Rievtech PLC BACnet MSTP / BACnet IP parameter configuration method and usage examples

NOTE:

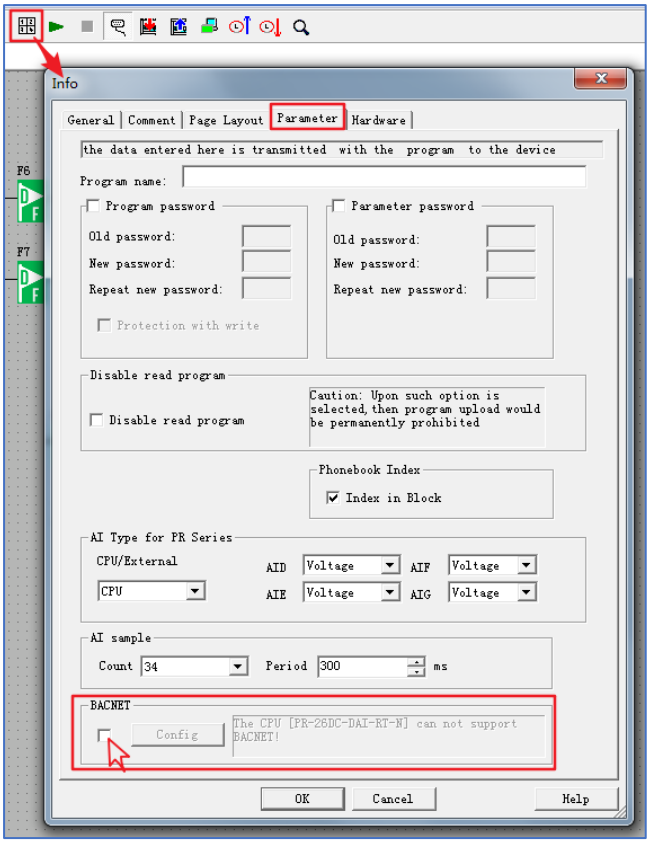
(1) Ethernet PLC with firmware version number >=V1.57 supports BACnet. Firmware version >=2.05, 250 BV and 205 AV can be used. 4G and 4GWIFI models currently do not support BACnet.

(2) HVAC series PLC supports BACnet MSTP.

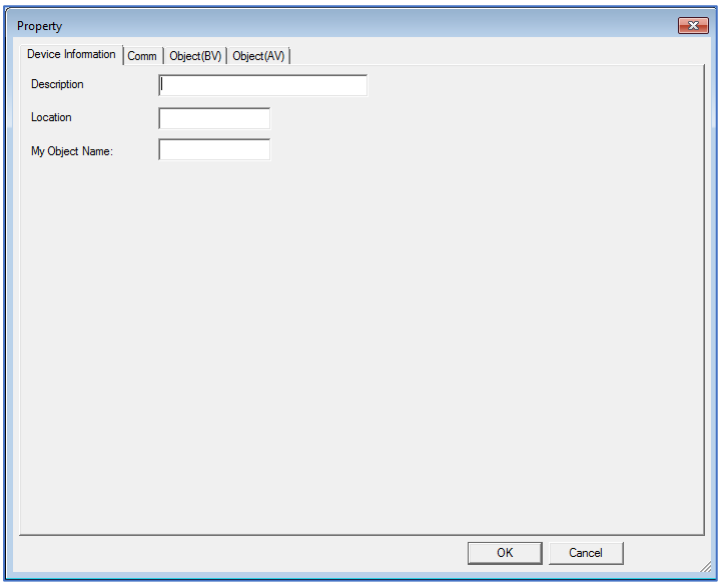
(3) xLogic with version number >=V3.4.3.7 supports BACnet. Starting from version V3.4.6.3, xLogic supports 250 BV and 250 AV.

1. Set PLC BACnet MSTP / BACnet IP

Open the BACnet configuration window, as shown in the figure below:



Select the check box, the 'Config' button becomes available, then click this button, the configuration window pops up, as shown in the figure below. Divided into 4 pages: ‘Device Information’, 'Comm', 'Object(BV)' and 'Object(AV)', the following four pages are introduced respectively.



‘Device Information’ page

On this page, you can fill in relevant characters in the ‘Description’, ‘Location’, ‘My Object Name’ directories.

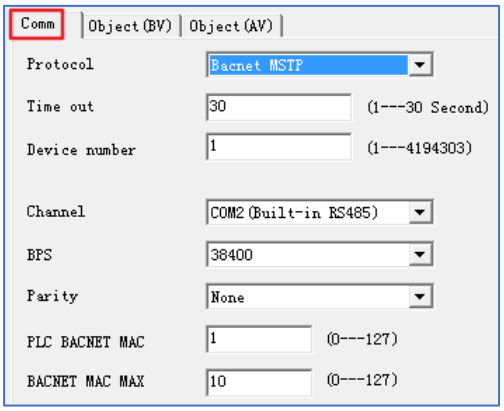
‘Description’ is limited to 50 characters.

‘Location’ is limited to 12 characters.

‘My Object Name’ is limited to 32 characters.

‘Comm’ page

(1) Bacnet MSTP



‘Protocol’

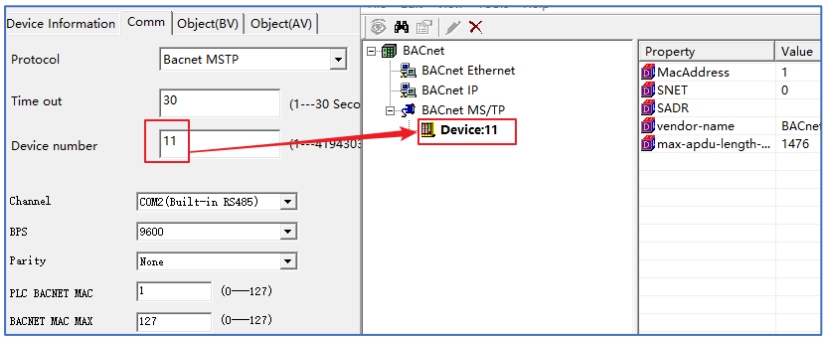
Select BACnet protocol, there are 2 options: 'Bacnet MSTP' for RS485 communication and 'Bacnet IP' for Ethernet communication. Here select 'Bacnet MSTP'.

‘Time out’

A value from 1 -- 30 (Second) can be set.

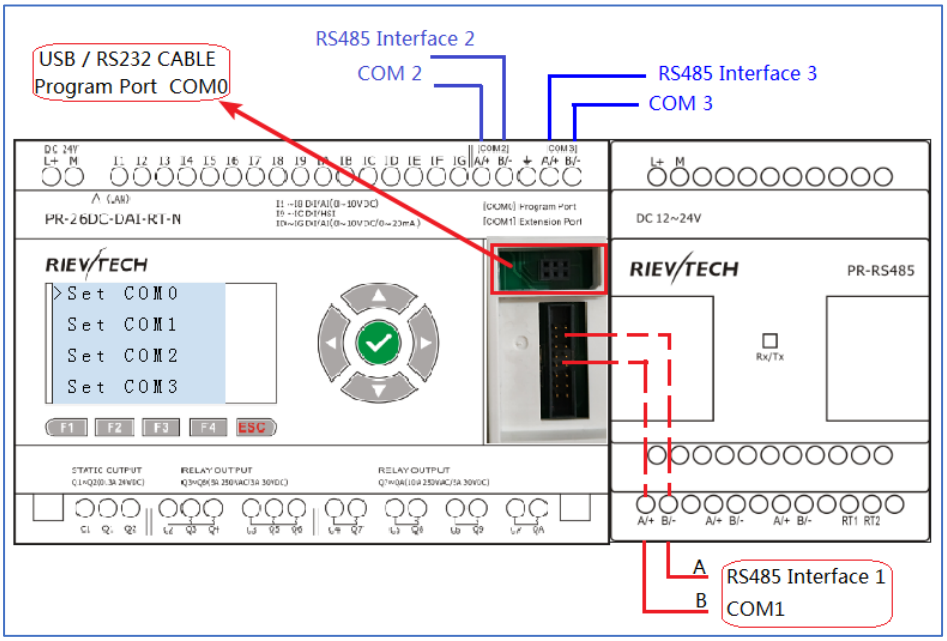
‘Device number’

A value from 1 to 41943303 can be set. It has the same function as the device name and is used to identify the device in the network. Be careful not to repeat the device number.



'Channel'

Select the RS485 channel supported by the PLC. The number of RS485 channels supported by different models is also different. The distribution of com ports on the PLC is shown in the figure below, taking PR-26DC-DAI-RT-N as an example:



'BPS'

Set the baud rate for RS485 communication. Different coms have different baud rate options. The default baud rate of PLC is 9600.

'Parity'

There are three options: None, Odd, and Even, and the PLC defaults to None.

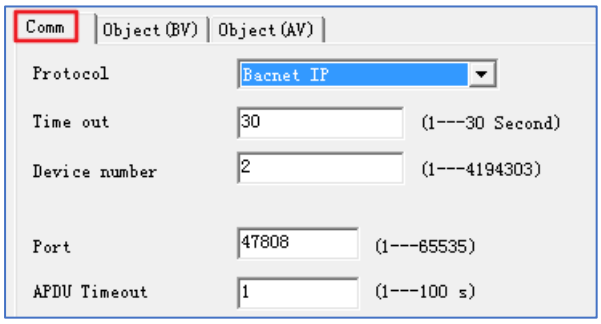
'PLC BACNET MAC'

It is necessary to ensure that the MAC of each device is unique, and a value from 0 to 127 can be set.

'BACNET MAC MAX'

The default value is 127, which sets the maximum mac value of BACnet devices in the network. The input range is 0 --127. Set the appropriate value according to the requirement.

