current P/JP variable	Reset type		No
In545	Reserved			Yes
In546	Move directly to the robot position specified by the current P/JP variable	Reset type		No
In547	OUT[0] control command	Special type		No
In548	OUT[1] control	Special type		No

	command			
In549	OUT[2] control command	Special type		No
In550	OUT[3] control command	Special type		No
In551	OUT[4] control command	Special type		No
In552	OUT[5] control command	Special type		No
In553	OUT[6] control command	Special type		No
In554	OUT[7] control command	Special type		No
In555	OUT[8] control command	Special type		No
In556	OUT[9] control command	Special type		No
In557	OUT[10] control command	Special type		No
In558	OUT[11] control command	Special type		No
In559	OUT[12] control command	Special type		No
In560	OUT[13] control command	Special type		No
In561	OUT[14] control command	Special type		No

In562	OUT[15] control command	Special type		No
In563-In719	Reserved area (can be used as a custom area)			Yes

(2) Bus output address mapping table (basic remote control area)

Robot address	Function	Remarks	Is effective when the control permission is granted to remote I/O unit (only effective in auto mode) and when the robot is in manual mode?
Out512	Program running state		Yes
Out513	Program stop state		Yes
Out514	Program reset successful state		Yes
Out515	Robot enable state		Yes
Out516	Robot emergency stop state	ON indicates the emergency stop state and OFF indicates the non-emergency stop state	Yes
Out517	System fault state		Yes
Out518	System warning state		Yes

Robot address	Function	Remarks	Is effective when the control permission is granted to remote I/O unit (only effective in auto mode) and when the robot is in manual mode?
Out519	Servo fault state		Yes
Out520	Servo warning state		Yes
Out521	Safety door warning state		Yes
Out522	System startup completed state		Yes
Out523	Robot in motion state		Yes
Out524	Robot motion complete state		Yes
Out525	Bus communication heartbeat signal		Yes
Out526	Dynamic braking state	0: OFF, 1: ON	Yes
Out527	P/JP variable write successful		Yes
Out528	IN[0] state		Yes
Out529	IN[1] state		Yes

Robot address	Function	Remarks	Is effective when the control permission is granted to remote I/O unit (only effective in auto mode) and when the robot is in manual mode?
Out530	IN[2] state		Yes
Out531	IN[3] state		Yes
Out532	IN[4] state		Yes
Out533	IN[5] state		Yes
Out534	IN[6] state		Yes
Out535	IN[7] state		Yes
Out536	IN[8] state		Yes
Out537	IN[9] state		Yes
Out538	IN[10] state		Yes
Out539	IN[11] state		Yes
Out540	IN[12] state		Yes
Out541	IN[13] state		Yes
Out542	IN[14] state		Yes
Out543	IN[15] state		Yes
Out544	OUT[0] state		Yes
Out545	OUT[1] state		Yes
Out546	OUT[2] state		Yes
Out547	OUT[3] state		Yes
Out548	OUT[4] state		Yes
Out549	OUT[5] state		Yes

Robot address	Function	Remarks	Is effective when the control permission is granted to remote I/O unit (only effective in auto mode) and when the robot is in manual mode?
Out550	OUT[6] state		Yes
Out551	OUT[7] state		Yes
Out552	OUT[8] state		Yes
Out553	OUT[9] state		Yes
Out554	OUT[10] state		Yes
Out555	OUT[11] state		Yes
Out556	OUT[12] state		Yes
Out557	OUT[13] state		Yes
Out558	OUT[14] state		Yes
Out559	OUT[15] state		Yes
Out560	Read the type of the currently operated point	0: Position point, 1: Joint point	Yes
Out561-719	Reserved area (can be used as a custom area)		Yes

(3) Bus input address mapping table (extended remote control area)

No.	Function	Description
In720-In735	Remote control command	
In736-In751	Remote control input parameter 1	

No.	Function	Description
In752-In767	Remote control input parameter 2	
In768-In783	Remote control input parameter 3	
...	...	
In1520-In1535	Remote control return parameter 50	
...	Reserved	
In2304-In2319	I/O project switchover	
In2320-In2335	Load number selection	
In2336-In2351	Coordinate system selection	1-Joint coordinate system, 2-Base coordinate system, 3-Flange coordinate system, 4-Workobject coordinate system, and 5-World coordinate system
In2352-In2367	Tool coordinate system selection	
In2368-In2383	Workobject coordinate system selection	
In2384-In2399	Speed setting	
In2400-In2415	Direct motion mode setting (0-MovJ, 1-MovL, 2-Jump, 3-JumpL, 4-MovABSJ)	
In2416-In2431	Low bit of the LH parameter of the jump motion	
In2432-In2447	High bit of the LH parameter of the jump motion	

No.	Function	Description
In2448-In2463	Low bit of the MH parameter of the jump motion	
In2464-In2497	High bit of the MH parameter of the jump motion	
In2480-In2495	Low bit of the RH parameter of the jump motion	
In2496-In2511	High bit of the RH parameter of the jump motion	
In2512-In2527	Write the serial number of the current P/JP variable	
In2528-In2543	Reserved	
In2544-In2559	Reserved	

(4) Bus output address mapping table (extended remote control area)

No.	Function	Remarks
Out720-Out735	Remote control state	
Out736-Out751	Remote control return parameter 1/Remote control error code	
Out752-Out767	Remote control return parameter 2/System fault code	
Out768-Out783	Remote control return parameter 3	
...	...	
Out1520-Out1535	Remote control return parameter 50	
...	Reserved	
Out2000-Out2015	Low bit of the current position J1/X coordinates	Position of the active mechanical unit (robot by default)

No.	Function	Remarks
Out2016-Out2031	High bit of the current position J1/X coordinates	
Out2032-Out2047	Low bit of the current position J2/Y coordinates	
Out2048-Out2063	High bit of the current position J2/Y coordinates	
Out2064-Out2079	Low bit of the current position J3/Z coordinates	
Out2080-Out2095	High bit of the current position J3/Z coordinates	
Out2096-Out2111	Low bit of the current position J4/A coordinates	
Out2112-Out2127	High bit of the current position J4/A coordinates	
Out2128-Out2143	Low bit of the current position J5/B coordinates	
Out2144-Out2159	High bit of the current position J5/B coordinates	
Out2160-Out2175	Low bit of the current position J6/C coordinates	
Out2176-Out2191	High bit of the current position J6/C coordinates	
...	...	
Out2240-Out2255	Read the serial number of the current P/JP variable	
Out2272-Out2287	Current control permission	0: PC/TP

No.	Function	Remarks
		2: Remote Ethernet client 4: Remote IO
Out2288-Out2303	Current project number	Range 1-256
Out2304-Out2319	Current project switchover state	0: Switchover successful 1: Switchover in progress 2: Project not obtained 3: Invalid project name for remote I/O switchover 4: The current project is running and needs to be stopped before switchover. 5: Incoming path error (system error) 6: Project compilation in progress, please wait 7: Input value out of range (1-256)
Out2320-Out2335	Current load number	
Out2336-Out2351	Current coordinate system	
Out2352-Out2367	Current speed	
Out2368-Out2383	Current tool coordinate system number	
Out2384-Out2399	Current workobject coordinate system number	
Out2400-Out2415	Active error code	

No.	Function	Remarks
Out2416-Out2431	Current mode	
Out2432-Out2447	Current direct motion mode (0-MovJ, 1-MovL, 2-Jump, 3-JumpL	
Out2448-Out2463	Low bit of the LH parameter of the current jump motion	
Out2464-Out2479	High bit of the LH parameter of the current jump motion	
Out2480-Out2495	Low bit of the MH parameter of the current jump motion	
Out2496-Out2511	High bit of the MH parameter of the current jump motion	
Out2512-Out2527	Low bit of the RH parameter of the current jump motion	
Out2528-Out2543	High bit of the RH parameter of the current jump motion	

Results

After the setting is completed and saved, you can switch control to the remote I/O unit. You can control the robot and monitor the robot state through I/O, and observe whether the robot feedback meets expectations.

As shown below, the output signals in bit format that are mapped are displayed in orange on the monitoring screen.

I/O labels		I/O monitor				
		Name	Labels	Status	Description	
Standard I/O	Input	Out[000]		OFF	Program run status	
		Out[001]		OFF	Emergency stop status	
		Out[002]		ON	System fault status	
	Output	Out[003]		ON	Program stopped	
		Out[004]		OFF	Program reset successful	
		Out[005]		OFF	Enable status	
	Fieldbus slave I/O	Out[006]		OFF	IN[0] status	
		Out[007]		OFF	IN[1] status	
		Out[008]		OFF	IN[2] status	
	Input	Out[009]		OFF	IN[3] status	
Out[010]			OFF	OUT[0] status		
Fieldbus master I/O	Output	Out[011]		OFF		
		Out[012]		OFF		
		Out[013]		OFF		
	Fieldbus slave I/O	Out[014]		OFF	OUT[1] status	
		Out[015]		ON	OUT[3] status	
		Out[016]		ON	OUT[2] status	
	Memory I/O	Input	Out[017]		OFF	
			Out[018]		OFF	
			Out[019]		OFF	
		Output	Out[020]		OFF	
Out[021]				OFF		
Out[022]				OFF		
Fieldbus slave I/O		Out[023]		OFF		
		Out[024]		OFF		
		Out[025]		OFF		

Mapped outputs are displayed in orange

When the user attempts to change the orange output signal, the message bar indicates that the output signal is configured and the output state cannot be changed.

Output

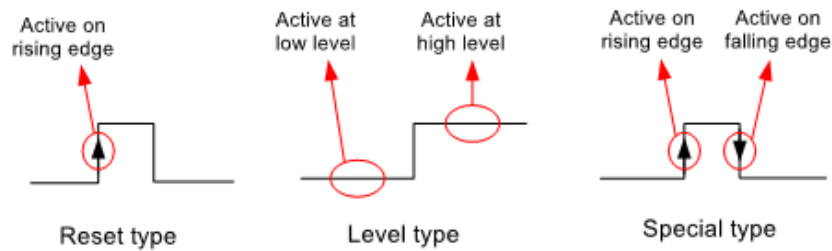
```
[Message]: 15:20:20 Out[006] has been configured and the output state cannot be changed
[Message]: 15:20:21 Out[007] has been configured and the output state cannot be changed
[Message]: 15:20:24 Out[004] has been configured and the output state cannot be changed
[Message]: 15:20:26 Out[003] has been configured and the output state cannot be changed
[Message]: 15:20:29 Out[002] has been configured and the output state cannot be changed
[Message]: 15:20:29 Out[001] has been configured and the output state cannot be changed
```

Remarks

1. The input signals in the I/O mapping configuration take effect only when the control permission is granted to the remote I/O unit. In contrast, the output signals can indicate the robot state regardless of to which device the control permission is granted.
2. The output signals configured in the I/O settings will be occupied by the system and can no longer be controlled through the monitoring page or command.
3. The run and stop of the output refer to the run and stop of the program, not the start and stop of robot motion. Once started, the robot remains in the running state until the stop command is received.
4. After the input signal is used to impose emergency stop on the robot, the robot will be automatically enabled if the control permission is switched back to InoRobotLab. In this case, for safety reasons, you must press and release the emergency stop button before you can

operate the robot.

5. The following describes the reset type, level type, and special type commands.



1. For a reset type command (active on rising edge of the user input command), in order for the command to take effect, you need to write 1 when the corresponding coil is 0, maintain it for a period of time (recommended at least 200ms), and then clear the value. You can refer to the level sequence relationship of the reset type buttons of the HMI.

2. For a level type command (edge is not detected, only the level, high or low, is detected), you need to write 1 to the corresponding coil for the command to take effect. To cancel the command, you need to write 0 to the corresponding coil.

For a special type command (active on both rising and falling edges of the user input command), it is actually a special level command, which takes effect only when the value in the address changes. For example, for the enable command, 0 to 1 indicates enable, and 1 to 0 indicates disable.

3.1.4. Project Number Configuration

The program number configuration is to map the serial number and the project. It supports up to 256 mapping relationships. Then, you can switch the project via the bus.

Steps

1. Configure the I/O mapping

The following figure shows the I/O mapping of "Switch project via I/O" and "Current project status".

Controller parameter configuration

Robot settings
 ▶ Zero settings
 ▶ Installation parameters
 ▶ Peripheral configuration
 ▶ Fieldbus slave configuration
 ▶ Switch settings
 ▶ Address allocation settings
 ▶ I/O mapping settings
 ▶ Project No. configuration
 ▶ Point file configuration
 ▶ IRLink settings
 ▶ Mechanical unit configuration
 ▶ Fieldbus master configuration
 ▶ Motion parameters
 ▶ Control parameters
 ▶ Workspace
 ▶ System settings
 ▶ Debug

I/O mapping settings

Refresh Save

Parameter name	Value
Input parameter 35	NULL
Input parameter 36	NULL
Input parameter 37	NULL
Input parameter 38	NULL
Input parameter 39	NULL
Input parameter 40	NULL
Input parameter 41	NULL
Input parameter 42	NULL
Input parameter 43	NULL
Input parameter 44	NULL
Input parameter 45	NULL
Input parameter 46	NULL
Input parameter 47	NULL
Input parameter 48	NULL
Input parameter 49	NULL
Input parameter 50	NULL
Switch point file via I/O	In[1600~1615]
Switch project via I/O	NULL
Load No. settings	NULL
Frame selection	NULL
Tool frame No. selection	NULL
Workobject frame No. selection	NULL
Speed settings	NULL
Direct motion mode settings	NULL
Jump motion LH parameter low bit	NULL
Jump motion LH parameter high bit	NULL
Jump motion MH parameter low bit	NULL
Jump motion MH parameter high bit	NULL
Jump motion RH parameter low bit	NULL
Jump motion RH parameter high bit	NULL

1 - Input parameter -> 16Bit - Word -> Switch point file via I/O

Export file Import file Restore defaults

Controller parameter configuration

Robot settings
 ▶ Zero settings
 ▶ Installation parameters
 ▶ Peripheral configuration
 ▶ Fieldbus slave configuration
 ▶ Switch settings
 ▶ Address allocation settings
 ▶ I/O mapping settings
 ▶ Project No. configuration
 ▶ Point file configuration
 ▶ IRLink settings
 ▶ Mechanical unit configuration
 ▶ Fieldbus master configuration
 ▶ Motion parameters
 ▶ Control parameters
 ▶ Workspace
 ▶ System settings
 ▶ Debug

I/O mapping settings

Refresh Save

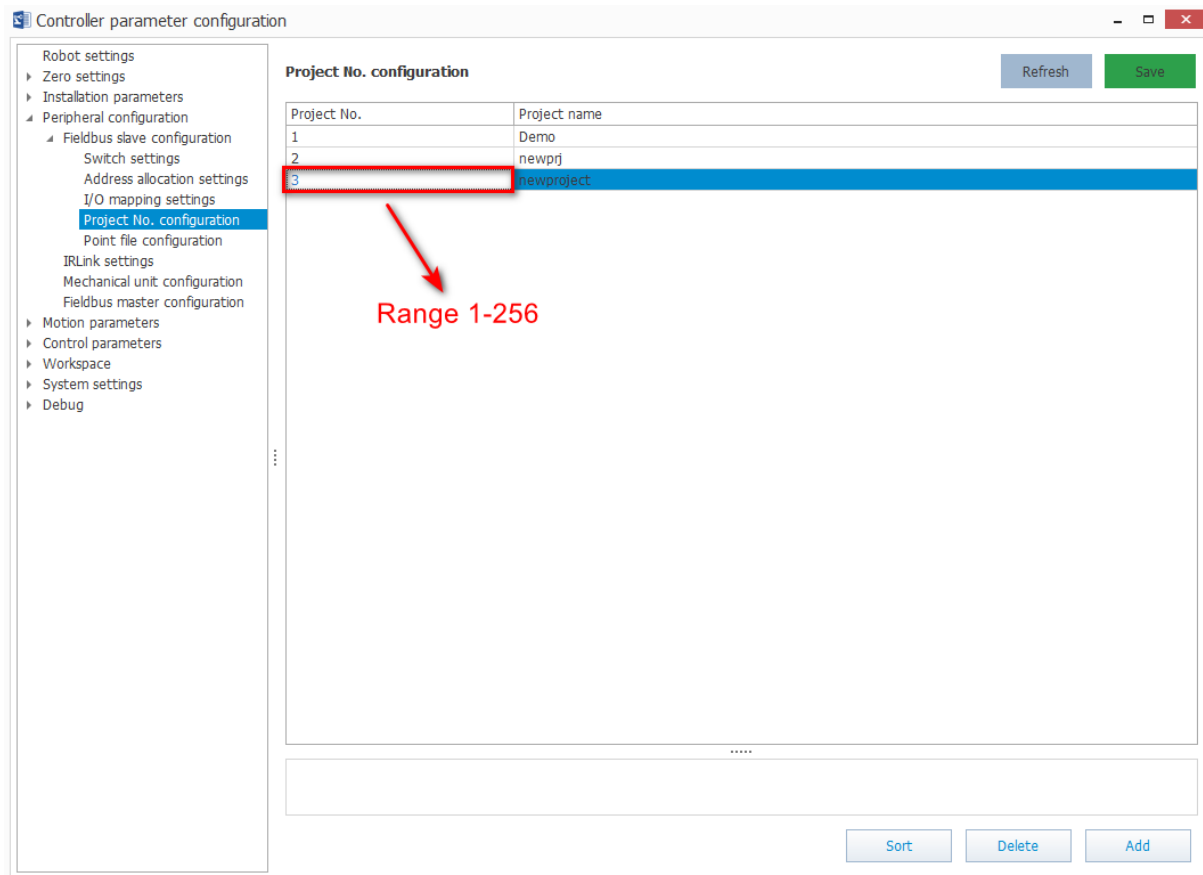
Parameter name	Value
High bit of Y coordinate of J2 at current position	NULL
Low bit of Z coordinate of J3 at current position	NULL
High bit of Z coordinate of J3 at current position	NULL
Low bit of A coordinate of J4 at current position	NULL
High bit of A coordinate of J4 at current position	NULL
Low bit of B coordinate of J5 at current position	NULL
High bit of B coordinate of J5 at current position	NULL
High bit of C coordinate of J6 at current position	NULL
Current position J6/C coordinate high bit	NULL
Active P/JP variable number	NULL
Point file switching status	NULL
Current control	NULL
Active project No.	NULL
Current project status	Out[1616~1631]
Active load No.	NULL
Current frame	NULL
Active tool frame No.	NULL
Active workobject frame No.	NULL
Current speed	NULL
Current fault code	NULL
Current mode	NULL
Current direct motion mode	NULL
Current jump motion LH parameter low bit	NULL
Current jump motion LH parameter high bit	NULL
Current jump motion MH parameter low bit	NULL
Current jump motion MH parameter high bit	NULL
Current jump motion RH parameter low bit	NULL
Current jump motion RH parameter high bit	NULL

2 - Output parameters -> 16Bit - Word -> Current project status

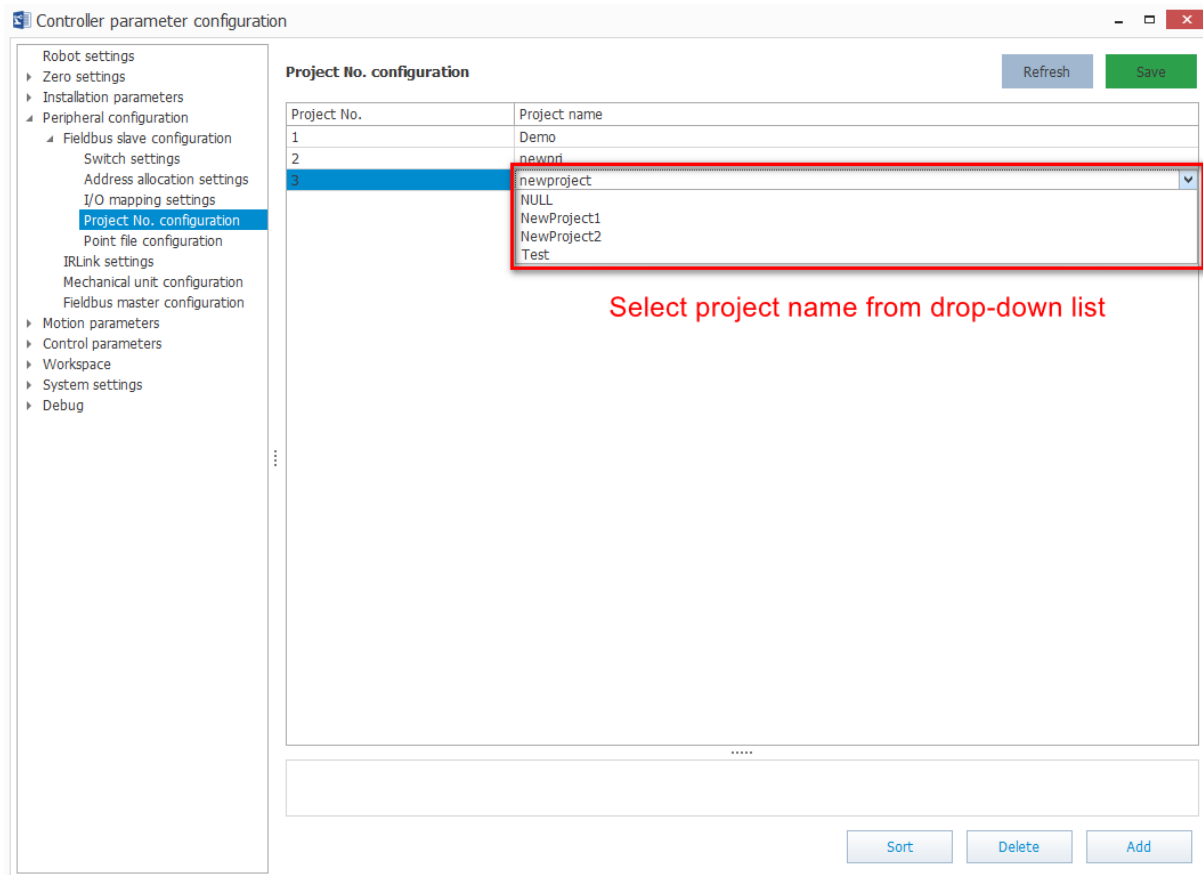
Export file Import file Restore defaults

2. Configure the project number

- Go to Controller parameter settings > Project No. configuration. The current project mapping relationship list is automatically loaded.
- Refresh: Displays the current project mapping relationship of the controller to the list.
- Add: Adds a project mapping. The number is automatically sorted from the smallest to the largest. The project name is "NULL" by default.
- Edit the project number: The project number ranges from 1 to 256. Click the project number to edit it directly. The project number must be unique.



- Select project name: Select the project name from the drop-down list. The used project names will be automatically filtered out.



- Sort: Sorts the project number from the smallest to the largest.
- Delete: Deletes the selected one or more lines of the list.
- Multi-selection: Same as file selection operation in Windows system. Ctrl+A: Select all lines, Shift+Click: Select multiple consecutive lines, Ctrl+Click: Select multiple particular lines.
- Save: Saves the project mapping relationship to the controller. It is recommended to click Sort before saving.

If you do not click Save, when you close the controller parameter setting interface and reopen it, the interface will be restored to the data before modification.

3.2 Configuration through the Teach Pendant

3.2.1. Fieldbus Switch Settings

You can switch on or off five types of buses including Modbus, Ethernet/IP, EtherCAT, MC, and

PROFINET, and configure the bus parameters. Note that only one fieldbus can be activated at a time.

a) Modbus settings

ModbusRTU and Modbus TCP functions of the robot controller can be enabled simultaneously without conflict.

Regardless of Modbus RTU or Modbus TCP, the robot controller can only be configured on teach pendant and InoRobotLab as Modbus slave, not as Modbus master.

Steps

Click Set > External > Bus Switch > Modbus, as shown below.

The screenshot shows the 'Bus Switch' configuration window. On the left, a sidebar lists various bus protocols: Modbus (selected), Ethernet/IP, EtherCAT, MC, Profinet, and CANopen. The main area is divided into two sections: 'Active ModbusRTU' and 'Active ModbusTCP'. Both sections have an 'On-state:OFF' checkbox. The 'Active ModbusRTU' section includes 'Com Config' (Baud: 9600, Parity: Even, Databits: 8, Stopbits: 1, TMode: RTU) and 'Slave Config' (SlaveID: 1, FrameDelay(ms): 5, Timeout(0.1s): 0). The 'Active ModbusTCP' section includes 'Port' (502) and 'FrameDelay(ms)' (1).

Bus Switch	I/O-Mapping	ProjNum-Cfg	PFile-Cfg	IRLink-Set	MechUnit-Cfg	Safety IO action
<div>Modbus</div> <div>Ethernet/IP</div> <div>EtherCAT</div> <div>MC</div> <div>Profinet</div> <div>CANopen</div>	<div>☐ Active ModbusRTU On-state:OFF</div> <div>☐ Active ModbusTCP On-state:OFF</div> <div><div>Com Config:</div><div>Baud</div><div>9600</div><div>▼</div><div>Parity</div><div>Even</div><div>▼</div><div>Databits</div><div>8</div><div>▼</div><div>Stopbits</div><div>1</div><div>▼</div><div>TMode</div><div>RTU</div><div>▼</div></div> <div><div>Slave Config:</div><div>SlaveID</div><div>1</div><div>FrameDelay(ms)</div><div>5</div><div>Timeout(0.1s)</div><div>0</div></div> <div><div>Port</div><div>502</div><div>FrameDelay(ms)</div><div>1</div></div>					

Check the checkbox to turn on or off the ModbusRTU and ModbusTCP function.

In the Modbus RTU function, the frame interval depends on the baud rate. The larger the baud rate, the smaller the frame interval. If the baud rate is changed, the frame interval will be automatically changed accordingly.

In the ModbusTCP function, the port number is fixed to 502 and the frame interval can be set as needed.

The order of toggle switch operation and parameter setting is not limited. The settings are saved to the controller only when you click the Save button.

Results

After the configuration is complete, you can verify the configuration through communication with the Modbus client.

Remarks

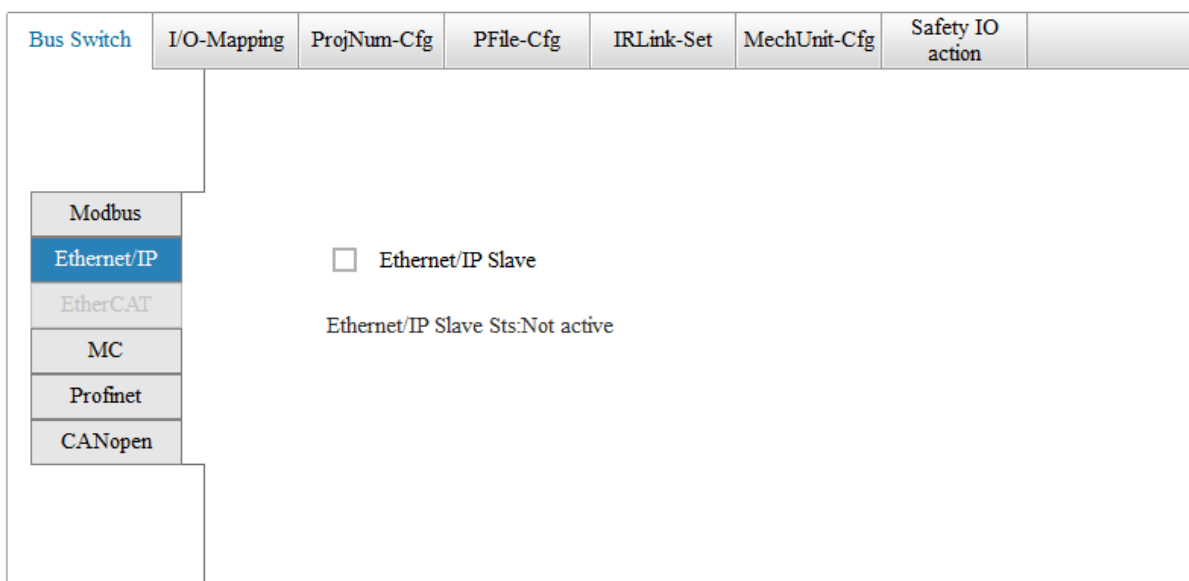
If the robot controller has been configured with Modbus using InoRobShop, Modbus configuration cannot be performed on the teach pendant. If you want to configure the Modbus settings through the teach pendant, there are two methods:

- 1) Clear the configuration on the teach pendant by using the "Clear PLC-CFG" function.
- 2) Download a secondary development project without Modbus configuration through the teach pendant.

For details on the use of Modbus functions, see Modbus User Guide of Inovance Robot.

b) Ethernet/IP settings

You can enable or disable the Ethernet/IP slave function by checking the checkbox and clicking the Save button in the upper right corner. The interface also displays the port number and connection status of the slave. When a master is connected, the indicator is green. The IP address and port number of the master are displayed.



For details on the use of Ethernet/IP functions, see EthernetIP User Guide of Inovance Robot.

c) EtherCAT settings

The EtherCAT function is optional. It can only be used on controllers that support the EtherCAT function.

You can enable or disable the EtherCAT slave function and configure the related parameters.

You can enable or disable the EtherCAT slave function by toggling the switch and clicking the Save button in the upper right corner. You can also configure the alias of the slave and the maximum number of dropped frames.

The interface also displays the connection status of the EtherCAT slave. When no connection exists, the indicator is red. When a master is connected, the indicator is green.

After the alias is modified, the robot needs to be powered on again to make the modification take effect.

The screenshot shows a software interface for configuring an Omron PLC. At the top, there are tabs: Robot, BasePos, Installation, Motion, External (selected), System, and Function. A 'Save' button is in the top right corner. Below the tabs, there is a sub-menu with options: Bus Switch, I/O-Mapping, ProjNum-Cfg, PFile-Cfg, IRLink-Set, MechUnit-Cfg, and Safety IO action. The 'Bus Switch' sub-menu is open, showing a list of communication protocols: Modbus, Ethernet/IP, EtherCAT (selected), MC, Profinet, and CANopen. To the right of this list, there is a checkbox labeled 'EtherCAT Slave' which is currently unchecked. Below the checkbox, the status 'EtherCAT Slave Sts:Not active' is displayed. Further down, there are two input fields: 'Alias:' with the value '1' and 'Max Frame Loss:' with the value '8'.

For details on the use of EtherCAT functions, see EthernetIP User Guide of Omron PLC and Inovance Robot.

d) MC settings

You can enable the MC function of the robot controller. The robot acts as a slave. Up to four master connections are supported.

