EtherNetIP User Manual
V1.0

Contents

1 Vision Sensor Configuration

Add the industrial protocol Ethernet/IP communication in the communication setup under the editing interface of the visual sensor, and after successful addition, enter the PLC configuration.
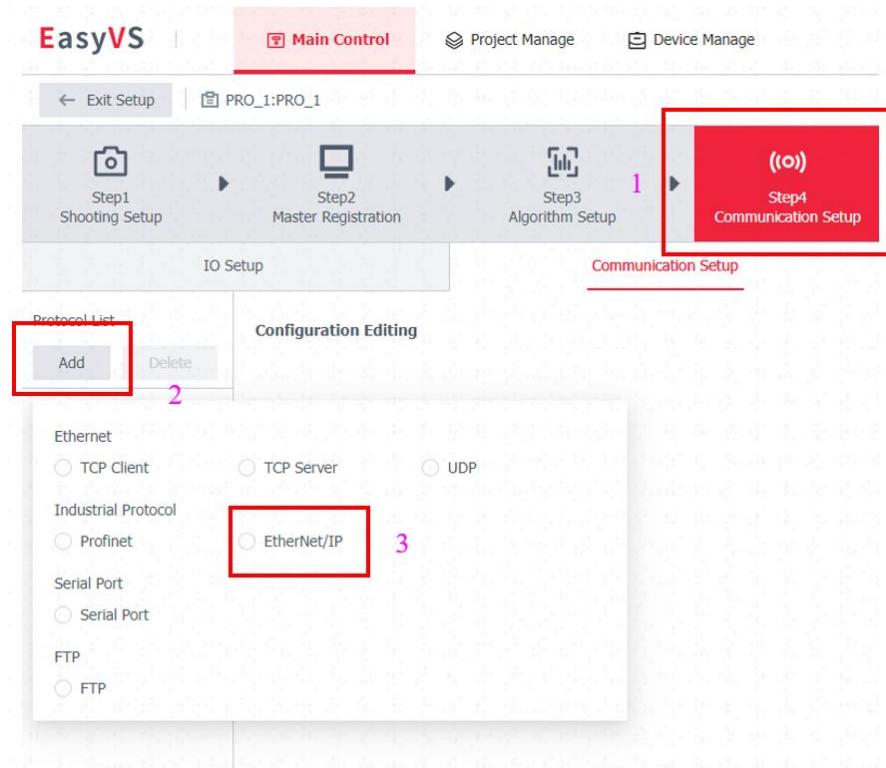

Figure 1-1 Add EtherNet/IP Communication Protocol.

2 PLC Configuration

Using the Omron NJ Series PLC as an example, we will configure Ethernet/IP communication.

2.1 Connect the PLC

Open the Sysmac Studio software and connect to the PLC (according to the actual wiring method). Optionally, choose whether to upload the built-in program as needed.
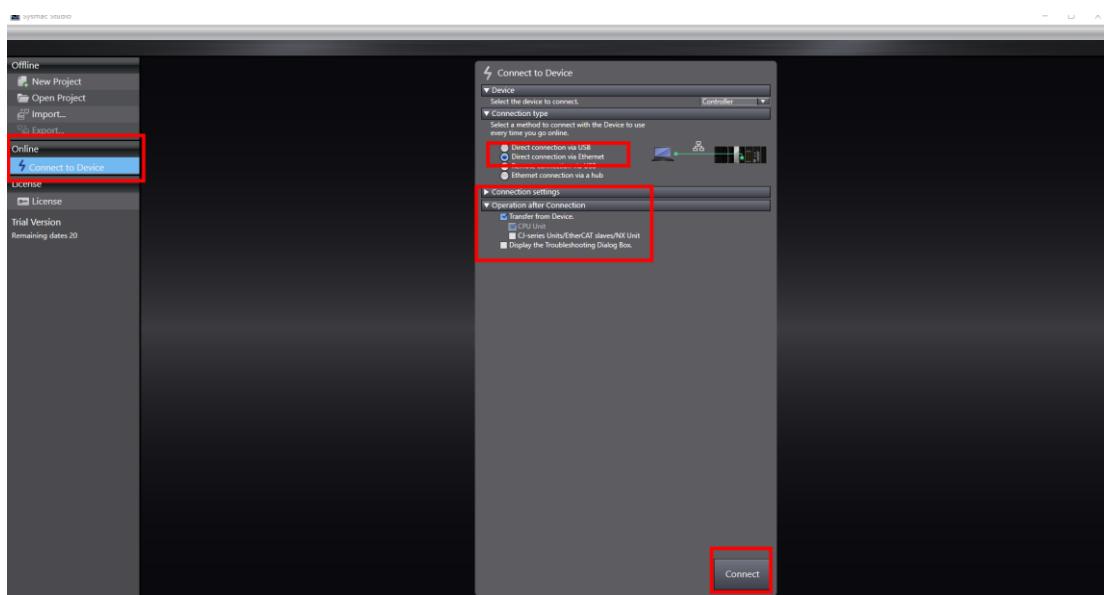

Figure 2-1 Connect the PLC to the Software

2.2 Set the IP Information for the PLC Device

After the PLC is connected, click the offline button to disconnect the PLC. Then, select Configuration and Settings, double-click on the built-in EtherNet/IP port, choose TCP/IP settings, and modify the PLC device IP address and subnet mask.
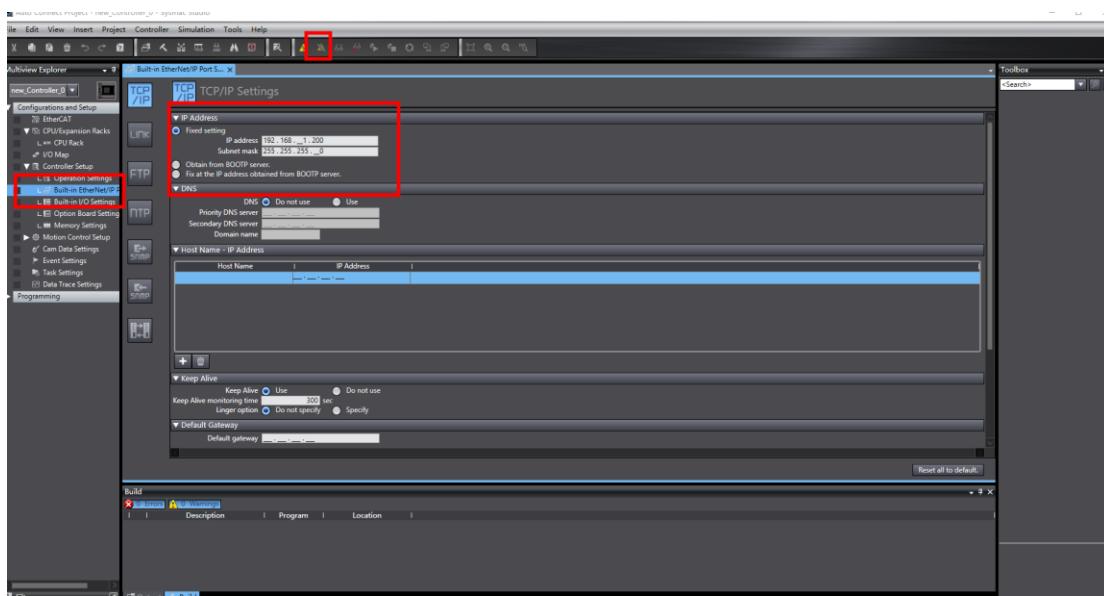
Figure 2-2 Modify the IP of the PLC

2.3 Set Global Variables for the PLC

Select programming, double-click on global variables, right-click on the blank area of global variables, select new, and create new global variables to monitor the data obtained and sent by the PLC via Ethernet/IP.

Create an input global variable with a size of 500 bytes.

Create an output global variable with a size of 76 bytes.
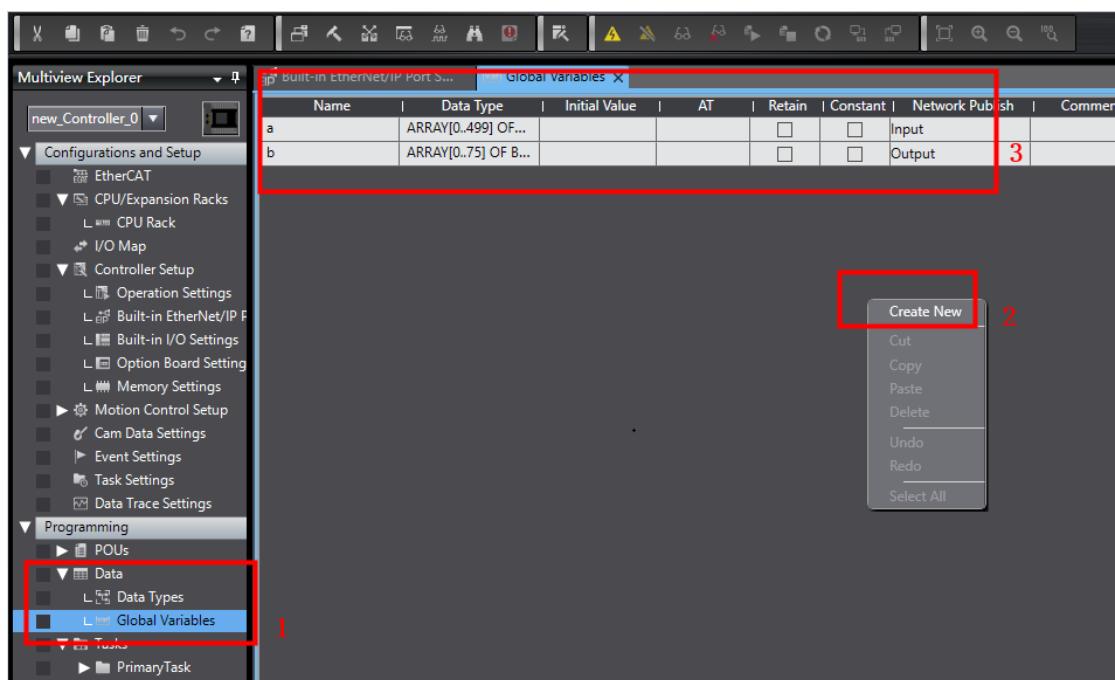
Figure 2-3 Add a Global Variable

2.4 Export the Global Variables

After the creation of the global variables, select "Tools" -> "Export Global Variables" -> "Network Configurator" to export the newly created global variables to a CSV file.
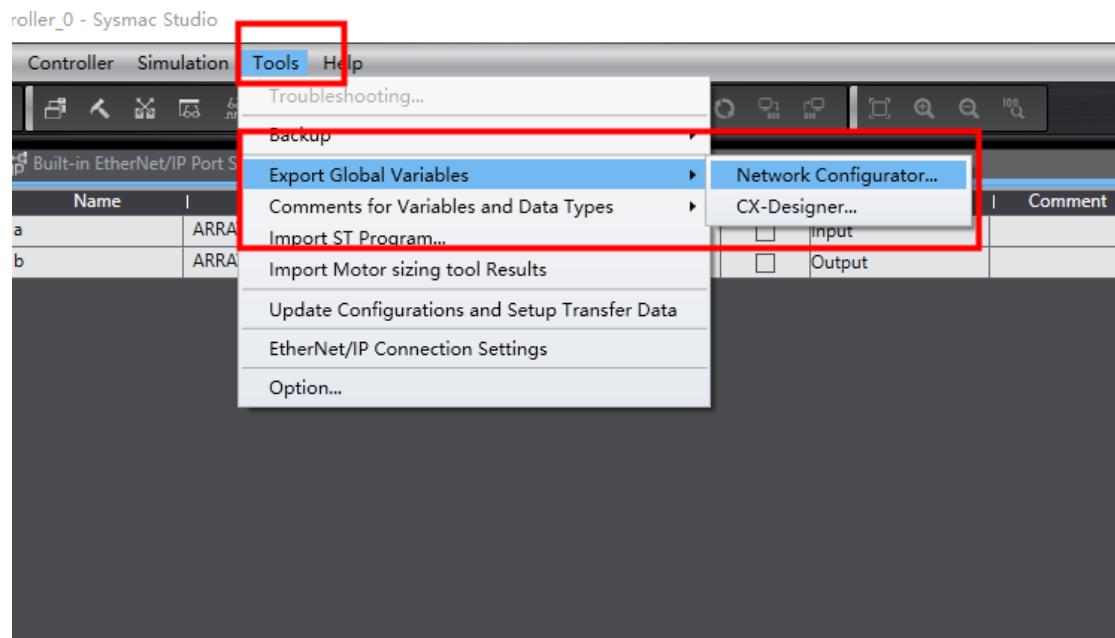

Figure 2-4 Export Global Variables Process
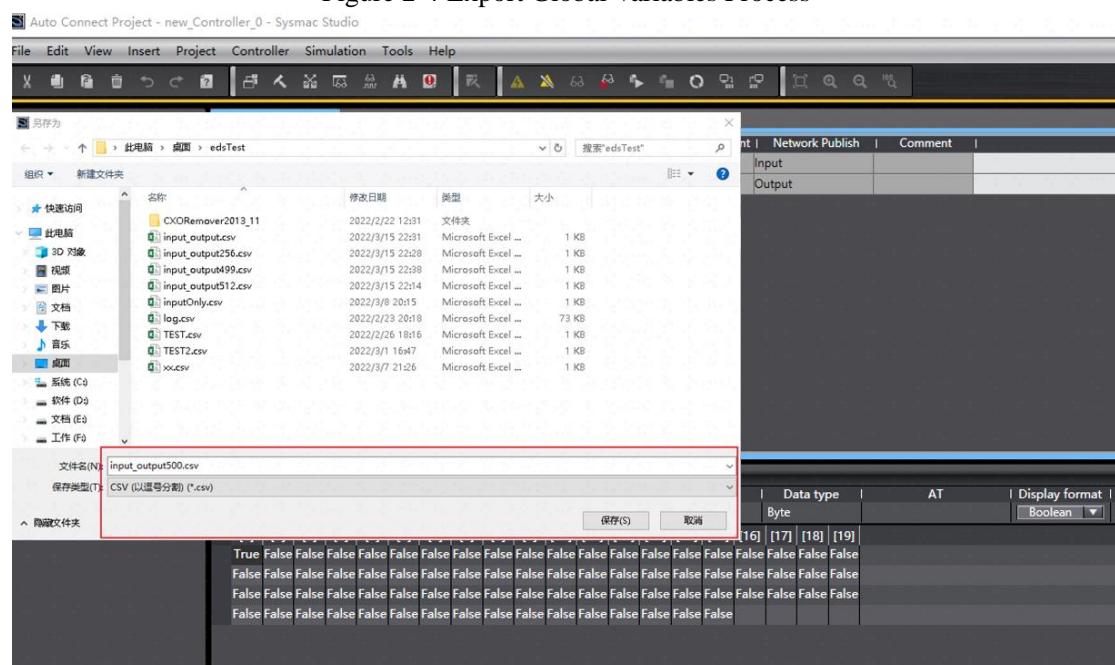
Figure 2-5 Choose the Path to Save the Global Variables File