(2) Bacnet IP



'Protocol'

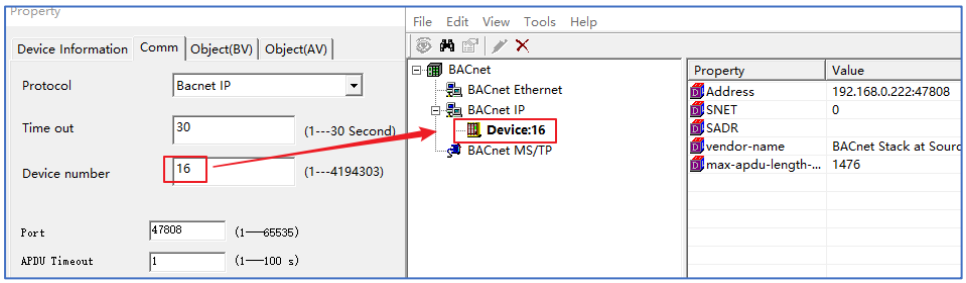
Select BACnet protocol, there are 2 options: 'Bacnet MSTP' for RS485 communication and 'Bacnet IP' for Ethernet communication. Here select 'Bacnet IP'.

'Time out'

A value from 1 -- 30 (Second) can be set.

'Device number'

A value from 1 to 41943303 can be set. It has the same function as the device name and is used to identify the device in the network. Be careful not to repeat the device number.



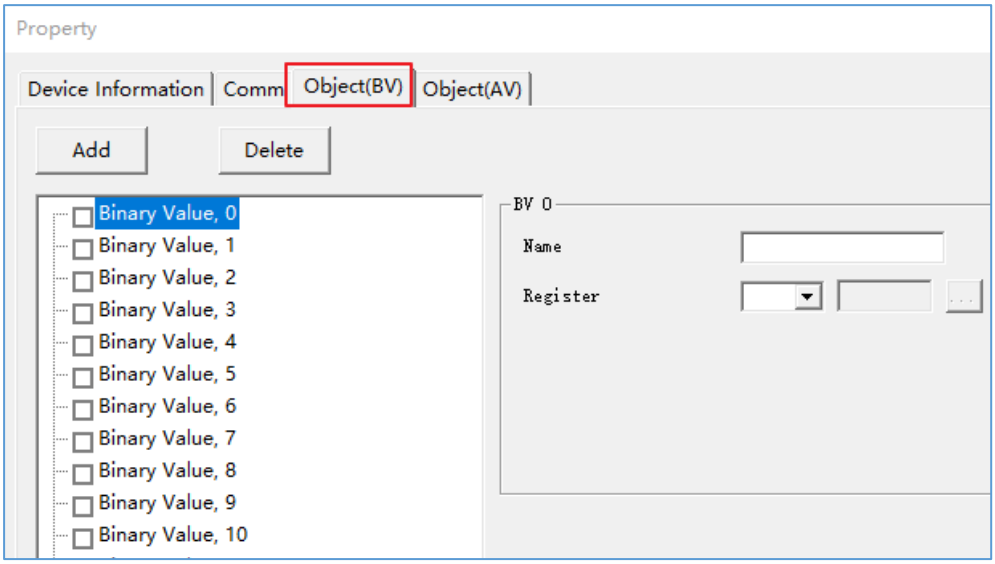
'Port'

The default is 47808.

'APDU Timeout'

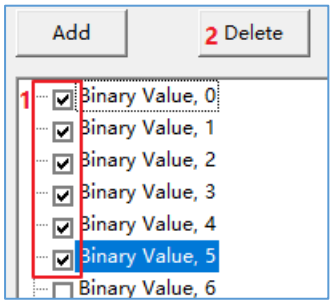
A value from 1 -- 100s can be set, and the default value is 1.

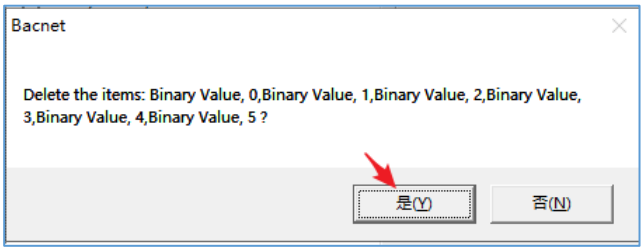
'Object(BV)' page



Delete BV

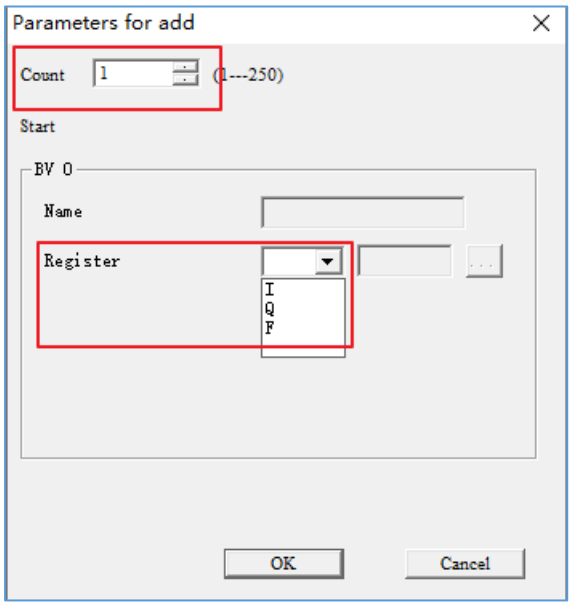
Check the checkbox in front of the BV that needs to be deleted (multiple selections are allowed), and then click the ‘Delete’ button above.





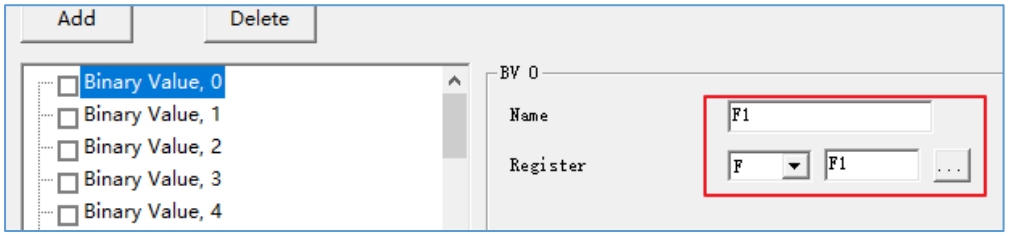
Add BV

Click the ‘Add’ button above.



Count: Set the number of BV to add. Note that the total number of BV will not exceed 250. For example, if some BV already exists, even if 250 is filled in here, the number of newly added BV will not be 250, but 250 minus the existing number.

Register: You can choose I, Q, F or empty. With the 'Count' above, multiple BV of the same register can be added at one time.

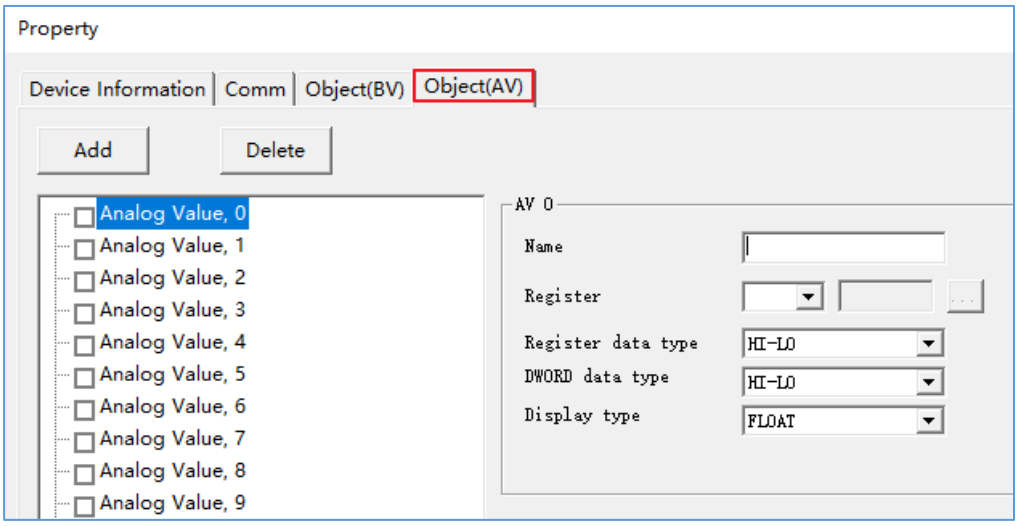


First select 'Binary Value, 0' in the list on the left, set the name of the object on the right, and assign a register to it. 'Name' only allows up to 8 commonly used characters.

250 digital objects can be set on this page, and an I, Q or F register can be assigned to each object. Registers of type 'I' can only be read, not written. Registers of type 'Q' and

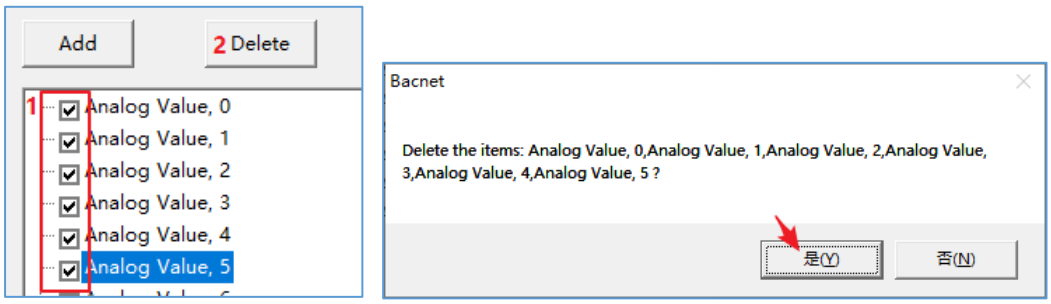
'F' support read/write. But in the program in the PLC, the input pins of their blocks need to be suspended, so that the write operation can be successful.