Bus Switch	I/O-Mapping	ProjNum-Cfg	PFile-Cfg	IRLink-Set	MechUnit-Cfg	Safety IO action																														
<div> <div> Modbus Ethernet/IP EtherCAT MC Profinet CANopen </div> <div> <div> Activation switch ☐ Not active </div> <table border="1"> <thead> <tr> <th>ID</th> <th>MC Device Addr</th> <th>Status</th> <th>Reconnect</th> <th>Auto reconnect</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>192.168.0.1:6000</td> <td>Disconnect</td> <td>No</td> <td>☐</td> <td>NewConnection</td> </tr> <tr> <td>2</td> <td>192.168.0.1:6001</td> <td>Disconnect</td> <td>No</td> <td>☐</td> <td></td> </tr> <tr> <td>3</td> <td>192.168.0.1:6002</td> <td>Disconnect</td> <td>No</td> <td>☐</td> <td>DisConnect</td> </tr> <tr> <td>4</td> <td>192.168.0.1:6003</td> <td>Disconnect</td> <td>No</td> <td>☐</td> <td></td> </tr> </tbody> </table> </div> </div>							ID	MC Device Addr	Status	Reconnect	Auto reconnect		1	192.168.0.1:6000	Disconnect	No	☐	NewConnection	2	192.168.0.1:6001	Disconnect	No	☐		3	192.168.0.1:6002	Disconnect	No	☐	DisConnect	4	192.168.0.1:6003	Disconnect	No	☐	
ID	MC Device Addr	Status	Reconnect	Auto reconnect																																
1	192.168.0.1:6000	Disconnect	No	☐	NewConnection																															
2	192.168.0.1:6001	Disconnect	No	☐																																
3	192.168.0.1:6002	Disconnect	No	☐	DisConnect																															
4	192.168.0.1:6003	Disconnect	No	☐																																

Steps

As shown above, select a connection item in the list to establish a connection or break the current connection.

In contrast to the previous three protocols, the MC function can be enabled or disabled directly through the toggle switch. The interface displays the IP address, port number, connection switch, connection status, and automatic re-connection switch of the four masters. You can establish a connection to the master by entering the IP address and port number of the master and then clicking the NewConnection button.

Select a connection item and click DisConnect to disconnect the controller from the external MC.

Note: After the master connection is successful, the IP and port numbers of the master cannot be modified. The auto re-connect option can be checked only when the master connection is successful. When the auto re-connect option is checked, the IP address, port number, and connection switch cannot be modified.

For details on the use of MC functions, see the MC Communication Guide between Mitsubishi PLC and Inovance Robot.

e) PROFINET settings

To use this function, the controlled must be installed with an external PROFINET slave

expansion card.

It allows you to configure the PROFINET slave function of the robot.

You can enable or disable the PROFINET slave function by toggling the switch and clicking the Save button in the upper right corner.

The interface also displays the IP address, subnet mask, MAC address, software version number, and master connection status of the PROFINET slave expansion card. When not connected, the status is displayed as "Disconnect". When a master is connected, it displays "Connected".

Bus Switch	I/O-Mapping	ProjNum-Cfg	PFile-Cfg	IRLink-Set	MechUnit-Cfg	Safety IO action										
<div>Modbus</div> <div>Ethernet/IP</div> <div>EtherCAT</div> <div>MC</div> <div>Profinet</div> <div>CANopen</div>	<div>Activation switch ☐ Not active</div> <table border="1"><tbody><tr><td>IP Address</td><td></td></tr><tr><td>Subnet Mask</td><td></td></tr><tr><td>MAC Addr</td><td></td></tr><tr><td>Vision</td><td></td></tr><tr><td>Status</td><td>Disconnect</td></tr></tbody></table> <p>※Please read the Remote Control Manual before using special bus</p>						IP Address		Subnet Mask		MAC Addr		Vision		Status	Disconnect
IP Address																
Subnet Mask																
MAC Addr																
Vision																
Status	Disconnect															

For details on the use of PROFINET functions, see the PROFINET Communication Guide between Siemens PLC and Inovance Robot.

3.2.2. Address Allocation Settings

The teach pendant does not support address allocation.

3.2.3. I/O Mapping Configuration

Remote I/O control allows you to control program start/stop, reset, and emergency stop of the robot via I/Os (including digital I/Os, fieldbus I/Os, and memory I/Os). You can also monitor the program running and fault state of the robot.

The I/O mapping is to bind some commands of the remote I/O control function to the input signals (In) of the robot, and the status of the robot to the output signals (Out). In this way, you can control the robot using the input signals and monitor the robot using the output signals.

Steps

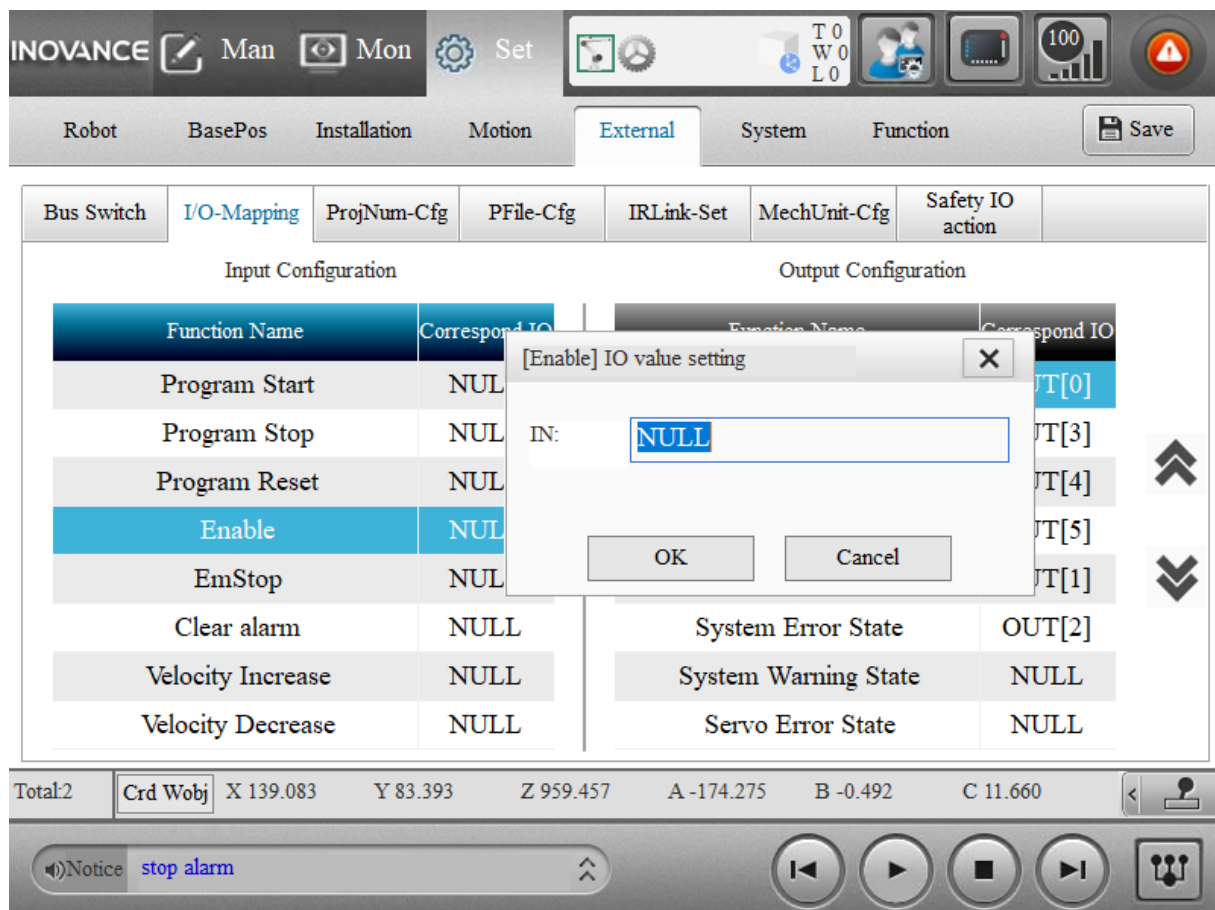
Click Set > External > I/O-Mapping, as shown below.

The screenshot displays the INOVANCE robot control software interface. The top menu bar includes 'INOVANCE', 'Man', 'Mon', 'Set', and several status icons. Below the menu is a tabbed interface with 'Robot', 'BasePos', 'Installation', 'Motion', 'External' (selected), 'System', and 'Function'. The 'External' tab contains sub-tabs: 'Bus Switch', 'I/O-Mapping' (selected), 'ProjNum-Cfg', 'PFile-Cfg', 'IRLink-Set', 'MechUnit-Cfg', and 'Safety IO action'. The 'I/O-Mapping' sub-tab displays two tables: 'Input Configuration' and 'Output Configuration'.

Input Configuration		Output Configuration	
Function Name	Correspond IO	Function Name	Correspond IO
Program Start	NULL	Program Run State	OUT[0]
Program Stop	NULL	Program Stop State	OUT[3]
Program Reset	NULL	Program Reset State	OUT[4]
Enable	NULL	Enable State	OUT[5]
EmStop	NULL	Emergency Stop State	OUT[1]
Clear alarm	NULL	System Error State	OUT[2]
Velocity Increase	NULL	System Warning State	NULL
Velocity Decrease	NULL	Servo Error State	NULL

The status bar at the bottom shows coordinates (X 139.083, Y 83.393, Z 959.457, A -174.275, B -0.492, C 11.660) and a notice area with the text 'gency stop alarm'.

To modify the I/O mapping, click on an I/O. In the pop-up dialog, enter the I/O number. If you do not want to configure any I/O, enter "NULL".



The teach pendant only supports the I/O mapping configuration for the following functions:

I/O function		Description
Input (Used for external control)	Program start	Start the current program in the remote I/O control mode, active on rising edge
	Program stop	Stop the running program in the remote I/O control mode, active on rising edge
	Program reset	Reset the robot program in the remote I/O unit mode, active on rising edge (Program can be reset only when in stopped state.)
	Enable	Enable the robot in the remote I/O unit mode, active on both rising (enable) and falling (disable) edges
	Emergency stop	Impose emergency stop on the robot in the remote I/O unit mode. ON for non-emergency stop; OFF for emergency stop.

	Clear alarm	Clear the alarm in the remote I/O unit mode, active on rising edge
	Speed increase	Increase the global operating speed of the system by 5% in the remote I/O unit mode, active on rising edge
	Speed decrease	Decrease the global operating speed of the system by 5% in the remote I/O unit mode, active on rising edge
	Homing	Return the robot to the work origin 0 in the remote I/O unit mode, active on rising edge
	Switch to manual mode	Switch the robot to manual mode in the remote I/O unit mode, active on rising edge
	Switch to automatic mode	Switch the robot to the automatic mode in the remote I/O unit mode, active on rising edge
Output (Used for display status)	Program running state	Under any control permission, the specified I/O output an ON signal when task 0 is in running state
	Program stop state	Under any control permission, the specified I/O output an OFF signal when task 0 is in stopped state
	Program reset successful state	Under any control permission, the specified I/O output an ON signal when the program is set successfully
	Robot enable state	Under any control permission, the specified I/O output an ON signal when the system is enabled
	Robot emergency stop state	Under any control permission, the specified I/O output an ON signal when the system is in the emergency stop state
	System fault state	Under any control permission, the specified I/O output an ON signal when the system stops at an alarm
	System	Under any control permission, the specified I/O output

warning state	an ON signal when a warning occurs in the system
Servo fault state	Under any control permission, the specified I/O output an ON signal when the servo drive reports a fault
Servo warning state	Under any control permission, the specified I/O output an ON signal when a warning occurs on the servo drive
Safety door warning state	Under any control permission, the specified I/O output an ON signal when a safety door warning occurs
System startup completed state	Under any control permission, the specified I/O output an ON signal when the system is in the startup completed state
Robot in motion state	Under any control permission, the specified I/O output an ON signal when the robot is in moving state
Robot motion complete state	Under any control permission, the specified I/O output an ON signal when the robot finishes the direct motion command
Bus communication heartbeat signal	Under any control permission, the ON-OFF state switchover occurs continuously as long as this I/O is configured. The default switchover interval is 1s.

Note:

1. The teach pendant only supports the I/O mapping configuration of basic functions such as program running and monitoring, and I/O mapping of advanced functions such as point modification need to be configured on InoRobotLab.
2. If the message "Current I/O value is already used" is displayed when an I/O is selected, but the function bound to this I/O cannot be found on the I/O mapping interface, it indicates that this I/O has already been configured to a certain function through InoRobotLab. You can check

the I/O configuration on InoRobotLab.

3. The input signals in the I/O mapping configuration take effect only when the control permission is granted to the remote I/O unit. In contrast, the output signals can indicate any robot states except the motion complete state, regardless of to which device the control permission is granted.
4. The output signals configured in the I/O settings will be occupied by the system and can no longer be controlled through the monitoring page or command.
5. The run and stop of the output refer to the run and stop of the program, not the start and stop of robot motion. Once started, the robot remains in the running state until the stop command is received or a fault is encountered.
6. After the input signal is used to impose emergency stop on the robot, if the control permission is switched back to the teach pendant, the emergency stop will be automatically deactivated.

3.2.4. Project Number Configuration

Many recipes may exist in different projects. You can switch the projects through the bus. The system includes 256 program IDs. The project path corresponding to each ID can be set in the I/O mapping.

Steps

Operation	Example
-----------	---------

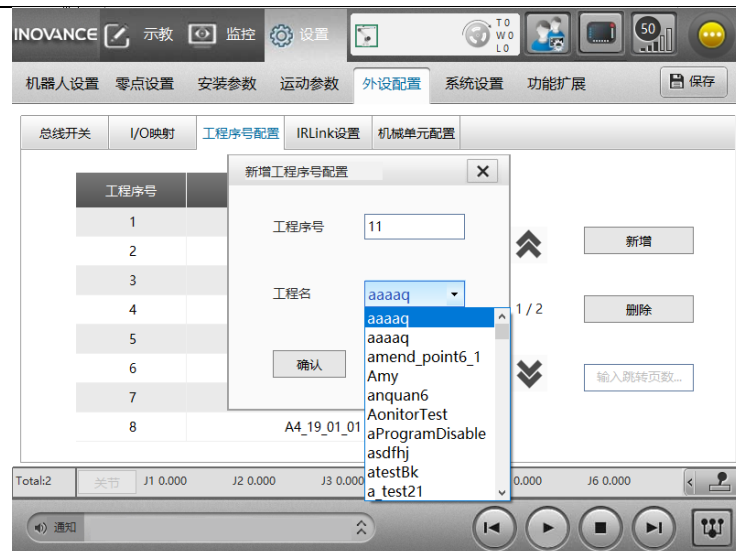
Go to Set > External > ProjNum-Cfg. The project configuration number information is retrieved from the controller.



The project number configuration information is displayed if available. If the number of project number configuration information is large, the information is displayed in multiple pages. You can navigate through the pages using the page up and page down buttons. Also, you can jump to a specific page by entering the page number. If the entered number is larger than the total number of pages, a prompt is displayed.



You can manually add a project number configuration. Note that the project number that has been used cannot be used again. You can select the project from the drop-down box. If all projects are configured, further addition is impossible.



To delete a project number configuration, select the configuration and click Delete.



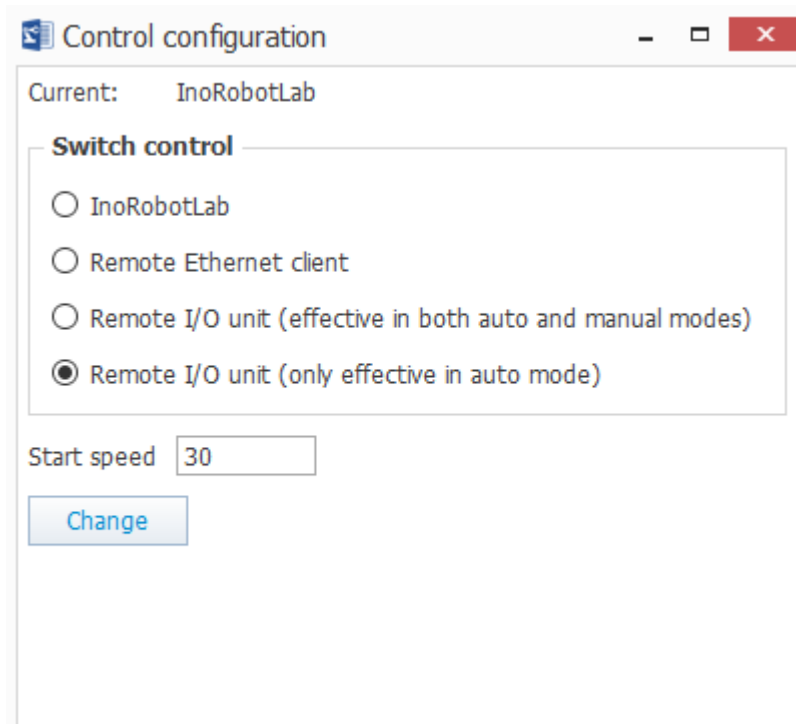
To edit a project number, double-click the configuration. the project number. Note that the project number that has been used cannot be used again.



Note: All the changes need to be saved before they can take effect. The changes will be lost when you switch to other interfaces without saving them.

4 Differences between Two Remote I/O Unit Control Modes

The remote I/O unit control is divided into two modes: Remote I/O unit (effective in both auto and manual modes) and Remote I/O unit (only effective in auto mode).



4.1 Remote I/O Unit (Effective in Both Auto and Manual Modes)

In this control mode, the remote I/O unit has full control regardless of whether the controller is in automatic or manual mode. The teach pendant/InoRobotLab can only perform monitoring function, but cannot perform setting and operating type functions such as modifying global variables, axis control and teaching, and more.

4.2 Remote I/O Unit (Only Effective in Auto Mode)



In this control mode, the remote I/O unit has full control when the controller is in automatic mode. The teach pendant/InoRobotLab can only perform monitoring function. If the controller is switched to the manual mode, the remote I/O unit will lose the control permission. In this case, the teach pendant/InoRobotLab can perform setting and operating type functions such as modifying global variables, axis control and teaching, and more. The remote I/O unit can only perform monitoring function and instructions from the remote I/O unit such as setting or teaching instructions will not take effect. (For details on the effectiveness of the basic remote commands, see the default fieldbus I/O configuration table (basic remote control area) in section 3.1.3. For details on the effectiveness of the extended remote commands, see section 9.1.1.) The following two tables show the functions that can be performed by InoRobotLab and teach pendant when the controller is in the manual mode.

Concept explanation:

Effective: The remote command can be executed.

Ineffective: The remote command will not be executed.

Functions available on InoRobotLab

Function	Operation in InoRobotLab	Special requirements	Permission requirements
Enable/Disable the robot	Click the control panel to enable or disable the robot	Line number is not changed.	User, Administrator, and Manufacturer
Modify the global variables	Go to Station > Monitor > Global variable monitor.	The line number is not changed after the global variables are changed.	User, Administrator, and Manufacturer

Modify the global points	Go to Station > Monitor > Global variable monitor.	The line number is not changed after the global points are changed (only the memory points are modified here, and the modified points disappear after restart).	User, Administrator, and Manufacturer
Modify the I/Os	Go to Station > Monitor > I/O monitor.	Modifying the I/Os while the program is running does not change the line number.	User, Administrator, and Manufacturer
Axis control panel	Function name	The following functions do not reset the line number.	User, Administrator, and Manufacturer
	1: Speed settings		
	2: Mechanical unit settings		
	3: Axis motion control		
	4: Mechanical lock	The robot needs to be disabled.	
	5: Dynamic brake/Singularity crossing	The robot needs to be disabled.	
	6: Homing	(Homing without trajectory recovery)	

	7: Reset independent axis		
	8: Change motion mode		
	9: Move to point (MovL, MovJ, MovAbsJ)	(Note: No trajectory recovery)	
	10. Display the current position		
Axis control panel > Coordination function	Turn on/off coordination function		User, Administrator, and Manufacturer
Modify the global speed	Top of the panel	The line number is not affected.	User, Administrator, and Manufacturer
Return to the work origin	Go to Controller parameter configuration > Zero settings > Work origin > Move to point.		User, Administrator, and Manufacturer

Functions available on Teach Pendant

Function	Operation on teach pendant	Special requirements	Permission requirements
Enable/Disable the robot	Enable or disable the robot through the button on the right side panel	Line number is not changed.	User, Editor, Manager, and Factory
Modify the global variables	Go to Mon > Global.	The line number is not changed after the global variable is	User, Editor, Manager, and Factory

		modified (The teach pendant cannot set custom global variables, tool, wobj, load parameters, or modify global points.)	
Modify the points during debugging	Modify the points in debugging mode	The line number is not changed after the points are modified in the debugging mode.	Editor, Manager, and Factory
Modify the points during debugging	Modify the points in debugging mode	The line number is not changed after the points are modified in the debugging mode.	Editor, Manager, and Factory
Modify the I/Os	Go to Mon > IO.	The line number is not changed after the I/O modification.	User, Editor, Manager, and Factory
Axis control panel	Function name	The following functions do not reset the line number.	User, Editor, Manager, and Factory
	1: Mechanical unit settings		
	2: Axis motion control		

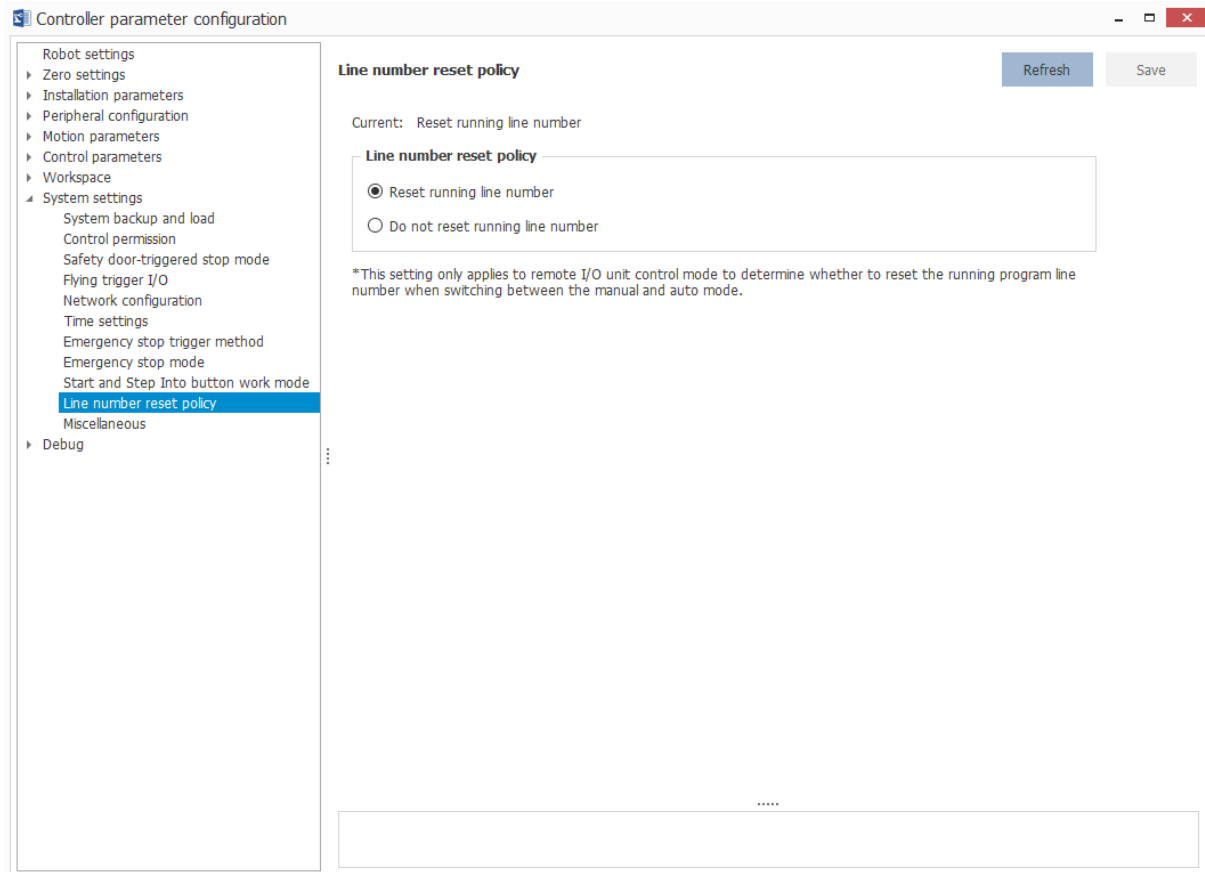
	3: Mechanical lock	The robot needs to be disabled.	
	4: Dynamic brake/Singularity crossing	The robot needs to be disabled.	
	5: Reset independent axis		
	6: Change motion mode		
	7. Display the current position		
	8: Homing		
Axis control panel > Coordination function	Turn on/off coordination function		User, Editor, Manager, and Factory
Move to point (MovL, MovJ, JumpL, Jump, MovAbsJ)	Go to Man > Point > GO.	The line number will not be reset (Note: Trajectory recovery not available.)	User, Editor, Manager, and Factory
Modify the global speed	Go to the upper right corner of the main interface.	The line number is not reset.	User, Editor, Manager, and Factory
Return to the work origin	Go to Set > BasePos > WorkOrigion > Run to.		Editor, Manager, and Factory

Note:

1. The teach pendant cannot set custom global variables, tool, wobj, load parameters, or modify global points. You can access these functions on InoRobotLab.

2. Line number reset policy

It allows you to configure whether to reset the running program line number when a switchover between manual and auto modes occurs under the control of the remote I/O unit.



Reset Running line number: When a switchover between manual and auto modes occurs under the control of the remote I/O unit, the program running line number will be reset.

Do not reset running line number: When a switchover between manual and auto modes occurs under the control of the remote I/O unit, the program running line number will not be reset.

4.3 Example of Differences between Two Types of Control Modes

Scenario 1: Switch to the remote I/O unit mode (effective in both manual and auto modes) and start the program. A problem exists with variable B[0] in the program. In this case, you can modify the variable using the remote command 0x0301.

Scenario 2: Switch to remote I/O unit mode (only effective in auto mode) and start the program.

A problem exists with variable B[0] in the program. In this case, you can switch to the manual mode and modify the variable, then switch back to the auto mode and restart the program.

5 Classification and Use of Remote Control

5.1.1. Basic Remote Control

The basic remote control uses one bit for one function. The control commands are divided into three types, namely, the reset type, the level type, and the special type. For the use of the basic remote control, see the Modbus control method.

5.1.2. Extended Remote Control

As mentioned earlier, the extended remote control consists of an input area and an output area. The input area includes a parameter and additional input parameters, and the output area includes the current remote control status and return parameters.

Input:

Content	Input address	Remarks
Remote control command	Default: In720-In735, configurable	Enter the remote control command/parameter.
Remote control input parameter 1	Default: In736-In751	The content format is given in each parameter.
Remote control input parameter 2	Default: In752-In767	The content format is given in each parameter.
Remote control	Default: In768-	The content format is given in each parameter.

input parameter 3	In783	
...	...	...
Remote control input parameter 50	In1520-In1535	The content format is given in each parameter.

Output:

Content		Word output	Remarks
Current remote control state		Default: Out720- Out735, configurable	Returns the current execution state
Remote control return parameter 1	Remote control execution failure error code	Default: Out736- Out751	The content format is given in each parameter.
Remote control return parameter 2	Controller system fault code	Default: Out752- Out767	The content format is given in each parameter.
Remote control return parameter 3	Null	Default: Out768- Out783	The content format is given in each parameter.
...		...	...
Remote control return parameter 50	Null	Default: 1520- Out1535	The content format is given in each parameter.

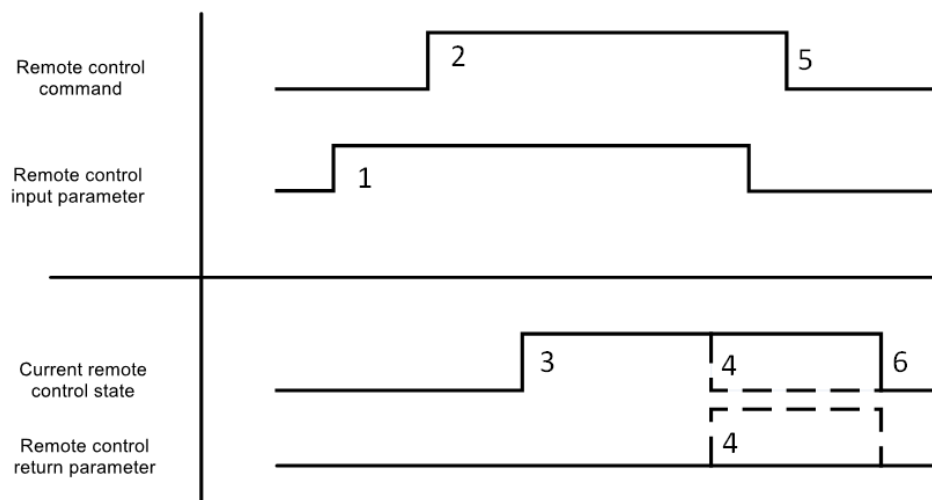
The use of extended remote control is as follows:

The remote command is executed by assigning the command code to the bus input address corresponding to the remote control command, and by assigning the command data to the bus input address. (Note that you need to enter the command data before entering the command.)

After receiving the remote command, the controller processes the command and sends status (result) and other information to the master unit through the current remote control state and remote control return parameters.

After the remote command is completed, assign the state initialization command (0x0000 (hexadecimal)) to the bus input address corresponding to the remote control command. Remote commands can be executed when the current remote control state is idle (0x0000 (hexadecimal)).

The timing requirements for remote control are as follows:



1. Setting of the remote control input parameters
2. Setting of the remote control commands
3. The current remote control state changes to the command execution state 0x0001.
(When the command is executed quickly, the state may not change from the command execution state to 0x0001, but to the command complete state 0x0002.)
4. The current remote control state changes to command complete state 0x0002 or abnormal execution state 0x0003. If any data is returned, the remote control return parameters will generate corresponding data.
5. Setting of the remote control state initialization command 0x0000.
6. The current remote control state changes to the idle state.

For details on remote control commands, the format of input parameters, and the meaning of return parameters, see Appendix 2.

6 I/O Monitor

6.1 I/O Monitoring on InoRobotLab

6.1.1. Inputs

You can view the input status of standard I/Os, fieldbus master I/Os, fieldbus master I/Os, memory I/Os, and system I/Os. Also, you can force the input signal of standard I/Os, and observe the corresponding input status in the Status and Value columns.

The inputs can be displayed in Bit, Byte, and Word based on the size of the variable, corresponding to In, InB and InW of the system I/O variable respectively. The following details the three monitoring modes: Bit, Bye, and Word.

- Prerequisite

Ensure that the controller is connected, that the input and output modules are connected correctly, and that the IRLink settings are made correctly.

To monitor fieldbus I/Os, ensure that the address is assigned correctly and that the fieldbus master is connected. (See section 8.2.1.)

6.1.1.1 Bit Monitoring

- Viewing the Input Status

On the I/O monitor page, select the bus type to be monitored and go to Input > Bit. You can view the input status, as shown below.