2.5 Synchronize the Program to the PLC Device

Click the online button to connect to the PLC, click the to controller button, and

download the program to the PLC.
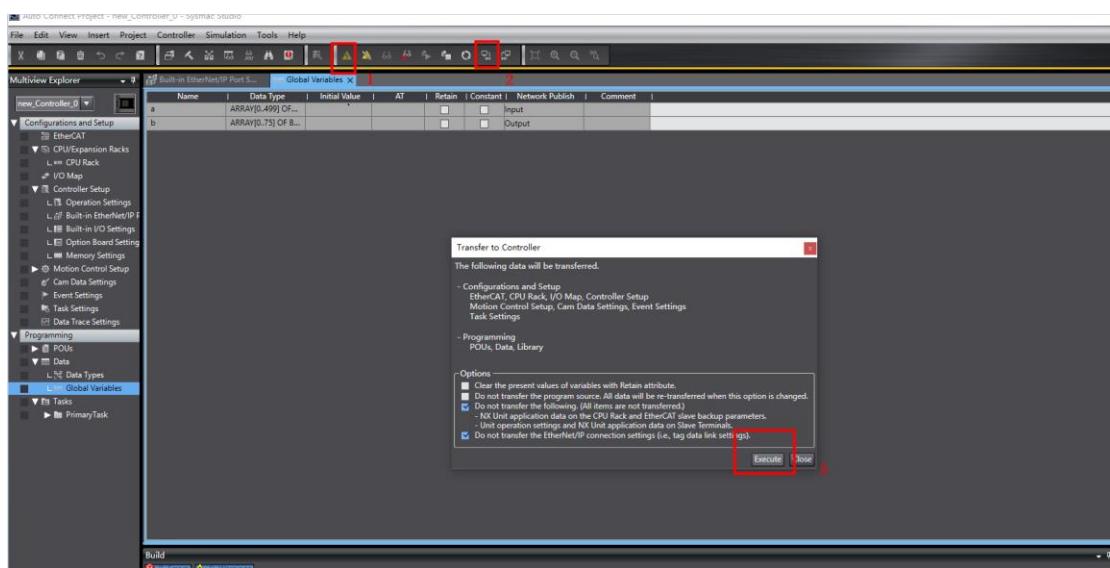
Figure 2-6 Transfer to the Controller

3 PLC and Sensor Connection Configuration

3.1 Install the EDS File in the Network Configurator Software

Figure 3-1 Path of the Network Configurator Software

Click the "EDS File" button and select "Install" to install the EDS file.
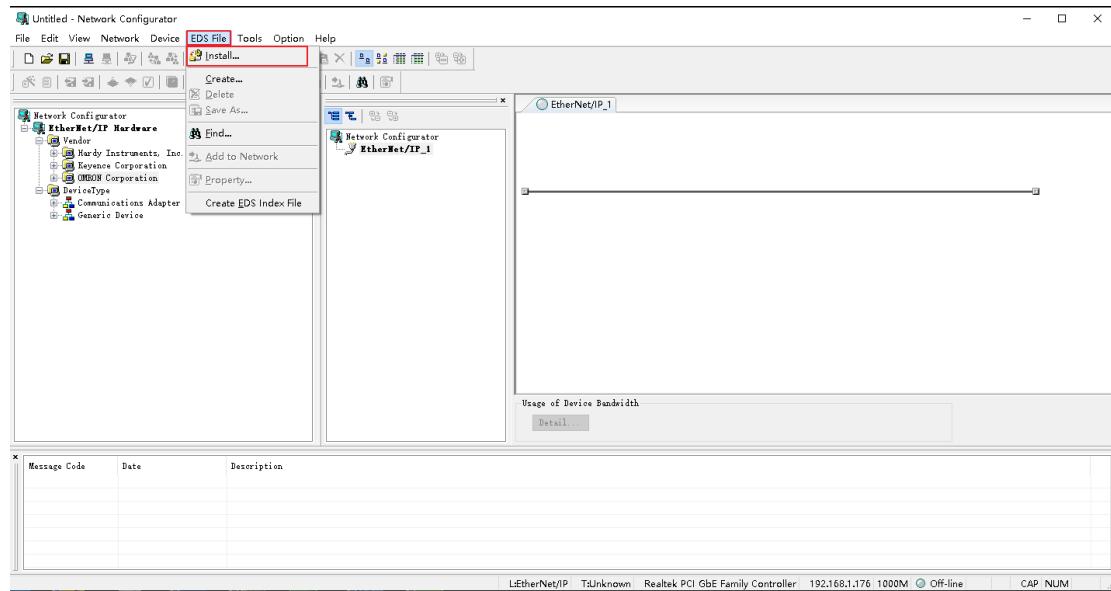
Figure 3-2 Install the EDS File

Select the eds file of the vision sensor in the \EtherNetIP folder in the EasyVS client installation directory.
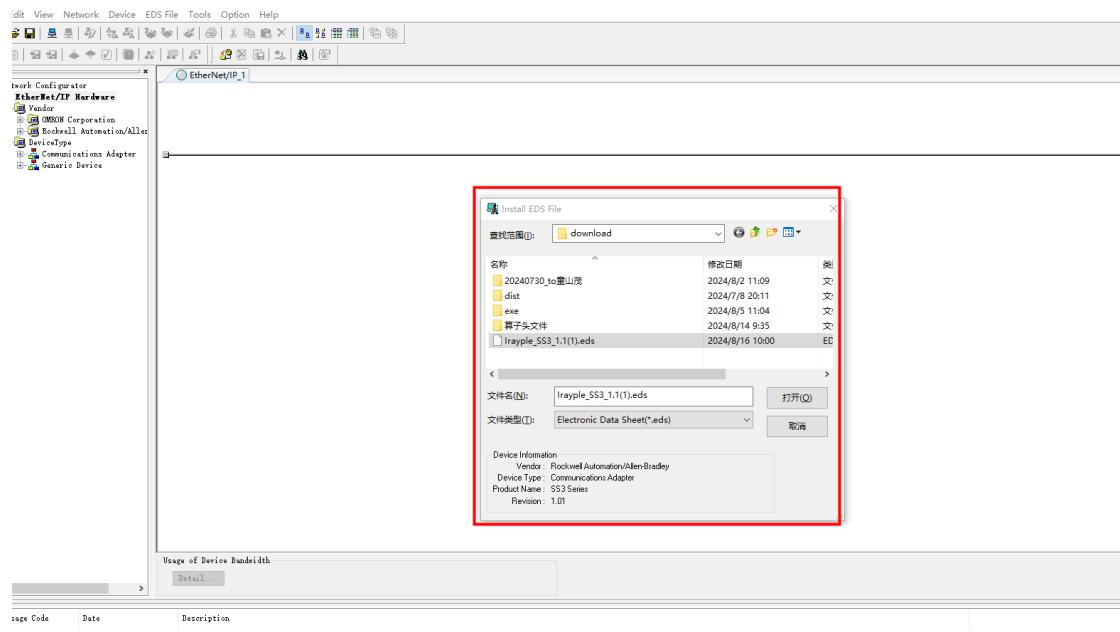
Figure 3-3 Select the EDS File

No need to install icons.

After successful installation, the SS3 Series will appear in the left-hand device bar.
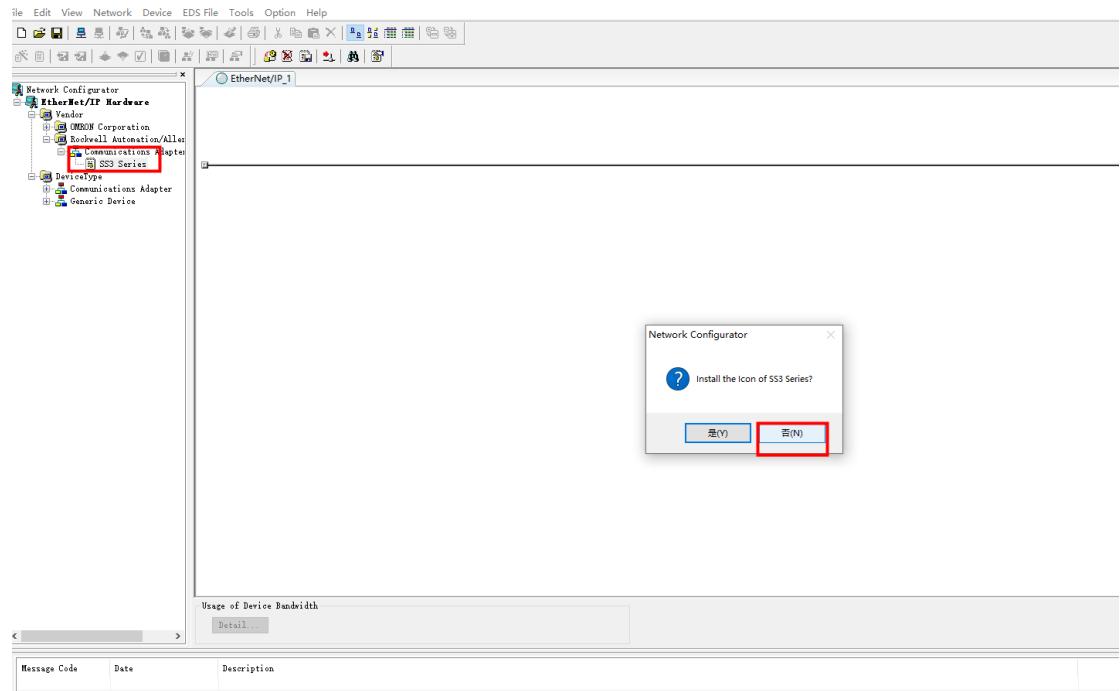
Figure 3-4 Do Not Install Icons

3.2 Create an Ethernet/IP Network Environment

Click "Option"→"Select Interface"→"Ethernet I/F".
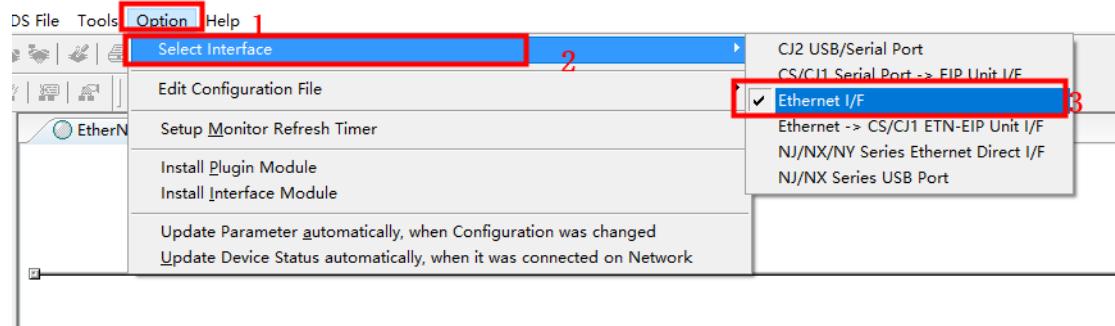
Figure 3-5 Create an EtherNetIP Network Environment

When there are multiple network cards on the computer, you need to select the network card to connect with the PLC.
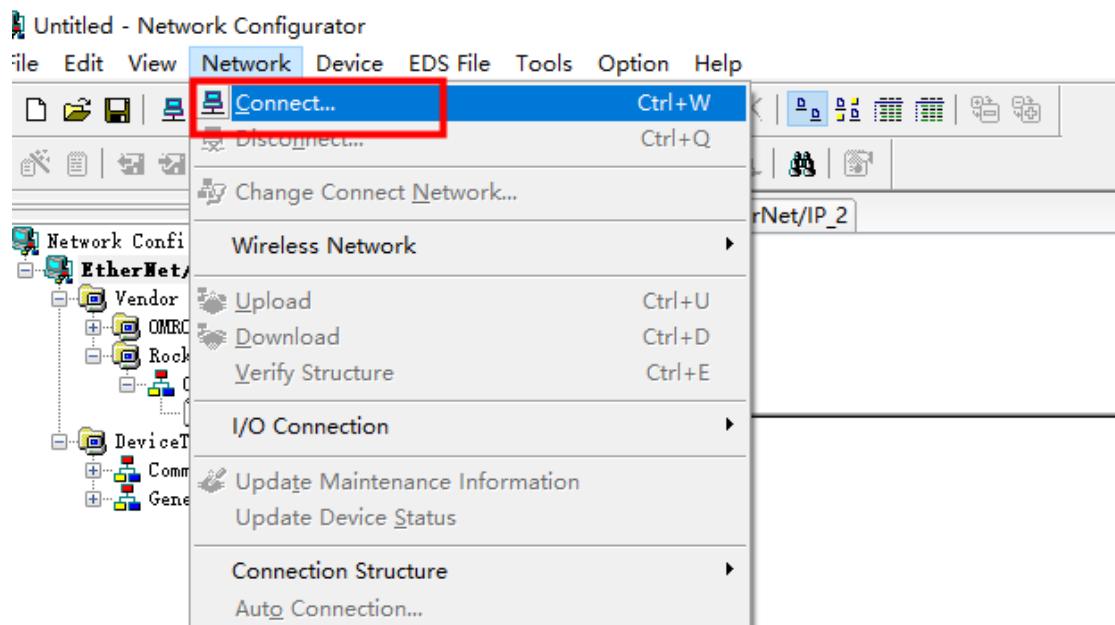