‘Object(AV)’ page



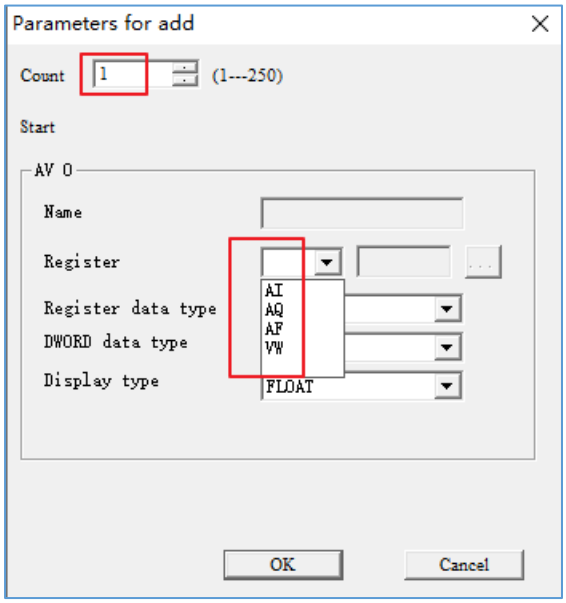
Delete AV

Check the checkbox in front of the AV that needs to be deleted (multiple selections are allowed), and then click the ‘Delete’ button above.

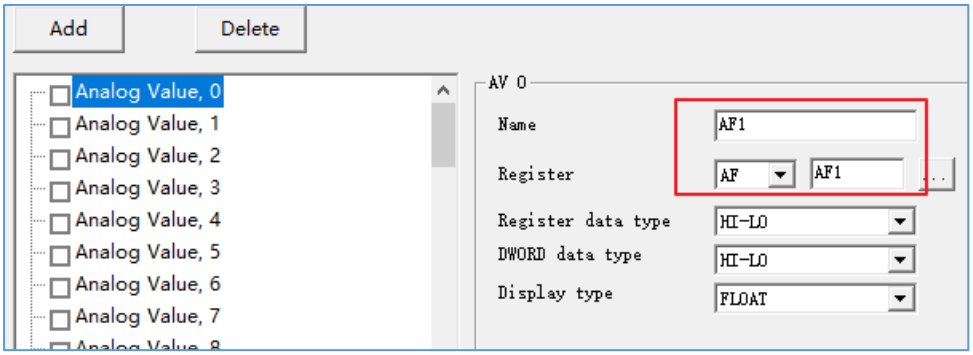


Add AV

Click the ‘Add’ button above.



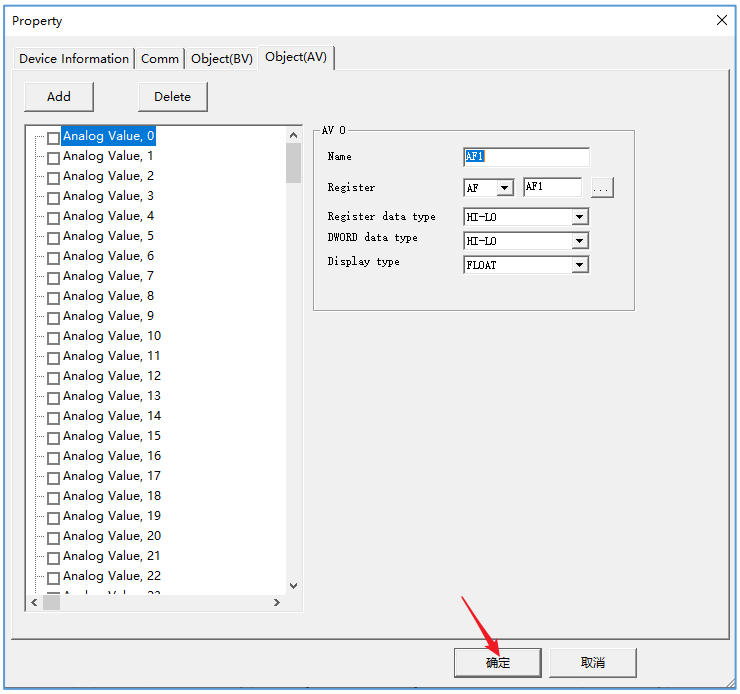
Count: Set the number of AV to add. Note that the total number of AV will not exceed 250. For example, if some AV already exists, even if 250 is filled in here, the number of newly added AV will not be 250, but 250 minus the existing number.
Register: You can choose AI, AQ, AF, VW or empty. With the 'Count' above, multiple AV of the same register can be added at one time.

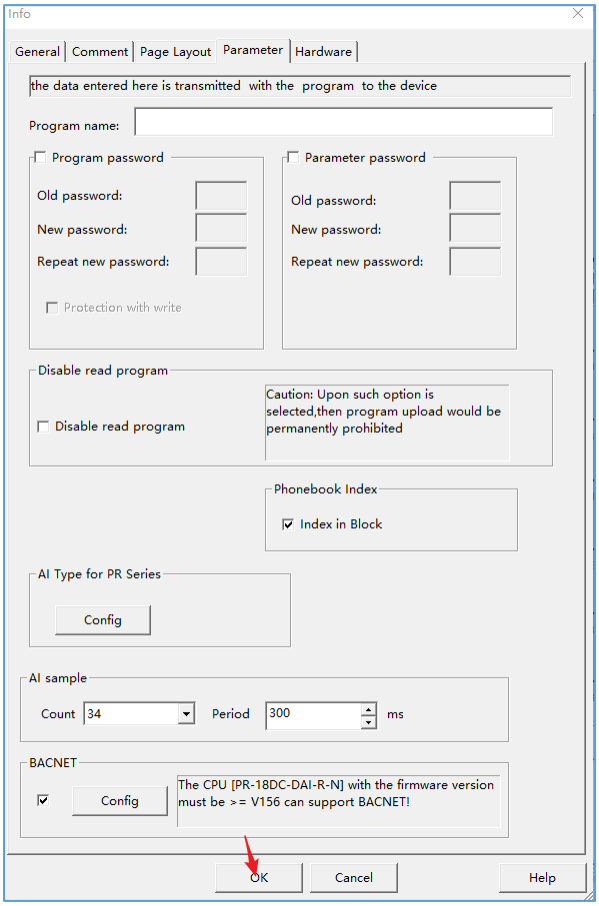


The operation steps are the same as the BV page.
‘Register data type’
The byte order when providing the value in register, you can choose 'HI-LO' and 'LO-HI' modes.
‘DWORD data type’
The byte order of DWORD data, you can choose 'HI-LO' and 'LO-HI' modes.
‘Display type’
Select the data format when displaying values, only support 'FLOAT'.

Similarly, 250 analog objects can be set on this page, and an AI, AQ, AF or VW register can be assigned to each object. The 'AI' register can only read values, but cannot write values. AQ, AF and VW support read/write, and only when the input pins of these register blocks are floating, the write value operation can be successful.

After configuring all the parameters, click the 'OK' button in the lower right corner, as shown in the figure below. Then download the BACnet settings to the PLC along with the xLogic program, and the settings will take effect after the PLC restarts.

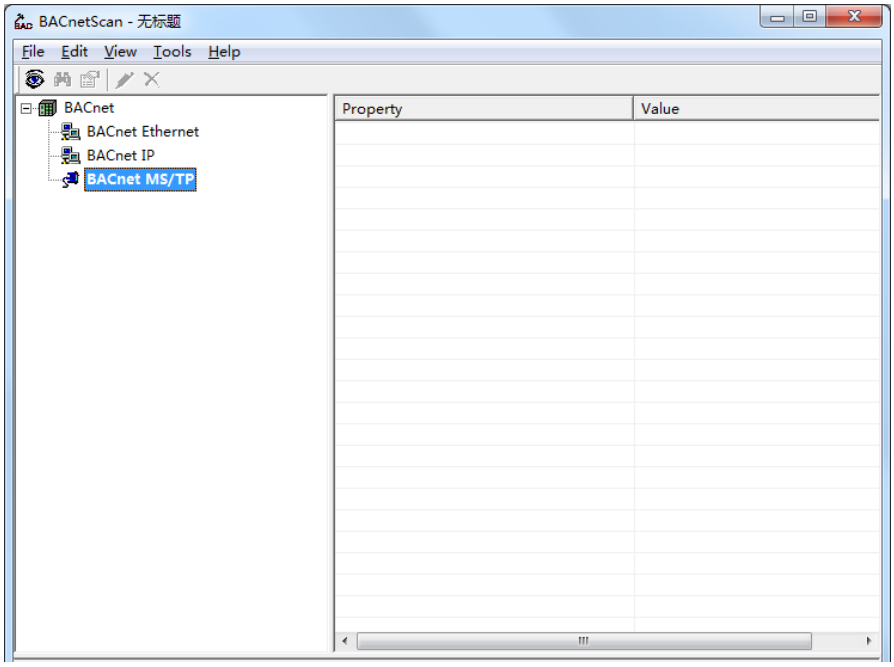

Property
Device Information
Comm
Object(BV)
Object(AV)
Add
Delete
Analog Value, 0
Analog Value, 1
Analog Value, 2
Analog Value, 3
Analog Value, 4
Analog Value, 5
Analog Value, 6
Analog Value, 7
Analog Value, 8
Analog Value, 9
Analog Value, 10
Analog Value, 11
Analog Value, 12
Analog Value, 13
Analog Value, 14
Analog Value, 15
Analog Value, 16
Analog Value, 17
Analog Value, 18
Analog Value, 19
Analog Value, 20
Analog Value, 21
Analog Value, 22
AV 0
Name
AF1
Register
AF
AF1
Register data type
HI-LO
DWORD data type
HI-LO
Display type
FLOAT
确定
取消


Info
General
Comment
Page Layout
Parameter
Hardware
the data entered here is transmitted with the program to the device
Program name:
Program password
Old password:
New password:
Repeat new password:
Protection with write
Parameter password
Old password:
New password:
Repeat new password:
Disable read program
Disable read program
Caution: Upon such option is selected,then program upload would be permanently prohibited
Phonebook Index
Index in Block
AI Type for PR Series
Config
AI sample
Count
34
Period
300
ms
BACNET
Config
The CPU [PR-18DC-DAI-R-N] with the firmware version must be >= V156 can support BACNET!
OK
Cancel
Help