I/O monitor

	Name	Labels	Status	Force	Description
Standard I/O	In[000]		ON	Forced	
Input	In[001]		OFF	Not forced	
Bit	In[002]		OFF	Not forced	
Byte	In[003]		OFF	Forced	
Word	In[004]		OFF	Not forced	
Output	In[005]		OFF	Not forced	
Bit	In[006]		OFF	Not forced	
Byte	In[007]		OFF	Not forced	
Word	In[008]		OFF	Not forced	
Fieldbus slave I/O	In[009]	DI004	OFF	Not forced	
Input	In[010]		OFF	Not forced	
Bit	In[011]		OFF	Not forced	
Byte	In[012]		OFF	Not forced	
Word	In[013]		OFF	Not forced	
Output	In[014]		OFF	Not forced	
Bit	In[015]		OFF	Not forced	
Byte	In[016]		OFF	Not forced	
Word	In[017]		OFF	Not forced	
Fieldbus master I/O	In[018]		OFF	Not forced	
Input	In[019]		OFF	Not forced	
Bit	In[020]		OFF	Not forced	
Byte	In[021]		OFF	Not forced	
Word	In[022]		OFF	Not forced	
Output	In[023]		OFF	Not forced	
Bit	In[024]		OFF	Not forced	
Byte	In[025]		OFF	Not forced	
Word	In[026]		OFF	Not forced	
Memory I/O	In[027]		OFF	Not forced	
Input	In[028]		OFF	Not forced	
Bit	In[029]		OFF	Not forced	
Byte	In[030]		OFF	Not forced	
Word					
Output					
Bit					

- Forcing the Input Status

Select Standard I/O > Input > Bit, click the force switch of an input, for example, In[005], to switch it to "Forced", and then click the input's status to change its status from "OFF" to "ON".

I/O monitor

	Name	Labels	Status	Force	Description
Standard I/O	In[000]		OFF	Not forced	
Input	In[001]		OFF	Not forced	
Bit	In[002]		OFF	Not forced	
Byte	In[003]		OFF	Not forced	
Word	In[004]		ON	Forced	
Output	In[005]		OFF	Not forced	
Bit	In[006]		OFF	Not forced	
Byte	In[007]		OFF	Not forced	
Word	In[008]		OFF	Not forced	
Fieldbus slave I/O	In[009]	DI004	OFF	Not forced	
Input	In[010]		OFF	Not forced	
Bit	In[011]		OFF	Not forced	
Byte	In[012]		OFF	Not forced	
Word	In[013]		OFF	Not forced	
Output	In[014]		OFF	Not forced	
Bit	In[015]		OFF	Not forced	
Byte	In[016]		OFF	Not forced	
Word	In[017]		OFF	Not forced	
Fieldbus master I/O	In[018]		OFF	Not forced	
Input	In[019]		OFF	Not forced	
Bit	In[020]		OFF	Not forced	
Byte	In[021]		OFF	Not forced	
Word	In[022]		OFF	Not forced	
Output	In[023]		OFF	Not forced	
Bit	In[024]		OFF	Not forced	
Byte	In[025]		OFF	Not forced	
Word	In[026]		OFF	Not forced	
Memory I/O	In[027]		OFF	Not forced	
Input	In[028]		OFF	Not forced	
Bit	In[029]		OFF	Not forced	
Byte	In[030]		OFF	Not forced	
Word					
Output					
Bit					

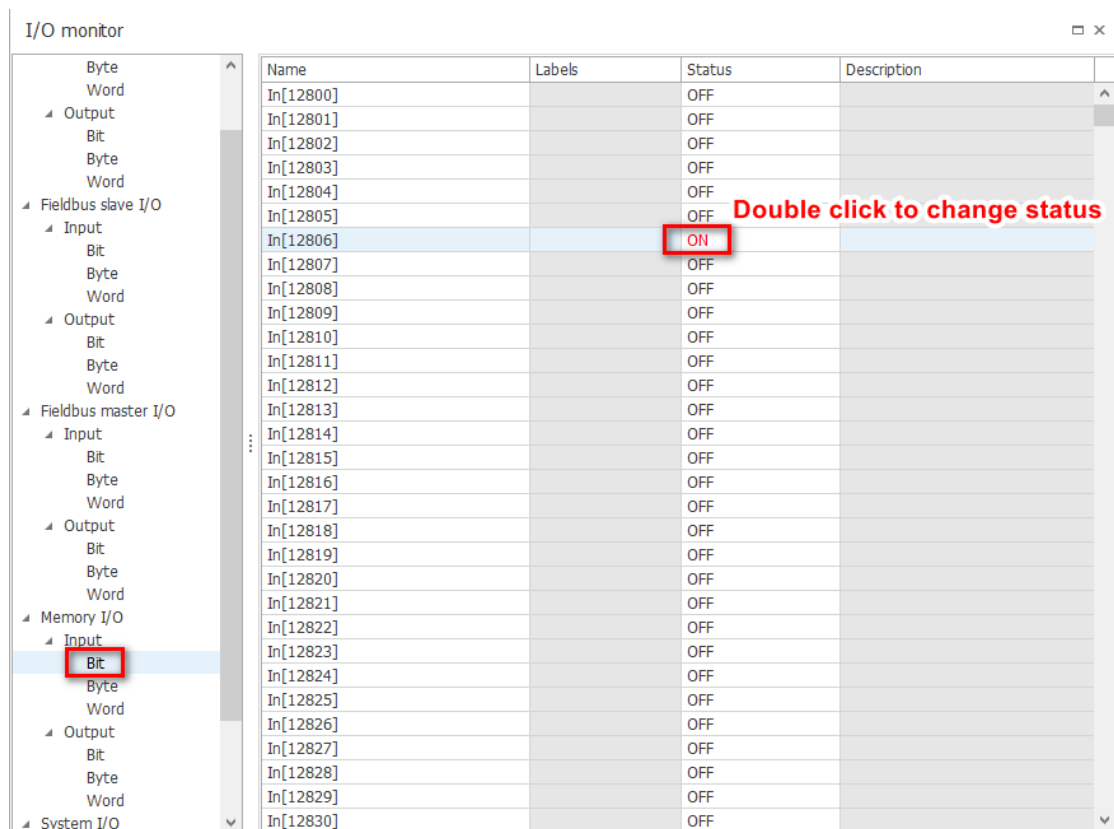
2. Double click to change status

1. Click the Force switch

After the forcing takes effect, the input is judged according to the forced value in the logical judgment of the program.

- Changing the Input Status of Memory I/Os

Select Memory I/O > Input > Bit, click the status of an input, for example In[12806]. The status of the input is changed, for example, from "OFF" to "ON".



After the change takes effect, the input is judged according to the value displayed in the monitoring list in the logical judgment of the program.

6.1.1.2 Byte Monitoring

- Viewing the Input Status

On the I/O monitor page, select the bus type to be monitored and go to Input > Byte. You can click the Display format cell to change the display format including decimal, binary, hexadecimal and 32-bit floating-point. For example, InB[000] is displayed in decimal with a value of 32.

The screenshot shows the I/O monitor interface. On the left, the tree view is expanded to 'Standard I/O' > 'Input' > 'Byte', with 'Byte' highlighted. The main table displays the following data:

Name	Labels	Value	Display format	Description
InB[000]		32	Decimal	
InB[001]		0	Decimal	
InB[002]		0	Decimal	
InB[003]		0	Decimal	
InB[004]		0	Decimal	
InB[005]		0	Decimal	
InB[006]		0	Decimal	
InB[007]		0	Decimal	
InB[008]		0	Decimal	
InB[009]		0	Decimal	
InB[010]		0	Decimal	
InB[011]		0	Decimal	
InB[012]		0	Decimal	
InB[013]		0	Decimal	
InB[014]		0	Decimal	
InB[015]		0	Decimal	

When displayed in binary, the value of InB[000] is 0010 0000.

The screenshot shows the I/O monitor interface. On the left, the tree view is expanded to 'Standard I/O' > 'Input' > 'Byte', with 'Byte' highlighted. The main table displays the following data:

Name	Labels	Value	Display format	Description
InB[000]		0010 0000	Binary	
InB[001]		0	Decimal	
InB[002]		0	Decimal	
InB[003]		0	Decimal	
InB[004]		0	Decimal	
InB[005]		0	Decimal	
InB[006]		0	Decimal	
InB[007]		0	Decimal	
InB[008]		0	Decimal	
InB[009]		0	Decimal	
InB[010]		0	Decimal	
InB[011]		0	Decimal	
InB[012]		0	Decimal	
InB[013]		0	Decimal	
InB[014]		0	Decimal	
InB[015]		0	Decimal	

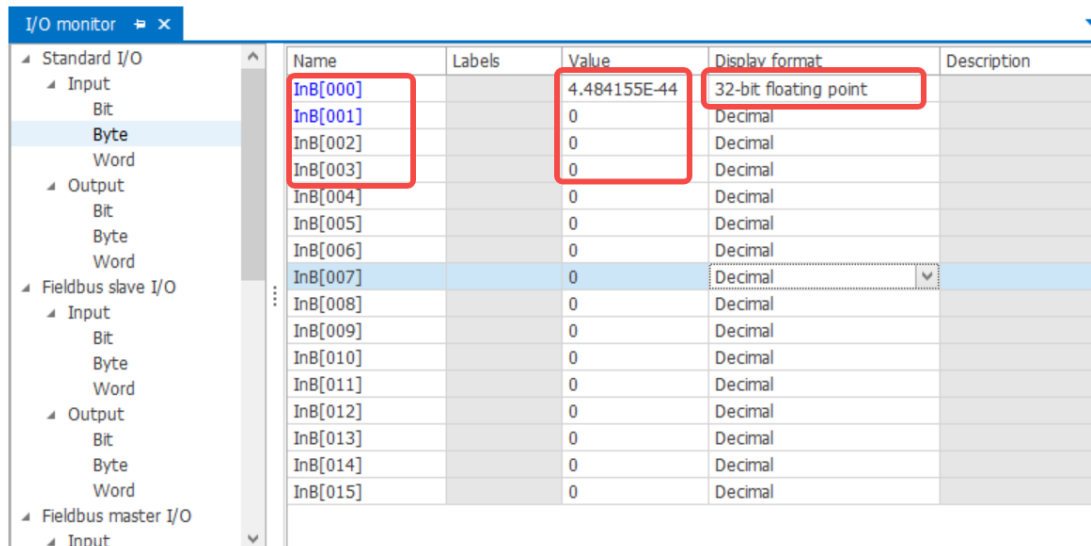
When displayed in hexadecimal, the value of InB[000] is 0x 20.

The screenshot shows the I/O monitor interface. On the left, the tree view is expanded to 'Standard I/O' > 'Input' > 'Byte', with 'Byte' highlighted. The main table displays the following data:

Name	Labels	Value	Display format	Description
InB[000]		0x 20	Hexadecimal	
InB[001]		0	Decimal	
InB[002]		0	Decimal	
InB[003]		0	Decimal	
InB[004]		0	Decimal	
InB[005]		0	Decimal	
InB[006]		0	Decimal	
InB[007]		0	Decimal	
InB[008]		0	Decimal	
InB[009]		0	Decimal	
InB[010]		0	Decimal	
InB[011]		0	Decimal	
InB[012]		0	Decimal	
InB[013]		0	Decimal	
InB[014]		0	Decimal	
InB[015]		0	Decimal	

Note: When the 32-bit floating-point format is selected, the value displayed is actually a 32-bit

floating-point number consisting of four bytes, as there are only 8 bits in a byte. For example, InB[000] is displayed as a 32-bit floating-point number as shown below. The value 4.484155E-44 indicates the value of a 32-bit floating-point number consisting of four bytes InB[000], InB[001], InB[002], and InB[003].



Name	Labels	Value	Display format	Description
InB[000]		4.484155E-44	32-bit floating point	
InB[001]		0	Decimal	
InB[002]		0	Decimal	
InB[003]		0	Decimal	
InB[004]		0	Decimal	
InB[005]		0	Decimal	
InB[006]		0	Decimal	
InB[007]		0	Decimal	
InB[008]		0	Decimal	
InB[009]		0	Decimal	
InB[010]		0	Decimal	
InB[011]		0	Decimal	
InB[012]		0	Decimal	
InB[013]		0	Decimal	
InB[014]		0	Decimal	
InB[015]		0	Decimal	

6.1.1.3 Word Monitoring

- Viewing the Input Status

On the I/O monitor page, select the bus type to be monitored and go to Input > Word. You can click the Display format column to change the display format including decimal, binary, hexadecimal and 32-bit floating-point. For example, InB[000] is displayed in decimal with a value of 32.

I/O monitor					
<div> Standard I/O <div> Input <div> Bit Byte Word </div> Output <div> Bit Byte Word </div> </div> </div> <div> Fieldbus slave I/O <div> Input <div> Bit Byte Word </div> Output <div> Bit Byte Word </div> </div> </div> <div> Fieldbus master I/O <div> Input </div> </div>					
Name	Labels	Value	Display format	Description	
InW[000]		32	Decimal		
InW[001]		0	Decimal		
InW[002]		0	Decimal		
InW[003]		0	Decimal		
InW[004]		0	Decimal		
InW[005]		0	Decimal		
InW[006]		0	Decimal		
InW[007]		0	Decimal		

When displayed in binary, the value of InW[000] is 0000 0000 0010 0000.

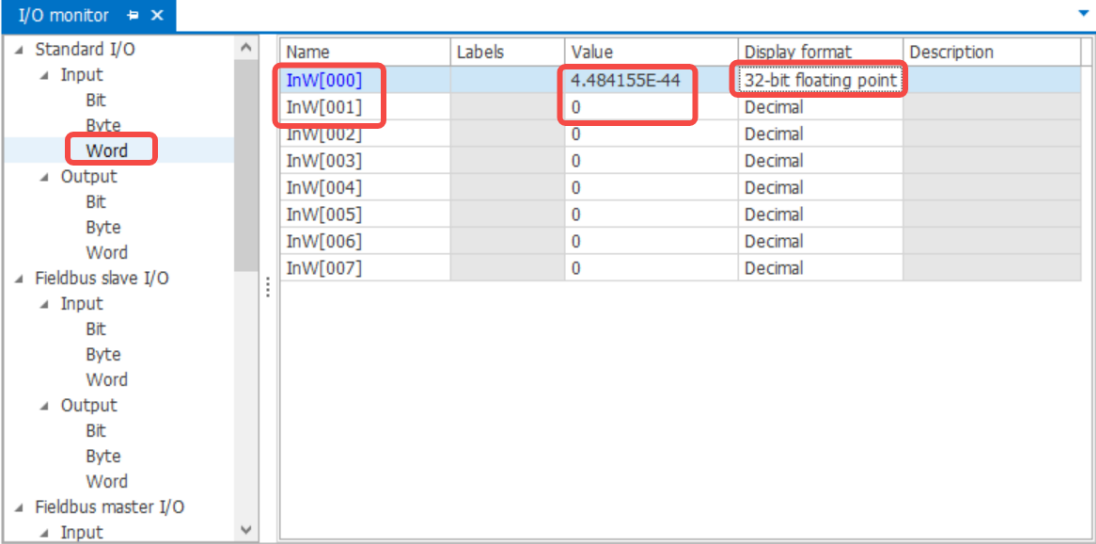
I/O monitor					
<div> Standard I/O <div> Input <div> Bit Byte Word </div> Output <div> Bit Byte Word </div> </div> </div> <div> Fieldbus slave I/O <div> Input <div> Bit Byte Word </div> Output <div> Bit Byte Word </div> </div> </div> <div> Fieldbus master I/O <div> Input </div> </div>					
Name	Labels	Value	Display format	Description	
InW[000]		0000 0000 0010 0000	Binary		
InW[001]		0	Decimal		
InW[002]		0	Decimal		
InW[003]		0	Decimal		
InW[004]		0	Decimal		
InW[005]		0	Decimal		
InW[006]		0	Decimal		
InW[007]		0	Decimal		

When displayed in hexadecimal, the value of InW[000] is 0x 00 20.

I/O monitor					
<div> Standard I/O <div> Input <div> Bit Byte Word </div> Output <div> Bit Byte Word </div> </div> </div> <div> Fieldbus slave I/O <div> Input <div> Bit Byte Word </div> Output <div> Bit Byte Word </div> </div> </div> <div> Fieldbus master I/O <div> Input </div> </div>					
Name	Labels	Value	Display format	Description	
InW[000]		0x 00 20	Hexadecimal		
InW[001]		0	Decimal		
InW[002]		0	Decimal		
InW[003]		0	Decimal		
InW[004]		0	Decimal		
InW[005]		0	Decimal		
InW[006]		0	Decimal		
InW[007]		0	Decimal		

Note: When the 32-bit floating-point format is selected, the value displayed is actually a 32-bit

floating-point number consisting of two words, as there are only 16 bits in a word. For example, InW[000] is displayed as a 32-bit floating-point number as shown below. The value 4.484155E-44 indicates the value of a 32-bit floating-point number consisting of two bytes InW[000] and InW[001].



Name	Labels	Value	Display format	Description
InW[000]		4.484155E-44	32-bit floating point	
InW[001]		0	Decimal	
InW[002]		0	Decimal	
InW[003]		0	Decimal	
InW[004]		0	Decimal	
InW[005]		0	Decimal	
InW[006]		0	Decimal	
InW[007]		0	Decimal	

6.1.2. Outputs

You can view the output status of standard I/Os, fieldbus master I/Os, fieldbus slave I/Os, memory I/Os, and system I/Os. Also, you can modify the output status. You can observe the output status in the Status and Value columns.

The outputs can be displayed in Bit, Byte, and Word based on the size of the variable, corresponding to In, OutB and OutW of the system I/O variable respectively. The following details the three monitoring modes: Bit, Byte, and Word.

- Prerequisite

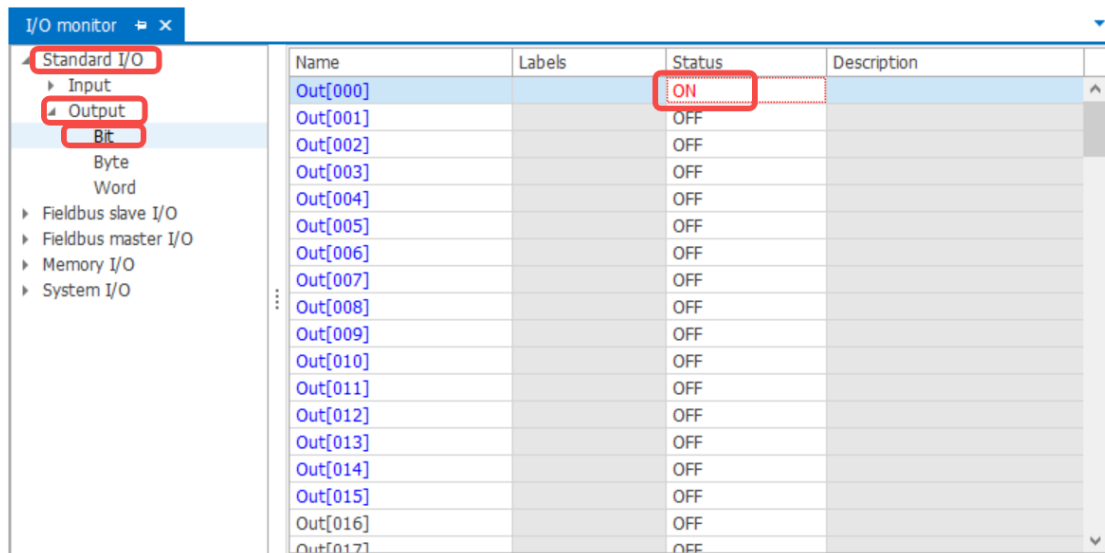
Ensure that the controller is connected, that the input and output modules are connected correctly, and that the IRLink settings are made correctly.

To monitor fieldbus I/Os, ensure that the address is assigned correctly and that the fieldbus master is connected. (See section 8.2.1.)

6.1.2.1 Bit Monitoring

- Viewing the Output Status

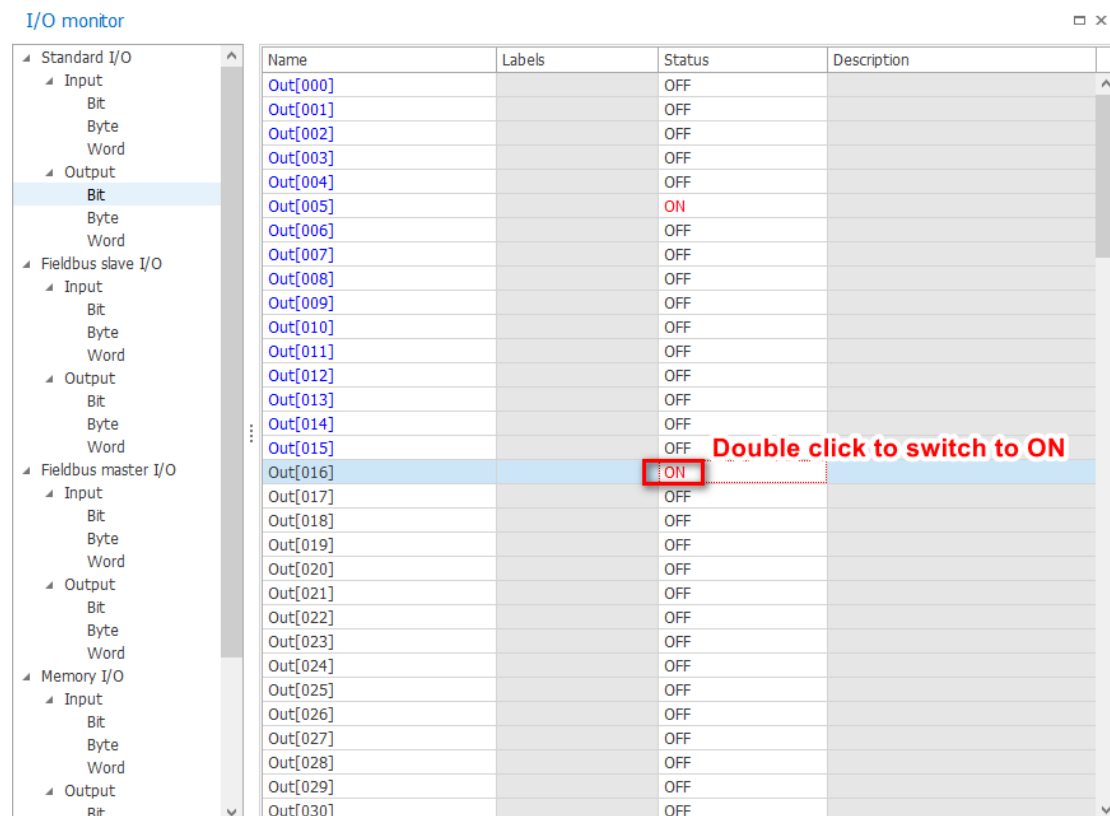
On the I/O monitor page, select the bus type to be monitored and go to Output > Bit. You can view the output status, as shown below.



Name	Labels	Status	Description
Out[000]		ON	
Out[001]		OFF	
Out[002]		OFF	
Out[003]		OFF	
Out[004]		OFF	
Out[005]		OFF	
Out[006]		OFF	
Out[007]		OFF	
Out[008]		OFF	
Out[009]		OFF	
Out[010]		OFF	
Out[011]		OFF	
Out[012]		OFF	
Out[013]		OFF	
Out[014]		OFF	
Out[015]		OFF	
Out[016]		OFF	
Out[017]		OFF	

- Switching the Output Status

On the corresponding output, click the cell in the Status column to switch the output state.

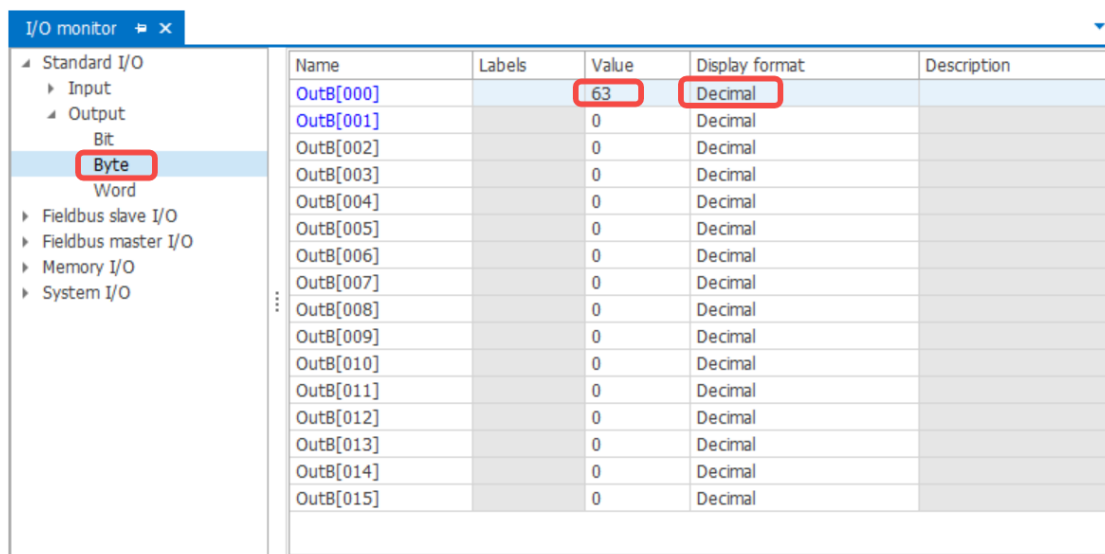


Name	Labels	Status	Description
Out[000]		OFF	
Out[001]		OFF	
Out[002]		OFF	
Out[003]		OFF	
Out[004]		OFF	
Out[005]		ON	
Out[006]		OFF	
Out[007]		OFF	
Out[008]		OFF	
Out[009]		OFF	
Out[010]		OFF	
Out[011]		OFF	
Out[012]		OFF	
Out[013]		OFF	
Out[014]		OFF	
Out[015]		OFF	
Out[016]		ON	
Out[017]		OFF	
Out[018]		OFF	
Out[019]		OFF	
Out[020]		OFF	
Out[021]		OFF	
Out[022]		OFF	
Out[023]		OFF	
Out[024]		OFF	
Out[025]		OFF	
Out[026]		OFF	
Out[027]		OFF	
Out[028]		OFF	
Out[029]		OFF	
Out[030]		OFF	

6.1.2.2 Byte Monitoring

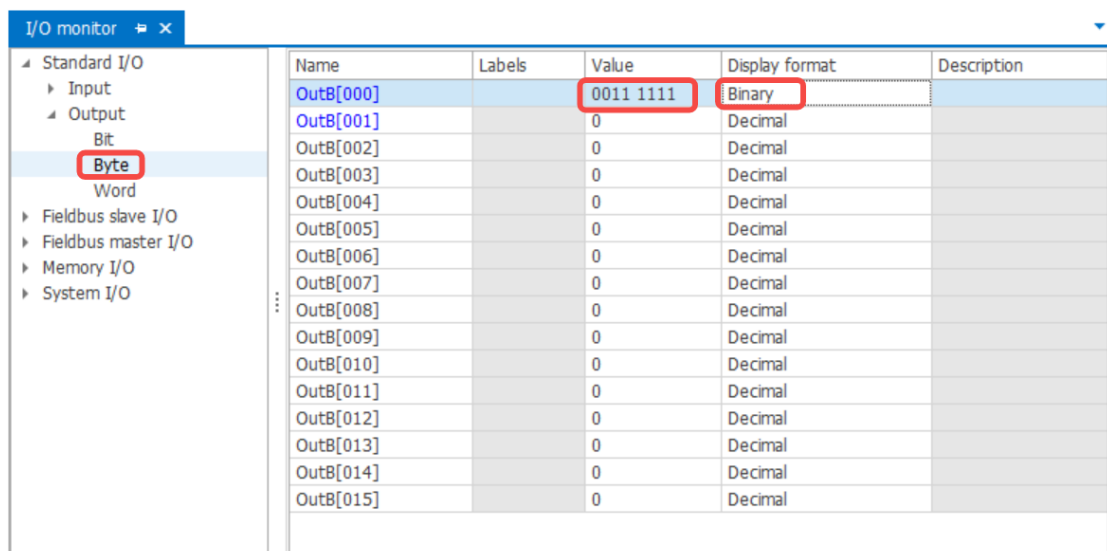
- Viewing the Output Status

On the I/O monitor page, select the bus type to be monitored and go to Output > Byte. You can click the Display format cell to change the display format including decimal, binary, hexadecimal and 32-bit floating-point. For example, OutB[000] is displayed in decimal with a value of 63.



Name	Labels	Value	Display format	Description
OutB[000]		63	Decimal	
OutB[001]		0	Decimal	
OutB[002]		0	Decimal	
OutB[003]		0	Decimal	
OutB[004]		0	Decimal	
OutB[005]		0	Decimal	
OutB[006]		0	Decimal	
OutB[007]		0	Decimal	
...				
OutB[008]		0	Decimal	
OutB[009]		0	Decimal	
OutB[010]		0	Decimal	
OutB[011]		0	Decimal	
OutB[012]		0	Decimal	
OutB[013]		0	Decimal	
OutB[014]		0	Decimal	
OutB[015]		0	Decimal	

When displayed in binary, the value of OutB[000] is 0011 1111.



Name	Labels	Value	Display format	Description
OutB[000]		0011 1111	Binary	
OutB[001]		0	Decimal	
OutB[002]		0	Decimal	
OutB[003]		0	Decimal	
OutB[004]		0	Decimal	
OutB[005]		0	Decimal	
OutB[006]		0	Decimal	
OutB[007]		0	Decimal	
...				
OutB[008]		0	Decimal	
OutB[009]		0	Decimal	
OutB[010]		0	Decimal	
OutB[011]		0	Decimal	
OutB[012]		0	Decimal	
OutB[013]		0	Decimal	
OutB[014]		0	Decimal	
OutB[015]		0	Decimal	

When displayed in hexadecimal, the value of OutB[000] is 0x 3F.

I/O monitor					
<ul style="list-style-type: none"> Standard I/O <ul style="list-style-type: none"> Input Output <ul style="list-style-type: none"> Bit Byte Word Fieldbus slave I/O Fieldbus master I/O Memory I/O System I/O 					
Name	Labels	Value	Display format	Description	
OutB[000]		0x 3F	Hexadecimal		
OutB[001]		0	Decimal		
OutB[002]		0	Decimal		
OutB[003]		0	Decimal		
OutB[004]		0	Decimal		
OutB[005]		0	Decimal		
OutB[006]		0	Decimal		
OutB[007]		0	Decimal		
OutB[008]		0	Decimal		
OutB[009]		0	Decimal		
OutB[010]		0	Decimal		
OutB[011]		0	Decimal		
OutB[012]		0	Decimal		
OutB[013]		0	Decimal		
OutB[014]		0	Decimal		
OutB[015]		0	Decimal		

Note: When the 32-bit floating-point format is selected, the value displayed is actually a 32-bit floating-point number consisting of four bytes, as there are only 8 bits in a byte. For example, OutB[000] is displayed as a 32-bit floating-point number as shown below. The value 8082818E-44 indicates the value of a 32-bit floating-point number consisting of four bytes OutB[000], OutB[001], OutB[002], and OutB[003].