Figure 3-6 connect Network

As shown in Figure 3-6, click Connect Network and select the local network adapter to be connected.
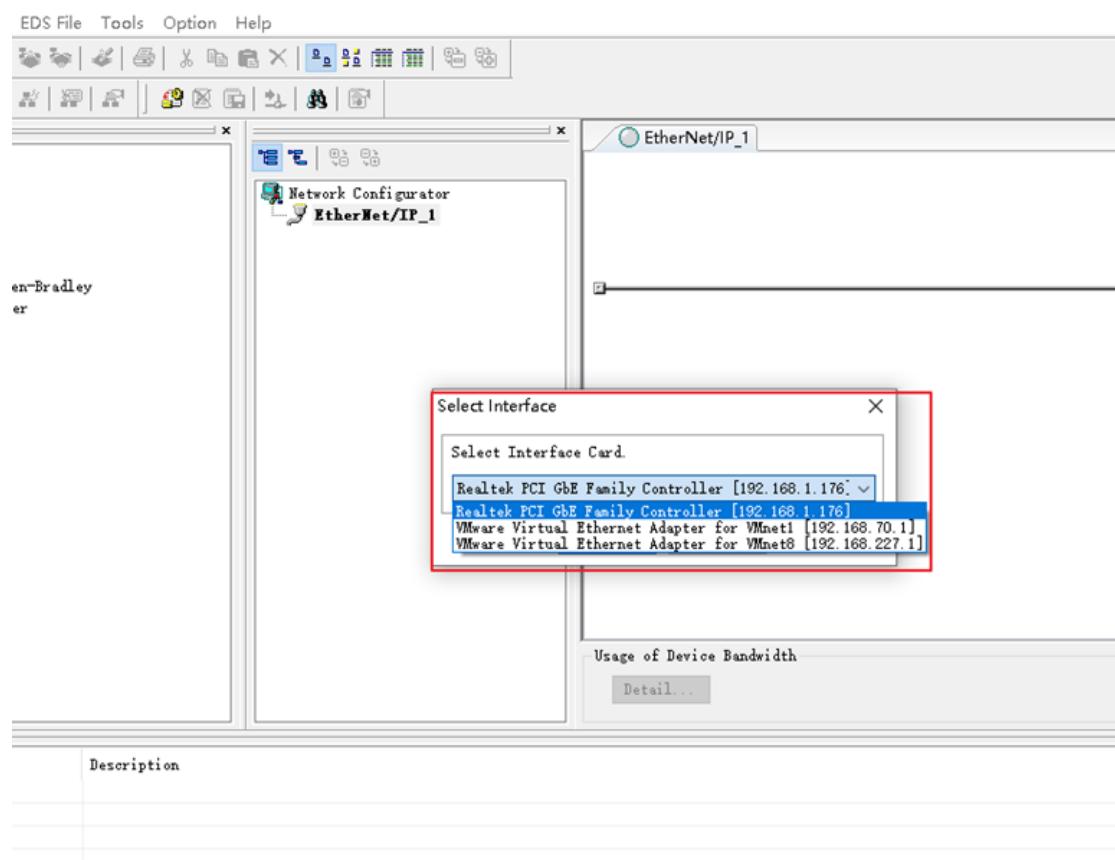
Figure 3-7 Select the Network Card

Select the TCP port and click OK.
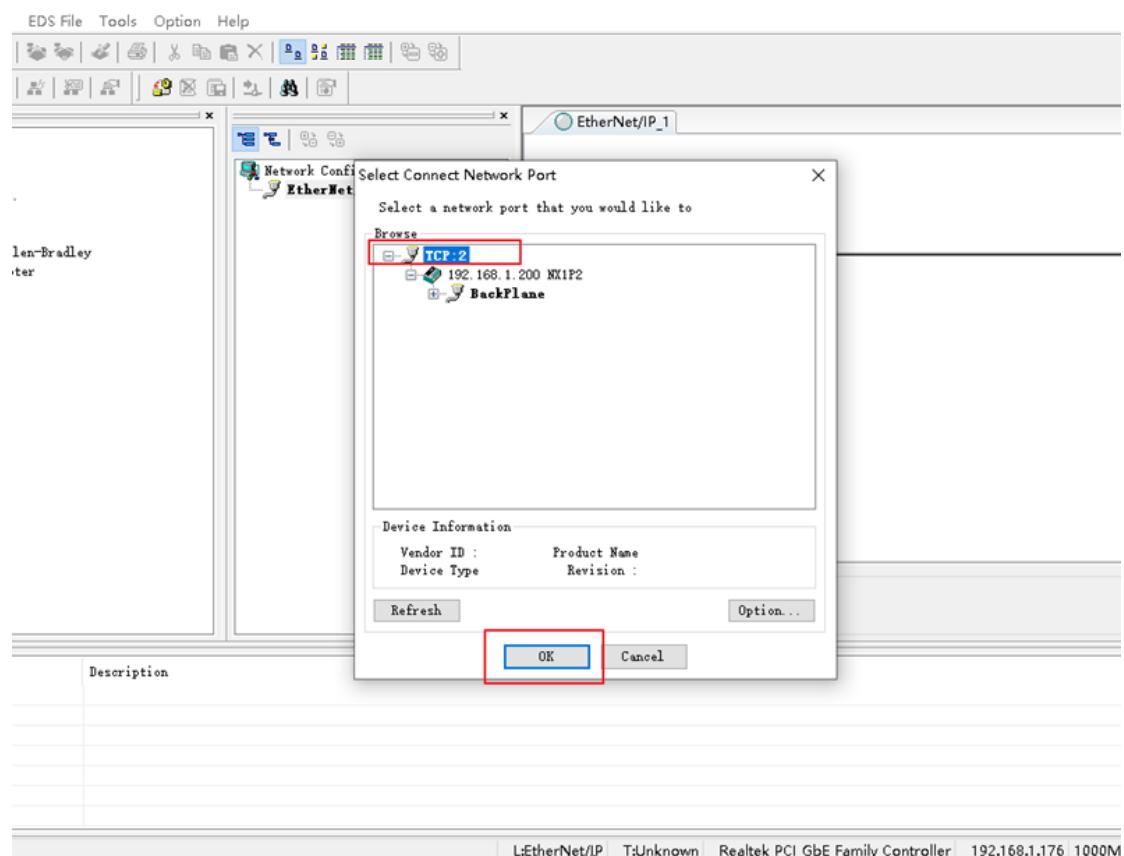
Figure 3-8 Select the TCP Port

Click the online button to create a new network.
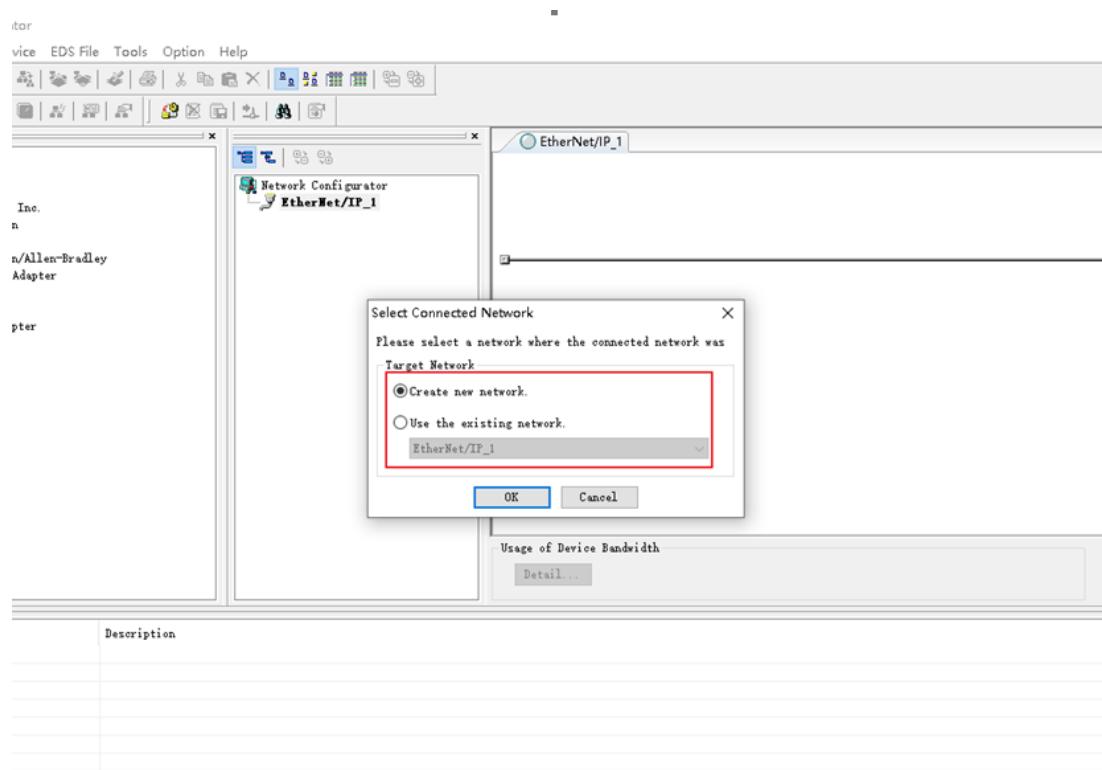
Figure 3-9 Go Online

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Creation complete.
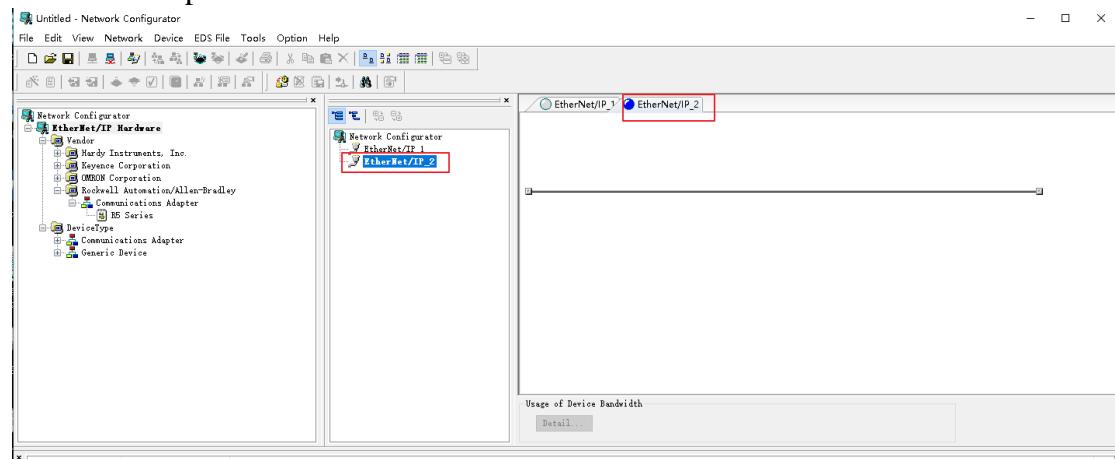
Figure 3-10 Diagram of Successful Online Activation and Creation of a New Network

Right-click on the blank area of the newly created network and select "Upload" to add the PLC device for adding PLC devices.
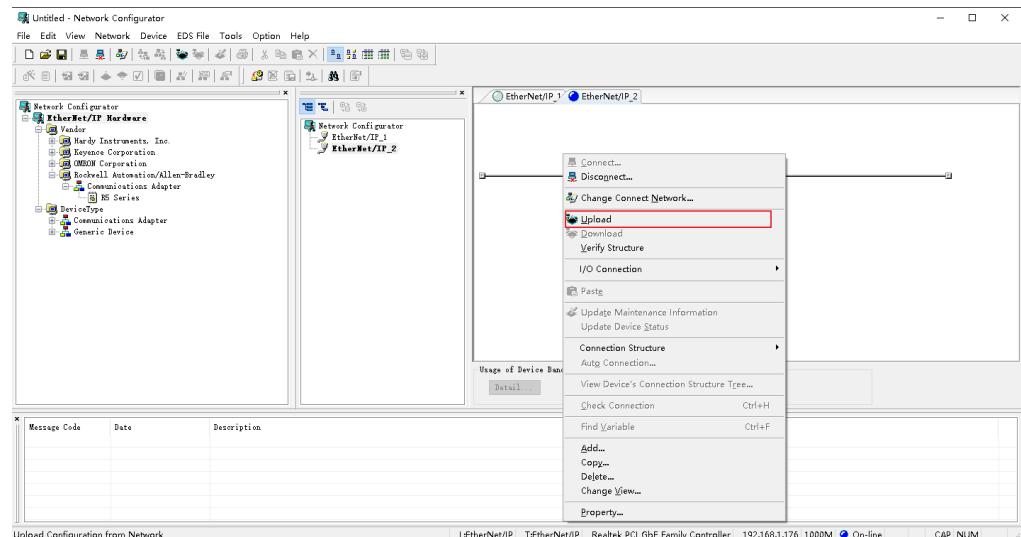

Figure 3-11 PLC Device Addition
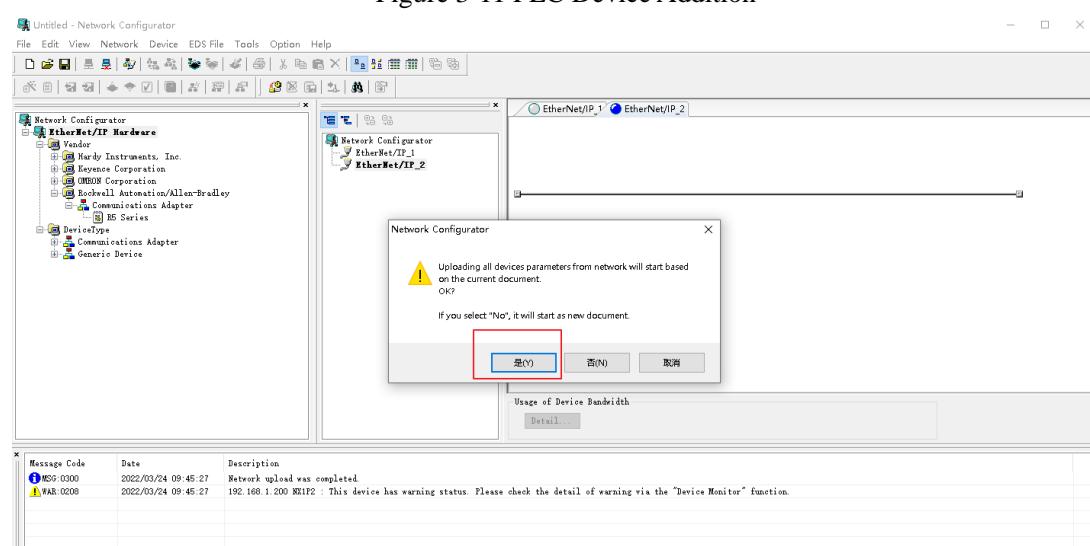
Figure 3-12 Popup Window During Addition