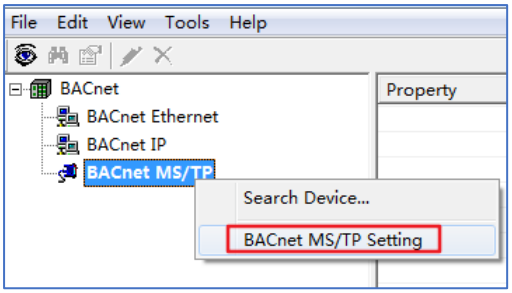
2. BACnetScan software reads and writes PLC registers

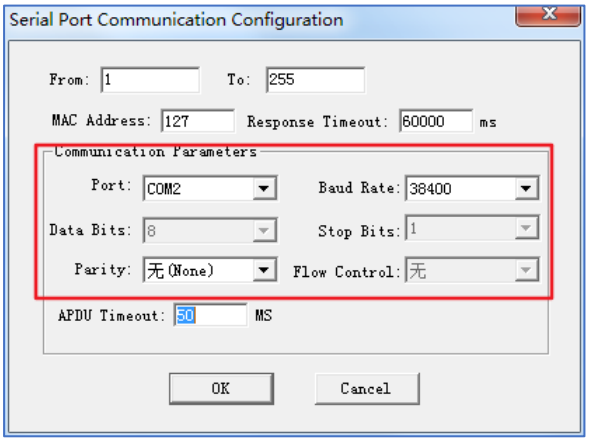
After completing the above PLC parameter settings, open the BACnetScan software (only for demonstration, you can use other software with the same function), as shown in the figure below:

(1) BACnet MSTP



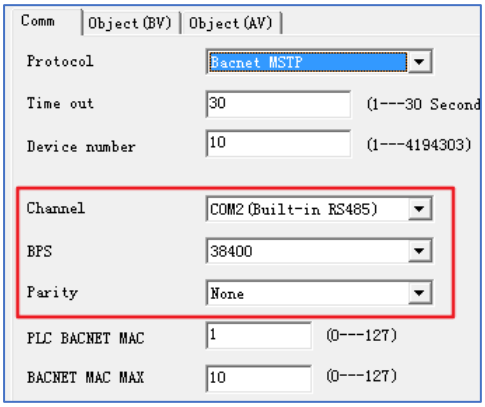
Select 'BACnet MS/TP', right-click, pop-up right-click menu, select 'BACnet MS/TP Setting'.





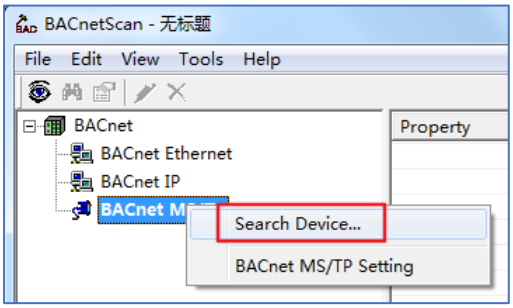
In the above dialog box, the value of 'MAC Address' cannot conflict with the MAC address of other devices, and the default value is 127.

The parameters in 'Communication Parameters' need to be the same as those in the PLC, as shown in the figure below. Note that COM2 here is the COM port corresponding to the RS485 channel on the PC, which is different from COM2 in the figure below.

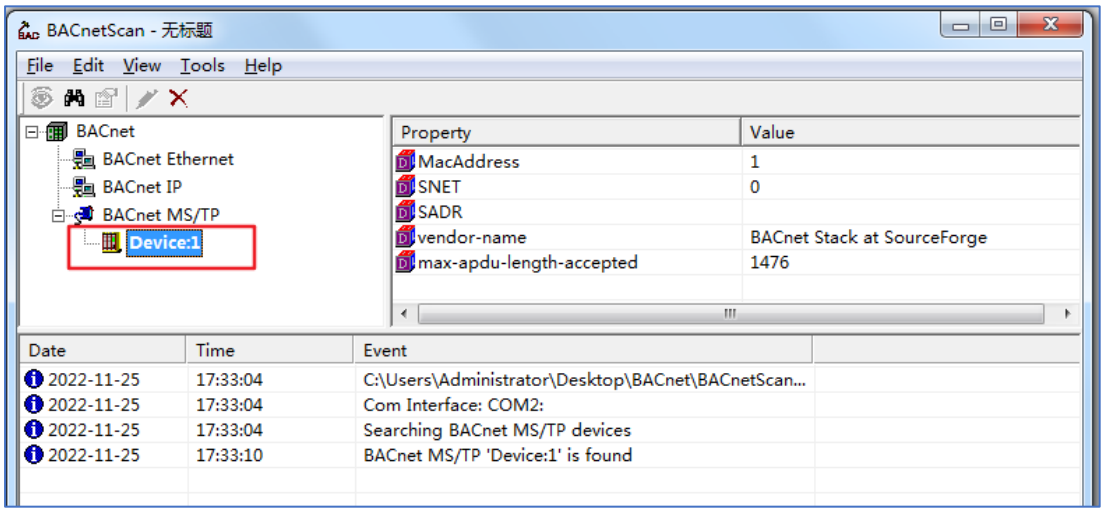


After setting, click the 'OK' button below.

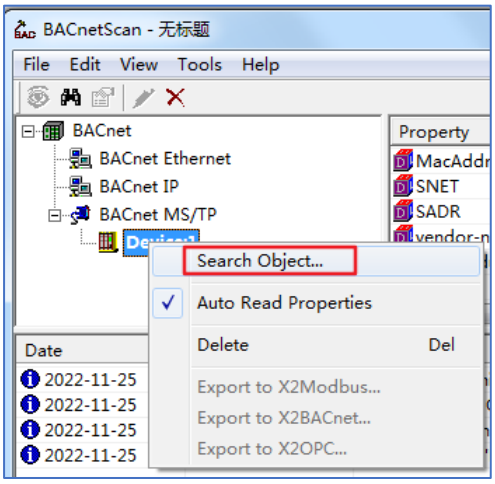
Then select the 'Search Device...' option in the right-click menu, as shown in the figure below.



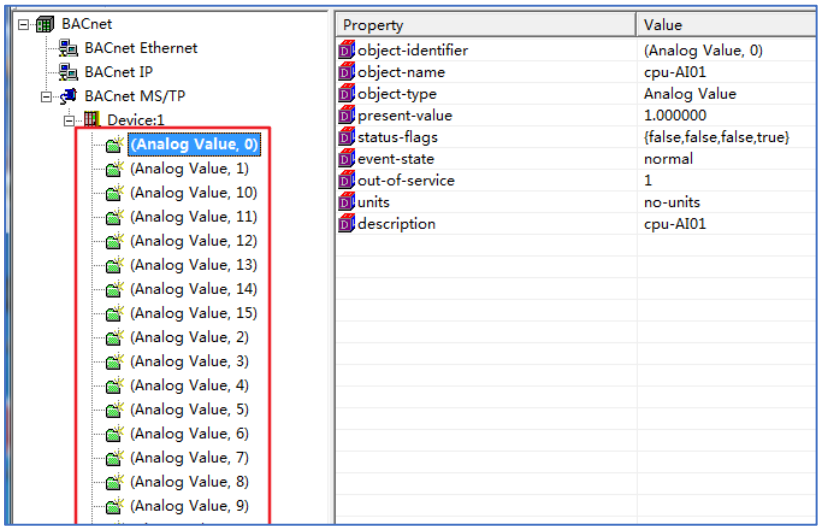
At this time, some prompts will be displayed in the prompt bar, and all found devices will be listed under the option of 'BACnet MS/TP', as shown in the figure below, and the message bar will prompt 'BACnet MS/TP 'Device: 1' is found'.



Select 'Device: 1', right-click, pop up the right-click menu, and select the 'Search Object' option.

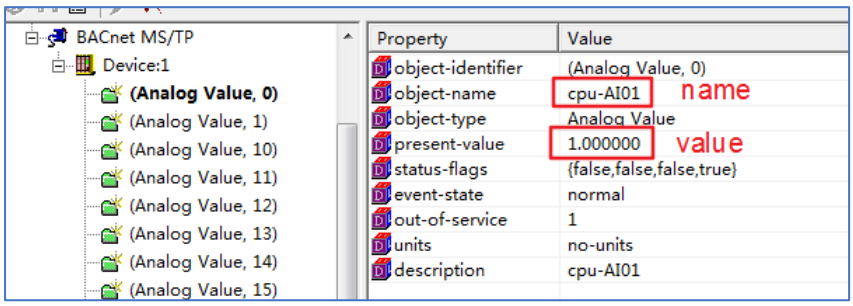


BACnetScan will list all the searched Objects under the Device: 1 option, as shown in the figure below:

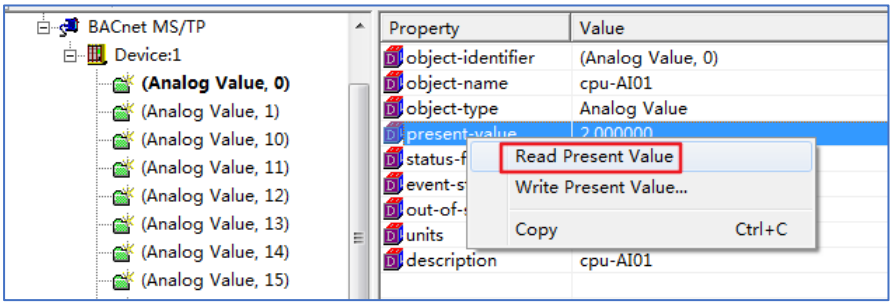


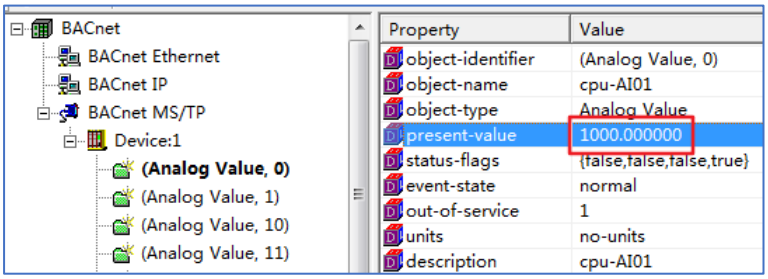
All 250 Binary Values and 250 Analog Values of the PLC will be listed, even if they are not used.