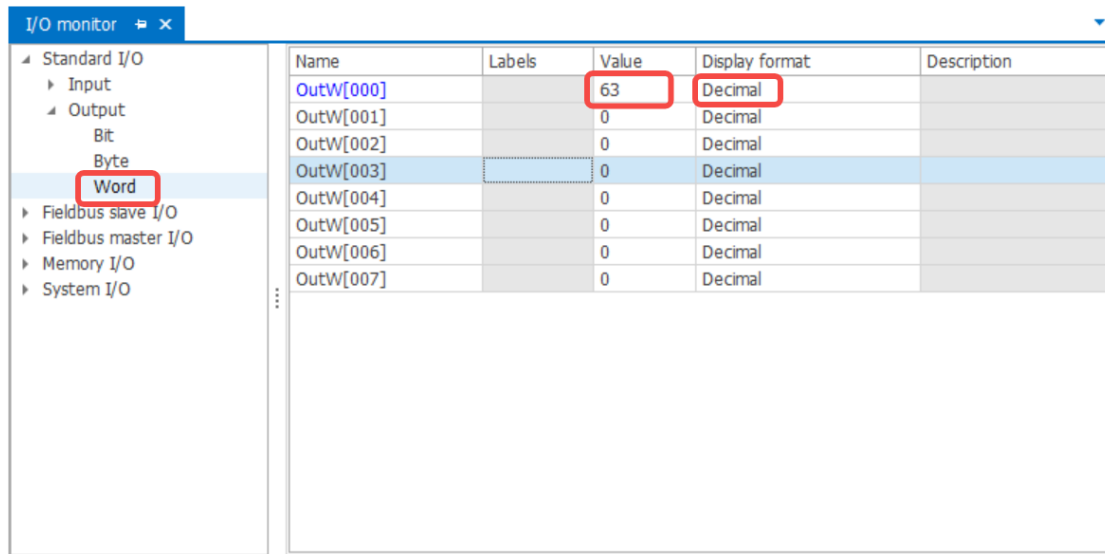
I/O monitor					
<ul style="list-style-type: none"> Standard I/O <ul style="list-style-type: none"> Input Output <ul style="list-style-type: none"> Bit Byte Word Fieldbus slave I/O Fieldbus master I/O Memory I/O System I/O 					
Name	Labels	Value	Display format	Description	
OutB[000]		8.82818E-44	32-bit floating point		
OutB[001]		0	Decimal		
OutB[002]		0	Decimal		
OutB[003]		0	Decimal		
OutB[004]		0	Decimal		
OutB[005]		0	Decimal		
OutB[006]		0	Decimal		
OutB[007]		0	Decimal		
OutB[008]		0	Decimal		
OutB[009]		0	Decimal		
OutB[010]		0	Decimal		
OutB[011]		0	Decimal		
OutB[012]		0	Decimal		
OutB[013]		0	Decimal		
OutB[014]		0	Decimal		
OutB[015]		0	Decimal		

6.1.2.3 Word Monitoring

- Viewing the Output Status

On the I/O monitor page, select the bus type to be monitored and go to Output > Word. You can click the Display format cell to change the display format including decimal, binary,

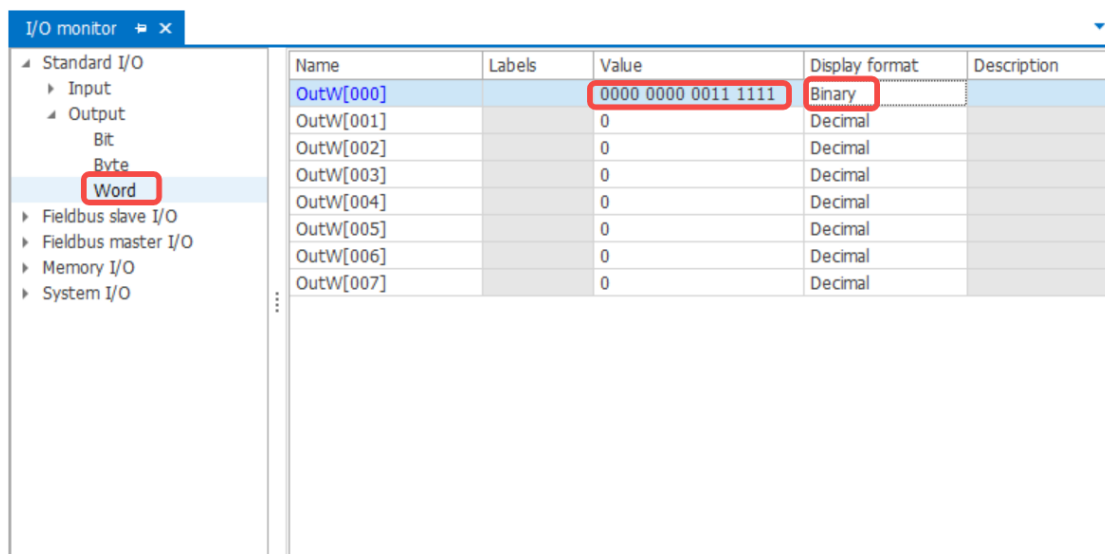
hexadecimal and 32-bit floating-point. For example, OutW[000] is displayed in decimal with a value of 63.



The screenshot shows the 'I/O monitor' window. On the left, a tree view under 'Standard I/O' has 'Output' expanded, and 'Word' is selected and highlighted with a red box. The main table displays a list of output words. The first row, 'OutW[000]', is highlighted in blue. Its 'Value' column shows '63' (highlighted with a red box) and its 'Display format' column shows 'Decimal' (also highlighted with a red box). The other rows show 'OutW[001]' through 'OutW[007]' with values of '0' and 'Decimal' format.

Name	Labels	Value	Display format	Description
OutW[000]		63	Decimal	
OutW[001]		0	Decimal	
OutW[002]		0	Decimal	
OutW[003]		0	Decimal	
OutW[004]		0	Decimal	
OutW[005]		0	Decimal	
OutW[006]		0	Decimal	
OutW[007]		0	Decimal	

When displayed in binary, the value of OutW[000] is 0000 0000 0011 1111.



This screenshot is identical to the one above, but the 'Display format' for 'OutW[000]' is now 'Binary' (highlighted with a red box). Consequently, the 'Value' column for 'OutW[000]' displays '0000 0000 0011 1111' (highlighted with a red box). All other data in the table remains the same.

Name	Labels	Value	Display format	Description
OutW[000]		0000 0000 0011 1111	Binary	
OutW[001]		0	Decimal	
OutW[002]		0	Decimal	
OutW[003]		0	Decimal	
OutW[004]		0	Decimal	
OutW[005]		0	Decimal	
OutW[006]		0	Decimal	
OutW[007]		0	Decimal	

When displayed in hexadecimal, the value of OutW[000] is 0x 00 3F.

I/O monitor					
<ul style="list-style-type: none"> Standard I/O <ul style="list-style-type: none"> Input Output <ul style="list-style-type: none"> Bit Byte Word Fieldbus slave I/O Fieldbus master I/O Memory I/O System I/O 					
Name	Labels	Value	Display format	Description	
OutW[000]		0x 00 3F	Hexadecimal		
OutW[001]		0	Decimal		
OutW[002]		0	Decimal		
OutW[003]		0	Decimal		
OutW[004]		0	Decimal		
OutW[005]		0	Decimal		
OutW[006]		0	Decimal		
OutW[007]		0	Decimal		

Note: When the 32-bit floating-point format is selected, the value displayed is actually a 32-bit floating-point number consisting of two words, as there are only 16 bits in a word. For example, InW[000] is displayed as a 32-bit floating-point number as shown below. The value 8082818E-44 indicates the value of a 32-bit floating-point number consisting of two bytes InW[000] and InW[001].

I/O monitor					
<ul style="list-style-type: none"> Standard I/O <ul style="list-style-type: none"> Input Output <ul style="list-style-type: none"> Bit Byte Word Fieldbus slave I/O Fieldbus master I/O Memory I/O System I/O 					
Name	Labels	Value	Display format	Description	
OutW[000]		8.82818E-44	32-bit floating point		
OutW[001]		0	Decimal		
OutW[002]		0	Decimal		
OutW[003]		0	Decimal		
OutW[004]		0	Decimal		
OutW[005]		0	Decimal		
OutW[006]		0	Decimal		
OutW[007]		0	Decimal		

6.1.3. System IO

The system I/Os include 16 inputs and 16 outputs, which can be displayed by bit only.

I/O monitor

Name	Status	Description
SysIn[000]	OFF	
SysIn[001]	OFF	
SysIn[002]	OFF	
SysIn[003]	ON	
SysIn[004]	ON	
SysIn[005]	ON	
SysIn[006]	OFF	
SysIn[007]	ON	
SysIn[008]	OFF	
SysIn[009]	OFF	
SysIn[010]	OFF	
SysIn[011]	OFF	
SysIn[012]	OFF	
SysIn[013]	OFF	
SysIn[014]	OFF	
SysIn[015]	OFF	

6.1.4. Meaning of Colors in I/O Monitor

In the I/O monitor, the variable names are differentiated by colors: blue, orange and black, respectively.

Blue: Indicates standard I/Os connected to the actual device or bus I/Os assigned with an address.

Orange: Indicates outputs which have been occupied and for which the control permissions is not RC_ACTIVE. The status of such outputs cannot be changed through monitoring interface or instructions.

Black:

1. Indicates standard I/Os not connected to the actual device or bus I/Os not assigned with an address.
2. Indicates outputs which have been occupied and for which the control permissions is RC_ACTIVE.

Note:

1. The orange display has a higher priority than blue and black. When an I/O is displayed in orange, if you want to know whether the I/O has blue or black attributes, you can infer based on the color of the I/Os before and after it.

2. Control permission of output signal:

Control Permission	Description
RC_STATIC	Indicates that it is occupied by the RC system. That is, Out is bound to a system function. In this case, the output signal is related to the function only and the signal status cannot be manually changed.
RC_ACTIVE	Indicates that it is under normal RC control. In this case, the signal is normally controlled. For example, you can change the signal in I/O monitor or using the Set instruction.
PLC_ACTIVE	It indicates PLC control state. In this case, signals are controlled by PLC software like InoRobShop.

6.2 I/O Monitoring on Teach Pendant

Ensure that IRLink configurations are correct before using the I/O monitoring!

The I/O monitoring interface includes IN, OUT, AD, DA, and SysIO.

6.2.1. IN

1. The input includes common input, standard input, fieldbus input, and memory input, which can be selected through the drop-down menu, as shown below.

Note:

Common input: Indicates inputs with specified label and remark. When the current active project contains inputs with specified label, these inputs are displayed as common inputs.

For the definition of standard, fieldbus, and memory inputs, see section 5.4.1.

The screenshot shows the INOVANCE software interface. The 'IO' tab is selected. A dropdown menu is open, showing the following options: Standard, Common input IO, Standard, Fieldbus, and Memory IO. The 'Standard' option is selected. The main table displays the configuration for input channels In[001] through In[007]. All inputs are currently set to 'OFF' and 'NoForced'. The interface also includes a status bar at the bottom showing coordinates (X 139.083, Y 83.393, Z 959.457, A -174.275, B -0.492, C 11.660) and a 'Heat speed75' indicator.

IN	OUT	AD	DA	SysIOIn	SysIOOut	Force	Label	Remark
In[001]						OFF	NoForced	
In[002]						OFF	NoForced	
In[003]						OFF	NoForced	
In[004]						OFF	NoForced	
In[005]						OFF	NoForced	
In[006]						OFF	NoForced	
In[007]						OFF	NoForced	

2. Each input can be displayed by bit, byte, or word.

Note:

8 bits equal 1 byte, and 16 bits equal 1 word. For example, the values of In[000]-In[007] correspond to the value of InB[000]; the values of In[000]-In[015] corresponds to the value of InW[000].

INOVANCE Auto Mon Set T0 W0 L0 100

Global IO Connection Servo Cond-Monitor Log Version Craft-Monitor

Standard ☒ Bit ☐ Byte ☐ Word Dec

Var_Name	Status	Force	Label	Remark
In[000]	OFF	NoForced		
In[001]	OFF	NoForced		
In[002]	OFF	NoForced		
In[003]	OFF	NoForced		
In[004]	OFF	NoForced		
In[005]	OFF	NoForced		
In[006]	OFF	NoForced		
In[007]	OFF	NoForced		

IN OUT AD DA SysIOIn SysIOOut

Total:2 Crd Wobj X 139.083 Y 83.393 Z 959.457 A -174.275 B -0.492 C 11.660

Notice gency stop alarm Heat speed75

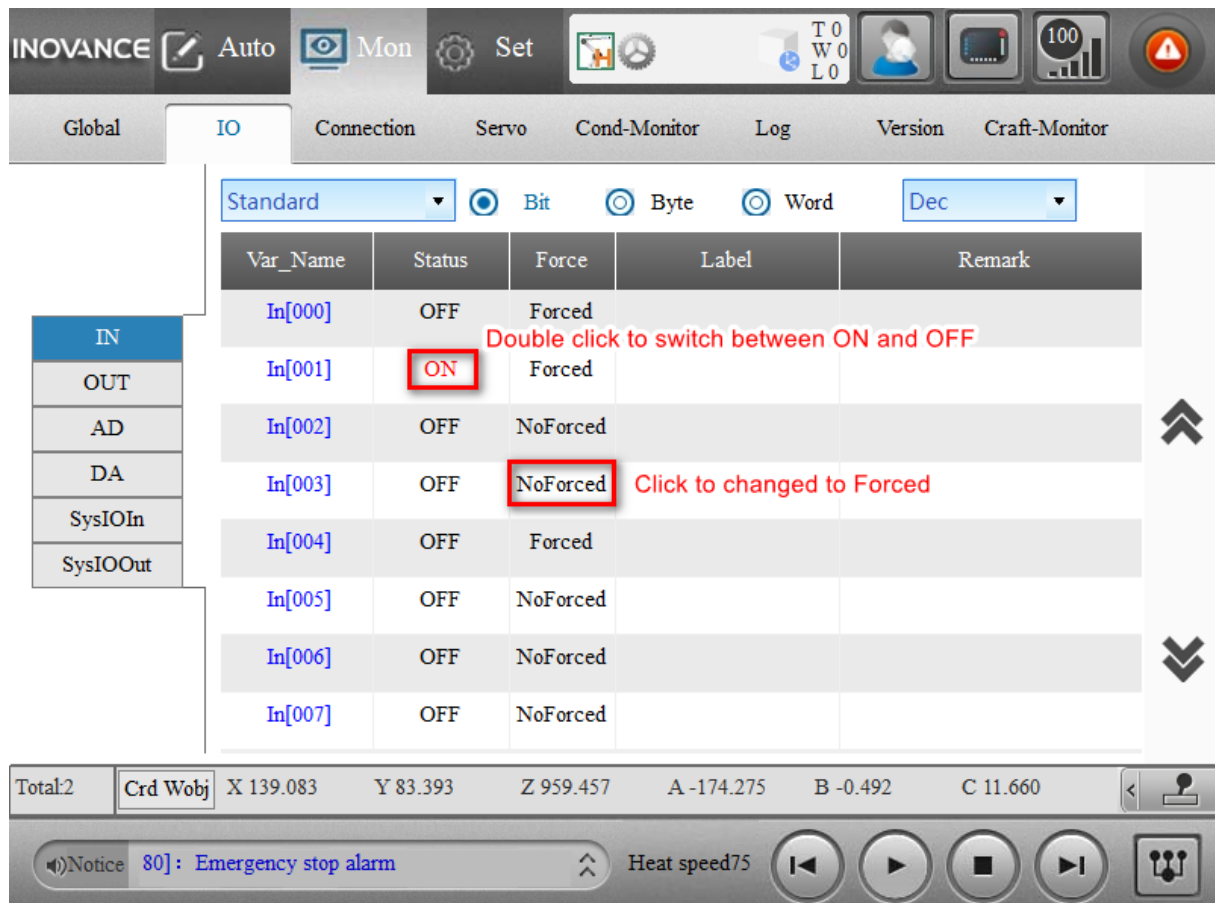
3. When you choose to display an input by bit, the status may be ON or OFF depending on the return value, 1 for ON, 0 for OFF, ON in red, OFF in black.

4. Inputs displayed by byte and word can further be displayed in decimal, binary, or hexadecimal. The default display format is "Decimal".

The screenshot displays the INOVANCE IO Monitor software interface. The 'IO' tab is selected, showing a table of input variables (In[000] to In[007]). The 'Force' column is visible, with values 'NoForced'. A dropdown menu is open for the 'Force' column, showing options: Dec, Bin, and Hex. The 'Status' column shows 'OFF' for all inputs. The interface includes a top menu bar with 'INOVANCE', 'Auto', 'Mon', 'Set', and various status icons. A bottom status bar shows coordinates (X 139.083, Y 83.393, Z 959.457, A -174.275, B -0.492, C 11.660) and a notice area with 'ergency stop alarm'.

Var_Name	Status	Force	Label
In[000]	OFF	NoForced	
In[001]	OFF	NoForced	
In[002]	OFF	NoForced	
In[003]	OFF	NoForced	
In[004]	OFF	NoForced	
In[005]	OFF	NoForced	
In[006]	OFF	NoForced	
In[007]	OFF	NoForced	

5. When you choose to display an input by bit, the "Force" column is displayed. When the value of "Force" column of an input is "Forced", you can click the column to change its value.



6. Description of columns

Force: The status of the input signal is determined by the external source by default. However, you can change the status of an input signal to "Forced" using the Force switch. Then the signal can be forced to ON or OFF.

Status: Displays the current status. For the standard input, you can click the signal value to reverse the status.

Label: The label string of the I/O corresponding to the I/O variable name.

Remark: The remark string of the I/O corresponding to the I/O variable name.

Note:

You can monitor the IN variables in the monitor in the debug mode (for details, see the detailed description of the monitoring function in Section 3.4.)

Enter debug mode, click Monitor, check the Pick option; or select Custom base type, enter the variable name, click Add and then the variable is automatically displayed in the list of

monitored objects.

6.2.2. OUT

The operation on the outputs is generally similar to that on the inputs.

Note: For an output displayed in orange, you cannot change the ON/OFF status by double clicking it.

The screenshot shows the INOVANCE software interface with the 'IO' tab selected. The 'OUT' sub-tab is active, displaying a table of output variables. The table has four columns: 'Var_Name', 'Status', 'Label', and 'Remark'. The 'Status' column for 'Out[028]' is highlighted in orange and labeled 'OFF'. A red box and text annotation indicate that for an output not mapped, a double click is required to switch between ON and OFF.

Var_Name	Status	Label	Remark
Out[024]	OFF		
Out[025]	OFF		
Out[026]	OFF		
Out[027]	OFF		
Out[028]	OFF		
Out[029]	OFF		
Out[030]	OFF		
Out[031]	OFF		

Similar to the input, for an output, 8 bits equals 1 byte, and 16 bits equal 1 word.

Note:

You can monitor the OUT variables in the monitor in the debug mode (for details, see the detailed description of the monitoring function in Section 3.4.)

Enter debug mode, click Monitor, check the Pick option; or select Custom base type, enter the variable name, click Add and then the variable is automatically displayed in the list of monitored objects.

6.2.3. AD/DA

Output type: It indicates that an analog signal is current or voltage.

Range: Analog signal range. Every analog port has several selection ranges according to IRLink product models.

Status: An analog parameter value. When it is a voltage signal, the unit is V; When it is a current signal, it is measured in mA. Click the status to directly modify the status value.

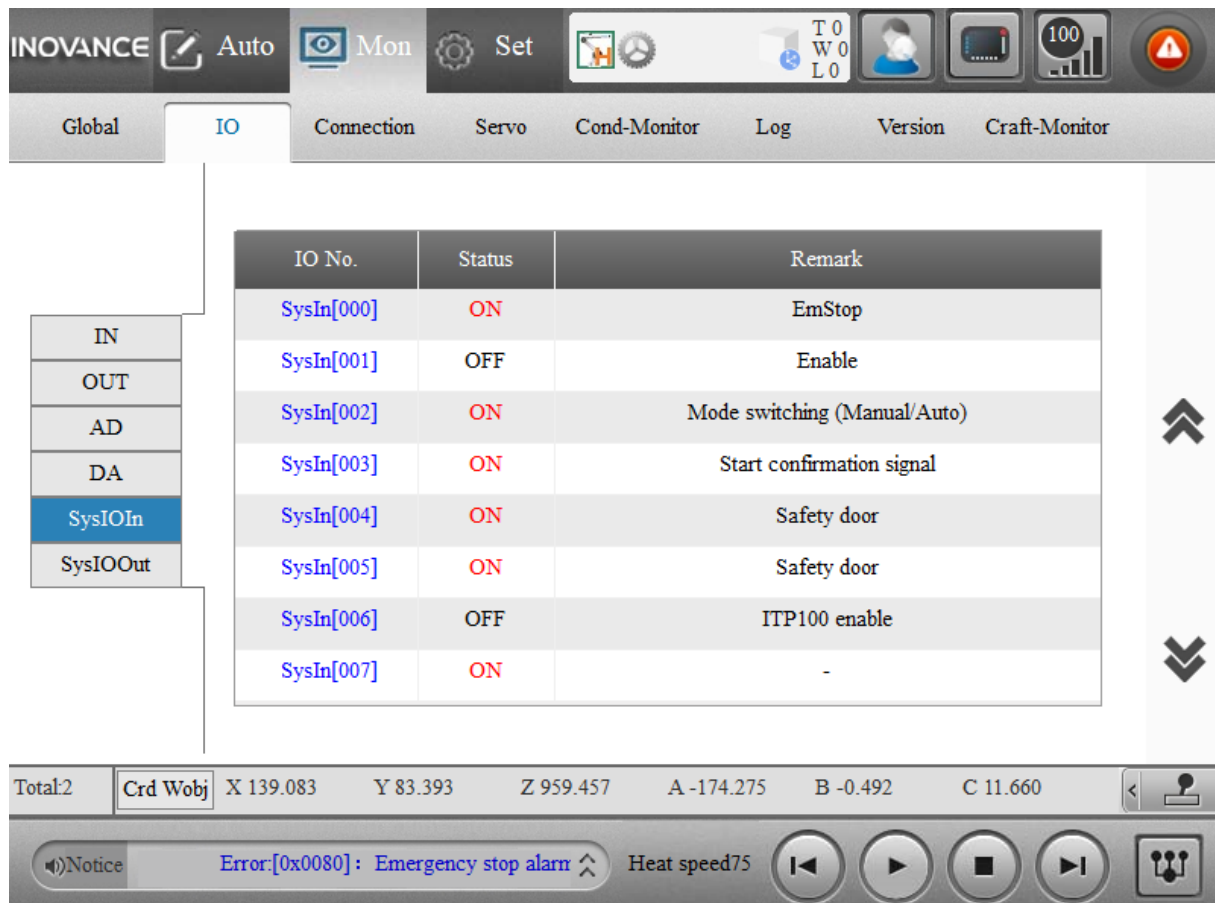
DA switch: It determines whether a DA status value is valid. You can change the status by clicking the switch.

Label: Displays the label set in the project.

Remark: Displays the remarks set in the project.

Note: Labels and remarks cannot be modified here, please modify them in the project.

6.2.4. System I/O



For the IRCB10 controller, System I/Os are In[0] to In[2] that are linked to emergency stop, enable function and mode switching respectively and displayed on the IN/OUT interface.

For the IRCB300, IRCB100 and IRCB500 controllers, System I/Os have a separate SysIO interface with 16 inputs and 16 outputs as follows:

Systems of the IRCB300/IRCB100 controller			
Input	Function	Output	Function
SysIn[0]	Emergency stop	SysOut[0]	System running indication
SysIn[1]	Enable	SysOut[1]	System error indicator
SysIn[2]	Switch mode (Manual/Auto)	SysOut[2]	System enabled indication
SysIn[3]	-	SysOut[3]	EtherNet1 connection indication On: Connected Off: Disconnected
SysIn[4]	Safety Door-	SysOut[4]	EtherNet1 frame transmission

	Triggered Stop Mode		indication Flashing: Data is being transmitted Solid ON: Connected, but no data is being transmitted
SysIn[5]	Safety Door-Triggered Stop Mode	SysOut[5]	EtherNet2 connection indication On: Connected Off: Disconnected
SysIn[6]	ITP100 enabled	SysOut[6]	EtherNet2 frame transmission indication Flashing: Data is being transmitted Solid ON: Connected, but no data is being transmitted
SysIn[7]	-	SysOut[7]	-
SysIn[8]	-	SysOut[8]	Manipulator enabled indicator
SysIn[9]	-	SysOut[9]	-
SysIn[10]	-	SysOut[10]	-
SysIn[11]	-	SysOut[11]	-
SysIn[12]	-	SysOut[12]	-
SysIn[13]	-	SysOut[13]	-
SysIn[14]	-	SysOut[14]	-
SysIn[15]	-	SysOut[15]	-

System I/Os of the IRCB500/IRCB501 controller			
Input	Function	Output	Function
SysIn[0]	Emergency stop	SysOut[0]	Soft STO
SysIn[1]	Enable	SysOut[1]	Manipulator enabled indicator

SysIn[2]	Switch mode (Manual/Auto)	SysOut[2]	
SysIn[3]	Start confirmation signal	SysOut[3]	EtherNet1 connection indication On: Connected Off: Disconnected
SysIn[4]	Safety Door- Triggered Stop Mode	SysOut[4]	EtherNet1 frame transmission indication Flashing: Data is being transmitted Solid ON: Connected, but no data is being transmitted
SysIn[5]	Safety Door- Triggered Stop Mode	SysOut[5]	EtherNet1 connection indication On: Connected Off: Disconnected
SysIn[6]	ITP100 enabled	SysOut[6]	EtherNet1 frame transmission indication Flashing: Data is being transmitted Solid ON: Connected, but no data is being transmitted
SysIn[7]	-	SysOut[7]	-
SysIn[8]	-	SysOut[8]	
SysIn[9]	-	SysOut[9]	-
SysIn[10]	-	SysOut[10]	-
SysIn[11]	-	SysOut[11]	-
SysIn[12]	-	SysOut[12]	-
SysIn[13]	-	SysOut[13]	-
SysIn[14]	-	SysOut[14]	-
SysIn[15]	-	SysOut[15]	-

6.2.5. Meaning of Colors in I/O Monitor

In the I/O monitor, the variable names are differentiated by colors: blue, orange and black, respectively.

Blue: Indicates standard I/Os connected to the actual device or bus I/Os assigned with an address.

Orange: Indicates outputs which have been occupied and for which the control permissions is not RC_ACTIVE. The status of such outputs cannot be changed through monitoring interface or instructions.

Black: Indicates I/Os that meet the following conditions:

1. Standard I/Os not connected to the actual device or bus I/Os not assigned with an address.
2. Outputs which have not been occupied and for which the control permissions is RC_ACTIVE.

Note:

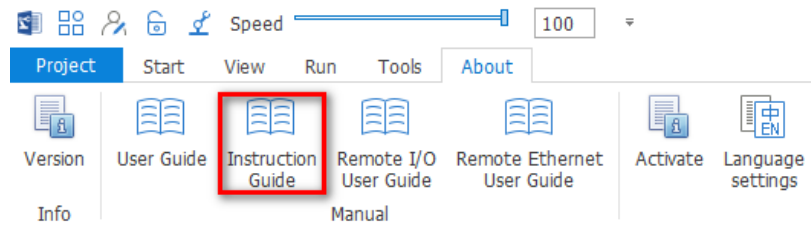
1. The orange display has a higher priority than blue and black. When an I/O is displayed in orange, if you want to know whether the I/O has blue or black attributes, you can infer based on the color of the I/Os before and after it.

2. Control permission of output signal:

Control Permission	Description
RC_STATIC	Indicates that it is occupied by the RC system. That is, Out is bound to a system function. In this case, the output signal is related to the function only and the signal status cannot be manually changed.
RC_ACTIVE	Indicates that it is under normal RC control. In this case, the signal is normally controlled. For example, you can change the signal in I/O monitor or using the Set instruction.
PLC_ACTIVE	It indicates PLC control state. In this case, signals are controlled by PLC software like InoRobShop.

7 User Instructions for Read/Writing the Bus

Refer to the Programming Instruction Guide.



7.1.1. Example: How to receive data from PLC through instructions?

Receive INT32 data from PLC using a custom area:

$R[0] = IN[1056].INT32$ or $R[0] = INB[132].INT32$ or $R[0] = INW[66].INT32$

Receive FLOAT data from PLC using a custom area:

$R[0] = IN[1056].FLOAT$ or $R[0] = INB[132].FLOAT$ or $R[0] = INW[66].FLOAT$

Receive FLOAT data from PLC using a custom area and directly define the points:

$P[0] = \{(INW[66].FLOAT, INW[68].FLOAT, INW[70].FLOAT, 0, 0), (1, 0, 0, 0), (1, 0, 0, 0)\};$

Receive DOUBLE data from PLC using a custom area:

$R[0] = IN[1056].DOUBLE$ or $R[0] = INB[132].DOUBLE$ or $R[0] = INW[66].DOUBLE$

8 Controlling the Robot via Digital I/O and Fieldbus I/O Simultaneously

1. In the I/O mapping settings, configure the I/Os corresponding to functions such as program start as memory I/Os (starting from 12800).

Controller parameter configuration

- Robot settings
 - Zero settings
 - Installation parameters
 - Peripheral configuration
 - Fieldbus slave configuration
 - Switch settings
 - Address allocation settings
 - I/O mapping settings**
 - Project No. configuration
 - Point file configuration
 - IRLink settings
 - Mechanical unit configuration
 - Fieldbus master configuration
 - Motion parameters
 - Control parameters
 - Workspace
 - System settings
 - Debug

I/O mapping settings Refresh Save

Parameter name	Value
1 - Input parameter	
01Bit - Bit	
Start program	In[0]
Stop program	In[1]
Reset program	In[2]
Enable	In[4]
Emergency stop	In[3]
Clear alarm	In[5]
Speed increase	In[6]
Speed decrease	In[7]
Homing	In[8]
Manual/Auto mode switch	In[9]
Start all static tasks	In[10]
Set type of currently operated point	In[11]
Dynamic brake	In[12]
Teach J1/X+	In[13]
Teach J2/Y+	In[14]
Teach J3/Z+	In[15]
Teach J4/A+	In[16]
Teach J5/B+	In[17]
Teach J6/C+	NULL
Teach J1/X-	NULL
Teach J2/Y-	NULL
Teach J3/Z-	NULL
Teach J4/A-	NULL
Teach J5/B-	NULL
Teach J6/C-	NULL
Write current position into current P/J/P variable	NULL

1 - Input parameter -> 01Bit - Bit -> Teach J5/B+

Export file Import file Restore defaults

Controller parameter configuration

- Robot settings
 - Zero settings
 - Installation parameters
 - Peripheral configuration
 - Fieldbus slave configuration
 - Switch settings
 - Address allocation settings
 - I/O mapping settings**
 - Project No. configuration
 - Point file configuration
 - IRLink settings
 - Mechanical unit configuration
 - Fieldbus master configuration
 - Motion parameters
 - Control parameters
 - Workspace
 - System settings
 - Debug

I/O mapping settings Refresh Save

Parameter name	Value
Jump motion MH parameter high bit	NULL
Jump motion RH parameter low bit	NULL
Jump motion RH parameter high bit	NULL
Active P/J/P variable number	NULL
2 - Output parameters	
01Bit - Bit	
Program run status	Out[11]
Program stopped	Out[0]
Program reset successful	Out[12]
Enable status	Out[3]
Emergency stop status	Out[4]
System fault status	Out[1]
System warning status	Out[2]
Servo fault status	Out[5]
Servo warning status	Out[17]
Safety door warning status	NULL
System startup completion status	NULL
Robot in motion	NULL
Robot motion completion status	NULL
Bus communication heartbeat	NULL
Dynamic brake	NULL
P/J/P variable write success	NULL
IN[0] status	Out[6]
IN[1] status	Out[7]
IN[2] status	Out[8]
IN[3] status	Out[9]
IN[4] status	NULL
IN[5] status	NULL

2 - Output parameters -> 01Bit - Bit -> Servo warning status

Export file Import file Restore defaults

2. Write a static task that is to be implemented through signals or operations:

Start;

In12800 = In0 | In512; (In0 is a digital I/O, and In512 is a fieldbus slave I/O)

In12801 = In1 | In513;

In12802 = In2 | In514;

In12803 = In3 | In515;

In12804 = In4 | In516;

In12805 = In5 | In517;

Out0 = Out12800; (Out0 is a digital IO)

Out512 = Out12800; (Out512 is a fieldbus slave IO)

Out1 = Out12801

Out513 = Out12801

Out2 = Out12802

Out514 = Out12802

Out3 = Out12803

Out515 = Out12803

Out4 = Out12804

Out516 = Out12804

Out5 = Out12805

Out517 = Out12805

End;

8.1.1. Appendix 1: Fieldbus I/O Correspondence

When the I/O size is set to 256 bytes in the address allocation, the relationship between the fieldbus I/Os and the addresses of different fieldbuses is shown in the following table.