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Select the IP address of the PLC device. (The automatic import option will pop up after the first configuration and subsequent configuration. If the PLC model or Vision Sensor is not changed, you can directly right click to import the last device configuration and modify the IP according to the actual situation.)
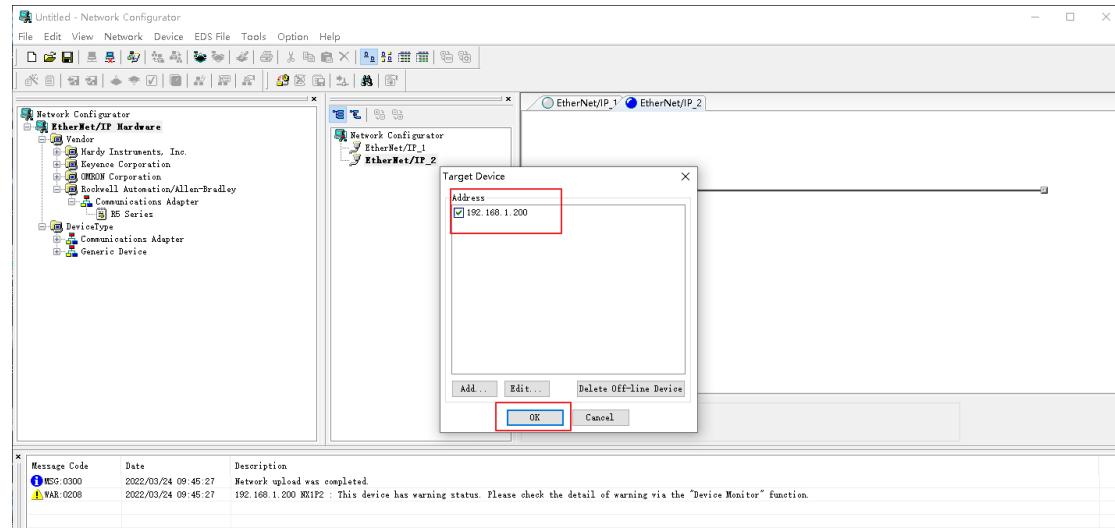
Figure 3-13 Select the IP Address of the PLC and Add It to the Network

After the addition is complete, the PLC device will appear in the newly created network.
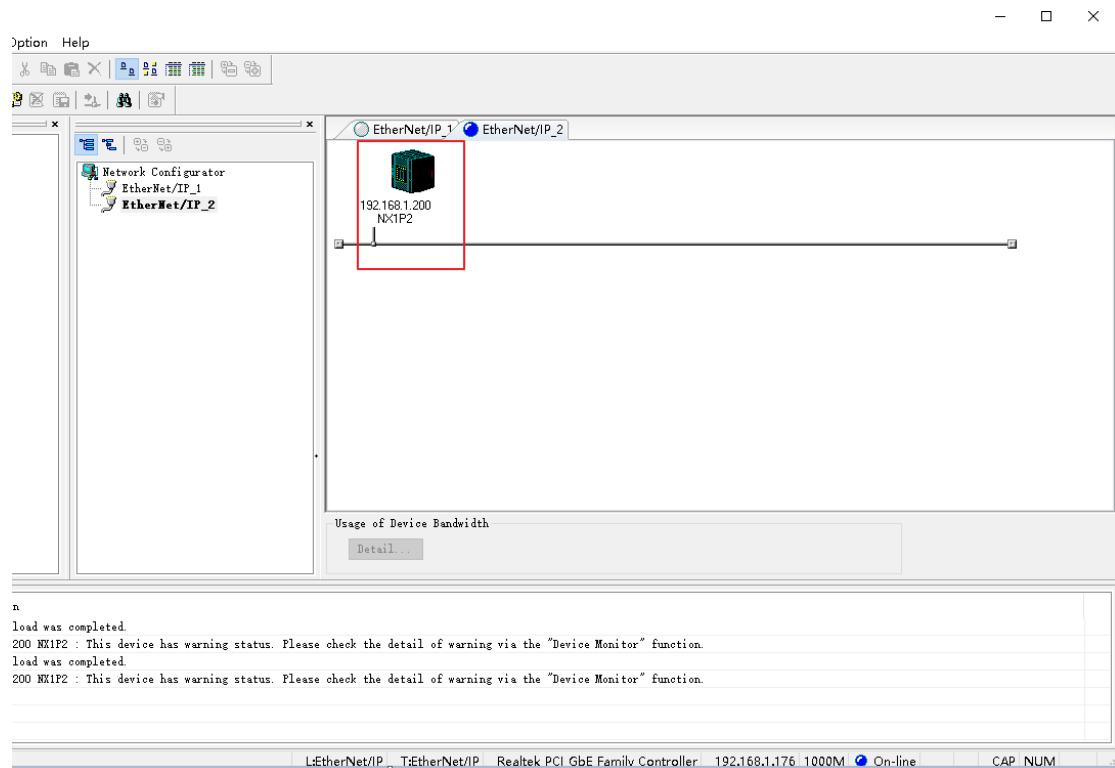

Figure 3-14 Addition Successful

Double-click on the SS3 Series in the device bar to add the vision sensor device to the network.
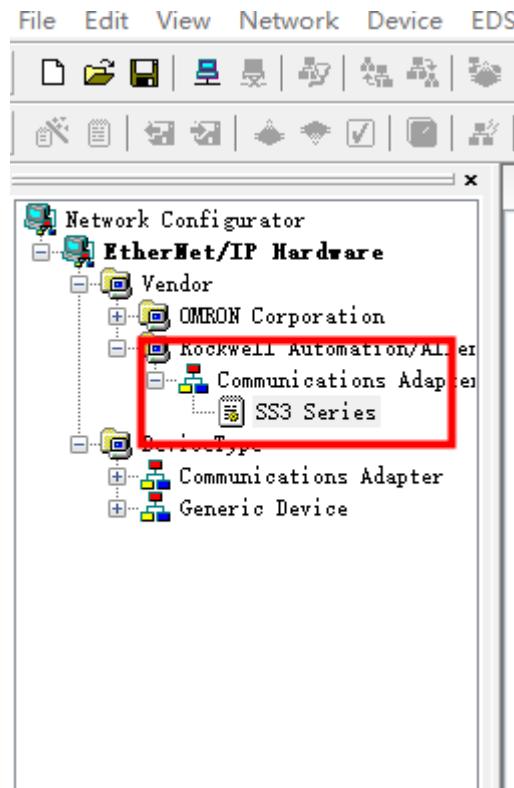
Figure 3-15 Add the Vision Sensor Device
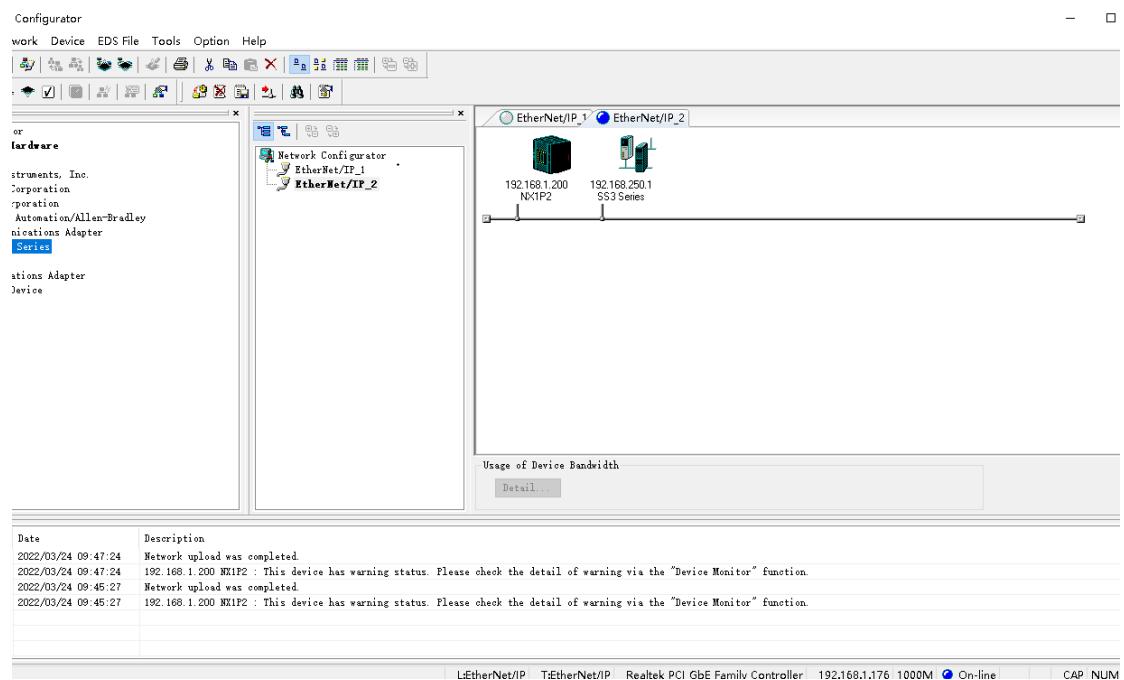
Figure 3-16 Addition Successful

Modify the device IP address to the actual IP of the camera.
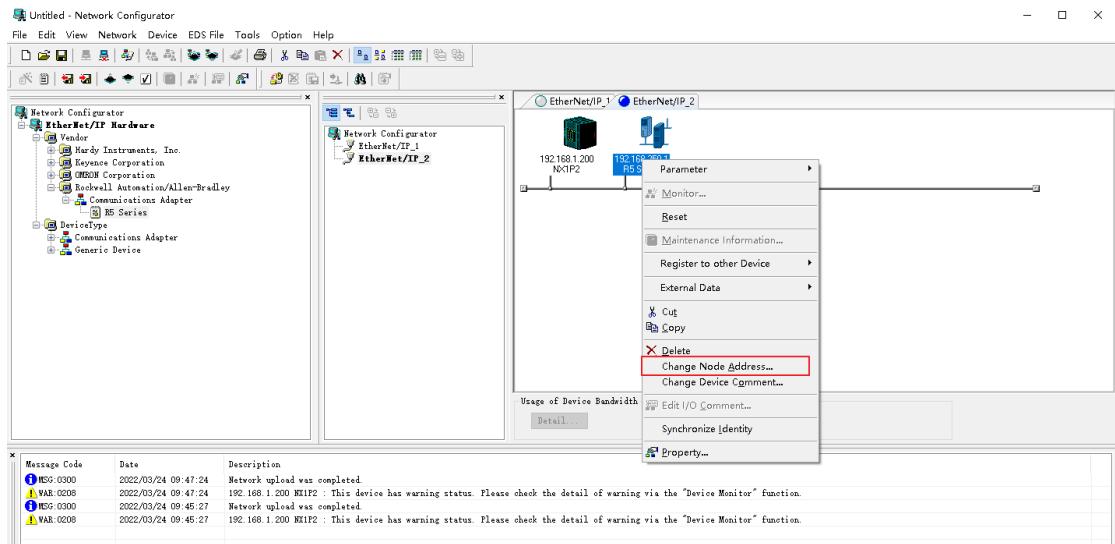
Figure 3-17 Motify the Device IP

3.3 Establish the Address Mapping Between the PLC Device and the Vision Sensor

Select the PLC device in the network, right-click the mouse, and choose "Parameter"->"Edit" to edit the PLC.
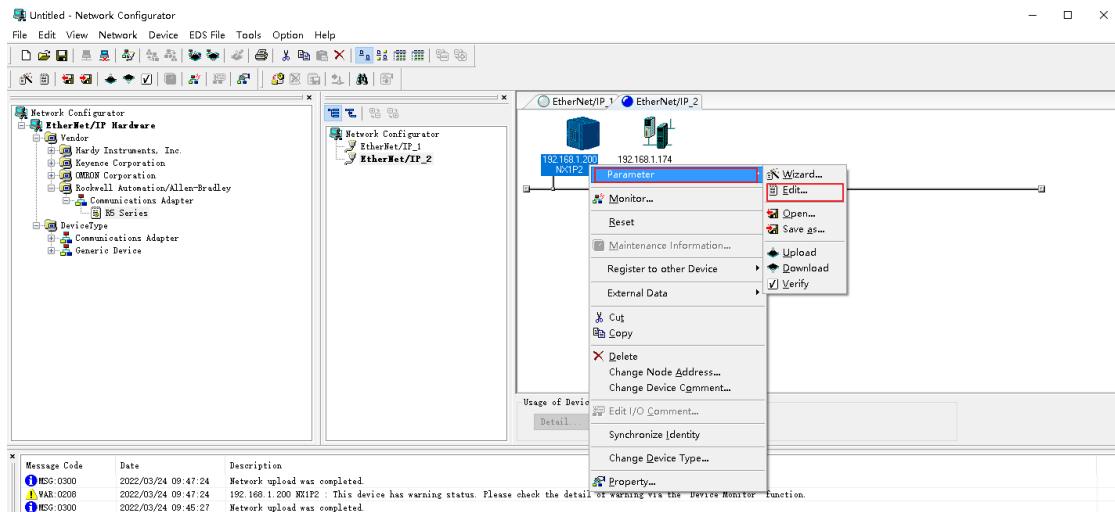
Figure 3-18 Enter the Address Mapping Interface
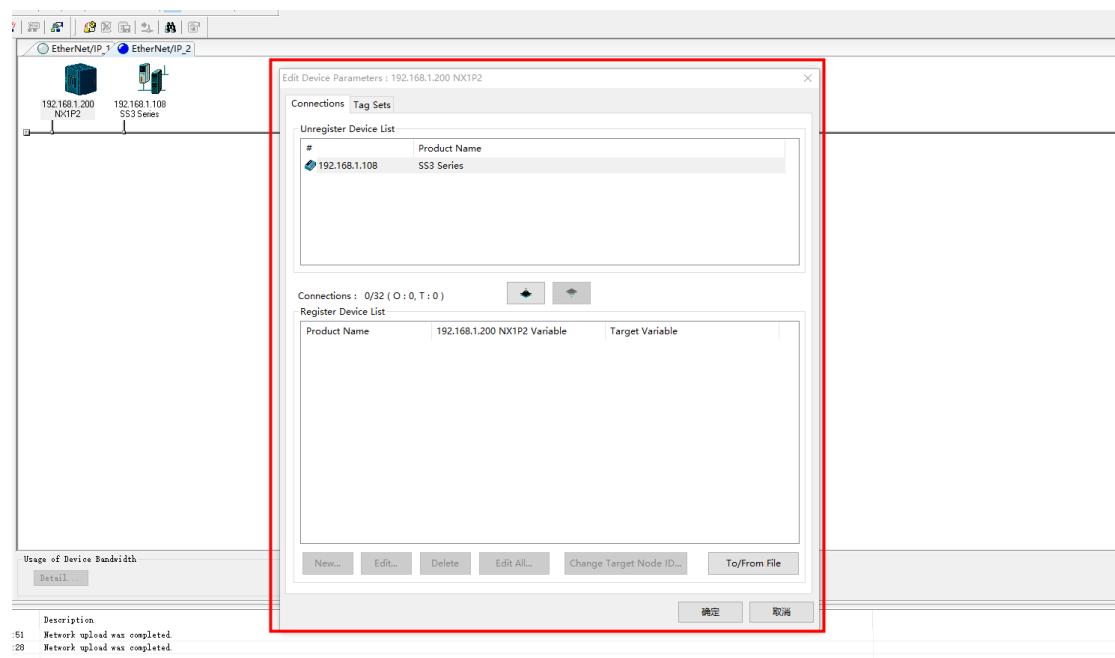
Figure 3-19 Current Mapping Status