Both the name and value of ‘Analog Value, 0’ can be found in the property bar on the right, as shown in the figure below.

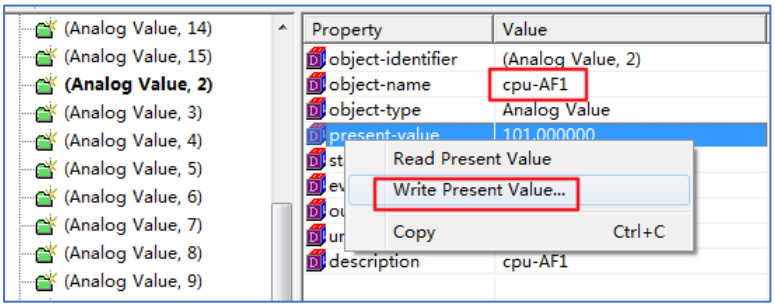


Select the 'present-value' attribute, right-click, and select the 'Read Present Value' option in the right-click menu to update the current value of PLC AI01.

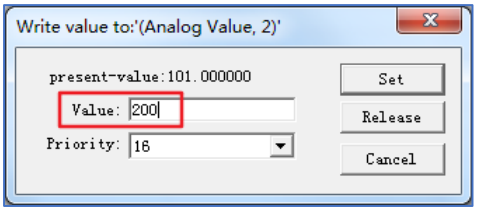




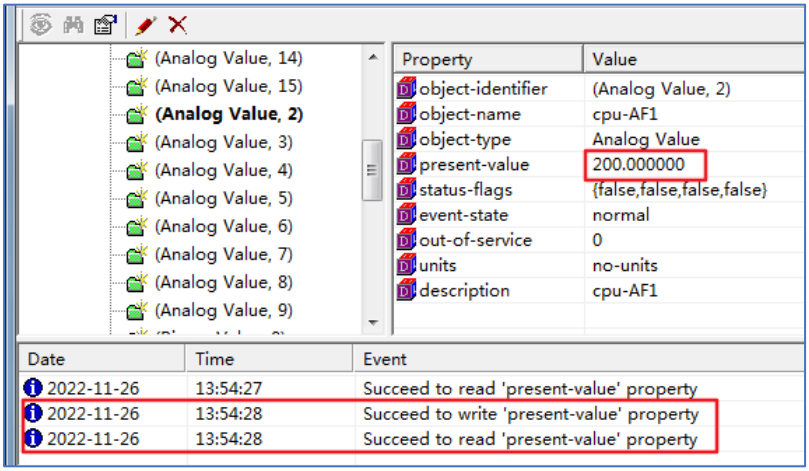
Select the 'Write Present Value' option in the right-click menu to write the value of PLC AF1 as shown in the figure below:



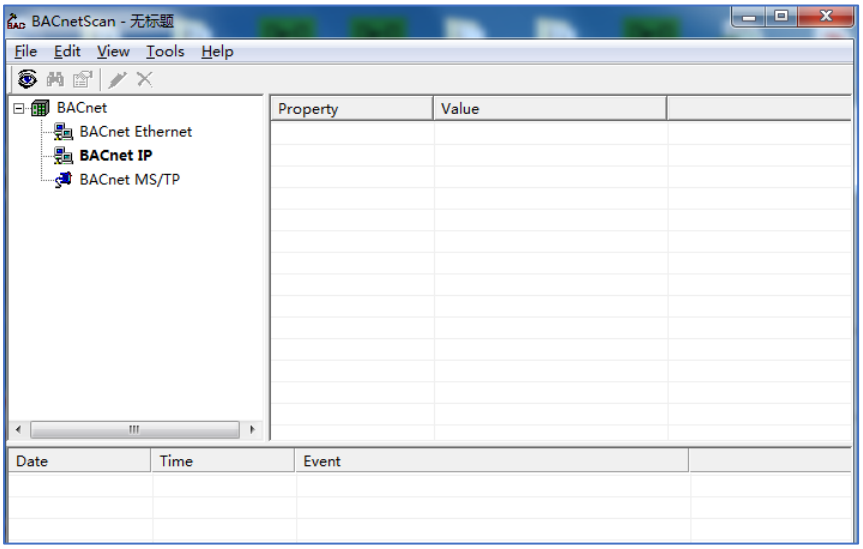
Enter a new value in the 'Value' of the pop-up window, and then click the 'Set' button to write the new value into AF1.



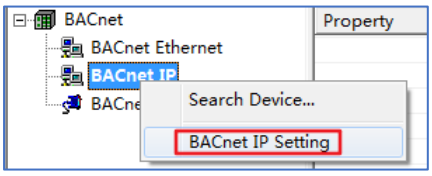
Write operations have priorities 1-16, with the minimum priority being 16.
After the writing is successful, the value of ‘present-value’ will change to a new value, and the information column will prompt ‘Succeed to write ‘present-value’ property’.

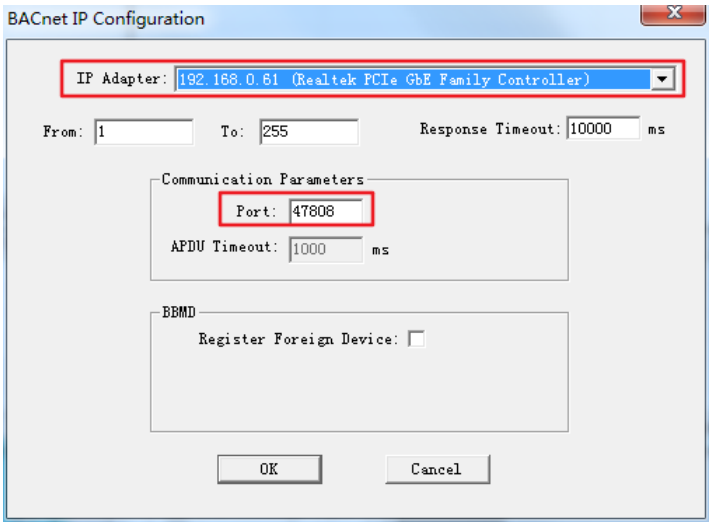


(2) BACnet IP



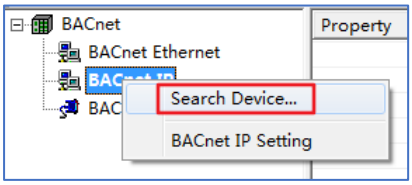
Select 'BACnet IP', right-click, pop-up right-click menu, select 'BACnet IP Setting'.



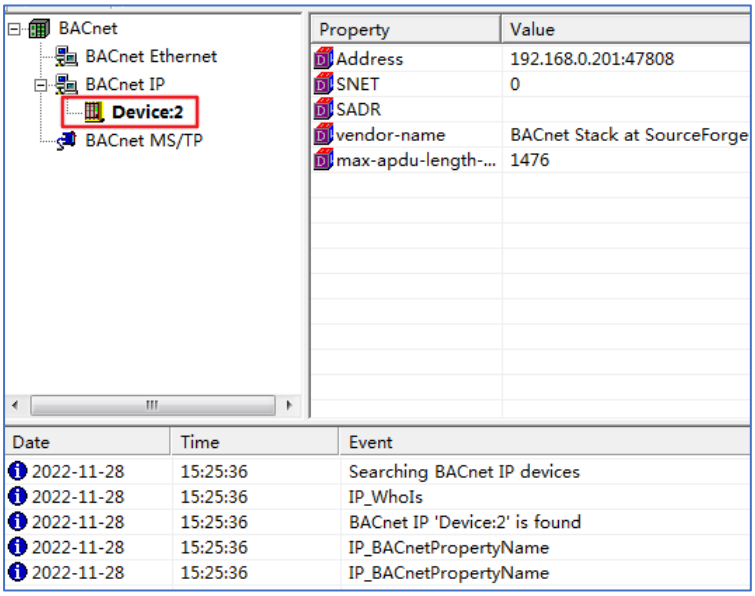


Select the physical network card of the PC, and keep the default value of 47808 for 'Port'. After setting, click the 'OK' button below.

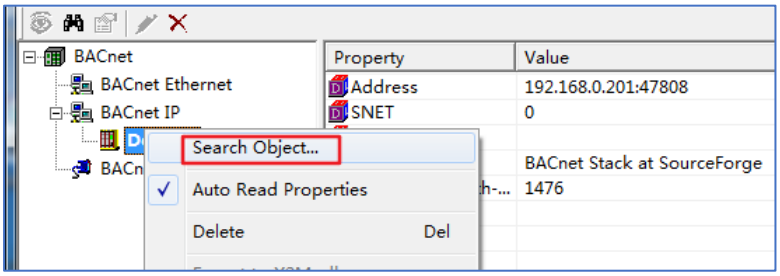
Then select the 'Search Device...' option in the right-click menu, as shown in the figure below.



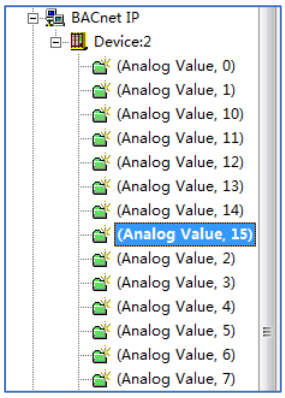
At this time, some prompts will be displayed in the prompt bar, and all found devices will be listed under the 'BACnet IP' option, as shown in the figure below, and the message bar will prompt 'BACnet IP'Device: 2'is found'. The IP of the PLC is 192.168 .0.201.