Fieldbus input address mapping relationship:

(m is the start word address of the data transmitted to the robot by the Ethernet/IP master)

(p is the start word address of the data transmitted by the EtherCAT master to the robot, that is, the first object of RxPDO)

(s is the start word address of the data transmitted by the PROFINET master to the robot)

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
Modbus object type: Coil; access type: read/write; parameter: 0x01, 0x05, 0x0f				
In512	4096 (coil address)	m(bit0)	p(bit0)	s(bit8)
In513	4097 (coil address)	m(bit1)	p(bit1)	s(bit9)
In514	4098 (coil address)	m(bit2)	p(bit2)	s(bit10)
In515	4099 (coil address)	m(bit3)	p(bit3)	s(bit11)
In516	4100 (coil address)	m(bit4)	p(bit4)	s(bit12)
In517	4101 (coil address)	m(bit5)	p(bit5)	s(bit13)
In518	4102 (coil address)	m(bit6)	p(bit6)	s(bit14)
In519	4103 (coil address)	m(bit7)	p(bit7)	s(bit15)
In520	4104 (coil address)	m(bit8)	p(bit8)	s(bit0)
In521	4105 (coil address)	m(bit9)	p(bit9)	s(bit1)
In522	4106 (coil address)	m(bit10)	n(bit10)	s(bit2)

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
	address)			
	...	...	...	...
In527	4111 (coil address)	m(bit15)	p(bit15)	s(bit7)
In528-In543	4112-4127 (coil address)	m+1(bit0-bit15)	p+1(bit0-bit15)	Low: s+1(bit8-bit15) High: s+1(bit0-bit7)
In544-In559	4128-4143 (coil address)	m+2(bit0-bit15)	p+2(bit0-bit15)	Low: s+2(bit8-bit15) High: s+2(bit0-bit7)
In560-In575	4144-4159 (coil address)	m+3(bit0-bit15)	p+3(bit0-bit15)	Low: s+3(bit8-bit15) High: s+3(bit0-bit7)
In576-In591	4160-4175 (coil address)	m+4(bit0-bit15)	p+4(bit0-bit15)	Low: s+4(bit8-bit15) High: s+4(bit0-bit7)
In592-In607	4176-4191 (coil address)	m+5(bit0-bit15)	p+5(bit0-bit15)	Low: s+5(bit8-bit15) High: s+5(bit0-bit7)
In608-In623	4192-4207 (coil	m+6(bit0-bit15)	p+6(bit0-bit15)	Low: s+6(bit8-

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
	address)			bit15) High: s+6(bit0-bit7)
In624-In639	4208-4223 (coil address)	m+7(bit0-bit15)	p+7(bit0-bit15)	Low: s+7(bit8-bit15) High: s+7(bit0-bit7)
In640-In655	4224-4239 (coil address)	m+8(bit0-bit15)	p+8(bit0-bit15)	Low: s+8(bit8-bit15) High: s+8(bit0-bit7)
In656-In671	4240-4255 (coil address)	m+9(bit0-bit15)	p+9(bit0-bit15)	Low: s+9(bit8-bit15) High: s+9(bit0-bit7)
In672-In687	4256-4271 (coil address)	m+10(bit0-bit15)	p+10(bit0-bit15)	Low: s+10(bit8-bit15) High: s+10(bit0-bit7)
In688-In703	4272-4287 (coil address)	m+11(bit0-bit15)	p+11(bit0-bit15)	Low: s+11(bit8-bit15) High: s+11(bit0-bit7)
In704-In719	4288-4303 (coil address)	m+12(bit0-bit15)	p+12(bit0-bit15)	Low: s+12(bit8-bit15)

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
				High: s+12(bit0-bit7)
Modbus object type: holding register; access type: read/write; parameter: 0x03, 0x06, 0x10				
In720-In735	34800 (register address)	m+13	p+13	s+13
In736-In751	34801 (register address)	m+14	p+14	s+14
In752-In767	34802 (register address)	m+15	p+15	s+15
In768-In783	34803 (register address)	m+16	p+16	s+16
In784-In799	34804 (register address)	m+17	p+17	s+17
In800-In815	34805 (register address)	m+18	p+18	s+18
In816-In831	34806 (register address)	m+19	p+19	s+19
In832-In847	34807 (register address)	m+20	p+20	s+20
In848-In863	34808 (register address)	m+21	p+21	s+21
In864-In879	34809 (register address)	m+22	p+22	s+22
In880-In895	34810 (register address)	m+23	p+23	s+23

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
	address)			
In896-In911	34811 (register address)	m+24	p+24	s+24
In912-In927	34812 (register address)	m+25	p+25	s+25
In928-In943	34813 (register address)	m+26	p+26	s+26
In944-In959	34814 (register address)	m+27	p+27	s+27
In960-In975	34815 (register address)	m+28	p+28	s+28
In976-In991	34816 (register address)	m+29	p+29	s+29
In992-In1007	34817 (register address)	m+30	p+30	s+30
In1008- In1023	34818 (register address)	m+31	p+31	s+31
In1024- In1039	34819 (register address)	m+32	p+32	s+32
In1040- In1055	34820 (register address)	m+33	p+33	s+33
In1056- In1071	34821 (register address)	m+34	p+34	s+34
In1072- In1087	34822 (register address)	m+35	p+35	s+35

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
In1088-In1103	34823 (register address)	m+36	p+36	s+36
In1104-In1119	34824 (register address)	m+37	p+37	s+37
In1120-In1135	34825 (register address)	m+38	p+38	s+38
In1136-In1151	34826 (register address)	m+39	p+39	s+39
In1152-In1167	34827 (register address)	m+40	p+40	s+40
In1168-In1183	34828 (register address)	m+41	p+41	s+41
In1184-In1199	34829 (register address)	m+42	p+42	s+42
In1200-In1215	34830 (register address)	m+43	p+43	s+42
In1216-In1231	34831 (register address)	m+44	p+44	s+44
In1232-In1247	34832 (register address)	m+45	p+45	s+45
In1248-In1263	34833 (register address)	m+46	p+46	s+46
In1264-In1279	34834 (register address)	m+47	p+47	s+47
In1280-	34835 (register address)	m+48	p+48	s+48

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
In1295	address)			
In1296- In1311	34836 (register address)	m+49	p+49	s+49
In1312- In1327	34837 (register address)	m+50	p+50	s+50
In1328- In1343	34838 (register address)	m+51	p+51	s+51
In1344- In1359	34839 (register address)	m+52	p+52	s+52
In1360- In1375	34840 (register address)	m+53	p+53	s+53
In1376- In1391	34841 (register address)	m+54	p+54	s+54
In1392- In1407	34842 (register address)	m+55	p+55	s+55
In1408- In1423	34843 (register address)	m+56	p+56	s+56
In1424- In1439	34844 (register address)	m+57	p+57	s+57
In1440- In1455	34845 (register address)	m+58	p+58	s+58
In1456- In1471	34846 (register address)	m+59	p+59	s+59
In1472- In1487	34847 (register address)	m+60	p+60	s+60

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
In1488- In1503	34848 (register address)	m+61	p+61	s+61
In1504- In1519	34849 (register address)	m+62	p+62	s+62
In1520- In1535	34850 (register address)	m+63	p+63	s+63
In1536- In1551	34851 (register address)	m+64	p+64	s+64
In1552- In1567	34852 (register address)	m+65	p+65	s+65
In1568- In1583	34853 (register address)	m+66	p+66	s+66
In1584- In1599	34854 (register address)	m+67	p+67	s+67
In1600- In1615	34855 (register address)	m+68	p+68	s+68
In1616- In1631	34856 (register address)	m+69	p+69	s+69
In1632- In1647	34857 (register address)	m+70	p+70	s+70
In1648- In1663	34858 (register address)	m+71	p+71	s+71
In1664- In1679	34859 (register address)	m+72	p+72	s+72
In1680-	34860 (register address)	m+73	p+73	s+73

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
In1695	address)			
In1696- In1711	34861 (register address)	m+74	p+74	s+74
In1712- In1727	34862 (register address)	m+75	p+75	s+75
In1728- In1743	34863 (register address)	m+76	p+76	s+76
In1744- In1759	34864 (register address)	m+77	p+77	s+77
In1760- In1775	34865 (register address)	m+78	p+78	s+78
In1776- In1791	34866 (register address)	m+79	p+79	s+79
In1792- In1807	34867 (register address)	m+80	p+80	s+80
In1808- In1823	34868 (register address)	m+81	p+81	s+81
In1824- In1839	34869 (register address)	m+82	p+82	s+82
In1840- In1855	34870 (register address)	m+83	p+83	s+83
In1856- In1871	34871 (register address)	m+84	p+84	s+84
In1872- In1887	34872 (register address)	m+85	p+85	s+85

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
In1888- In1903	34873 (register address)	m+86	p+86	s+86
In1904- In1919	34874 (register address)	m+87	p+87	s+87
In1920- In1935	34875 (register address)	m+88	p+88	s+88
In1936- In1951	34876 (register address)	m+89	p+89	s+89
In1952- In1967	34877 (register address)	m+90	p+90	s+90
In1968- In1983	34878 (register address)	m+91	p+91	s+91
In1984- In1999	34879 (register address)	m+92	p+92	s+92
In2000- In2015	34880 (register address)	m+93	p+93	s+93
In2016- In2031	34881 (register address)	m+94	p+94	s+94
In2032- In2047	34882 (register address)	m+95	p+95	s+95
In2048- In2063	34883 (register address)	m+96	p+96	s+96
In2064- In2079	34884 (register address)	m+97	p+97	s+97
In2080-	34885 (register address)	m+98	p+98	s+98

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
In2095	address)			
In2096- In2111	34886 (register address)	m+99	p+99	s+99
In2112- In2127	34887 (register address)	m+100	p+100	s+100
In2128- In2143	34888 (register address)	m+101	p+101	s+101
In2144- In2159	34889 (register address)	m+102	p+102	s+102
In2160- In2175	34890 (register address)	m+103	p+103	s+103
In2176- In2191	34891 (register address)	m+104	p+104	s+104
In2192- In2207	34892 (register address)	m+105	p+105	s+105
In2208- In2223	34893 (register address)	m+106	p+106	s+106
In2224- In2239	34894 (register address)	m+107	p+107	s+107
In2240- In2255	34895 (register address)	m+108	p+108	s+108
In2256- In2271	34896 (register address)	m+109	p+109	s+109
In2272- In2287	34897 (register address)	m+110	p+110	s+110

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
In2288- In2303	34898 (register address)	m+111	p+111	s+111
In2304- In2319	34899 (register address)	m+112	p+112	s+112
In2320- In2335	34900 (register address)	m+113	p+113	s+113
In2336- In2351	34901 (register address)	m+114	p+114	s+114
In2352- In2367	34902 (register address)	m+115	p+115	s+115
In2368- In2383	34903 (register address)	m+116	p+116	s+116
In2384- In2399	34904 (register address)	m+117	p+117	s+117
In2400- In2415	34905 (register address)	m+118	p+118	s+118
In2416- In2431	34906 (register address)	m+119	p+119	s+119
In2432- In2447	34907 (register address)	m+120	p+120	s+120
In2448- In2463	34908 (register address)	m+121	p+121	s+121
In2464- In2479	34909 (register address)	m+122	p+122	s+122
In2480-	34910 (register address)	m+123	p+123	s+123

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
In2495	address)			
In2496- In2511	34911 (register address)	m+124	p+124	s+124
In2512- In2527	34912 (register address)	m+125	p+125	s+125
In2528- In2543	34913 (register address)	m+126	p+126	s+126
In2544- In2559	34914 (register address)	m+127	p+127	

Fieldbus output address mapping relationship:

(n is the start word address of the data transmitted by the robot to the Ethernet/IP master.)

(q is the start word address of the data transmitted by the robot to the EtherCAT master, that is, the first object of TxPDO.)

(t is the start word address of the data transmitted by the robot to the PROFINET master.)

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
Modbus object type: discrete input; access type: read-only; parameter: 0x02				
Out512	0 (coil address)	n(bit0)	q(bit0)	t(bit8)
Out513	1 (coil address)	n(bit1)	q(bit1)	t(bit9)
Out514	2 (coil address)	n(bit2)	q(bit2)	t(bit10)
Out515	3 (coil address)	n(bit3)	q(bit3)	t(bit11)
Out516	4 (coil address)	n(bit4)	q(bit4)	t(bit12)
Out517	5 (coil address)	n(bit5)	q(bit5)	t(bit13)
Out518	6 (coil address)	n(bit6)	q(bit6)	t(bit14)
Out519	7 (coil address)	n(bit7)	q(bit7)	t(bit15)

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
Out520	8 (coil address)	n(bit8)	q(bit8)	t(bit0)
Out521	9 (coil address)	n(bit9)	q(bit9)	t(bit1)
Out522	10 (coil address)	n(bit10)	n(bit10)	t(bit2)
	...	...	...	...
Out527	15 (coil address)	n(bit15)	q(bit15)	t(bit7)
Out528-Out543	16-31 (coil address)	n+1(bit0-bit15)	q+1(bit0-bit15)	Low: t+1(bit8-bit15) High: t+1(bit0-bit7)
Out544-Out559	32-47 (coil address)	n+2(bit0-bit15)	q+2(bit0-bit15)	Low: t+2(bit8-bit15) High: t+2(bit0-bit7)
Out560-Out575	48-63 (coil address)	n+3(bit0-bit15)	q+3(bit0-bit15)	Low: t+3(bit8-bit15) High: t+3(bit0-bit7)
Out576-Out591	64-79 (coil address)	n+4(bit0-bit15)	q+4(bit0-bit15)	Low: t+4(bit8-bit15) High: t+4(bit0-bit7)
Out592-Out607	80-95 (coil address)	n+5(bit0-bit15)	q+5(bit0-bit15)	Low: t+5(bit8-bit15)

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
				High: t+5(bit0-bit7)
Out608-Out623	96-111 (coil address)	n+6(bit0-bit15)	q+6(bit0-bit15)	Low: t+6(bit8-bit15) High: t+6(bit0-bit7)
Out624-Out639	112-127 (coil address)	n+7(bit0-bit15)	q+7(bit0-bit15)	Low: t+7(bit8-bit15) High: t+7(bit0-bit7)
Out640-Out655	128-143 (coil address)	n+8(bit0-bit15)	q+8(bit0-bit15)	Low: t+8(bit8-bit15) High: t+8(bit0-bit7)
Out656-Out671	144-159 (coil address)	n+9(bit0-bit15)	q+9(bit0-bit15)	Low: t+9(bit8-bit15) High: t+9(bit0-bit7)
Out672-Out687	160-175 (coil address)	n+10(bit0-bit15)	q+10(bit0-bit15)	Low: t+10(bit8-bit15) High: t+10(bit0-bit7)
Out688-Out703	176-191 (coil address)	n+11(bit0-bit15)	q+11(bit0-bit15)	Low: t+11(bit8-bit15) High: t+11(bit0-bit7)

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
				bit7
Out704-Out719	192-207 (coil address)	n+12(bit0-bit15)	q+12(bit0-bit15)	Low: t+12(bit8-bit15) High: t+12(bit0-bit7)
Modbus object type: input register; access type: read-only; parameter: 0x04				
Out720-Out735	2048 (register address)	n+13	q+13	t+13
Out736-Out751	2049 (register address)	n+14	q+14	t+14
Out752-Out767	2050 (register address)	n+15	q+15	t+15
Out768-Out783	2051 (register address)	n+16	q+16	t+16
Out784-Out799	2052 (register address)	n+17	q+17	t+17
Out800-Out815	2053 (register address)	n+18	q+18	t+18
Out816-Out831	2054 (register address)	n+19	q+19	t+19
Out832-Out847	2055 (register address)	n+20	q+20	t+20
Out848-Out863	2056 (register address)	n+21	q+21	t+21
Out864-Out879	2057 (register address)	n+22	q+22	t+22

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
	address)			
Out880-Out895	2058 (register address)	n+23	q+23	t+23
Out896-Out911	2059 (register address)	n+24	q+24	t+24
Out912-Out927	2060 (register address)	n+25	q+25	t+25
Out928-Out943	2061 (register address)	n+26	q+26	t+26
Out944-Out959	2062 (register address)	n+27	q+27	t+27
Out960-Out975	2063 (register address)	n+28	q+28	t+28
Out976-Out991	2064 (register address)	n+29	q+29	t+29
Out992-Out1007	2065 (register address)	n+30	q+30	t+30
Out1008- Out1023	2066 (register address)	n+31	q+31	t+31
Out1024- Out1039	2067 (register address)	n+32	q+32	t+32
Out1040- Out1055	2068 (register address)	n+33	q+33	t+33
Out1056- Out1071	2069 (register address)	n+34	q+34	t+34

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
Out1072- Out1087	2070 (register address)	n+35	q+35	t+35
Out1088- Out1103	2071 (register address)	n+36	q+36	t+36
Out1104- Out1119	2072 (register address)	n+37	q+37	t+37
Out1120- Out1135	2073 (register address)	n+38	q+38	t+38
Out1136- Out1151	2074 (register address)	n+39	q+39	t+39
Out1152- Out1167	2075 (register address)	n+40	q+40	t+40
Out1168- Out1183	2076 (register address)	n+41	q+41	t+41
Out1184- Out1199	2077 (register address)	n+42	q+42	t+42
Out1200- Out1215	2078 (register address)	n+43	q+43	t+42
Out1216- Out1231	2079 (register address)	n+44	q+44	t+44
Out1232- Out1247	2080 (register address)	n+45	q+45	t+45
Out1248- Out1263	2081 (register address)	n+46	q+46	t+46
Out1264-	2082 (register	n+47	q+47	t+47

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
Out1279	address)			
Out1280- Out1295	2083 (register address)	n+48	q+48	t+48
Out1296- Out1311	2084 (register address)	n+49	q+49	t+49
Out1312- Out1327	2085 (register address)	n+50	q+50	t+50
Out1328- Out1343	2086 (register address)	n+51	q+51	t+51
Out1344- Out1359	2087 (register address)	n+52	q+52	t+52
Out1360- Out1375	2088 (register address)	n+53	q+53	t+53
Out1376- Out1391	2089 (register address)	n+54	q+54	t+54
Out1392- Out1407	2090 (register address)	n+55	q+55	t+55
Out1408- Out1423	2091 (register address)	n+56	q+56	t+56
Out1424- Out1439	2092 (register address)	n+57	q+57	t+57
Out1440- Out1455	2093 (register address)	n+58	q+58	t+58
Out1456- Out1471	2094 (register address)	n+59	q+59	t+59

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
Out1472- Out1487	2095 (register address)	n+60	q+60	t+60
Out1488- Out1503	2096 (register address)	n+61	q+61	t+61
Out1504- Out1519	2097 (register address)	n+62	q+62	t+62
Out1520- Out1535	2098 (register address)	n+63	q+63	t+63
Out1536- Out1551	2099 (register address)	n+64	q+64	t+64
Out1552- Out1567	2100 (register address)	n+65	q+65	t+65
Out1568- Out1583	2101 (register address)	n+66	q+66	t+66
Out1584- Out1599	2102 (register address)	n+67	q+67	t+67
Out1600- Out1615	2103 (register address)	n+68	q+68	t+68
Out1616- Out1631	2104 (register address)	n+69	q+69	t+69
Out1632- Out1647	2105 (register address)	n+70	q+70	t+70
Out1648- Out1663	2106 (register address)	n+71	q+71	t+71
Out1664-	2107 (register address)	n+72	q+72	t+72

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
Out1679	address)			
Out1680- Out1695	2108 (register address)	n+73	q+73	t+73
Out1696- Out1711	2109 (register address)	n+74	q+74	t+74
Out1712- Out1727	2110 (register address)	n+75	q+75	t+75
Out1728- Out1743	2111 (register address)	n+76	q+76	t+76
Out1744- Out1759	2112 (register address)	n+77	q+77	t+77
Out1760- Out1775	2113 (register address)	n+78	q+78	t+78
Out1776- Out1791	2114 (register address)	n+79	q+79	t+79
Out1792- Out1807	2115 (register address)	n+80	q+80	t+80
Out1808- Out1823	2116 (register address)	n+81	q+81	t+81
Out1824- Out1839	2117 (register address)	n+82	q+82	t+82
Out1840- Out1855	2118 (register address)	n+83	q+83	t+83
Out1856- Out1871	2119 (register address)	n+84	q+84	t+84

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
Out1872- Out1887	2120 (register address)	n+85	q+85	t+85
Out1888- Out1903	2121 (register address)	n+86	q+86	t+86
Out1904- Out1919	2122 (register address)	n+87	q+87	t+87
Out1920- Out1935	2123 (register address)	n+88	q+88	t+88
Out1936- Out1951	2124 (register address)	n+89	q+89	t+89
Out1952- Out1967	2125 (register address)	n+90	q+90	t+90
Out1968- Out1983	2126 (register address)	n+91	q+91	t+91
Out1984- Out1999	2127 (register address)	n+92	q+92	t+92
Out2000- Out2015	2128 (register address)	n+93	q+93	t+93
Out2016- Out2031	2129 (register address)	n+94	q+94	t+94
Out2032- Out2047	2130 (register address)	n+95	q+95	t+95
Out2048- Out2063	2131 (register address)	n+96	q+96	t+96
Out2064-	2132 (register address)	n+97	q+97	t+97

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
Out2079	address)			
Out2080- Out2095	2133 (register address)	n+98	q+98	t+98
Out2096- Out2111	2134 (register address)	n+99	q+99	t+99
Out2112- Out2127	2135 (register address)	n+100	q+100	t+100
Out2128- Out2143	2136 (register address)	n+101	q+101	t+101
Out2144- Out2159	2137 (register address)	n+102	q+102	t+102
Out2160- Out2175	2138 (register address)	n+103	q+103	t+103
Out2176- Out2191	2139 (register address)	n+104	q+104	t+104
Out2192- Out2207	2140 (register address)	n+105	q+105	t+105
Out2208- Out2223	2141 (register address)	n+106	q+106	t+106
Out2224- Out2239	2142 (register address)	n+10 7	q+107	t+107
Out2240- Out2255	2143 (register address)	n+108	q+108	t+108
Out2256- Out2271	2144 (register address)	n+109	q+109	t+109

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
Out2272- Out2287	2145 (register address)	n+110	q+110	t+110
Out2288- Out2303	2146 (register address)	n+111	q+111	t+111
Out2304- Out2319	2147 (register address)	n+112	q+112	t+112
Out2320- Out2335	2148 (register address)	n+113	q+113	t+113
Out2336- Out2351	2149 (register address)	n+114	q+114	t+114
Out2352- Out2367	2150 (register address)	n+115	q+115	t+115
Out2368- Out2383	2151 (register address)	n+116	q+116	t+116
Out2384- Out2399	2152 (register address)	n+117	q+117	t+117
Out2400- Out2415	2153 (register address)	n+118	q+118	t+118
Out2416- Out2431	2154 (register address)	n+119	q+119	t+119
Out2432- Out2447	2155 (register address)	n+120	q+120	t+120
Out2448- Out2463	2156 (register address)	n+121	q+121	t+121
Out2464-	2157 (register address)	n+122	q+122	t+122

Robot address	Modbus address	Ethernet/IP address	EtherCAT address	PROFINET address
Out2479	address)			
Out2480- Out2495	2158 (register address)	n+123	q+123	t+123
Out2496- Out2511	2159 (register address)	n+124	q+124	t+124
Out2512- Out2527	2160 (register address)	n+125	q+125	t+125
Out2528- Out2543	2161 (register address)	n+126	q+126	t+126
Out2544- Out2559	2162 (register address)	n+127	q+127	

9 Appendix 2: Extended Remote Control Command List

9.1.1. List of Commands

Type	Function	Parameter	Description	Is effective when the control permission is granted to remote I/O unit (only effective in
------	----------	-----------	-------------	--

				auto mode) and when the robot is in manual mode?
System status- related commands	Read the current coordinate system	0x0001	Added world coordinate system	Yes
	Set the current coordinate system	0x0002		No
	Read the speed level	0x0003		Yes
	Set the speed level	0x0004		No
	Get the current fault code and warning code of the system	0x0005		Yes
	Get the current fault code and warning code of the servo drive	0x0006		Yes
	Read the Manual/Auto mode	0x0007		Yes
	Set the Manual/Auto mode	0x0008		No
	Read the current position of the robot	0x0009	Added input parameters Input parameter 1: Read the current position values in a certain	Yes

			coordinate system format - 1: Joint coordinate system, 2: Base coordinate system, 3: Tool coordinate system, 4: Workobject coordinate system, 5: World coordinate system	
	Read the current tool coordinate system number	0x000A		Yes
	Set the the current tool coordinate system number	0x000B		No
	Read the current tool coordinate system number	0x000C		Yes
	Set the current workobject coordinate system number	0x000D		No
	Read the heartbeat interval	0x000E		Yes
	Set the heartbeat interval	0x000F		No

	Read the current control permission	0x0010		Yes
	Read the current load number	0x0011		Yes
	Set the current load number	0x0012		No
	Read the DA binding state and the linear speed analog setting	0x0013	Input parameter Input parameter 1: The DA number queried Return parameter (For details, see the reading of the DA binding state and the linear speed analog setting.)	Yes
	Read the DA binding state, linear speed value, and DA output data	0x0014	Input parameter Input parameter 1: The DA number queried Return parameter (For details, see the reading of DA binding state, linear speed value, and DA output	Yes

			data.)	
	Set the binding of the linear speed and the analog output	0x0015	Input parameter (For details, see the binding settings of linear speed and the analog output)	No
	Set the unbinding of the linear speed and the analog output	0x0016	Input parameter Input parameter 1: Unbound DA number Return parameter (For details, see the unbinding settings of linear speed and analog output.)	No
	Read the trajectory recovery threshold check mode	0x0017		Yes
	Set the trajectory recovery threshold check mode	0x0018	Input parameter Input parameter 1: 0: Joint mode 1: Position mode	No
	Read the trajectory recovery threshold	0x0019	Input parameter Input parameter 1: 1: Manual, 2: Auto	Yes

			Return parameter (For details, see the reading of trajectory recovery threshold.)	
	Set the trajectory recovery threshold	0x001A	Input parameter (For details, see the setting of the trajectory recovery threshold.)	No
	Read the current position display format	0x0710	1-Joint coordinate system, 2-Base coordinate system, 3-Flange coordinate system, 4-Workobject coordinate system, 5-World coordinate system	Yes
	Set the current position display format	0x0711	1-Joint coordinate system, 2-Base coordinate system, 3-Flange coordinate system, 4-Workobject coordinate system, 5-World	No

			coordinate system	
Read/Write-related commands	Read the global P/JP points	0x0200	Input parameters 01: Whether the point is a joint point (0) or position point (1) 02: Point number Return parameter (For details, see the read/write of points)	Yes
	Write the current position of the robot to the global P/JP point	0x0201	Input parameter 01: Whether the point is a joint point (0) or position point (1) 02: Point number Return parameter (For details, see the read/write of points)	No
	Write the input robot point to the global P/JP point	0x0202	Input parameters 01: Whether the point is a joint point (0) or position point (1)	No

			02: Point number Return parameter (For details, see the read/write of points)	
System variable- related commands	Read the B variable	0x0300		Yes
	Set the B variable	0x0301		No
	Batch read the B variables	0x0302		Yes
	Batch set the B variables	0x0303		No
	Read the R variable	0x0304		Yes
	Set the R variable	0x0305		No
	Batch read the R variables	0x0306		Yes
	Batch set the R variables	0x0307		No
	Read the D variable	0x0308		Yes
	Set the D variable	0x0309		No
	Batch read the D variables	0x030A		Yes
	Batch set the D variables	0x030B		No
System standard I/O-related commands	Read the system standard I/O input state (in word)	0x0400		Yes
	Read the system	0x0401		Yes

	standard I/O output state (in word)			
	Set the system standard I/O output state (in word)	0x0402		No
	Batch read the system standard I/O input state (in word)	0x0403		Yes
	Batch read the system standard I/O output state (in word)	0x0404		Yes
	Batch set the system standard I/O output state (in word)	0x0405		No
Motion-related commands	Move to a point via MOVJ	0x0500		No
	Move to a point via MOVL	0x0501		No
	Move to a point via JUMP	0x0502		No
	Move to a point via JUMPL	0x0503		No
	Move to a joint point with specified value via MOVJABS	0x0504	Add interpolation motion to a joint point with specified value	No

	Reserved	0x0505		Yes
	Reserved	0x0506		Yes
	Reserved	0x0507		Yes
	Query the robot motion status	0x0508		Yes
	Query the robot motion completion status	0x0509		Yes
	Interrupt the current direct motion	0x050A		No
	Read the current teaching motion mode	0x050B		Yes
	Set the current teaching motion mode	0x050C		No
Read the system parameter settings	Read the joint stepsize of jogging	0x0600		Yes
	Set the joint stepsize of jogging	0x0601		No
	Read the position stepsize of jogging	0x0602		Yes
	Set the position stepsize of jogging	0x0603		No
	Read the orientation stepsize of jogging	0x0604		Yes
	Set the orientation	0x0605		No

	stepsize of jogging			
External axis-related commands	Read the activated unit for teaching motion	0x0701		Yes
	Set the activated unit for teaching motion	0x0702		No
	Read the coordination switch for teaching motion	0x0703		Yes
	Set the coordination switch for teaching motion	0x0704		No
Average load rate and current monitoring	Read the average load rate	0x0750		Yes
	Read the current	0x0751		Yes
Multitasking- related commands	Get the task status	0x0800	Added input parameters Input parameter 1: Input range 0-3; return state: 0 - Stop, 1 - Start, 10 - Complete, 100 - Inactive; If the input range is exceeded, the	Yes

			return state is 3, otherwise, the return value is 1.	
Tracking process- related commands	Read the height of the workobject for the tracking process	0x0801		Yes
	Set the height of the workobject for the tracking process	0x0802		No
	Read the upper and lower boundaries for the tracking process	0x0803		Yes
	Set the upper and lower boundaries for the tracking process	0x0804		No
	Read the detection parameters for the tracking process	0x0805		Yes
	Set the detection parameters for the tracking process	0x0806		No
Interference zone-related commands	Get the interference zone parameters	0x8010		Yes
	Set the interference zone parameters	0x8011		No

	Get the interference zone status	0x8012		Yes
	Sets the interference zone status	0x8013		No
	Get the monitoring object parameters	0x8014		Yes
	Set the monitoring object parameters	0x8015		No
	Get the active monitoring object	0x8016		Yes
	Set the monitoring object to be activated	0x8017		No

Note: For is multi-robot control in the future, use the highest bit of the parameter to specify the robot number. For example, parameter 0xR500, where R indicate the robot number.