In the editing interface, select "Tag Sets", then choose "Import from File" to import
the previously exported global variable CSV file from Sysmac Studio.
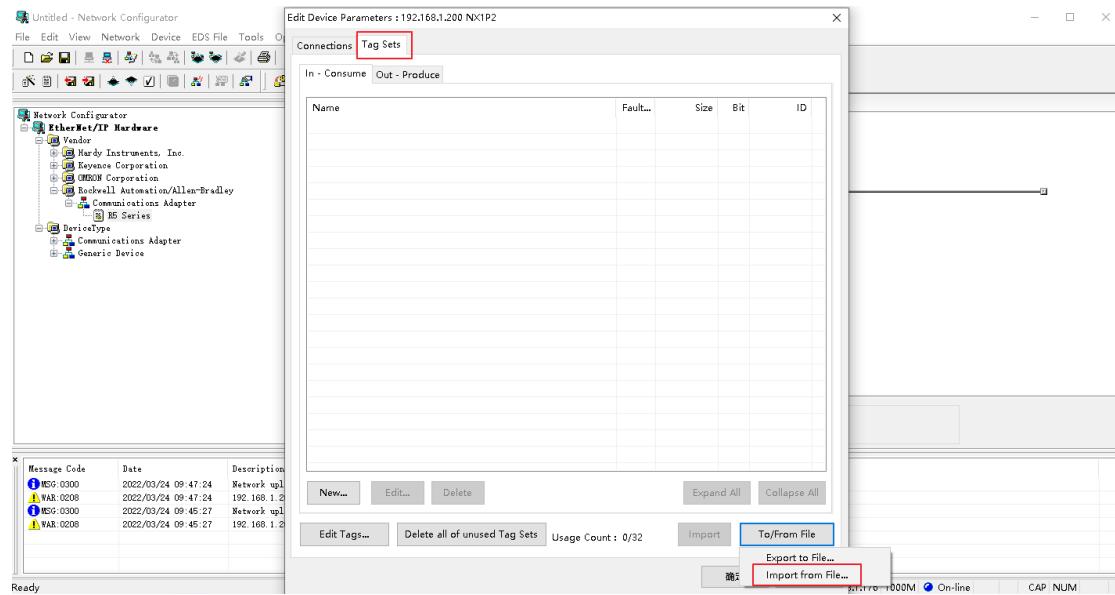
Figure 3-20 Import Global Variables
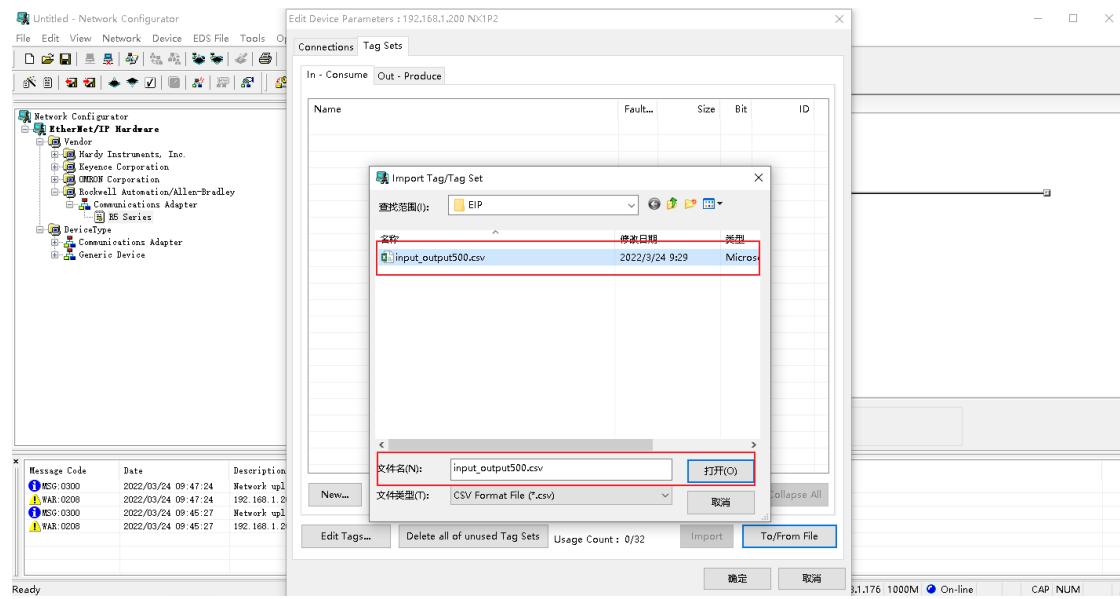
Figure 3-21 Select Global Variable File

After successful import of the CSV file, the previously set input global variable names and sizes will appear under In-Consume.
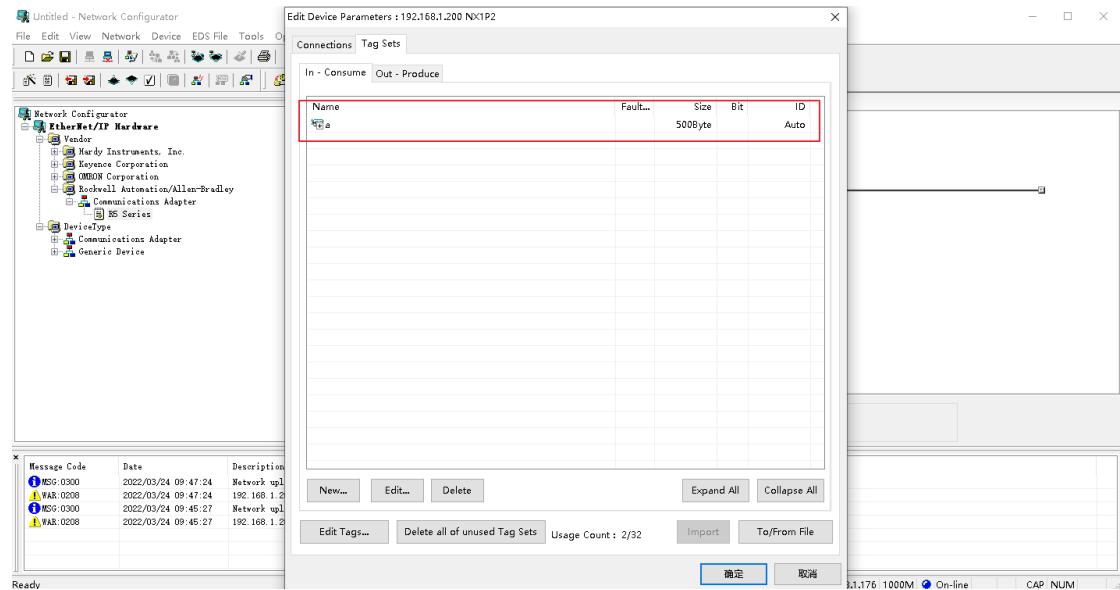
Figure 3-22 Enter the Size of the Global Variable

Under Out-Produce, the previously set output global variable names and sizes will appear.
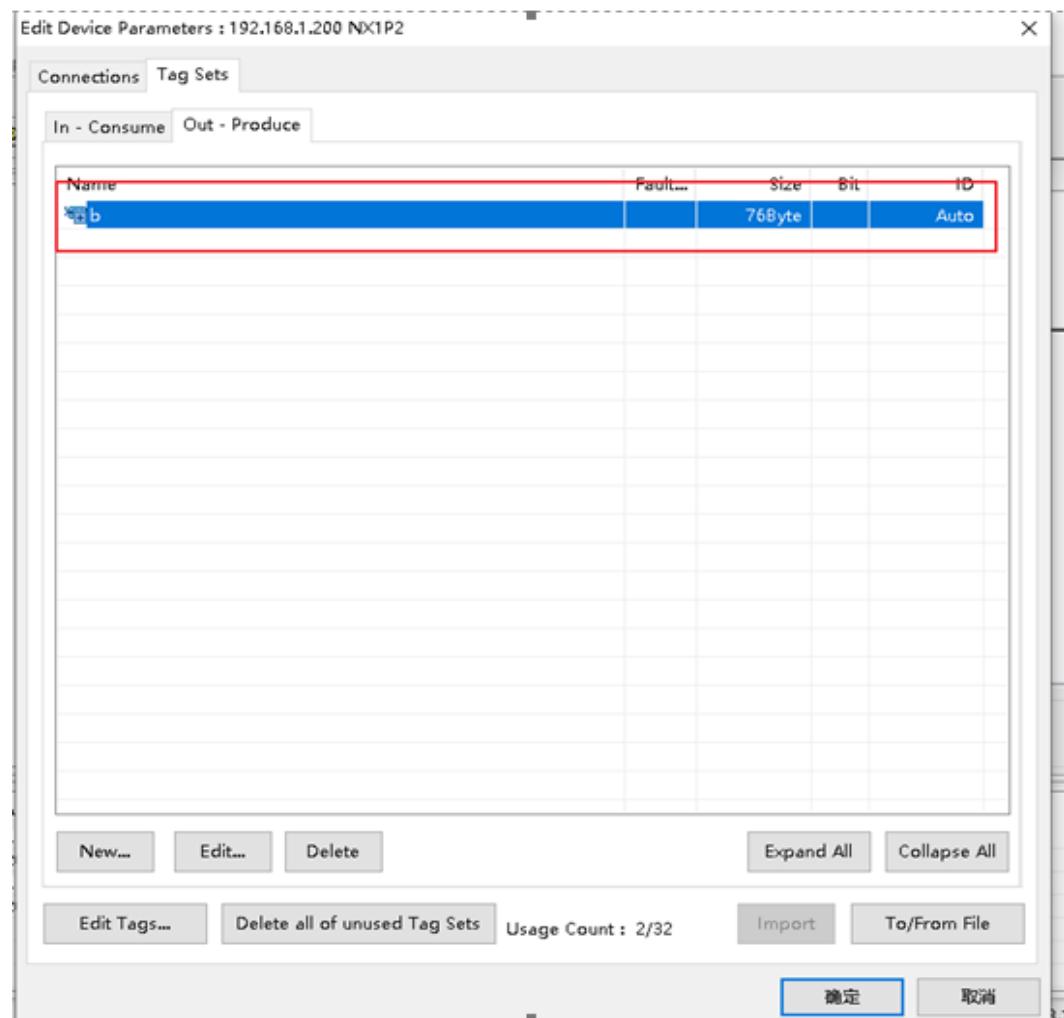
Figure 3-23 Enter the Size of the Output Global Variable