Select 'Device: 2', right-click, pop up the right-click menu, and select the 'Search Object' option.

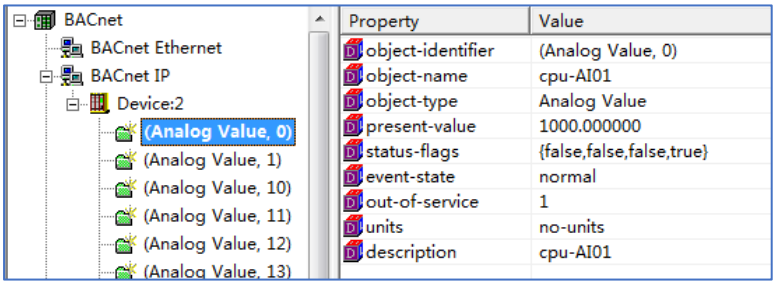


BACnetScan will list all the searched Objects under the Device: 2 option, as shown in the figure below:



All 250 Binary Values and 250 Analog Values of the PLC will be listed, even if they are not used.

Both the name and value of 'Analog Value, 0' can be found in the property bar on the right, as shown in the figure below.



The remaining operations are the same as BACnet MSTP.

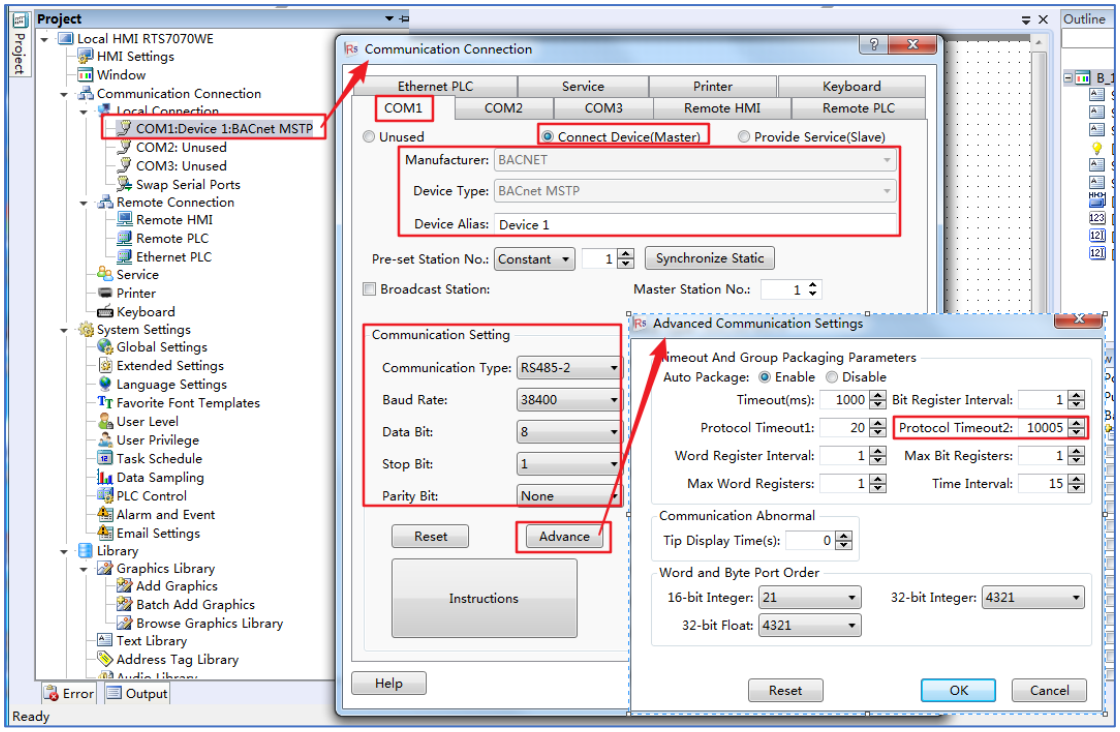
3. HMI communicates with PLC through BACnet MSTP / BACnet IP protocol

BACnet MSTP

(1) Add BACnet device

The COM2 of the PLC is connected to the serial port COM1, COM2 or COM3 of the HMI.

Add BACnet MSTP device on Rievtech Studio, as shown in the figure below.



Double-click COM1 under 'Local Connection' and check the 'Connect Device (Master)' option. Select 'BACNET' for 'Manufacturer' and 'BACnet MSTP' for 'Device Type'.

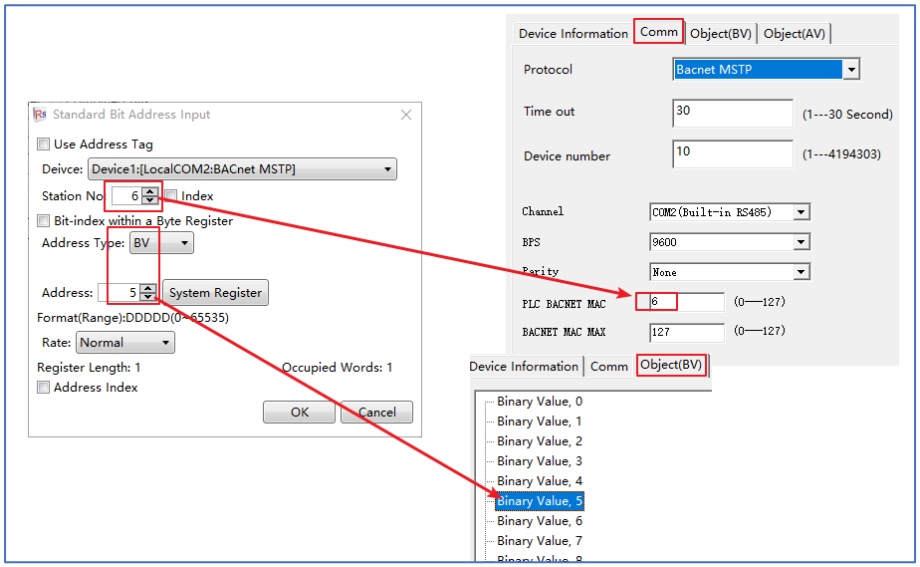
The parameters of 'Communication Setting' are the same as in PLC.

Pay attention when filling in the value of ‘Protocol Timeout2’ in ‘Advance’. Take '127005' as an example. Its first 3 digits '127' indicate that the maximum MAC in the network is 127. This value cannot be set too large, otherwise it will affect the communication efficiency. It is recommended to be the same as the parameters in the PLC, for example, it is 10 in this example. **The last 3 digits '005' are the MAC of the HMI.** This value cannot be the same as the MAC of other BACnet. It is recommended that all MAC values be used in order from small to large.

After the setting is complete, click the 'OK' button.

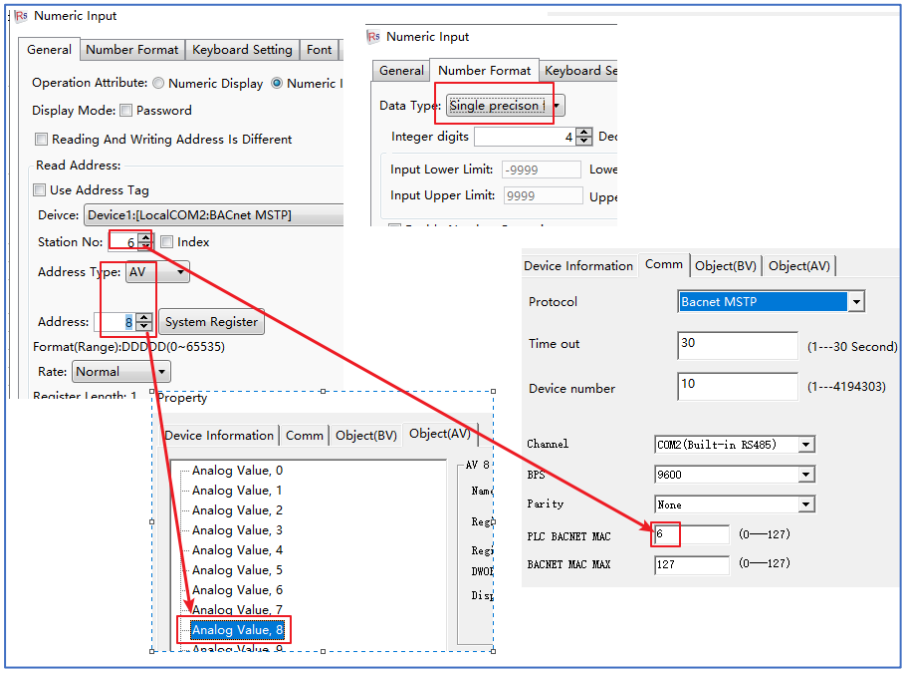
(2) Add components

Bit element



The value of 'Station No.' comes from the 'PLC BACNET MAC' in the PLC parameter. 'BV5' is 'Binary Value,5', and so are other registers.

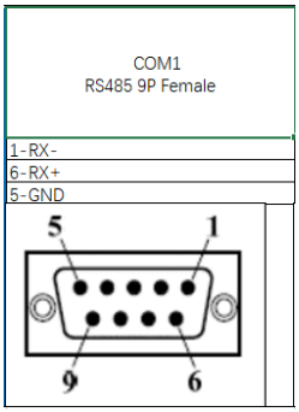
Word element



The value of 'Station No.' comes from the ' PLC BACNET MAC in the PLC parameter. 'AV8' is 'Analog Value,8', and so are other registers.

After adding the components, download the program to the HMI, and observe whether there are communication timeouts, communication errors and other prompts.