9.1.2. System Status Reading and Setting Commands

1. Read the current coordinate system

Input value:

Parameter	Data type	Value
Remote control command	Word (unsigned)	H0001
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	The value of the current coordinate system read: 1: Joint coordinate system 2: Base coordinate system 3: Flange coordinate system 4: Workobject coordinate system 5: World coordinate system
Remote control return parameter 2	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	
...		
Remote control return parameter 50	Word (unsigned)	

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to read the current coordinate system.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		
	...	
Reserved	Word (unsigned)	Null

2. Set the current coordinate system

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0002
Remote control input parameter 1	Word (unsigned)	Value entered when setting the current coordinate system (1-4) 1: Joint coordinate system 2: Base coordinate system 3: Flange coordinate system 4: Workobject coordinate system 5: World coordinate system
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.

		0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: The coordinate system number entered is out of range. 0x0002: Setting is not allowed in auto mode or in motion state. 0x0003: Failed to set the current coordinate system.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		
	...	
Reserved	Word (unsigned)	Null

3. Read the speed level

Input value:

Parameter	Data type	Description
Remote control command		H0003
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
-----------	-----------	-------------

Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter	Word (unsigned)	System speed level read.
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to read the system speed level.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		
	...	
Reserved	Word (unsigned)	Null

4. Set the speed level

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0004
Remote control input parameter 1	Word (unsigned)	Speed level (1 to 100)
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: The speed level input entered is out of range. 0x0002: Failed to set the speed level.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		
	...	
Reserved	Word (unsigned)	Null

5. Get the current fault codes and warning codes

Input value:

Parameter	Data type	Description
-----------	-----------	-------------

Remote control command	Word (unsigned)	H0005
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	<p>0x0000: Initialization is complete and new remote commands can be accepted.</p> <p>0x0001: The command is being executed.</p> <p>0x0002: The command is executed successfully.</p> <p>0x0003: The command execution is abnormal.</p>
Remote control return parameter	Word (unsigned)	The current fault code of the system returned.
Remote control return parameter 2	Word (unsigned)	The current system warning code returned.
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.

Remote control execution failure error code	Word (unsigned)	0x0001: Failed to get the current system fault code. 0x0002: Failed to get the current system warning code.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		
	...	
Reserved	Word (unsigned)	Null

6. Get the current fault code and warning code of the servo drive

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0006
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...	...	...
Remote control input parameter 50	...	Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0000: Initialization is complete and new remote commands can be accepted. 0x0001: The command is being executed. 0x0002: The command is executed successfully. 0x0003: The command execution is abnormal.

Remote control return parameter 1	Word (unsigned)	J1 servo fault code or warning code (Only one can be present at the same time.)
Remote control return parameter 2	Word (unsigned)	J2 servo fault code or warning code
Remote control return parameter 3	Word (unsigned)	J3 servo fault code or warning code
Remote control return parameter 4	Word (unsigned)	J4 servo fault code or warning code
Remote control return parameter 5	Word (unsigned)	J5 servo fault code or warning code
Remote control return parameter 6	Word (unsigned)	J6 servo fault code or warning code
Remote control return parameter 7		Reserved
Remote control return parameter 8		Reserved
Remote control return parameter 9	Word (unsigned)	Reserved
Remote control return parameter 10	Word (unsigned)	Reserved
Remote control return parameter 11	Word (unsigned)	Reserved
Remote control return parameter 12	Word (unsigned)	Reserved
Remote control return parameter 13	Word (unsigned)	Reserved
Remote control return	Word (unsigned)	Reserved

parameter 14		
Remote control return parameter 15		Reserved
Remote control return parameter 16		Reserved
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to get the current servo fault code or warning code failure
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		
	...	
Reserved	Word (unsigned)	Null

7. Get the Manual/Auto mode

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0007
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...

Remote control input parameter 50		Null
-----------------------------------	--	------

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	The current mode of the system returned. 1-Manual mode 2-Auto mode 3-Teaching check 5-Continuous teaching check
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to get the current system mode.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		
	...	
Reserved	Word (unsigned)	Null

8. Switch the system mode between manual and auto modes

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0008
Remote control input parameter 1	Word (unsigned)	1: Set to manual mode, 2: Set to auto mode
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.

Remote control execution failure error code	Word (unsigned)	0x0001: The input mode is neither 1 nor 2. 0x0002: Manual/Auto mode switchover failed. 0x0003: This parameter is already mapped.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		
	...	
Reserved	Word (unsigned)	Null

9. Read the current position of the robot

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0009
Remote control input parameter 1	Word (unsigned)	Read the current position value in a certain coordinate system format: 1-Joint coordinate system, 2-Base coordinate system, 3-Flange coordinate system, 4-Workobject coordinate system, 5-World coordinate system
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Single-precision floating-point	Low bit of X coordinate of J1
Remote control return parameter 2		High bit of X coordinate of J1
Remote control return parameter 3	Single-precision floating-point	Low bit of Y coordinate of J2
Remote control return parameter 4		High bit of Y coordinate of J2
Remote control return parameter 5	Single-precision floating-point	Low bit of Z coordinate of J3
Remote control return parameter 6		High bit of Z coordinate of J3
Remote control return parameter 7	Single-precision floating-point	Low bit of A coordinate of J4
Remote control return parameter 8		High bit of A coordinate of J4
Remote control return parameter 9	Single-precision floating-point	Low bit of B coordinate of J5
Remote control return parameter 10		High bit of B coordinate of J5
Remote control return parameter 11	Single-precision floating-point	Low bit of C coordinate of J6
Remote control return		High bit of C coordinate of J6

parameter 12		
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: The coordinate system display format entered is out of range. 0x0002: Failed to set coordinate system display format. 0x0003: The active tool and workobject parameters do not match.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		
	...	
Reserved	Word (unsigned)	Null

10. Get the current tool coordinate system number

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H000A
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...

Remote control input parameter 50		Null
-----------------------------------	--	------

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0000: Initialization is complete and new remote commands can be accepted. 0x0001: The command is being executed. 0x0002: The command is executed successfully. 0x0003: The command execution is abnormal.
Remote control return parameter 1	Word (unsigned)	The current tool coordinate system number returned.
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to get the current tool coordinate system number.
Controller system error code	Word (unsigned)	Refer to system fault codes

Reserved		
	...	
Reserved	Word (unsigned)	Null

11. Set the current tool coordinate system number

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H000B
Remote control input parameter 1	Word (unsigned)	Tool coordinate system number (0-15)
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
-----------	-----------	-------

Current remote control state	Word (unsigned)	<p>0x0003: The command execution is abnormal.</p> <p>0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.</p>
Remote control execution failure error code	Word (unsigned)	<p>0x0001: The tool coordinate system number entered is out of range.</p> <p>0x0002: Setting is not allowed in auto mode or in motion state.</p> <p>0x0003: Failed to set the current tool coordinate system number.</p>
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		
	...	
Reserved	Word (unsigned)	Null

12. Acquisition of the coordinate system number of the current workobject

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H000C
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null

Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Returns the coordinate system number of the current workobject
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001 Failed to get the current coordinate system number of the workobject
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved	...	Null

	...	
Reserved	...	Null

13. Set the coordinate system number of the current workobject

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H000D
Remote control input parameter 1	Word (unsigned)	Set workobject coordinate system number (0-15)
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...	...	
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: The workobject coordinate system number entered is out of range. 0x0002: Setting is not allowed in auto mode or in motion state. 0x0003: Failed to set the current workobject coordinate system number.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		
	...	
Reserved	Word (unsigned)	Null

14. Read the heartbeat interval

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H000E
Remote control input parameter 1	Word (unsigned)	Null
Remote control input	Word (unsigned)	Null

parameter 2		
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Heartbeat interval, in ms
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to read the heartbeat interval.
Controller system error code	Word (unsigned)	Refer to system fault codes

Reserved	...	Null
	...	Null
Reserved	Word (unsigned)	Null

15. Set the heartbeat interval

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H000F
Remote control input parameter 1	Word (unsigned)	Heartbeat interval (default value: 500 ms, range: [200-65000] ms, accuracy: ± 50 ms.)
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		

Remote control return parameter 50	Word (unsigned)	Null
---------------------------------------	-----------------	------

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: The heartbeat interval entered is out of range. 0x0002: Failed to set the heartbeat interval.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		
	...	
Reserved	Word (unsigned)	Null

16. Read the current control permission

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0010
Remote control input parameter 1	Word (unsigned)	Null
Remote control input	Word (unsigned)	Null

parameter 2		
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0000: Initialization is complete and new remote commands can be accepted. 0x0001: The command is being executed. 0x0002: The command is executed successfully. 0x0003: The command execution is abnormal.
Remote control return parameter 1	Word (unsigned)	Current control permission (0-InoRobotLab or teach pendant; 1-InoRobShop, 2-Remote Ethernet client, 3-Remote I/O unit)
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote	Word (unsigned)	0x0003: The command execution is abnormal.

control state		
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to read the current control permission.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		
	...	
Reserved	Word (unsigned)	Null

17. Read the current load number

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0011
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control	Word (unsigned)	0x0002: The command is executed

state		successfully.
Remote control return parameter 1	Word (unsigned)	The current load number returned.
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to get the current load number.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved	...	Null
	...	
Reserved	...	Null

18. Set of the current load number

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0012
Remote control input parameter 1	Word (unsigned)	Load number (0-15)
Remote control input	Word (unsigned)	Null

parameter 2		
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...	...	
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control	Word (unsigned)	0x0001: The load number entered is out of

execution failure error code		range. 0x0002: Setting is not allowed in auto mode or in motion state. 0x0003: Failed to set the current load number.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		
	...	
Reserved	Word (unsigned)	Null

19. Read data of DA binding status and linear speed analog setting

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0013
Remote control input parameter 1	Word (unsigned)	Bound DA number (0 to (num*4-1)
Remote control input parameter 2	Word (unsigned)	Null
...		
Remote control input parameter 50		

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	The binding state of DA, range 0 or 1.

Remote control return parameter 2	32-bit floating-point type	Low bit of the minValue variable
Remote control return parameter 3		High bit of the minValue variable
Remote control return parameter 4	32-bit floating-point type	Low bit of the maxValue variable
Remote control return parameter 5		High bit of the maxValue variable
Remote control return parameter 6	32-bit floating-point type	Low bit of the minSpeed variable
Remote control return parameter 7		High bit of the minSpeed variable
Remote control return parameter 8	32-bit floating-point type	Low bit of the maxSpeed variable
Remote control return parameter 9		High bit of the maxSpeed variable
...		
Remote control return parameter 50		

When execution fails:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: DA[Index] is occupied. 0x0002: DA module is not configured.

		0x0003: The input data is out of range. 0x0004: Internal error in command execution.
Controller system error code	Word (unsigned)	Refer to system fault codes
...		
Remote control return parameter 50	Word (unsigned)	

20. Read the DA binding state, linear speed value, and DA output data

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0014
Remote control input parameter 1	Word (unsigned)	Bound DA number (0 to (num*4-1))
Remote control input parameter 2	Word (unsigned)	Null
...		
Remote control input parameter 50		

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	The binding state of DA, range 0 or 1.
Remote control return	32-bit floating-point type	Low bit of the real-time output

parameter 2		value of DA
Remote control return parameter 3		High bit of the real-time output value of DA
Remote control return parameter 4	32-bit floating-point type	Low bit of the real-time output value of the linear speed
Remote control return parameter 5		High bit of the real-time output value of the linear speed
...		
Remote control return parameter 50		

When execution fails:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: DA[Index] is occupied. 0x0002: DA module is not configured. 0x0003: The input data is out of range. 0x0004: Internal error in command execution.
Controller system error code	Word (unsigned)	Refer to system fault codes
...		
Remote control return parameter 50	Word (unsigned)	

21. Set the binding of the linear speed and the analog output

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0015
Remote control input parameter 1	Word (unsigned)	Bound DA number (0 to (num*4-1))
Remote control input parameter 2	32-bit floating-point type	Low bit of the input value of the minVal variable
Remote control input parameter 3		High bit of the input value of the minVal variable
Remote control input parameter 4	32-bit floating-point type	Low bit of the input value of the maxVal variable
Remote control input parameter 5		High bit of the input value of the maxVal variable
Remote control input parameter 6	32-bit floating-point type	Low bit of the input value of the minSpeed variable
Remote control input parameter 7		High bit of the input value of the minSpeed variable
Remote control input parameter 8	32-bit floating-point type	Low bit of the input value of the maxSpeed variable
Remote control input parameter 9		High bit of the input value of the maxSpeed variable
...		
Remote control input parameter 50		

Return value:

When execution is successful:

Parameter	Data type	Description
-----------	-----------	-------------

Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	
Remote control return parameter 2	Word (unsigned)	
...		
Remote control return parameter 50	Word (unsigned)	

When execution fails:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: DA[Index] is occupied. 0x0002: DA module is not configured. 0x0003: The input data is out of range. 0x0004: Internal error in command execution.
Controller system error code	Word (unsigned)	Refer to system fault codes
...		
Remote control return parameter 50	Word (unsigned)	

22. Set the unbinding of the linear speed and the analog output

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0016
Remote control input parameter 1	Word (unsigned)	Bound DA number (0 to (num*4-1))
Remote control input parameter 2	Word (unsigned)	Null
...		
Remote control input parameter 50		

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	
Remote control return parameter 2	Word (unsigned)	
...		
Remote control return parameter 50	Word (unsigned)	

When execution fails:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.

		0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: DA[Index] is occupied. 0x0002: DA module is not configured. 0x0003: The input data is out of range. 0x0004: Internal error in command execution.
Controller system error code	Word (unsigned)	Refer to system fault codes
...		
Remote control return parameter 50	Word (unsigned)	

23. Read the trajectory recovery threshold check mode

Read whether the trajectory recovery threshold check mode is joint mode or position mode.

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0017
Remote control input parameter 1	Word (unsigned)	Null

Remote control input parameter 2	Word (unsigned)	Null
...		
Remote control input parameter 50		

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	0: Joint mode 1: Position control mode
Remote control return parameter 2	Word (unsigned)	
...		
Remote control return parameter 50	Word (unsigned)	

When execution fails:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to read the trajectory recovery threshold check mode.
Controller system error code	Word (unsigned)	Refer to system fault codes
...		
Remote control return	Word (unsigned)	

parameter 50		
--------------	--	--

24. Set the trajectory recovery threshold check mode

Set the trajectory recovery threshold check mode to joint mode or position mode.

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0018
Remote control input parameter 1	Word (unsigned)	0: Joint mode 1: Position mode
Remote control input parameter 2	Word (unsigned)	Null
...		
Remote control input parameter 50		

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	
Remote control return parameter 2	Word (unsigned)	
...		
Remote control return parameter 50	Word (unsigned)	

When execution fails:

Parameter	Data type	Description
-----------	-----------	-------------

Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to set the trajectory recovery threshold check mode. 0x0004: The input data is out of range.
Controller system error code	Word (unsigned)	Refer to system fault codes
...		
Remote control return parameter 50	Word (unsigned)	

25. Read the trajectory recovery threshold

In position mode, read the trajectory recovery threshold in manual motion and automatic motion.

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0019
Remote control input parameter 1	Word (unsigned)	1: Manual 2: Auto

Remote control input parameter 2	Word (unsigned)	Null
...		
Remote control input parameter 50		

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	32-bit floating-point type	Low bit of the input value of the TCP distance variable
Remote control return parameter 2		High bit of the input value of the TCP distance variable
Remote control return parameter 3	32-bit floating-point type	Low bit of the input value of the TCP rotation variable
Remote control return parameter 4		High bit of the input value of the TCP rotation variable
Remote control return parameter 5	32-bit floating-point type	Low bit of the input value of the external axis distance variable
Remote control return parameter 6		High bit of the input value of the external axis distance variable
Remote control return parameter 7	32-bit floating-point type	Low bit of the input value of the external axis rotation variable
Remote control return parameter 8		High bit of the input value of the external axis rotation variable
...		

Remote control return parameter 50	Word (unsigned)	
---------------------------------------	-----------------	--

When execution fails:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to read the track recovery threshold. 0x0004: The input data is out of range.
Controller system error code	Word (unsigned)	Refer to system fault codes
...		
Remote control return parameter 50	Word (unsigned)	

26. Set the trajectory recovery threshold

Set the trajectory recovery threshold in different modes according to the mode selected.

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H001A
Remote control input parameter 1	Word (unsigned)	1: Manual 2: Auto
Remote control input parameter 2	32-bit floating-point type	Low bit of the input value of the TCP distance variable
Remote control input parameter 3		High bit of the input value of the TCP distance variable
Remote control input parameter 4	32-bit floating-point type	Low bit of the input value of the TCP rotation variable

Remote control input parameter 5		High bit of the input value of the TCP rotation variable
Remote control input parameter 6	32-bit floating-point type	Low bit of the input value of the external axis distance variable
Remote control input parameter 7		High bit of the input value of the external axis distance variable
Remote control input parameter 8	32-bit floating-point type	Low bit of the input value of the external axis rotation variable
Remote control input parameter 9		High bit of the input value of the external axis rotation variable
...		
Remote control input parameter 50		

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	
Remote control return parameter 2	Word (unsigned)	
...		
Remote control return parameter 50	Word (unsigned)	

When execution fails:

Parameter	Data type	Description
-----------	-----------	-------------

Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to set the track recovery threshold. 0x0004: The input data is out of range.
Controller system error code	Word (unsigned)	Refer to system fault codes
...		
Remote control return parameter 50	Word (unsigned)	

27. Read the current position display format

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0710
Remote control input parameter 1	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

Address	Data type	Description
Current remote control	Word (unsigned)	0x0002: The command is executed

state		successfully.
Remote control return parameter 1	Word (unsigned)	1-Joint coordinate system, 2-Base coordinate system, 3-Flange coordinate system, 4-Workobject coordinate system, 5-World coordinate system
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

28. Set the current position display format

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0711
Remote control input parameter 1	Word (unsigned)	1-Joint coordinate system, 2-Base coordinate system, 3-Flange coordinate system, 4-Workobject coordinate system, 5-World coordinate system
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.

Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	1: The position display format entered is out of range. 2: The current active mechanical unit only supports joint coordinates for the position display format. 3: The current joint coordinate system only supports joint coordinates for the position display format. 4: The current coordinate system is not joint coordinate system. It is not allowed to set the position display format to the joint coordinates. 5: The tool is not held by the robot. It is not

		<p>allowed to set the position display format to the flange coordinates.</p> <p>6: Other internal errors, contact the manufacturer.</p>
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

9.1.3. Read/Write-related commands

1. Read the global points

Input value:

Parameter	Data type	Value
Remote control command	Word (unsigned)	H0200
Remote control input parameter 1	Word (unsigned)	<p>The point data in the memory and in the global point file can be read.</p> <p>Global point type</p> <p>0: Position point currently loaded</p> <p>1: Joint point currently loaded</p> <p>1000-1127: Position point file with corresponding serial number. By default, 1000 is P.pts (thousand's place: Position point file type, unit's place to hundred's place: Point file number). The file number</p>

		can be configured in the interface, range 0-127.
Remote control input parameter 2	Word (unsigned)	Global point number (0-9999)
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful (position point P):

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0000: Initialization is complete and new remote commands can be accepted. 0x0001: The command is being executed. 0x0002: The command is executed successfully. 0x0003: The command execution is abnormal.
Remote control return parameter 1	Single-precision floating-point type	Low bit of X coordinate of J1 read by the P variable
Remote control return parameter 2	Single-precision floating-point type	High bit of X coordinate of J1 read by the P variable
Remote control return parameter 3	Single-precision floating-point	Low bit of Y coordinate of J2 read by the P variable

	type	
Remote control return parameter 4	Single-precision floating-point type	High bit of Y coordinate of J2 read by the P variable
Remote control return parameter 5	Single-precision floating-point type	Low bit of Z coordinate of J3 read by the P variable
Remote control return parameter 6	Single-precision floating-point type	High bit of Z coordinate of J3 read by the P variable
Remote control return parameter 7	Single-precision floating-point type	Low bit of A coordinate of J4 read by the P variable
Remote control return parameter 8	Single-precision floating-point type	High bit of A coordinate of J4 read by the P variable
Remote control return parameter 9	Single-precision floating-point type	Low bit of B coordinate of J5 read by the P variable
Remote control return parameter 10	Single-precision floating-point type	High bit of B coordinate of J5 read by the P variable
Remote control return parameter 11	Single-precision floating-point type	Low bit of C coordinate of J6 read by the P variable
Remote control return parameter 12	Single-precision floating-point	High bit of C coordinate of J6 read by the P variable

	type	
Remote control return parameter 13	Word (signed)	Arm parameter 1 read by the P variable
Remote control return parameter 14	Word (signed)	Arm parameter 2 read by the P variable
Remote control return parameter 15	Word (signed)	Arm parameter 3 read by the P variable
Remote control return parameter 16	Word (signed)	Arm parameter 4 read by the P variable
Remote control return parameter 17	Single-precision floating-point type	Low bit of E1 joint value read by the P variable
Remote control return parameter 18	Single-precision floating-point type	High bit of E1 joint value read by the P variable
Remote control return parameter 19	Single-precision floating-point type	Low bit of the E2 joint value read by the P variable
Remote control return parameter 20	Single-precision floating-point type	High bit of the E2 joint value read by the P variable
Remote control return parameter 21	Single-precision floating-point type	Low bit of the E3 joint value read by the P variable
Remote control return parameter 22	Single-precision floating-point type	High bit of the E3 joint value read by the P variable

Remote control return parameter 23	Single-precision floating-point type	Low bit of the E4 joint value read by the P variable
Remote control return parameter 24	Single-precision floating-point type	High bit of E4 joint value read by the P variable
Remote control return parameter 25	Single-precision floating-point type	Low bit of E5 joint value read by the P variable
Remote control return parameter 26	Single-precision floating-point type	High bit of E5 joint value read by the P variable
Remote control return parameter 27	Single-precision floating-point type	Low bit of the joint value of E6 read by the P variable
Remote control return parameter 28	Single-precision floating-point type	High bit of the joint value of E6 read by the P variable
...		
Remote control return parameter 50		Null

When execution is successful (joint point JP):

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0000: Initialization is complete and new remote commands can be accepted. 0x0001: The command is being executed. 0x0002: The command is executed

		successfully. 0x0003: The command execution is abnormal.
Remote control return parameter 1	Single-precision floating-point type	Low bit of X coordinate of J1 read by the JP variable
Remote control return parameter 2		High bit of X coordinate of J1 read by the JP variable
Remote control return parameter 3	Single-precision floating-point type	Low bit of Y coordinate of J2 read by the JP variable
Remote control return parameter 4		High bit of Y coordinate of J2 read by the JP variable
Remote control return parameter 5	Single-precision floating-point type	Low bit of Z coordinate of J3 read by the JP variable
Remote control return parameter 6		High bit of Z coordinate of J3 read by the JP variable
Remote control return parameter 7	Single-precision floating-point type	Low bit of A coordinate of J4 read by the JP variable
Remote control return parameter 8		High bit of A coordinate of J4 read by the JP variable
Remote control return parameter 9	Single-precision floating-point type	Low bit of B coordinate of J5 read by the JP variable
Remote control return parameter 10		High bit of B coordinate of J5 read by the JP variable
Remote control return parameter 11	Single-precision floating-point type	Low bit of C coordinate of J6 read by the JP variable
Remote control return parameter 12		High bit of C coordinate of J6 read by the JP variable

Remote control return parameter 13	Single-precision floating-point type	Low bit of E1 joint value read by the JP variable
Remote control return parameter 14		High bit of E1 joint value read by the JP variable
Remote control return parameter 15	Single-precision floating-point type	Low bit of E2 joint value read by the JP variable
Remote control return parameter 16		High bit of E2 joint value read by the JP variable
Remote control return parameter 17	Single-precision floating-point type	Low bits of E3 joint value read by the JP variable
Remote control return parameter 18		High bit of E3 joint value read by the JP variable
Remote control return parameter 19	Single-precision floating-point type	Low bit of E4 joint value read by the JP variable
Remote control return parameter 20		High bit of E4 joint value read by the JP variable
Remote control return parameter 21	Single-precision floating-point type	Low bit of E5 joint value read by the JP variable
Remote control return parameter 22		High bit of E5 joint value read by the JP variable
Remote control return parameter 23	Single-precision floating-point type	Low bit of E6 joint value read by the JP variable
Remote control return parameter 24		High bit of E6 joint value read by the JP variable
...		
Remote control return parameter 50		Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	01: The point type input is out of range. 02: The global point input is out of range. 03: Robot acquisition via index failed. 04: Failed to get the file name by point type (1000-1127). 05: Point data switch in progress, try again later.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

2. Write the current position of the robot to the global point

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0201
Remote control input parameter 1	Word (unsigned)	You can write the current position of the robot to the memory and currently loaded file or to a specified file. Global point type 0: Position point currently loaded (written to memory and loaded file)

		<p>1: Joint point currently loaded (written to memory and loaded file)</p> <p>1000-1127: Position point file with corresponding serial number. By default, 1000 is P.pts (thousand's place: Position point file type, unit's place to hundred's place: Point file number). The file number can be configured in the interface, range 0-127.</p>
Remote control input parameter 2	Word (unsigned)	Number of modified global point (0-9999)
...	...	...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1		Null
...	...	
Remote control return parameter 50		Null

When execution fails:

Parameter	Data type	Value
Current remote	Word (unsigned)	0x0003: The command execution is abnormal.

control state		0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	01: The point type input is out of range. 02: The global point input is out of range. 03: Failed to get current robot point. 04: Point modification is not allowed during robot motion or in automatic mode. 05: The arm parameter of P variable is illegal. 06: Error acquiring robot points via index. 07: Error setting robot points via index. 08: Failed to find file name by point type (1000-1127). 09: Point data switch in progress, try again later.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

3. Write the input robot point to the global point

Input value (position point P):

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0202
Remote control	Word (unsigned)	You can write the robot points to the memory

input parameter 1		<p>and currently loaded file or to a specified file.</p> <p>Global point type</p> <p>0: Position point currently loaded (written to memory and loaded file)</p> <p>1: Joint point currently loaded (written to memory and loaded file)</p> <p>1000-1127: Position point file with corresponding serial number. By default, 1000 is P.pts (thousand's place: Position point file type, unit's place to hundred's place: Point file number). The file number can be configured in the interface, range 0-127.</p>
Remote control input parameter 2	Word (unsigned)	Number of modified global points (0-9999)
Remote control input parameter 3	Single-precision floating-point type	Low bit of X coordinate of J1 written by the P variable
Remote control input parameter 4		High bit of X coordinate of J1 written by the P variable
Remote control input parameter 5	Single-precision floating-point type	Low bit of Y coordinate of J2 written by the P variable
Remote control input parameter 6		High bit of Y coordinate of J2 written by the P variable
Remote control input parameter 7	Single-precision floating-point type	Low bit of Z coordinate of J3 written by the P variable
Remote control input parameter 8		High bit of Z coordinate of J3 written by the P variable
Remote control	Single-precision	Low bit of A coordinate of J4 written by the P

input parameter 9	floating-point type	variable
Remote control input parameter 10		High bit of A coordinate of J4 written by the P variable
Remote control input parameter 11	Single-precision floating-point type	Low bit of B coordinate of J5 written by the P variable
Remote control input parameter 12		High bit of B coordinate of J5 written by the P variable
Remote control input parameter 13	Single-precision floating-point type	Low bit of C coordinate of J6 written by the P variable
Remote control input parameter 14		High bit of C coordinate of J6 written by the P variable
Remote control input parameter 15	Word (signed)	Arm parameter 1 written by the P variable
Remote control input parameter 16	Word (signed)	Arm parameter 2 written by the P variable
Remote control input parameter 17	Word (signed)	Arm parameter 3 written by the P variable
Remote control input parameter 18	Word (signed)	Arm parameter 4 written by the P variable
Remote control input parameter 19	Single-precision floating-point type	Low bit of E1 joint value written the by P variable
Remote control input parameter 20		High bit of E1 joint value written by the P variable
Remote control input parameter 21	Single-precision floating-point type	Low bit of E2 joint value written by the P variable
Remote control return parameter 22		High bit of E2 joint value written by the P variable

Remote control return parameter 23	Single-precision floating-point type	Low bit of E3 joint value written by the P variable
Remote control return parameter 24		High bit of E3 joint value written by the P variable
Remote control return parameter 25	Single-precision floating-point type	Low bit of E4 joint value written by the P variable
Remote control return parameter 26		High bit of E4 joint value written by the P variable
Remote control return parameter 27	Single-precision floating-point type	Low bit of E5 joint value written by the P variable
Remote control return parameter 28		High bit of E5 joint value written by the P variable
Remote control return parameter 29	Single-precision floating-point type	Low bit of E6 joint value written by the P variable
Remote control return parameter 30		High bit of E6 joint value written by the P variable
...		
Remote control return parameter 50	Null	Null

Input value (joint point JP):

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0202
Remote control input parameter 1	Word (unsigned)	Type of modified global point (0: Position point; 1: Joint point)
Remote control input parameter 2	Word (unsigned)	Number of modified global points (0- 9999)

Remote control input parameter 3	Single-precision	Low bit of X coordinate of J1 written by the JP variable
Remote control input parameter 4	floating-point type	High bit of X coordinate of J1 written by the JP variable
Remote control input parameter 5	Single-precision	Low bit of Y coordinate of J2 written by the P variable
Remote control input parameter 6	floating-point type	High bit of Y coordinate of J2 written by the JP variable
Remote control input parameter 7	Single-precision	Low bit of Z coordinate of J3 written by the JP variable
Remote control input parameter 8	floating-point type	High bit of Z coordinate of J3 written by the JP variable
Remote control input parameter 9	Single-precision	Low bit of A coordinate of J4 written by the JP variable
Remote control input parameter 10	floating-point type	High bit of A coordinate of J4 written by the JP variable
Remote control input parameter 11	Single-precision	Low bit of B coordinate of J5 written by the JP variable
Remote control input parameter 12	floating-point type	High bit of B coordinate of J5 written by the JP variable
Remote control input parameter 13	Single-precision	Low bit of C coordinate of J6 written by the JP variable
Remote control input parameter 14	floating-point type	High bit of C coordinate of J6 written by the JP variable
Remote control input parameter 15	Single-precision	Low bit of E1 joint value written by the JP variable
Remote control input	floating-point type	High bit of E1 joint value written by the

parameter 16		JP variable
Remote control input parameter 17	Single-precision	Low bits of E2 joint value written by the JP variable
Remote control input parameter 18	floating-point type	High bit of E2 joint value written by the JP variable
Remote control input parameter 19	Single-precision	Low bit of E3 joint value written by the JP variable
Remote control input parameter 20	floating-point type	High bit of E3 joint value written by the JP variable
Remote control input parameter 21	Single-precision	Low bit of E4 joint value written by the JP variable
Remote control return parameter 22	floating-point type	High bit of E4 joint value written by the JP variable
Remote control return parameter 23	Single-precision	Low bit of E5 joint value written by the JP variable
Remote control return parameter 24	floating-point type	High bit of E5 joint value written by the JP variable
Remote control return parameter 25	Single-precision	Low bit of E6 joint value written by the JP variable
Remote control return parameter 26	floating-point type	High bit of E6 joint value written by the JP variable
...		
Remote control return parameter 50	Null	Null

Return value:

When execution is successful:

Parameter	Data type	Description
-----------	-----------	-------------

Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1		Null
...	...	
Remote control return parameter 50		Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	01: The point type input is out of range. 02: The global point input is out of range. 03: Point modification is not allowed during robot motion or in automatic mode. 04: The arm parameter of P variable is illegal. 05: Error acquiring robot points via index. 06: Error setting robot points via index. 07: Failed to get the file name by point type (1000-1127). 08: Point data switch in progress, try again later.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null

	...	
Reserved	Word (unsigned)	Null

9.1.4. System variable-related commands

1. Read the B variable

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0300
Remote control input parameter 1	Word (unsigned)	Serial number of the B variable (0-255)
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Read the value of the B variable
Remote control return	Word (unsigned)	Null

parameter 2		
...	...	...
Remote control return parameter 50	...	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: The input subscript of the B variable is out of range. 0x0002: Failed to read the B variable.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

2. Set the B variable

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0301
Remote control input parameter 1	Word (unsigned)	Number of the B variable (0-255)
Remote control input parameter 2	Word (unsigned)	Value of the B variable (0-255)
Remote control input	Word (unsigned)	Null

parameter 3		
...	...	...
Remote control input parameter 50	...	Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: The input subscript of the B variable is out of range. 0x0002: The input value of the B variable is out of range.