Select Connections, select the decoder device SS3 Series, and move the device to the registered list.
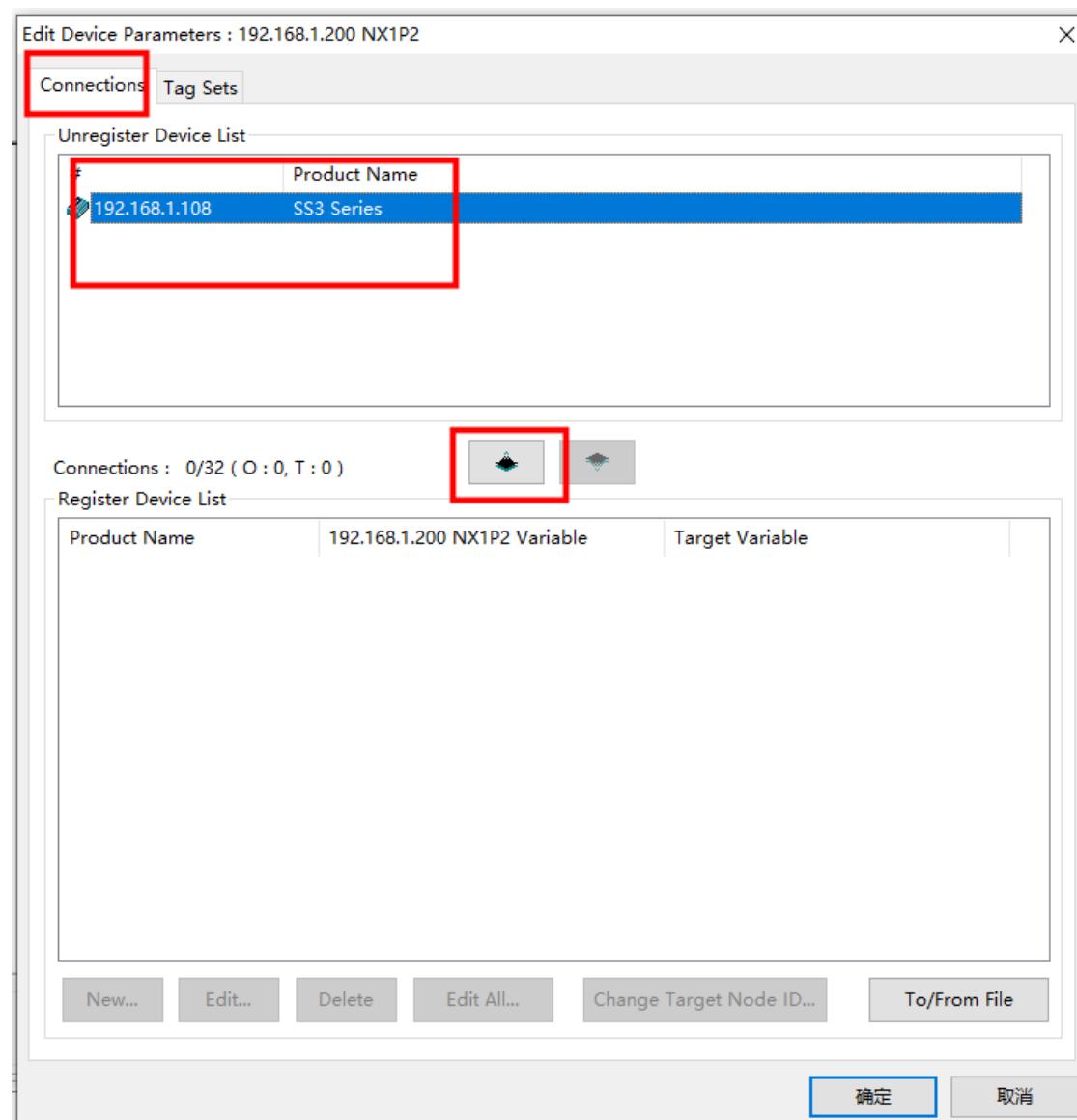
Figure 3-24 Move the Global Variable to the Registered List
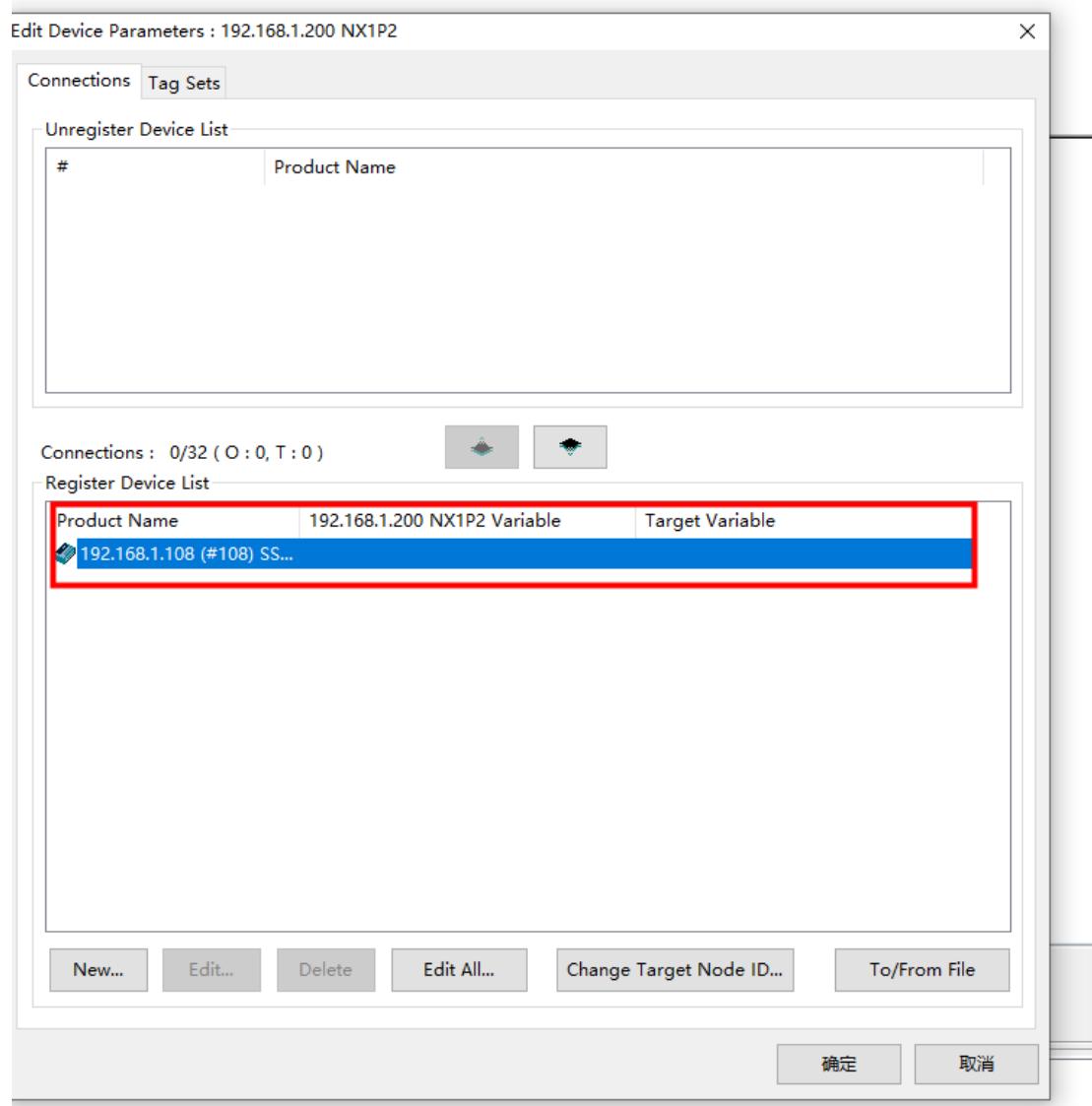
Figure 3-25 Move Successful

(1) Double-click on the visual sensor device in the registered list to open the edit page.

(2) Select the I/O type of the device.

(3) Set the Input Tag and Output Tag to associate the global variables in the PLC with the I/O in the vision sensor device.

(4) Set the Packet Interval for the data.

(5) After completing the settings, click "Regist" to complete the registration.
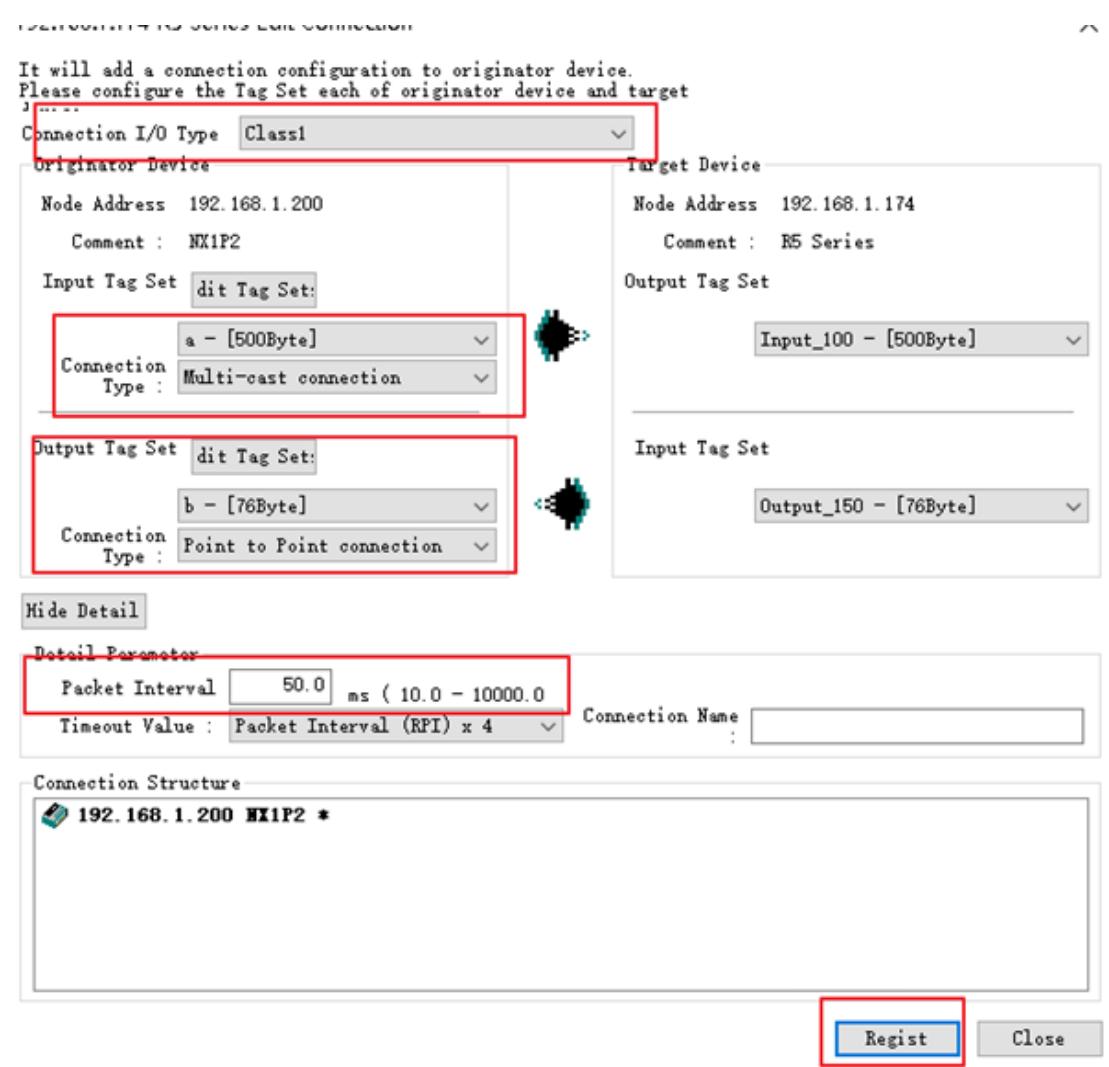
Figure 3-26 Set up the Visual Sensor Device

After completing the registration, the address mapping relationship between PLC device global variables and vision sensor will appear under the visual sensor device in the registration list.
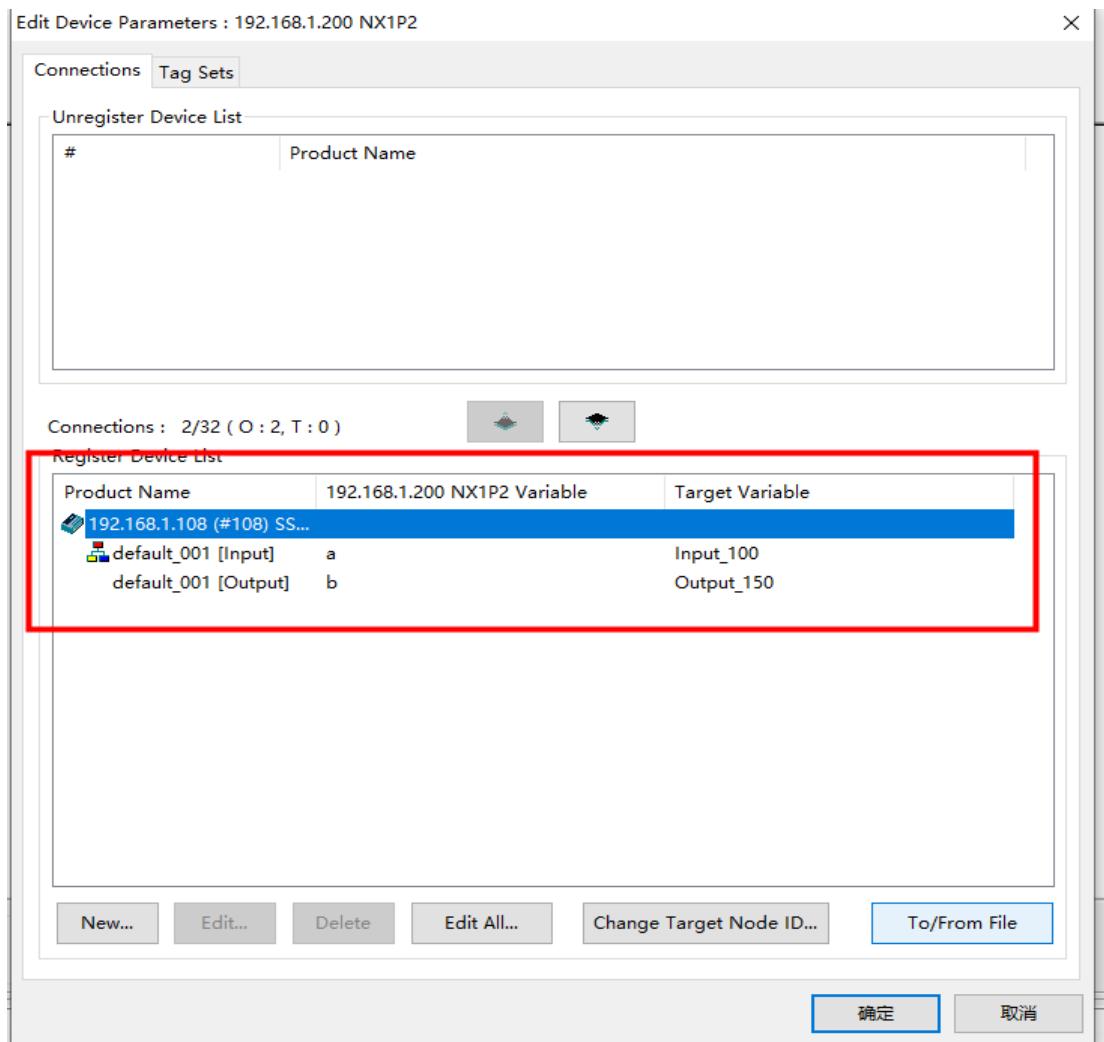
Figure 3-27 Mapping Relationship Diagram