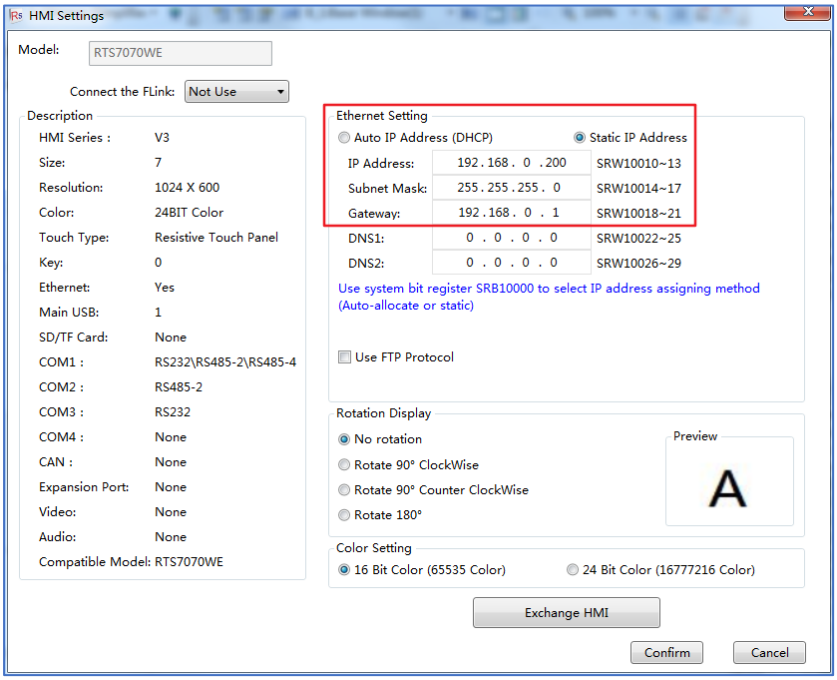
RS485-2 PIN



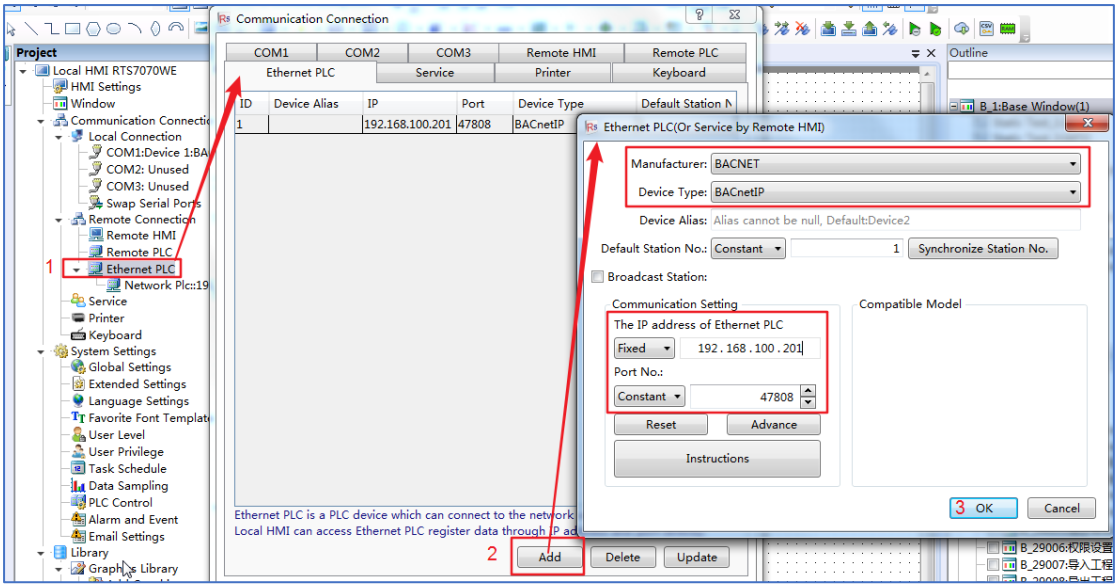
BACnet IP

(1) Add BACnet IP device

HMI and PLC are in a local area network, for example, the IP address of PLC is 192.168.0.201, and the IP address of HMI is 192.168.0.200.



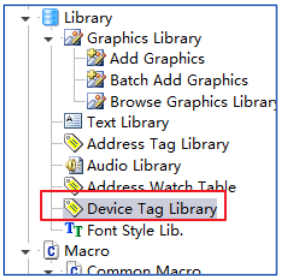
Add BACnet IP device on Rievtech Studio, as shown in the figure below.

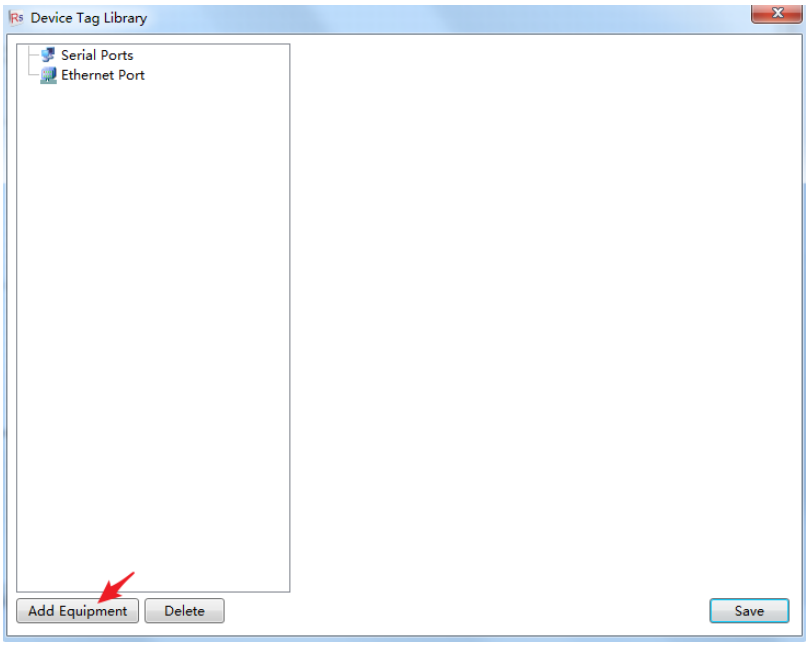


Double-click the 'Ethernet PLC' option, and click the 'Add' button in the pop-up window.
In the new window, select 'BACNET' for 'Manufacturer' and 'BACnetIP' for 'Device Type'.
Fill in the IP address of the PLC, and keep the value of Port as default.
Click the OK button.

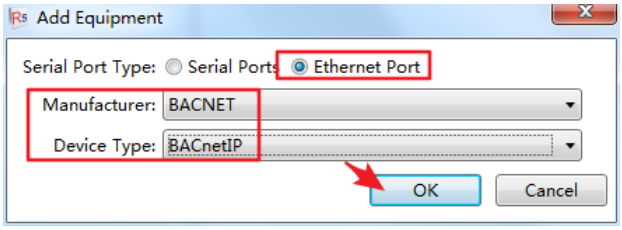
(2) Add BACnetIP 'Device Tag Library'

Double click on 'Device Tag Library'

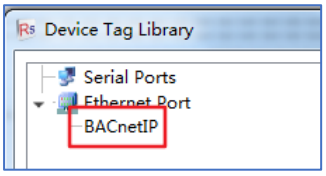




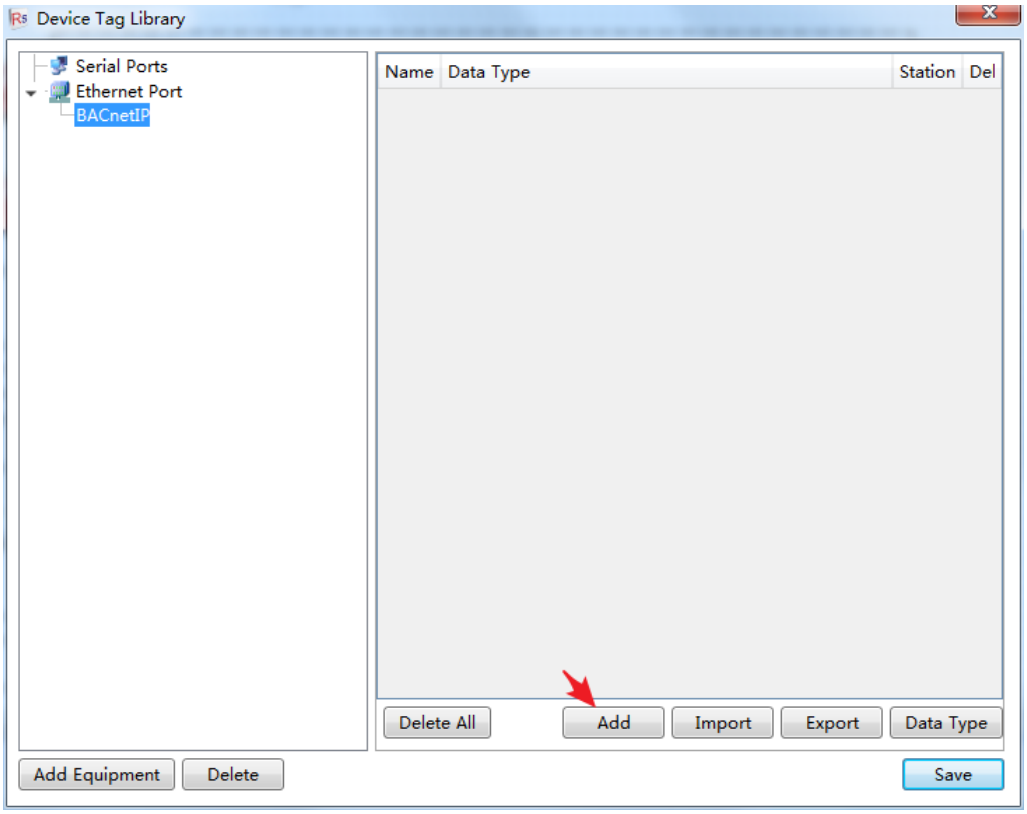
In the pop-up window, select 'Ethernet Port', 'Manufacturer' select 'BACNET', 'Device Type' select 'BACnetIP', as shown below:



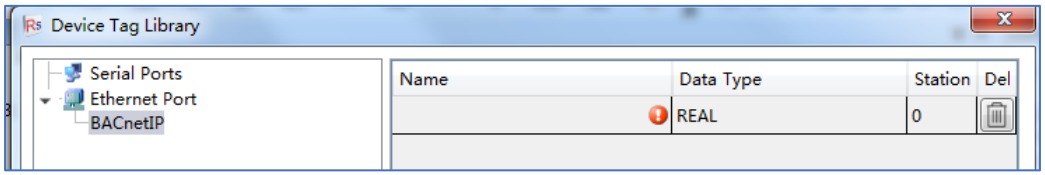
A new 'BACnetIP' will be created under the 'Ethernet Port' option, as shown in the figure below.