		0x0003: Failed to modify the B variable.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

3. Batch read the B variables

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0302
Remote control input parameter 1	Word (unsigned)	Serial number i of the starting B variable (0-255)
Remote control input parameter 2	Word (unsigned)	Number (n) of the read B variables (1-50)
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Note: When n exceeds 50, only the first 50 B variables are displayed. When i is in the range 0-255, but i+n exceeds 256, the excess B variables cannot be read. In these two cases, the "Current remote control status" is "The command is executed successfully."

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control	Word (unsigned)	

state		0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Value of the read B[i] variable
Remote control return parameter 2	Word (unsigned)	Value of the read B[i+1] variable
...		
Remote control return parameter n		Value of the read B[i+n-1] variable
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: The serial number of the starting B variable is out of range. 0x0002: The number of read B variables is 0.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

4. Batch set the B variables

Input value:

Parameter	Data type	Description
Remote control	Word (unsigned)	H0303

command		
Remote control input parameter 1	Word (unsigned)	Serial number i of the starting B variable (0-255)
Remote control input parameter 2	Word (unsigned)	Number (n) of the set B variables (1-48)
Remote control input parameter 3	Word (unsigned)	Input value of B[i] variable
Remote control input parameter 4	Word (unsigned)	Input value of B[i+1] variable
...	...	...
Remote control input parameter n+2	Word (unsigned)	Input value of B[i+n-1] variable
...	...	...
Remote control input parameter 50	...	...

Note: When n exceeds 48, only the first 48 B variables can be modified. When i is in the range 0-255, but i+n exceeds 256, the excess B variables cannot be modified. In these two cases, the "Current remote control status" is "The command is executed successfully."

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	/
Remote control return parameter 2	Word (unsigned)	Null

...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: The serial number of the starting B variable is out of range. 0x0002: The number of set B variables is 0. 0x0003: Failed to batch set the value of B variables.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

5. Read the R variable

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0304
Remote control input parameter 1	Word (unsigned)	Serial number of R variable (0-255)
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null

...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Double word (signed)	Low bit of the value of the read R variable
Remote control return parameter 2		High bit of the value of the read R variable
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: The subscript of the R variable is out of range.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

6. Set the R variable

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0305
Remote control input parameter 1	Word (unsigned)	Serial number of R variable (0-255)
Remote control input parameter 2	Double word (signed)	Low bit of the value of the set R variable
Remote control input parameter 3		High bit of the value of the set R variable
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
-----------	-----------	-------

Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: The serial number of the R variable is out of range. 0x0002: Failed to set the R variable.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

7. Batch read the R variables

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0306
Remote control input parameter 1	Word (unsigned)	Serial number i of the starting R variable (0-255)
Remote control input parameter 2	Word (unsigned)	Number (n) of the read R variables (1-25)
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input		Null

parameter 50		
--------------	--	--

Note: When n exceeds 25, only the first 25 R variables are displayed. When i is in the range 0-255, but i+n exceeds 256, the excess R variables cannot be read. In these two cases, the "Current remote control status" is "The command is executed successfully."

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Double word (signed)	Low bit of the value of the read R[i] variable
Remote control return parameter 2		High bit of the value of the read R[i] variable
Remote control return parameter 3	Double word (signed)	Low bit of the value of the read R[i+1] variable
Remote control return parameter 4		High bit of the value of the read R[i+1] variable
...	...	...
Remote control return parameter 1+(n-1)*2-1	Double word (signed)	Low bit of the value of the read R[i+n-1] variable
Remote control return parameter 2+(n-1)*2		High bit of the value of the read R[i+n-1] variable
...	...	...
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
-----------	-----------	-------

Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: The starting serial number of the R variable is out of range. 0x0002: The number of read R variables is 0.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

8. Batch set the R variables

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0307
Remote control input parameter 1	Word (unsigned)	Serial number i of the starting R variable (0-255)
Remote control input parameter 2	Word (unsigned)	Number (n) of the set R variables (1-24)
Remote control input parameter 3	Double word (signed)	Low bit of the input value of the R[i] variable
Remote control input parameter 4		High bit of the input value of the R[i] variable
Remote control input parameter 5	Double word (signed)	Low bit of the input value of the R[i+1] variable
Remote control input parameter 6		High bit of the input value of the R[i+1] variable

...	...	...
Remote control input parameter $3+(n-1)*2-1$	Double word (signed)	The value of R[i+n-1] variable input
Remote control input parameter $4+(n-1) \times 2$		Input value of R[i+n-1] variable
...	...	...
Remote control input parameter 50		Null

Note: When n exceeds 24, only the first 24 R variables can be modified. When i is in the range 0-255, but i+n exceeds 256, the excess R variables cannot be modified. In these two cases, the "Current remote control status" is "The command is executed successfully."

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the

		remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: The serial number of the starting R variable is out of range. 0x0002: The number of set R variables is 0. 0x0003: Failed to batch set the value of R variables.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

9. Read the D variable

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0308
Remote control input parameter 1	Word (unsigned)	Serial number of the D variable (0-255)
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Input value:

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Double-precision floating-point type	Lowest bit of the value of the read D variable
Remote control return parameter 2		Low bit of the value of the read D variable
Remote control return parameter 3		High bit of the value of the read D variable
Remote control return parameter 4		Highest bit of the value of the read D variable
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: The serial number of the D variable is out of range.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	

Reserved	Word (unsigned)	Null
----------	-----------------	------

10. Set the D variable

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0309
Remote control input parameter 1	Word (unsigned)	Serial number of the D variable (0-255)
Remote control input parameter 2	Double-precision floating-point type	Lowest bit of the value of the set D variable
Remote control input parameter 3		Low bit of the value of the set D variable
Remote control input parameter 4		High bit of the value of the set D variable
Remote control input parameter 5		Highest bit of the value of the set D variable
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return	Word (unsigned)	Null

parameter 2		
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: The serial number of the D variable is out of range. 0x0002: Failed to set the D variable.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

11. Batch read the D variables

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H030A
Remote control input parameter 1	Word (unsigned)	Serial number i of the starting D variable (0-255)
Remote control input	Word (unsigned)	Number (n) of the read D variables (1-12)

parameter 2		
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Note: When n exceeds 12, only the first 12 D variables are displayed. When i is in the range 0-255, but i+n exceeds 256, the excess D variables cannot be read. In these two cases, the "Current remote control status" is "The command is executed successfully."

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	64-bit floating-point type	Lowest bit of the value of the read D[i] variable
Remote control return parameter 2		Low bits of the value of the read D[i] variable
Remote control return parameter 3		High bit of the value of the read D[i] variable
Remote control return parameter 4		Highest bit of the value of the read D[i] variable
Remote control return parameter 5	64-bit floating-point type	Lowest bit of the value of the read D[i+1] variable
Remote control return parameter 6		Low bit of the value of the read D[i+1] variable
Remote control return		High bit of the read value of the D[i+1]

parameter 7		variable
Remote control return parameter 8		Highest bit of the value of the read D[i+1] variable
Remote control return parameter 9	64-bit floating- point type	Lowest bit of the value of the read D[i+2] variable
Remote control return parameter 10		Low bit of the value of the read D[i+2] variable
Remote control return parameter 11		High bit of the value of the read D[i+2] variable
Remote control return parameter 12		Highest bit of the value of the read D[i+2] variable
Remote control return parameter 13	64-bit floating- point type	Lowest bit of the value of the read D[i+3] variable
Remote control return parameter 14		Low bit of the value of the read D[i+3] variable
Remote control return parameter 15		High bit of the value of the read D[i+3] variable
Remote control return parameter 16		Highest bit of the value of the read D[i+3] variable
Remote control return parameter 17	64-bit floating- point type	Lowest bit of the value of the read D[i+4] variable
Remote control return parameter 18		Low bit of the value of the read D[i+4] variable
Remote control return parameter 19		High bit of the value of the read D[i+4] variable
Remote control return parameter 20		Highest bit of the value of the read D[i+4] variable

Remote control return parameter 21	...	Null
Remote control return parameter 22	...	Null
Remote control return parameter 50	...	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: The starting serial number of the D variable is out of range. 0x0002: The number of read D variables is 0.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

12. Batch set the D variables

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H030B
Remote control input parameter 1	Word (unsigned)	Serial number i of the starting D variable (0-255)
Remote control input parameter 2	Word (unsigned)	Number (n) of the read D variables (1-12)

Remote control input parameter 3	64-bit floating-point type	Lowest bit of the input value of the D[i] variable
Remote control input parameter 4		Low bit of the input value of the D[i] variable
Remote control input parameter 5		High bit of the input value of the D[i] variable
Remote control input parameter 6		Highest bit of the input value of the D[i] variable
Remote control input parameter 7	64-bit floating-point type	Lowest bit of the input value of the D[i+1] variable
Remote control input parameter 8		Low bit of the input value of the D[i+1] variable
Remote control input parameter 9		High bit of the input value of the D[i+1] variable
Remote control input parameter 10		Highest bit of the input value of the D[i+1] variable
Remote control input parameter 11	64-bit floating-point type	Lowest bit of the input value of the D[i+2] variable
Remote control input parameter 12		Low bit of the input value of the D[i+2] variable
Remote control input parameter 13		High bit of the input value of the D[i+2] variable
Remote control input parameter 14		Highest bit of the input value of the D[i+2] variable
Remote control input parameter 15	64-bit floating-point type	Lowest bit of the input value of the D[i+3] variable
Remote control input		Low bit of the input value of the D[i+3] variable

parameter 16		variable
Remote control input parameter 17		High bit of the input value of the D[i+3] variable
Remote control input parameter 18		Highest bit of the input value of the D[i+3] variable
Remote control input parameter 19	64-bit floating- point type	Lowest bit of the input value of the D[i+4] variable
Remote control input parameter 20		Low bit of the input value of the D[i+4] variable
Remote control input parameter 21		High bit of the input value of the D[i+4] variable
Remote control input parameter 22		Highest bit of the input value of the D[i+4] variable
Remote control input parameter 50		Null

Note: When n exceeds 12, only the first 12 D variables can be modified. When i is in the range 0-255, but i+n exceeds 256, the excess D variables cannot be modified. In these two cases, the "Current remote control status" is "The command is executed successfully."

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null

...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: The serial number of the starting D variable is out of range. 0x0002: The number of set D variables is 0. 0x0003: Failed to batch set the value of D variables.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

9.1.5. System standard I/O-related commands

1. Read the system standard I/O input state

Input value:

Parameter	Data type	Description
Remote control	Word (unsigned)	H0400

command		
Remote control input parameter 1	Word (unsigned)	Standard I/O input word subscript (0-7)
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Standard I/O input state read: 16 I/Os can be read at a time and converted to binary state. 0-OFF; 1-ON
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote	Word (unsigned)	0x0003: The command execution is abnormal.

control state		
Remote control execution failure error code	Word (unsigned)	0x0001: Standard I/O number entered is out of range. 0x0002: Failed to read standard I/O input state.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

2. Read the system standard I/O output state

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0401
Remote control input parameter 1	Word (unsigned)	Standard I/O output word subscript (0-7)
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control	Word (unsigned)	0x0002: The command is executed

state		successfully.
Remote control return parameter 1	Word (unsigned)	Standard I/O input state read: 16 I/Os can be read at a time and converted to binary state. 0-OFF; 1-ON
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Standard I/O number entered is out of range. 0x0002: Failed to read standard I/O output state.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

3. Set the standard I/O output state

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0402

Remote control input parameter 1	Word (unsigned)	Standard I/O output word subscript (0-7)
Remote control input parameter 2	Word (unsigned)	Output state (in word)
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the

		remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: Standard I/O number entered is out of range. 0x0002: Failed to set standard I/O output.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

4. Batch read the system standard I/O input state (in word)

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0403
Remote control input parameter 1	Word (unsigned)	Start word subscript of standard I/O input (0-7)
Remote control input parameter 2	Word (unsigned)	Number (n) of read standard I/Os (in word)
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control	Word (unsigned)	0x0002: The command is executed

state		successfully.
Remote control return parameter 1	Word (unsigned)	Input state of the first standard I/O read (subscript by word): 16 I/Os can be read at a time and converted to binary state. 0-OFF; 1-ON
Remote control return parameter 2	Word (unsigned)	Input state of the second standard I/O read (subscript by word)
...		
Remote control return parameter 8	Word (unsigned)	Input state of the eighth standard I/O read (subscript by word)
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Starting standard I/O number entered is out of range. 0x0002: The read standard I/O is out of range.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

5. Batch read the system standard I/O output state (in word)

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0404
Remote control input parameter 1	Word (unsigned)	Start subscript of standard I/O (range: 0-7)
Remote control input parameter 2	Word (unsigned)	Number (n) of read standard I/Os (in word, range 1 to 8)
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Input state of the first standard I/O read (subscript by word): 16 I/Os can be read at a time and converted to binary state. 0-OFF; 1-ON
Remote control return parameter 2	Word (unsigned)	Input state of the second standard I/O read (subscript by word):
...		
Remote control return	Word (unsigned)	Input state of the eighth standard I/O read

parameter 8		(subscript by word):
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Starting standard I/O number entered is out of range. 0x0002: The read standard I/O is out of range.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

6. Batch set the system standard I/O output state (in word)

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0405
Remote control input parameter 1	Word (unsigned)	Start subscript of standard I/O (range: 0-7)
Remote control input parameter 2	Word (unsigned)	Number (n) of set standard I/Os (in word, range 1 to 8)
Remote control input parameter 3	Word (unsigned)	Input value of the set first standard I/O (in word)
Remote control input	Word (unsigned)	Input value of the set second standard I/O

parameter 4		(in word)
...		...
Remote control input parameter 10		Input value of the set eighth standard I/O (in word)
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	/
Remote control return parameter 2	Word (unsigned)	/
...		
Remote control return parameter 8	Word (unsigned)	/
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.

Remote control execution failure error code	Word (unsigned)	0x0001: Starting standard I/O number entered is out of range. 0x0002: The set standard I/O is out of range.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

9.1.6. Motion-related commands

1. Move to a point via MOVJ

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0500
Remote control input parameter 1	Word (unsigned)	Subscript of the P variable to be moved to (0-9999)
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: Direct movement to the point is not allowed when in non-manual mode, when there is an alarm, or when the robot is not enabled. 0x0002: The serial number of the P variable entered is out of range. 0x0003: The P variable entered is not defined. 0x0004: The point is out of range.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null

	...	
Reserved	Word (unsigned)	Null

2. Move to a point via MOVL

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0501
Remote control input parameter 1	Word (unsigned)	Subscript of the P variable to be moved to (0-9999)
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return	Word (unsigned)	Null

parameter 50		
--------------	--	--

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: Direct movement to the point is not allowed when in non-manual mode, when there is an alarm, or when the robot is not enabled. 0x0002: The serial number of the P variable entered is out of range. 0x0003: The P variable entered is not defined. 0x0004: The point is out of range.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

When execution fails:

3. Move to a point via JUMP

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0502
Remote control input	Word (unsigned)	Subscript of the P variable to be moved to

parameter 1		(0-9999)
Remote control input parameter 2	Single-precision	Low bit of the LH parameter of the JUMP motion
Remote control input parameter 3	floating-point type	High bit of the LH parameter of the JUMP motion
Remote control input parameter 4	Single-precision	Low bit of the MH parameter of the JUMP motion
Remote control input parameter 5	floating-point type	High bit of the MH parameter of the JUMP motion
Remote control input parameter 6	Single-precision	Low bit of the RH parameter of the JUMP motion
Remote control input parameter 7	floating-point type	High bit of the RH parameter of the JUMP motion
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return	Word (unsigned)	Null

parameter 50		
--------------	--	--

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: Direct movement to the point is not allowed when in non-manual mode, when there is an alarm, or when the robot is not enabled. 0x0002: The serial number of the P variable entered is out of range. 0x0003: The P variable entered is not defined. 0x0004: The point is out of range. 0x0005: The LH, MH, and RH parameters are incorrect.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

4. Move to a point via JUMPL

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0503
Remote control input	Word (unsigned)	Subscript of the P variable to be moved to

parameter 1		(0-9999)
Remote control input parameter 2	Single-precision floating-point type	Low bit of the LH parameter of the JUMPL motion
Remote control input parameter 3		High bit of the LH parameter of the JUMPL motion
Remote control input parameter 4	Single-precision floating-point type	Low bit of the MH parameter of the JUMPL motion
Remote control input parameter 5		High bit of the MH parameter of the JUMPL motion
Remote control input parameter 6	Single-precision floating-point type	Low bit of the RH parameter of the JUMPL motion
Remote control input parameter 7		High bit of the RH parameter of the JUMPL motion
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return	Word (unsigned)	Null

parameter 50		
--------------	--	--

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: Direct movement to the point is not allowed when in non-manual mode, when there is an alarm, or when the robot is not enabled. 0x0002: The serial number of the P variable entered is out of range. 0x0003: The P variable entered is not defined. 0x0004: The point is out of range. 0x0005: The LH, MH, and RH parameters are incorrect.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

5. Query the robot motion status

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0508

Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Direct motion complete state 0-Not in motion 1-In motion
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control	Word (unsigned)	0x0001: Failed to query the direct motion state.

execution failure error code		
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

6. Query the robot motion completion status

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0509
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return	Word (unsigned)	Direct motion complete state

parameter 1		0-Motion not complete 1-Motion complete
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to query the direct motion complete state.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

7. Terminate the current direct motion

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H050A
Remote control input parameter 1	Word (unsigned)	Null
Remote control input	Word (unsigned)	Null

parameter 2		
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure	Word (unsigned)	0x0001: Failed to terminate the direct motion.

error code		
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

8. Read the current teaching motion mode

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H050B
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Current teaching mode: 0: Continuous teaching

		1: Jog teaching
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to read the teaching mode.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

9. Set the current teaching motion mode

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H050C
Remote control input parameter 1	Word (unsigned)	0: Continuous teaching 1: Jog teaching
Remote control input	Word (unsigned)	Null

parameter 2		
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure	Word (unsigned)	0x0001: The teaching mode input parameter is invalid.

error code		
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

9.1.7. Read the system parameter settings

1. Read the joint stepsize of jogging

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0600
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control	Word (unsigned)	0x0002: The command is executed

state		successfully.
Remote control return parameter 1	Single-precision floating-point type	Low bit of the joint stepsize of jogging
Remote control return parameter 2		High bit of the joint stepsize of jogging
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to read the joint stepsize of jogging.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

2. Set the joint stepsize of jogging

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0601
Remote control input parameter 1	Single-precision floating-point	Low bit of the joint stepsize of jogging

Remote control input parameter 2	type	High bit of the joint stepsize of jogging
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control	Word (unsigned)	0x0001: The joint stepsize of jogging entered is

execution failure error code		out of range [0.01, 10].
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

3. Read the position stepsize of jogging

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0602
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return	Single-precision	Low bit of the position stepsize of jogging

parameter 1	floating-point type	
Remote control return parameter 2		High bit of the position stepsize of jogging
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to read the position stepsize of jogging.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

4. Set the position stepsize of jogging

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0603
Remote control input parameter 1	Single-precision floating-point type	Low bit of the position stepsize of jogging
Remote control input parameter 2		High bit of the position stepsize of jogging

Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: The position stepsize of jogging entered is out of range [0.01, 10].

Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

5. Read the orientation stepsize of jogging

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0604
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Single-precision floating-point type	Low bit of the orientation stepsize of jogging
Remote control return		High bit of the orientation stepsize of

parameter 2		jogging
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to read the orientation stepsize of jogging.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

6. Set the orientation stepsize of jogging

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0605
Remote control input parameter 1	Single-precision floating-point type	Low bit of the orientation stepsize of jogging
Remote control input parameter 2		High bit of the orientation stepsize of jogging
Remote control input parameter 3	Word (unsigned)	Null

...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: The orientation stepsize of jogging entered is out of range [0.01, 10].
Controller system error code	Word (unsigned)	Refer to system fault codes

Reserved		Null
	...	
Reserved	Word (unsigned)	Null

9.1.8. External axis-related commands

1. Read the activated unit for teaching motion

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0701
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Serial number of the active mechanical unit: Corresponds to the display on the

		controller's axis control panel. For example, 0 indicates Robot.
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Failed to read the teaching mode.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

2. Set the activated unit for teaching motion

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0702
Remote control input parameter 1	Word (unsigned)	Serial number of the active mechanical unit: Corresponds to the display on the controller's axis control panel. For example, 0 indicates

		Robot.
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.

Remote control execution failure error code	Word (unsigned)	0x0001: Mechanical unit does not exist. 0x0002: Currently in automatic mode.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

3. Read the coordination switch for teaching motion

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0703
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return	Word (unsigned)	State of coordination switch for teaching

parameter 1		motion: 0: OFF, 1: ON
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

4. Set the coordination switch for teaching motion

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0704
Remote control input parameter 1	Word (unsigned)	Coordination switch for teaching motion: 0: OFF, 1: ON
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null

Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	0x0001: Input parameter is out of range (0 or 1). 0x0002: Coordination setting failure (condition is not met, or the robot is in motion or in auto mode)
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

9.1.9. Interference zone-related commands

1. Get the interference zone parameters based on the serial number

Input value

Parameter	Data type	Description
-----------	-----------	-------------

Remote control command	Word (unsigned)	0x0810
Input parameter 1	Word (unsigned)	Interference zone serial number

Return value:

When the execution is successful

Parameter	Data type		Value
Current remote control state	Word (unsigned)		0x0002: Normal
Output parameter 1	Word (unsigned)		Interference zone number
Output parameter 2	Low bit	Double word (signed)	Input signal
Output parameter 3	High bit		
Output parameter 4	Low bit	Double word (signed)	Output signal
Output parameter 5	High bit		
Output parameter 6	Word (unsigned)		0-Inside, 1-Outside
Output parameter 7	Word (unsigned)		0-No alarm, 1-Alarm
Output parameter 8	Low bit	Single-precision floating-point	Safety distance
Output parameter 9	High bit		
Output parameter 10	Word (unsigned)		Current workobject number

Output parameter 11	Word (unsigned)		Set the mode	
			0: Diagonal point	1: Datum point + side length
Output parameter 12	Low bit	Single- precision floating- point	Diagonal point 1_X	Datum point X
Output parameter 13	High bit			
Output parameter 14	Low bit	Single- precision floating- point	Diagonal point 1_Y	Datum point Y
Output parameter 15	High bit			
Output parameter 16	Low bit	Single- precision floating- point	Diagonal point 1_Z	Datum point Z
Output parameter 17	High bit			
Output parameter 18	Low bit	Single- precision floating- point	Diagonal point 2_X	Offset dx
Output parameter 19	High bit			
Output parameter 20	Low bit	Single- precision floating- point	Diagonal point 2_Y	Offset dy
Output parameter 21	High bit			
Output parameter 22	Low bit	Single- precision floating- point	Diagonal point 2_Z	Offset dz
Output parameter 23	High bit			

...	...	...	...
-----	-----	-----	-----

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: Abnormal
Failure error code	Word (unsigned)	1: Parameter acquisition error

2. Set the interference zone parameters based on the serial number

Parameter	Data type		Value
Remote control command	Word (unsigned)		0x0811
Input parameter 1	Word (unsigned)		Interference zone number
Input parameter 2	Low bit	Double word (signed)	Input signal
Input parameter 3	High bit		
Input parameter 4	Low bit	Double word (signed)	Output signal
Input parameter 5	High bit		
Input parameter 6	Word (unsigned)		0-Inside, 1-Outside

Input parameter 7	Word (unsigned)		0-No alarm, 1-Alarm	
Input parameter 8	Low bit	Single- precision floating- point	Safety distance	
Input parameter 9	High bit			
Input parameter 10	Word (unsigned)		Current workobject number	
Input parameter 11	Word (unsigned)		Set the mode	
			0: Diagonal point	1: Datum point + side length
Input parameter 12	Low bit	Single- precision floating- point	Diagonal point 1_X	Reference point X
Input parameter 13	High bit			
Input parameter 14	Low bit	Single- precision floating- point	Diagonal point 1_Y	Datum point Y
Input parameter 15	High bit			
Input parameter 16	Low bit	Single- precision floating-	Diagonal point 1_Z	Reference point Z.
Input parameter	High bit			

17		point		
Input parameter 18	Low bit	Single- precision	Diagonal point 2_X	Offset dx
Input parameter 19	High bit	floating- point		
Input parameter 20	Low bit	Single- precision	Diagonal point 2_Y	Offset dy
Input parameter 21	High bit	floating- point		
Input parameter 22	Low bit	Single- precision	Diagonal point 2_Z	Offset dz
Input parameter 23	High bit	floating- point		
...	...		...	...

When execution is successful:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0002: Normal

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: Abnormal
		0x0005: The control permission is granted to the

		remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Failure error code	Word (unsigned)	Non-zero: Parameter setting abnormal 1: Serial number out of range; 2: Parameter input error & non-manual mode; 3: Parameter setting error; 4: Parameter saving error; 5: Parameter saving error

3. Get the interference zone status

Input value

Parameter	Data type	Value
Remote control command	Word (unsigned)	0x0812

Output value

When execution is successful:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0002: Normal

Output parameter 1	Word (unsigned)	Interference zone 0 - state 0/1
Output parameter 2	Word (unsigned)	Interference zone 1 - state 0/1
Output parameter 3	Word (unsigned)	Interference zone 2 - state 0/1
Output parameter 4	Word (unsigned)	Interference zone 3 - state 0/1
Output parameter 5	Word (unsigned)	Interference zone 4 - state 0/1
Output parameter 6	Word (unsigned)	Interference zone 5 - state 0/1
Output parameter 7	Word (unsigned)	Interference zone 6 - state 0/1
Output parameter 8	Word (unsigned)	Interference zone 7 - state 0/1
Output parameter 9	Word (unsigned)	Interference zone 8 - state 0/1
Output parameter 10	Word (unsigned)	Interference zone 9 - state 0/1
Output parameter 11	Word (unsigned)	Interference zone 10 - state 0/1
Output parameter 12	Word (unsigned)	Interference zone 11 - state 0/1
Output parameter 13	Word (unsigned)	Interference zone 12 - state 0/1
Output parameter 14	Word (unsigned)	Interference zone 13 - state 0/1
Output parameter 15	Word (unsigned)	Interference zone 14 - state 0/1
Output parameter 16	Word (unsigned)	Interference area 15 - state 0/1

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: Abnormal
Failure error code	Word (unsigned)	1: Parameter acquisition error

4. Set the interference zone state according to the serial number

Input value

Parameter	Data type	Value
Remote control command	Word (unsigned)	0x0813
Input parameter 1	Word (unsigned)	Interference zone number
Input parameter 2	Word (unsigned)	Interference zone state

Output value

When execution is successful:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0002: Normal

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: Abnormal 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Failure error code	Word (unsigned)	Non-0: Parameter setting abnormal

5. Get the monitored object parameters based on the serial number

Input value

Parameter	Data type	Value
Remote control command	Word (unsigned)	0x0814
Input parameter 1	Word (unsigned)	Monitor object serial number

Output value

When execution is successful:

0-TCP && 1-MTCP

Parameter	Type	Value	
Current remote control state	Word (unsigned)	0x0002: Normal	
Output parameter 1	Word (unsigned)	Monitor object serial number	
Output parameter 2	Word (unsigned)	Monitoring object type	
		0-TCP	1: Multi-TCP
Output parameter 3	Word (unsigned)	NULL	MTCP_Tool 1 active state
Output parameter 4	Word (unsigned)	NULL	MTCP_Tool 2 active state
Output parameter 5	Word (unsigned)	NULL	MTCP_Tool 3 active state
Output parameter 6	Word (unsigned)	NULL	MTCP_Tool 4 active state

Output parameter 7	Word (unsigned)	NULL	MTCP_Tool No. 1
Output parameter 8	Word (unsigned)	NULL	MTCP_Tool No. 2
Output parameter 9	Word (unsigned)	NULL	MTCP_Tool No. 3
Output parameter 10	Word (unsigned)	NULL	MTCP_Tool No. 4
...	...	...	...

2: Sphere

Parameter	Type		Value
Current remote control state	Word (unsigned)		0x0002: Normal
Output parameter 1	Word (unsigned)		Monitoring object serial number
Output parameter 2	Word (unsigned)		Monitoring object type
			2: Sphere
Output parameter 3	Low bit	Single- precision floating-point	Sphere_Z
Output parameter 4	High bit		
Output	Low bit	Single-	Sphere_R

parameter 5		precision	
Output parameter 6	High bit	floating-point	
...	...		...