3.4 Download Settings to the PLC Device

Select the PLC device, right-click and choose "Parameter", select "Download", and download the parameter settings and network settings to the PLC.
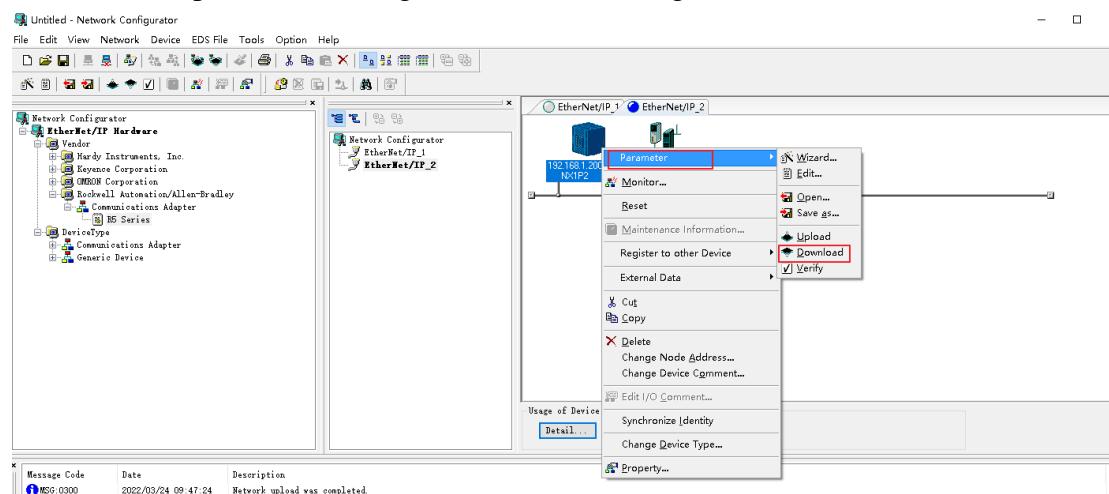
Figure 3-28 Download to PLC

Both download methods are available.
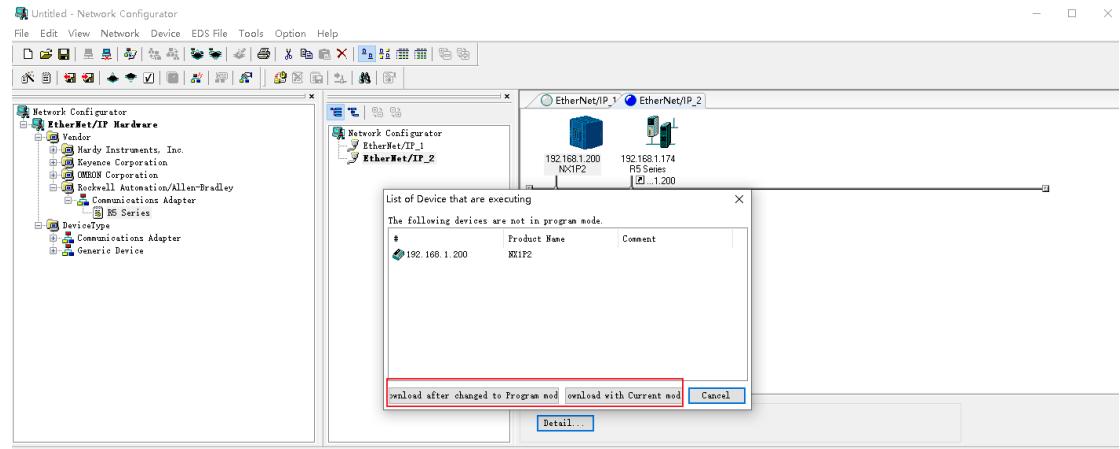
Figure 3-29 Two Download Methods
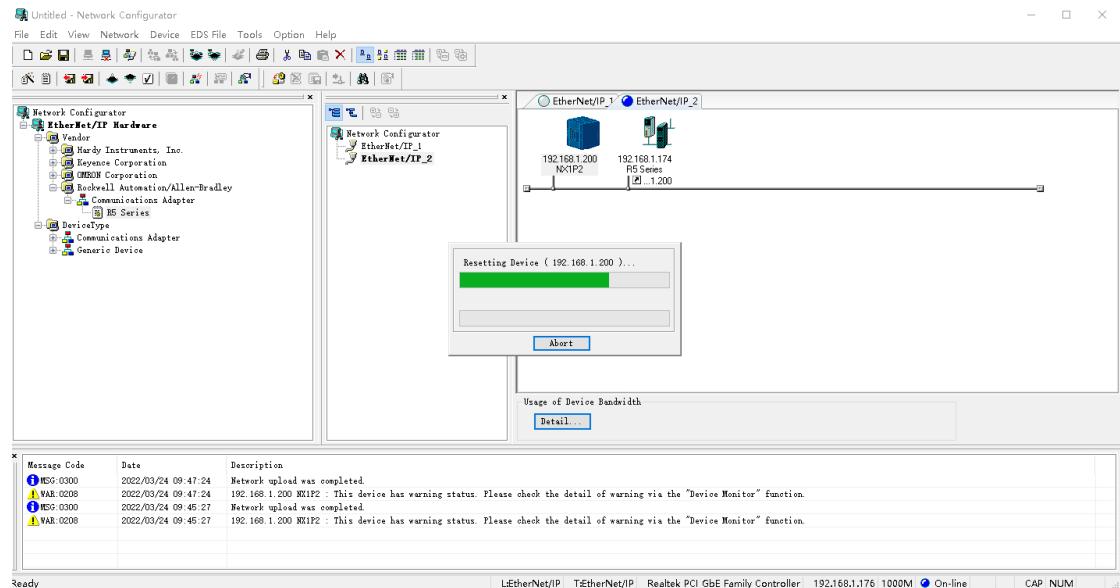
Figure 3-30 Download Diagram
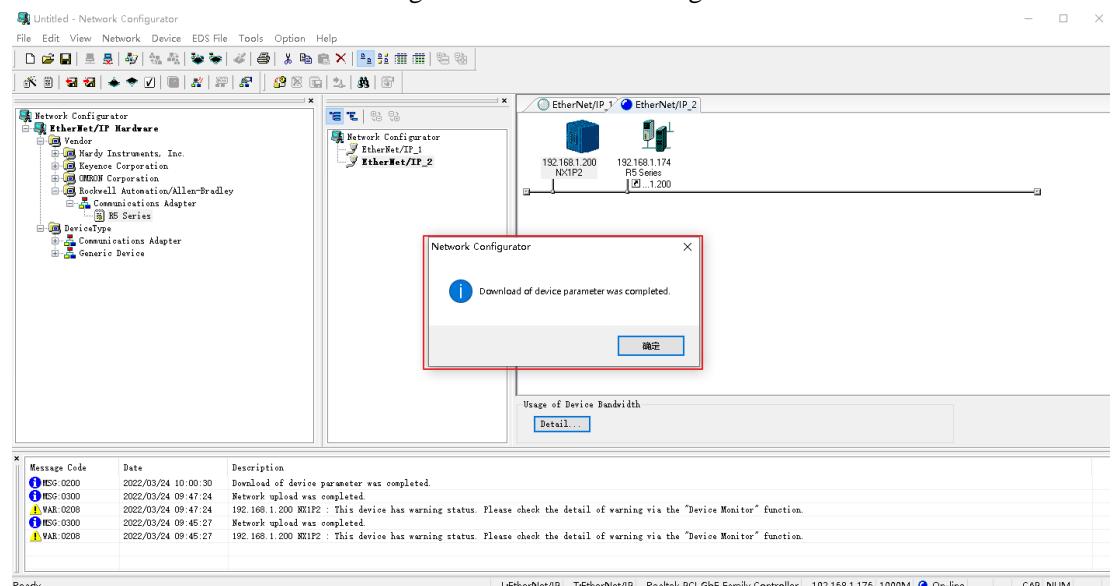
Figure 3-31 Successful Download

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After the configuration of PLC and visual sensor network and register is complete and the download is successful, the PLC can communicate with the sensor

4 Data Monitoring and Parsing

4.1 Data Monitoring
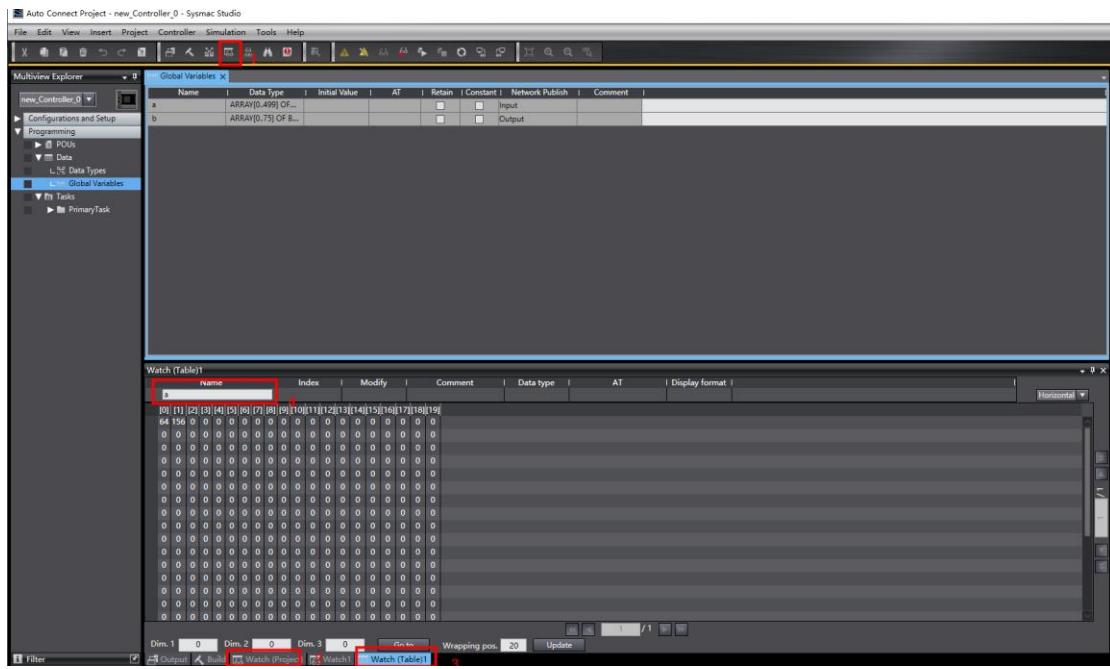
Figure 4-1 Modify the Value of a Register

Open Sysmac Studio and click the monitoring window button at ①. At this time, the software will automatically pop up the created ② monitoring (project) and ③ monitoring (table) 1 at the bottom. Enter variable a in monitoring (table) 1, 500 bytes of variable a will jump out below, and variable a will display the processing result of the Vision Sensor.

Click the monitor (project) to enter the monitor project interface, add B [0], B [1], B [2], and modify the format to Boolean through the drop-down button in the display format column, as shown in ②.
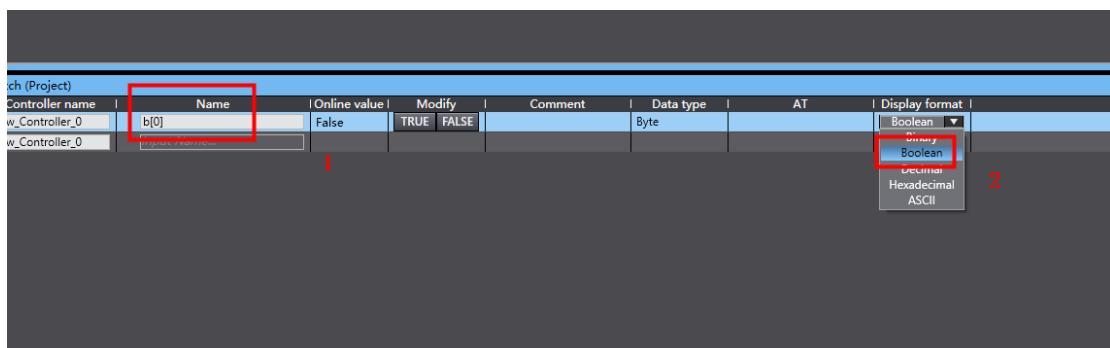
Figure 4-2 Configure the monitoring project

Note: Only the first three bytes of the vision sensor are used, and the rest are placeholders. According to the format of the input string configured in the
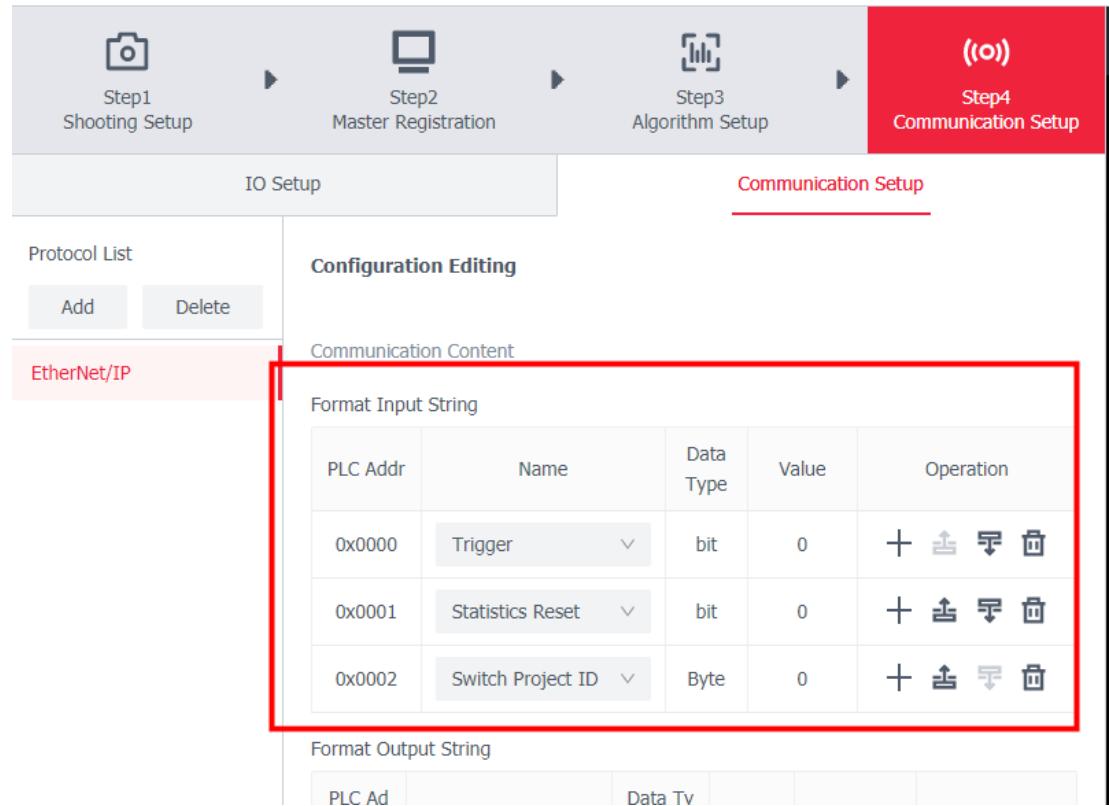
Figure 4-3 Example of Camera Input Configuration

In this example, B[0] can be set to TRUE or FALSE (if the shooting configuration is set in the editing interface and the trigger mode in the trigger configuration is industrial Ethernet) to realize the acquire stream image of the device. Set the B[1] position to TRUE to realize the statistics reset function (set the number of OK and ng to 0). If the trigger and reset functions need to be triggered again, The value in register must be modified to FALSE before it takes effect (device will only respond to the corresponding operation when the register location is modified). Switch to the corresponding project by modifying the value of the corresponding format at bit B[2].