Double-click 'BACnetIP', as shown below.

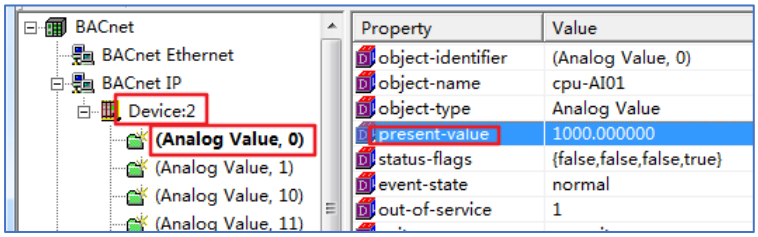


Click the 'Add' button.



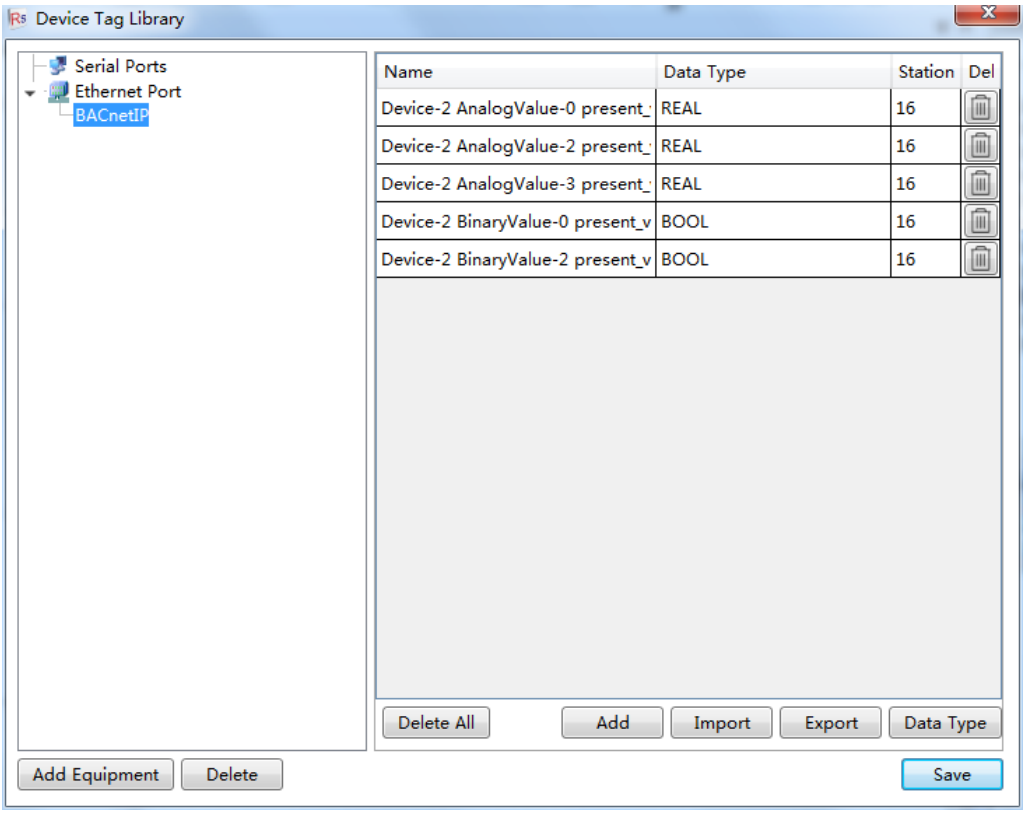
'**Name**': Enter "**Device-2 AnalogValue-0 present_value**". It should be noted that this name is composed of 3 parts in the figure below, and a space is added between each

content. Also there is no space between 'AnalogValue'.



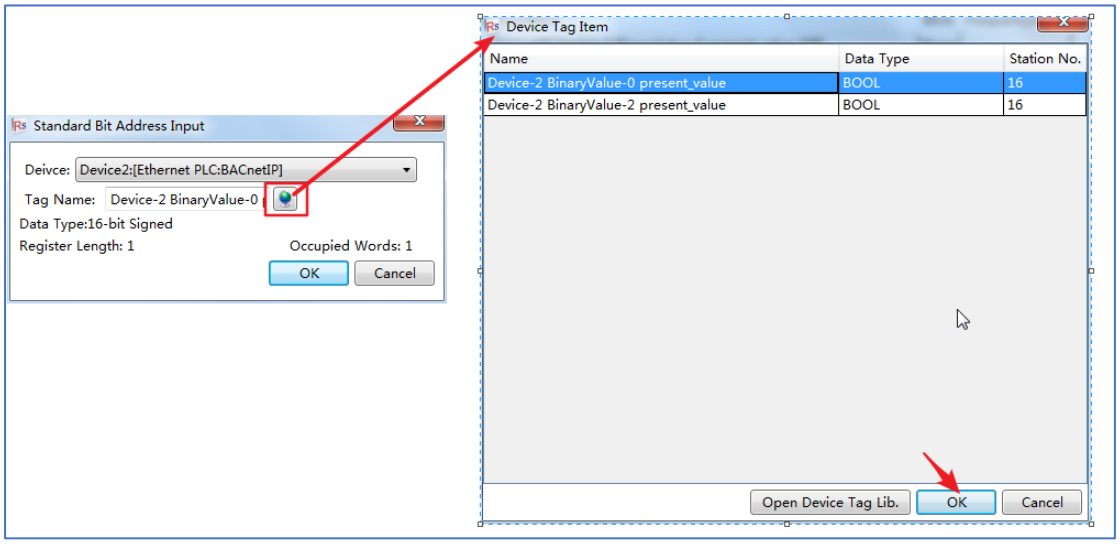
'**Data Type**': Select 'REAL' for AV type data, and 'BOOL' for BV type data.
'**Station**': If there is a priority option, fill in 16 here.

After adding, as shown below:



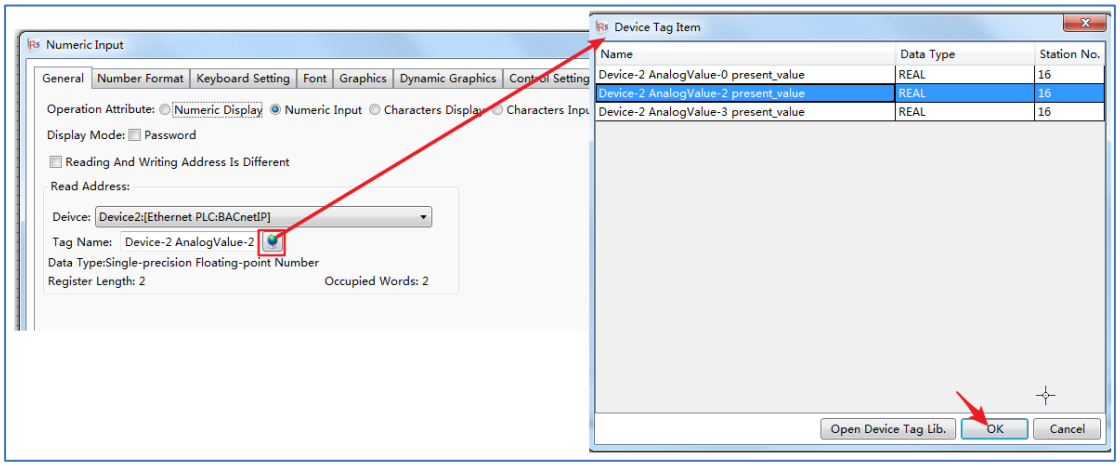
Click the 'Save' button to save the settings.
In addition, the configuration can be exported to a file in CSV format, and a file in CSV format can also be imported.

(3) Add components
Bit element



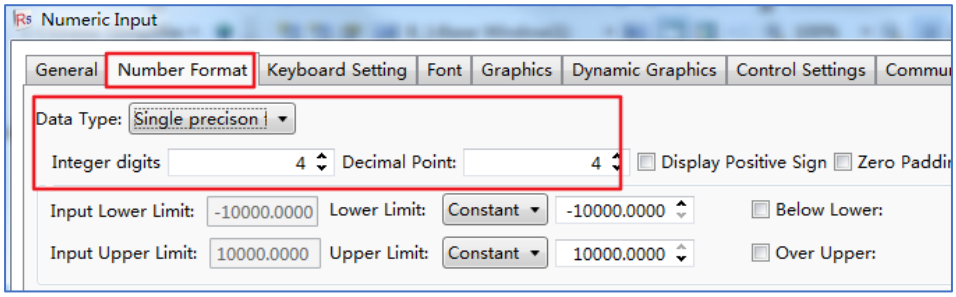
Select a tag and click the 'OK' button.

Word element



Select a tag and click the 'OK' button.

In addition, it should be noted that the values are all in 'float' format, so the display format of the character components is as follows:



After adding the components, download the program to the HMI, and observe whether there are communication timeouts, communication errors and other prompts.