3: Cuboid bounding box

Parameter	Type		Value		
Current remote control state	Word (unsigned)		0x0002: Normal		
Output parameter 1	Word (unsigned)		Monitoring object serial number		
Output parameter 2	Word (unsigned)		Monitoring object type		
			3: Cuboid bounding box		
Output parameter 3	Word (unsigned)		Cuboid bounding box_setting mode		
			0: Diagonal point	1: Datum point + side length	2: Get point + height
Output parameter 4	Low bit	Single- precision	Cuboid bounding box_diagonal	Datum point X	Point 1_X.
Output parameter 5	High bit	floating- point	point 1X		
Output parameter 6	Low bit	Single- precision	Cuboid bounding	Datum point Y	Point 1_Y

Output parameter 7	High bit	floating- point	box_diagonal point 1Y		
Output parameter 8	Low bit	Single- precision	Cuboid bounding	Datum point Z	Point 1_Z
Output parameter 9	High bit	floating- point	box_diagonal point 1Z		
Output parameter 10	Low bit	Single- precision	Cuboid bounding	Offset dx	Point 2_X
Output parameter 11	High bit	floating- point	box_diagonal point 2X		
Output parameter 12	Low bit	Single- precision	Cuboid bounding	Offset dy	Point 2_Y
Output parameter 13	High bit	floating- point	box_diagonal point 2Y		
Output parameter 14	Low bit	Single- precision	Cuboid bounding	Offset dz	Point 2_Z
Output	High bit	floating- point	box_diagonal point 2Z		

parameter 15					
Output parameter 16	Low bit	Single- precision	NULL	NULL	Point 3_X
Output parameter 17	High bit	floating- point			
Output parameter 18	Low bit	Single- precision	NULL	NULL	Point 3_Y
Output parameter 19	High bit	floating- point			
Output parameter 20	Low bit	Single- precision	NULL	NULL	Point 3_Z
Output parameter 21	High bit	floating- point			
Output parameter	Low bit	Single- precision	NULL	NULL	Point 4_X

22		floating-point			
Output parameter 23	High bit				
Output parameter 24	Low bit	Single-precision floating-point	NULL	NULL	Point 4_Y
Output parameter 25	High bit				
Output parameter 26	Low bit	Single-precision floating-point	NULL	NULL	Point 4_Z
Output parameter 27	High bit				
Output parameter 28	Low bit	Single-precision floating-point	NULL	NULL	Height H
Output parameter 29	High bit				

When execution fails:

Parameter	Data type	Value
Current remote control state	Diction	0x0003: Abnormal
Failure error code	Word (unsigned)	1: The parameter setting is abnormal

6. Set the monitoring object parameters according to the serial number

0-TCP && 1-MTCP

Parameter	Type	Value	
Remote control command	Word (unsigned)	0x0815	
Input parameter 1		Monitoring object serial number	
Input parameter 2	Word (unsigned)	Monitoring object type	
		0-TCP	1: Multi-TCP
Input parameter 3	Word (unsigned)	NULL	MTCP_Tool 1 active state
Input parameter 4	Word (unsigned)	NULL	MTCP_Tool 2 active state
Input parameter 5	Word (unsigned)	NULL	MTCP_Tool 3 active state
Input parameter 6	Word (unsigned)	NULL	MTCP_Tool 4 active state
Input parameter 7	Word (unsigned)	NULL	MTCP_Tool No. 1
Input parameter 8	Word (unsigned)	NULL	MTCP_Tool No. 2
Input parameter 9	Word (unsigned)	NULL	MTCP_Tool No. 3
Input parameter 10	Word (unsigned)	NULL	MTCP_Tool No. 4

...	...	...	...
-----	-----	-----	-----

2: Sphere

Parameter	Type		Value
Remote control command	Word (unsigned)		0x0815
Input parameter 1	Word (unsigned)		Monitoring object serial number
Input parameter 2	Word (unsigned)		Monitoring object type
			2: Sphere
Input parameter 3	Low bit	Single-precision floating-point	Sphere_Z
Input parameter 4	High bit		
Input parameter 5	Low bit	Single-precision floating-point	Sphere_R
Input parameter 6	High bit		
...	...		...

2: Cuboid bounding box

Parameter	Type	Value
Remote control	Word (unsigned)	0x0815

command					
Output parameter 1	Word (unsigned)		Monitoring object serial number		
Output parameter 2	Word (unsigned)		Monitoring object type		
			3: Cuboid bounding box		
Output parameter 3	Word (unsigned)		Cuboid bounding box_setting mode		
			0: Diagonal point	1: Datum point + side length	2: Get point + height
Output parameter 4	Low bit	Single- precision	Cuboid bounding box_diagonal	Datum point X	Point 1_X
Output parameter 5	High bit	floating- point	point 1X		
Output parameter 6	Low bit	Single- precision	Cuboid bounding box_diagonal	Datum point Y	Point 1_Y
Output parameter 7	High bit	floating- point	point 1Y		
Output parameter 8	Low bit	Single- precision	Cuboid bounding box_diagonal	Datum point Z	Point 1_Z
Output parameter 9	High bit	floating- point	point 1Z		
Output	Low bit	Single-		Offset dx	Point 2_X

parameter 10		precision	Cuboid		
Output parameter 11	High bit	floating- point	bounding box_diagonal point 2X		
Output parameter 12	Low bit	Single- precision	Cuboid bounding box_diagonal	Offset dy	Point 2_Y
Output parameter 13	High bit	floating- point	point 2Y		
Output parameter 14	Low bit	Single- precision	Cuboid bounding box_diagonal	Offset dz	Point 2_Z
Output parameter 15	High bit	floating- point	point 2Z		
Output parameter 16	Low bit	Single- precision	NULL	NULL	Point 3_X
Output parameter 17	High bit	floating- point			
Output parameter 18	Low bit	Single- precision	NULL	NULL	Point 3_Y
Output parameter 19	High bit	floating- point			
Output parameter 20	Low bit	Single- precision	NULL	NULL	Point 3_Z

Output parameter 21	High bit	floating-point			
Output parameter 22	Low bit	Single-precision	NULL	NULL	Point 4_X
Output parameter 23	High bit	floating-point			
Output parameter 24	Low bit	Single-precision	NULL	NULL	Point 4_Y
Output parameter 25	High bit	floating-point			
Output parameter 26	Low bit	Single-precision	NULL	NULL	Point 4_Z
Output parameter 27	High bit	floating-point			
Output parameter 28	Low bit	Single-precision	NULL	NULL	Height H
Output parameter 29	High bit	floating-point			

When execution is successful:

Parameter	Data type	Value
Current remote control state	Diction	0x0002: Normal

When execution fails:

Parameter	Data type	Value
Current remote control state	Diction	<p>0x0003: Abnormal</p> <p>0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.</p>
Failure error code	Word (unsigned)	<p>Non-0: Parameter setting abnormal</p> <p>1: Serial number out of range; 2: Parameter input error & non-manual mode;</p> <p>3: Parameter setting error;</p> <p>4: Parameter saving error; 5: Parameter saving error</p>

7. Get the monitoring object status

Input value

Parameter	Data type	Value
Remote control command	Diction	0x0816

Output value

When execution is successful:

Parameter	Data type	Value
Current remote control state	Diction	0x0002: Normal
Output parameter 1	Word (unsigned)	Serial number of the active monitoring object

When execution fails:

Parameter	Data type	Value
Current remote control state	Diction	0x0003: Abnormal
Failure error code	Word (unsigned)	1: Parameter acquisition error

8. Set the interference zone state according to the serial number

Input value

Parameter	Data type	Value
Remote control command	Diction	0x0817
Input parameter 1	Word (unsigned)	Monitoring object serial number

Output value

When execution is successful:

Parameter	Data type	Value
Current remote control state	Diction	0x0002: Normal

When execution fails:

Parameter	Data type	Value
Current remote control state	Diction	0x0003: Abnormal
Failure error code	Word (unsigned)	1: Parameter acquisition error

9.1.10. Average load rate and current monitoring

1. Read the average load rate

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0750
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.

Remote control return parameter 1	Single-precision floating-point	Low bit of the average load rate of J1
Remote control return parameter 2	Single-precision floating-point	High bit of the average load rate of J1
Remote control return parameter 3	Single-precision floating-point	Low bit of the average load rate of J2
Remote control return parameter 4	Single-precision floating-point	High bit of the average load rate of J2
Remote control return parameter 5	Single-precision floating-point	Low bit of the average load rate of J3
Remote control return parameter 6	Single-precision floating-point	High bit of the average load rate of J3
Remote control return parameter 7	Single-precision floating-point	Low bit of the average load rate of J4
Remote control return parameter 8	Single-precision floating-point	High bit of the average load rate of J4
Remote control return parameter 9	Single-precision floating-point	Low bit of the average load rate of J5
Remote control return parameter 10	Single-precision floating-point	High bit of the average load rate of J5
Remote control return parameter 11	Single-precision floating-point	Low bit of the average load rate of J6
Remote control return parameter 12	Single-precision floating-point	High bit of the average load rate of J6

When execution fails:

Parameter	Data type	Value
Current remote	Word (unsigned)	0x0003: The command execution is abnormal.

control state		
Remote control execution failure error code	Word (unsigned)	0x0001: Average load rate limit parameter error.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

1. Read the current

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0751
Remote control input parameter 1	Word (unsigned)	Null
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Single-precision floating-point	Low bit of current of J1
Remote control return parameter 2	Single-precision floating-point	High bit of current of J1

Remote control return parameter 3	Single-precision floating-point	Low bit of current of J2
Remote control return parameter 4	Single-precision floating-point	High bit of current of J2
Remote control return parameter 5	Single-precision floating-point	Low bit of current of J3
Remote control return parameter 6	Single-precision floating-point	High bit of current of J3
Remote control return parameter 7	Single-precision floating-point	Low bit of current of J4
Remote control return parameter 8	Single-precision floating-point	High bit of current of J4
Remote control return parameter 9	Single-precision floating-point	Low bit of current of J5
Remote control return parameter 10	Single-precision floating-point	High bit of current of J5
Remote control return parameter 11	Single-precision floating-point	Low bit of current of J6
Remote control return parameter 12	Single-precision floating-point	High bit of current of J6

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Current limit parameter error.

Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

9.1.11. Multitasking-related commands

1. Multi-task status acquisition

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0800
Remote control input parameter 1	Word (unsigned)	Enter task ID: Range 0 to 15
Remote control input parameter 2	Word (unsigned)	Null
Remote control input parameter 3	Word (unsigned)	Null
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Parameter	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.

Remote control return parameter 1	Word (unsigned)	0-Stop, 1-Start, 10-Complete, 100-Inactive
Remote control return parameter 1	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	0x0001: Instruction ID is out of range and execution fails.
Reserved	Word (unsigned)	Null
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

9.1.12. Tracking process-related commands

1 Read the height of the workobject following the process

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0801
Remote control input	Word (unsigned)	Conveyor number

parameter 1		
Remote control input parameter 2	Word (unsigned)	Workobject number
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Conveyor number
Remote control return parameter 2	Word (unsigned)	Workobject number
Remote control return parameter 3	Single-precision floating-point	Low position of workobject height
...	Single-precision floating-point	High bit of workobject height
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.

Remote control execution failure error code	Word (unsigned)	1: Input out of range, 2: Execution failed
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

2. Set the following workobject height

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0802
Remote control input parameter 1	Word (unsigned)	Conveyor number
Remote control input parameter 2	Word (unsigned)	Workobject number
Remote control input parameter 3	Single-precision floating-point	Low position of workobject height
	Single-precision floating-point	High bit of workobject height
...		...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Address	Data type	Description
---------	-----------	-------------

Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	1: Input out of range, 2: Execution failed
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

3. Read the upper and lower boundaries for the tracking process

Input value:

Parameter	Data type	Description
-----------	-----------	-------------

Remote control command	Word (unsigned)	H0803
Remote control input parameter 1	Word (unsigned)	Conveyor number
Remote control input parameter 50		Null

Return value (Regular boundaries)

When execution is successful:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Conveyor number
Remote control return parameter 2	Word (unsigned)	Boundary type: 0: Regular boundaries
Remote control return parameter 3	Single-precision floating-point	Low bit of upper workspace boundary
		High bit of upper workspace boundary
...		Low bit of lower workspace boundary
		High bit of lower workspace boundary
		Low bit of lower pickup boundary
		High bit of lower pickup boundary
		Low bit of stop distance
		High bit of stop distance

Return value (Inclined boundaries)

When execution is successful:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Conveyor number
Remote control return parameter 2	Word (unsigned)	Boundary type: : 1-Regular boundaries
...	Single-precision floating-point	Low bit of X coordinate of the upper workspace boundary P1
		High bit of X coordinate of the upper workspace boundary P1
		Low bit of Y coordinate of the upper workspace boundary P1
		High bit of Y coordinate of the upper workspace boundary P1
		Low bit of X coordinate of the upper workspace boundary P2
		High bit of X coordinate of the upper workspace boundary P2
		Low bit of Y coordinate of the upper workspace boundary P2
		High bit of Y coordinate of the upper workspace boundary P2
		Low bit of X coordinate of the upper workspace boundary P3
		High bit of X coordinate of the upper workspace boundary P3

		Low bit of Y coordinate of the upper workspace boundary P3
		High bit of Y coordinate of the upper workspace boundary P3
		Low bit of X coordinate of the upper workspace boundary P4
		High bit of X coordinate of the upper workspace boundary P4
		Low bit of Y coordinate of the upper workspace boundary P4
		High bit of Y coordinate of the upper workspace boundary P4
		Low bit of lower pickup boundary
		High bit of lower pickup boundary
		Low bit of stop distance
		High bit of stop distance

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	1: Input out of range, 2: Execution failed
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	

Reserved	Word (unsigned)	Null
----------	-----------------	------

4. Set the upper and lower boundaries for the tracking process

Input value (Regular boundaries)

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0804
Remote control input parameter 1	Word (unsigned)	Conveyor number
Remote control input parameter 2	Word (unsigned)	Boundary type: 0: Regular boundaries
Remote control input parameter 3	Single-precision floating-point	Low bit of upper workspace boundary
		High bit of upper workspace boundary
Remote control input parameter 4	Single-precision floating-point	Low bit of lower workspace boundary
		High bit of lower workspace boundary
Remote control input parameter 5	Single-precision floating-point	Low bit of lower pickup boundary
		High bit of lower pickup boundary
Remote control input parameter 6	Single-precision floating-point	Low bit of stop distance
		High bit of stop distance
Remote control input parameter 50		Null

Input value (Regular boundaries)

Parameter	Data type	Description
Remote control	Word (unsigned)	H0804

command		
Remote control input parameter 1	Word (unsigned)	Conveyor number
Remote control input parameter 2	Word (unsigned)	Boundary type: 1-Regular boundaries
Remote control input parameter 3	Single-precision floating-point type	Low bit of X coordinate of the upper workspace boundary P1
Remote control input parameter 4	Single-precision floating-point type	High bit of X coordinate of the upper workspace boundary P1
Remote control input parameter 5	Single-precision floating-point type	Low bit of Y coordinate of the upper workspace boundary P1
Remote control input parameter 6	Single-precision floating-point type	High bit of Y coordinate of the upper workspace boundary P1
Remote control input parameter 7		Low bit of X coordinate of the upper workspace boundary P2
Remote control input parameter 8		High bit of X coordinate of the upper workspace boundary P2
Remote control input parameter 9		Low bit of Y coordinate of the upper workspace boundary P2
Remote control input parameter 10		High bit of Y coordinate of the upper workspace boundary P2
Remote control input parameter 11		Low bit of X coordinate of the upper workspace boundary P3

Remote control input parameter 12		High bit of X coordinate of the upper workspace boundary P3
Remote control input parameter 13		Low bit of Y coordinate of the upper workspace boundary P3
Remote control input parameter 14		High bit of Y coordinate of the upper workspace boundary P3
Remote control input parameter 15		Low bit of X coordinate of the upper workspace boundary P4
Remote control input parameter 16		High bit of X coordinate of the upper workspace boundary P4
Remote control input parameter 17		Low bit of Y coordinate of the upper workspace boundary P4
Remote control input parameter 18		High bit of Y coordinate of the upper workspace boundary P4
Remote control input parameter 19		Low bit of lower pickup boundary
Remote control input parameter 20		High bit of lower pickup boundary
Remote control input parameter 21		Low bit of stop distance
Remote control input parameter 22		High bit of stop distance
...		
Remote control input parameter 50		Null

Return value:

When execution is successful:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	1: Input out of range 2: Execution failed 3: Inappropriate parameter combination (e.g. upper workspace boundary is larger than lower workspace boundary) 4: Setting is not allowed when in auto mode or when the robot is running.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

5. Read the detection mode for the tracking process

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0805
Remote control input parameter 1	Word (unsigned)	Conveyor number
Remote control input parameter 50		Null

Return value:

When execution is successful:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Conveyor number
Remote control return parameter 2	Word (unsigned)	Detection mode for the tracking process
...		

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control	Word (unsigned)	1: Input out of range

execution failure error code		2: Execution failed
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

6. Read the detection parameters for the tracking process

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0806
Remote control input parameter 1	Word (unsigned)	Conveyor number
Remote control input parameter 2	Word (unsigned)	Detection mode 0: Vision 1: Sensor 2: Vision + Sensor 3: Vision + Instruction
Remote control input parameter 3	Word (unsigned)	Parameter No.: The parameter number set in each detection mode (This number determines the function of parameter 4.) In the Vision mode: Parameter No. 0: Shooting spacing Parameter No. 1: Duplicate detection distance In the Sensor mode:

		<p>Parameter No. 0: Invalid DI distance</p> <p>Parameter No. 1: Workobject type No.</p> <p>In the Vision + Sensor mode:</p> <p>Parameter No. 0: DO level hold time</p> <p>Parameter No. 1: Duplicate detection distance</p> <p>Parameter No. 2: Invalid DI distance</p> <p>Parameter No. 3: Delay distance</p> <p>In the Vision + Instruction mode:</p> <p>Parameter No. 0: DO level hold time</p> <p>Parameter No. 1: Duplicate detection distance</p>
...	...	...
Remote control input parameter 50		Null

Return value:

When execution is successful:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Conveyor number
Remote control return parameter 2	Word (unsigned)	<p>Detection mode</p> <p>0: Vision</p> <p>1: Sensor</p> <p>2: Vision + Sensor</p> <p>3: Vision + Instruction</p>

Remote control return parameter 3		<p>Parameter No.: The parameter number set in each detection mode (This number determines the function of parameter 4.)</p> <p>In the Vision mode:</p> <p>Parameter No. 0: Shooting spacing</p> <p>Parameter No. 1: Duplicate detection distance</p> <p>In the Sensor mode:</p> <p>Parameter No. 0: Invalid DI distance</p> <p>Parameter No. 1: Workobject type No.</p> <p>In the Vision + Sensor mode:</p> <p>Parameter No. 0: DO level hold time</p> <p>Parameter No. 1: Duplicate detection distance</p> <p>Parameter No. 2: Invalid DI distance</p> <p>Parameter No. 3: Delay distance</p> <p>In the Vision + Instruction mode:</p> <p>Parameter No. 0: DO level hold time</p> <p>Parameter No. 1: Duplicate detection distance</p>
Remote control return parameter 4	<p>In case of workobject type, it is word (unsigned)</p> <p>In other cases, it</p>	<p>Except for the case of workobject type, in other cases it is the low bit of data.</p>

	is single-precision floating-point	
Remote control return parameter 5	In other cases, it is single-precision floating-point	Except for the case of workobject type, in other cases it is the high bit of data.
...	...	...
Remote control return parameter 50	Word (unsigned)	Null

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal.
Remote control execution failure error code	Word (unsigned)	1: Input out of range 2: Failed to get the detection type. 3: Failed to get the detection parameters.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

7. Set the detection parameters for the tracking process

Input value:

Parameter	Data type	Description
Remote control command	Word (unsigned)	H0807

Remote control input parameter 1	Word (unsigned)	Conveyor number
Remote control input parameter 2	Word (unsigned)	<p>Detection mode</p> <p>0: Vision</p> <p>1: Sensor</p> <p>2: Vision + Sensor</p> <p>3: Vision + Instruction</p>
Remote control input parameter 3	Word (unsigned)	<p>Parameter No.: The parameter number set in each detection mode (This number determines the function of parameter 4.)</p> <p>In the Vision mode:</p> <p> Parameter No. 0: Shooting spacing</p> <p> Parameter No. 1: Duplicate detection distance</p> <p>In the Sensor mode:</p> <p> Parameter No. 0: Invalid DI distance</p> <p> Parameter No. 1: Workobject type No.</p> <p>In the Vision + Sensor mode:</p> <p> Parameter No. 0: DO level hold time</p> <p> Parameter No. 1: Duplicate detection distance</p> <p> Parameter No. 2: Invalid DI distance</p> <p> Parameter No. 3: Delay distance</p> <p>In the Vision + Instruction mode:</p> <p> Parameter No. 0: DO level hold time</p> <p> Parameter No. 1: Duplicate detection distance</p>

Remote control input parameter 4	<p>In case of workobject type, it is word (unsigned)</p> <p>In other cases, it is single-precision floating-point</p>	<p>The workobject type number is empty</p> <p>In other cases, it is the low bit of data.</p>
Remote control input parameter 5	<p>In other cases, it is single-precision floating-point</p>	<p>The workobject type number is empty</p> <p>In other cases, it is the high bit of data.</p>
Remote control input parameter 50		Null

Return value:

When execution is successful:

Address	Data type	Description
Current remote control state	Word (unsigned)	0x0002: The command is executed successfully.
Remote control return parameter 1	Word (unsigned)	Null
Remote control return parameter 2	Word (unsigned)	Null
...		
Remote control return	Word (unsigned)	Null

parameter 50		
--------------	--	--

When execution fails:

Parameter	Data type	Value
Current remote control state	Word (unsigned)	0x0003: The command execution is abnormal. 0x0005: The control permission is granted to the remote I/O unit (only effective in auto mode), the controller is in the manual mode and the remote command does not take effect.
Remote control execution failure error code	Word (unsigned)	1: Input out of range 2: Failed to get the detection type. 3: Failed to get the detection parameters. 4: Operation is not allowed when in auto mode or when the robot is running. 5: The set detection type is not active.
Controller system error code	Word (unsigned)	Refer to system fault codes
Reserved		Null
	...	
Reserved	Word (unsigned)	Null

10 Appendix 3: Instructions for special bus types

10.1.1. Overview of Endianness

Endianness is the order of bytes in computer memory. It is divided into little-endian and big-

endian.

Little-endian: For multi-byte data (such as word, float, double), the least significant byte is stored at the lowest memory address.

Big-endian: For multi-byte data, the most significant byte is stored at the lowest memory address.

The data structure of the two types of endianness is as follows. In particular, there is no difference in the endianness for the bit and byte data.

Data type		Little endian	Big endian
Byte (8 bits)	Byte[0]	Byte[0] (bit[0:7])	Byte[0] (bit[0:7])
	Byte[1]	Byte[1] (bit[0:7])	Byte[1] (bit[0:7])
	Byte[2]	Byte[2] (bit[0:7])	Byte[2] (bit[0:7])
	Byte[3]	Byte[3] (bit[0:7])	Byte[3] (bit[0:7])
Word (16 bits)	Word[0]	Byte[0] (bit[0:7])	Byte[0] (bit[8:15])
		Byte[1] (bit[8:15])	Byte[1] (bit[0:7])
	Word[1]	Byte[2] (bit[0:7])	Byte[2] (bit[8:15])
		Byte[3] (bit[8:15])	Byte[3] (bit[0:7])
Double word/ Single-precision floating-point (32bits)	DWord[0]/ Float[0]	Byte[0] (bit[0:7])	Byte[0] (bit[23:31])
		Byte[1] (bit[8:15])	Byte[1] (bit[16:23])
		Byte[2] (bit[16:23])	Byte[2] (bit[8:15])
		Byte[3] (bit[23:31])	Byte[3] (bit[0:7])
Double precision floating-point number (64 bits)	Double[0]	Byte[0] (bit[0:7])	Byte[0] (bit[56:63])
		Byte[1] (bit[8:15])	Byte[1] (bit[48:55])
		Byte[2] (bit[16:23])	Byte[2] (bit[40:47])
		Byte[3] (bit[23:31])	Byte[3] (bit[32:39])
		Byte[4] (bit[32:39])	Byte[4] (bit[23:31])
		Byte[5] (bit[40:47])	Byte[5] (bit[16:23])
		Byte[6] (bit[48:55])	Byte[6] (bit[8:15])

		Byte[7] (bit[56:63])	Byte[7] (bit[0:7])
--	--	----------------------	--------------------

10.1.2. Endianness Conversion of Siemens PROFINET Bus

Like most bus devices on the market, the IRCB501 series controllers adopt little endian. Note that the processors of Siemens series PLC (PROFINET bus) adopt big endian. Therefore, when the Inovance robot acts as a PROFINET slave, endianness conversion is required to ensure communication consistency between the robot and the Siemens PLC master.

The bus data types supported by IRCB501 series controllers include bit, byte, word, double word, single-precision floating-point (float) and double-precision floating-point (double). When the PROFINET bus is activated, the controller automatically performs endianness conversion of word-type data. To use data types (double word, single-precision floating point, and double-precision floating-point) with a word length exceeding 32 bits, the data needs to be converted to word type at the master before communication is performed.

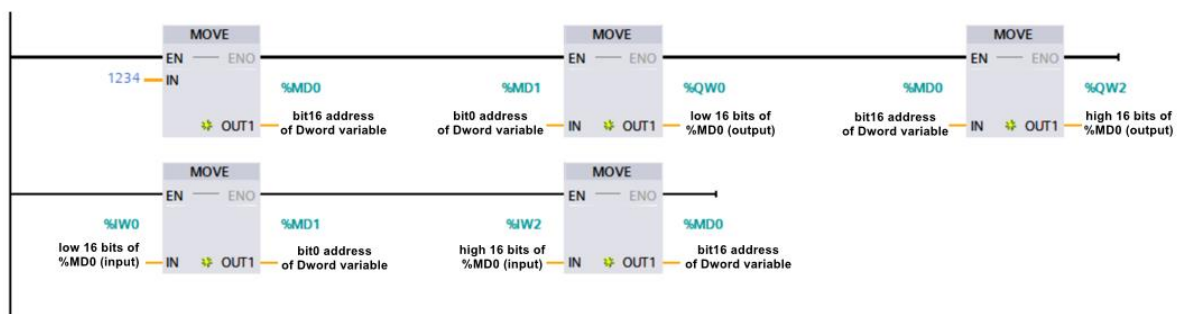
Data type	PLC register	Robot register	Remarks
Bit	IB0.0, QB0.0	In[512], Out[512]	Endianness conversion is not required.
Byte	IB0, QB0	InB[64], OutB[64]	
Word	IW0, QW0	InW[32], OutW[32]	The robot system automatically performs endianness conversion.
Double word (Dword) Single-precision floating-point number (Float)	ID0, QD0 Real	InW[32].Float, OutW[32].Float	Manual conversion into word data is required.

Double-precision floating-point number (Double)	LReal	InW[32].Double, OutW[32].Double	
---	-------	------------------------------------	--

Example of manual endianness conversion:

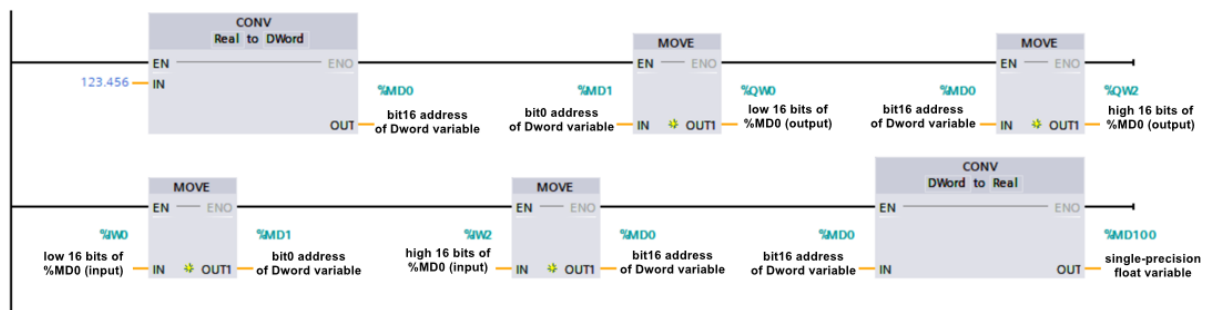
(1) Dword type data conversion

As shown below, MD0 is the internal register address of the PLC (MD0 stores the most significant 16-bit Dword data, and MD1 stores the least significant 16-bit Dword data), which is used to store Dword type data. QW0 is the register address mapped to the PROFINET bus. When data is sent, one Dword type data is divided into two Word type data, and the most significant 16-bit data and the least significant 16-bit data are swapped. When data is received, two Word type data are assigned to the most significant and least significant 16-bit addresses of the Dword register.



(2) Float type data conversion

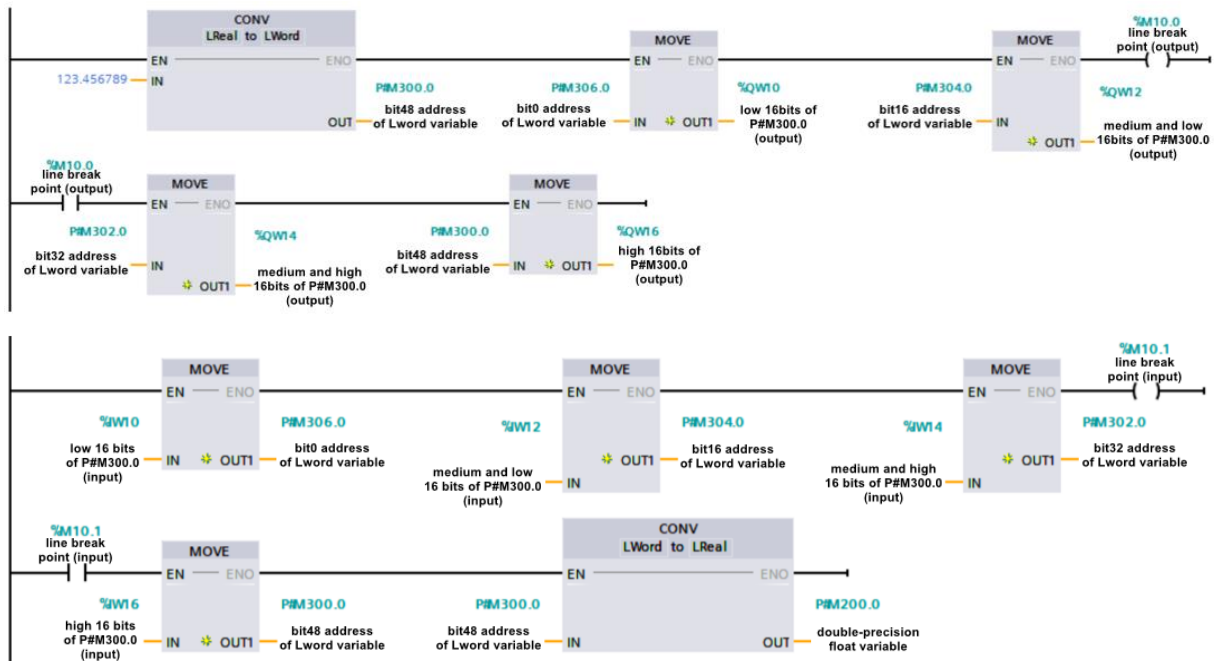
Use the CONV instruction to convert Float type data (PLC data is Real type) to Dword type data. The remaining operations are the same as Dword type data conversion.



(3) Double type data conversion

Use the CONV instruction to convert Double type data (PLC data is LReal type) to Lword data (equal to length of four Word data). The remaining operations are the same as Dword type data

conversion.



Note: The above examples are for reference only. The addresses of the data register used depend on the actual application.