4.2 Data Parsing

Through interface operation, it is possible to add data that the device needs to send. Integer and floating-point numbers occupy a fixed space of 4 bytes. The floating-point number type can be expanded or reduced in terms of the number of bytes sent through interface operation. The remaining space will be filled with the ASCII code "0" (i.e., the interface content being the hexadecimal value 0x30) to achieve the byte length set on the interface.

Figure 4-4 Example of Output Content Configuration

Here, two integers and one string type are added. As mentioned above, the output content in the example is 23 bytes, but the configured sending byte length on the configuration interface is 26. Therefore, 3 bytes of "0" values are padded to meet the desired byte length. Based on this configuration example, the first 4 bytes of the monitoring table represent the total output result, the next 4 bytes represent the grayscale area and midpoint count result, and the subsequent 26 bytes represent the QR code value. The output result starting from a[0] is as shown in the following diagram:
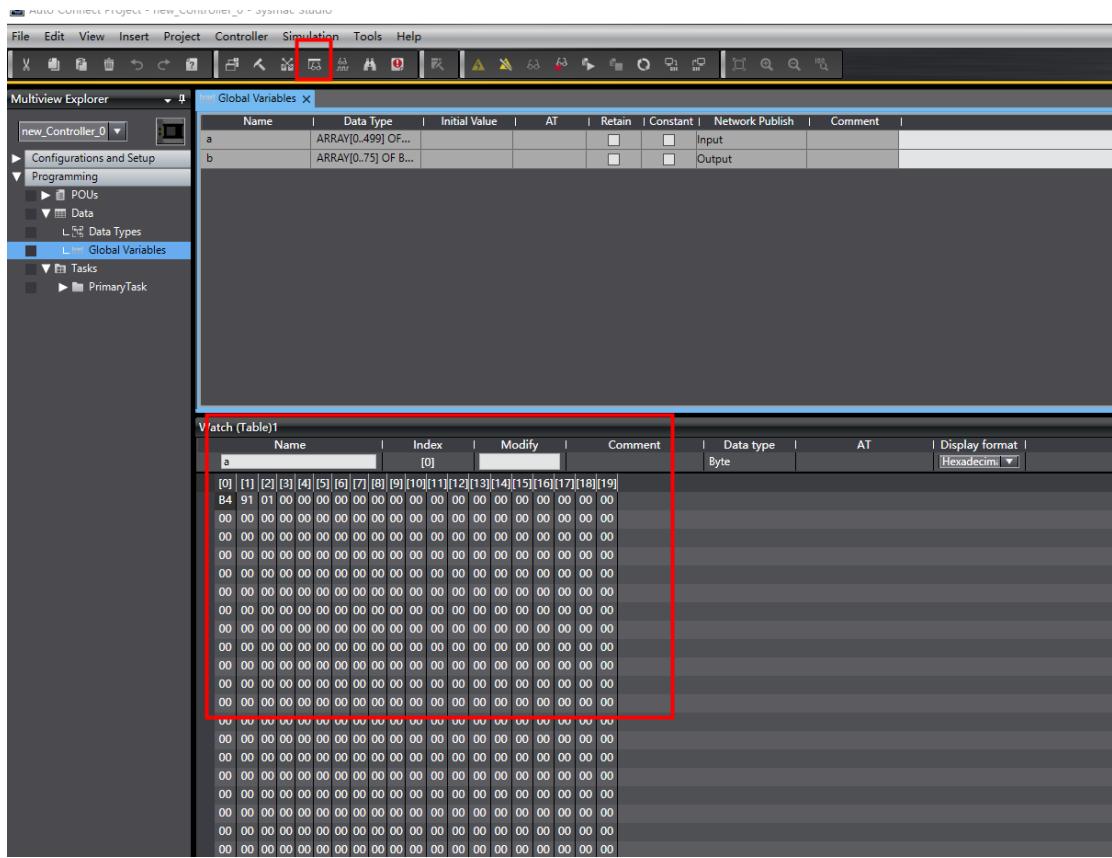
Figure 4-5 EtherNetIP Software Monitoring Table Result Diagram.

5 Using EtherNetIP Simulation Tool

5.1 Camera Starts EtherNetIP Server

Due to tool limitations, it is necessary to perform the operation on the camera first.

Restart the EtherNetIP server: Remove and then add EtherNetIP communication.

After restarting the EtherNetIP, first confirm whether the PLC has returned to normal. If it is normal, proceed with the following operations.

5.2 Configure the Local Network Card

Multiple network card hosts need to be configured.
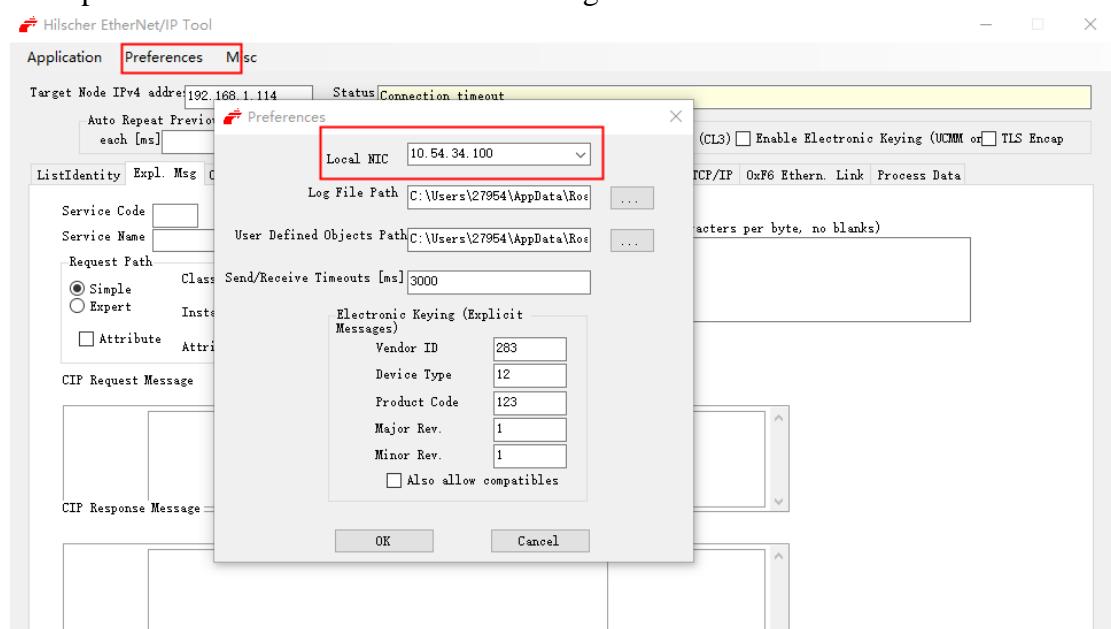
Figure 5-1 Set up IP Connections

5.3 Open the Simulation Tool for Configuration and Connect the Device

1. Enter the vision sensor IP.

2. Modify Data Size.

3. Modify Path: 200424972C962C64.

4. Set trigger.

5. Set auto increment, otherwise it can only be triggered once (tool limitation requires disconnecting to modify the content of the sent data).

6. Connect the device.
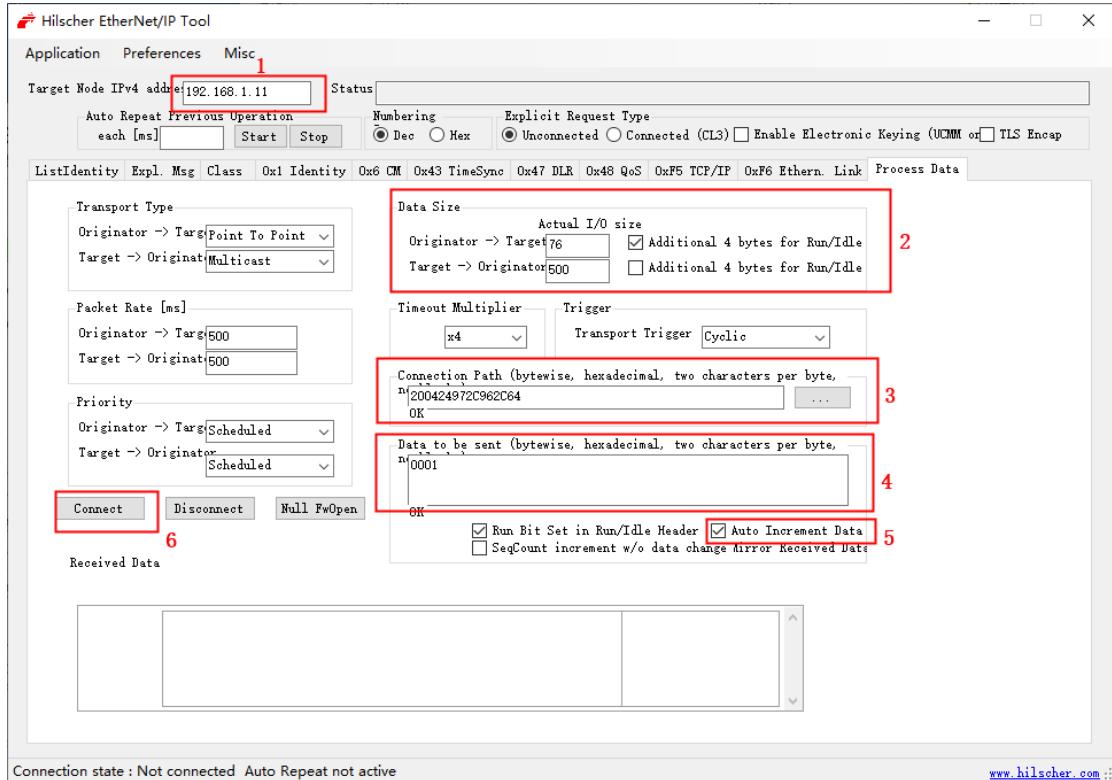
Figure 5-2 Simulate Device Performance Parameters

5.4 Connection Successful

1. The status box displays green and shows "success".

2. The data sent to the camera keeps increasing.

3. The camera can transmit the decoding results.

4. The camera is taking a photo.
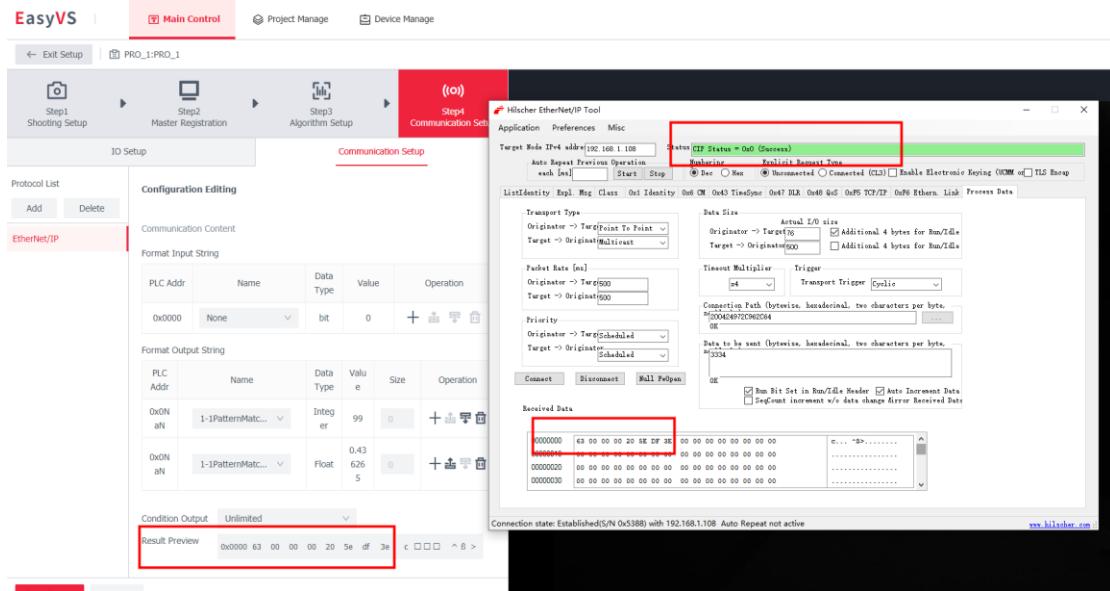
Figure 5-3 Successful Connection

Handling of Exceptional Situations:

If there is an inability to establish a connection between the software and the camera emulator, inquire if it is possible to disconnect the PLC's EtherNetIP on-site.

The entire process should have complete log retention.

Upon connecting to the camera, enable the NTP service to synchronize the time for easier communication with the client.