Weintek USA, Inc.
www.WeintekUSA.com
(425) 488-1100

Rev. FEB 18, 2020

Weintek HMI to BACnet IP Device

Introduction: This instruction manual discusses how to communicate with a BACnet IP server. BACnet is a communication protocol designed for building automation. The BACnet protocol defines the **object types** and the **properties** for each object type. All BACnet objects consists of a number of properties for information exchange. The table below shows you the common BACnet object types. A device that is compatible with BACnet protocol must have only one **instance** of Device object type for its structure. An instance number is the way to identify items within an object type.

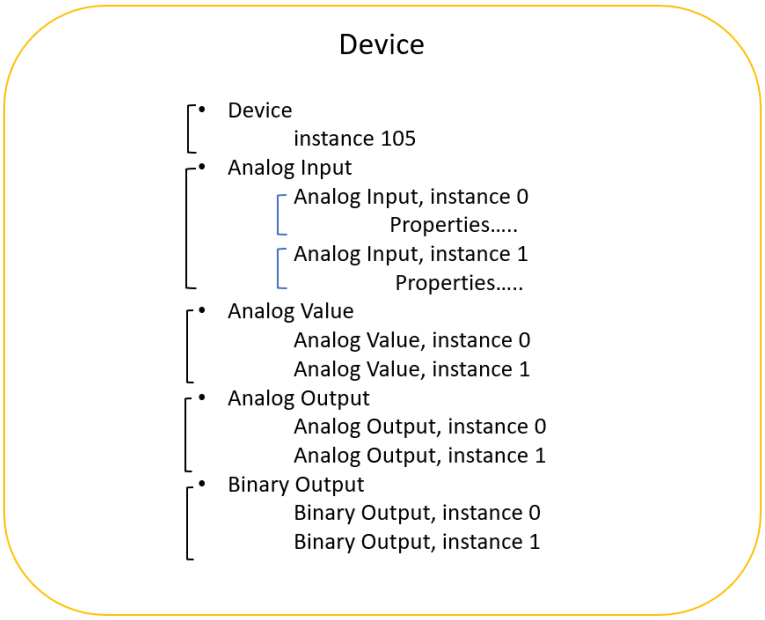
Object Type	Object Type ID	Example of Use
Analog Input	0	Analog sensor input
Analog Output	1	Command output
Analog Value	2	Setpoints or parameters
Binary Input	3	Digital sensor input
Binary Output	4	Relay output
Binary Value	5	Digital logic
Device	8	Device information, supported object types and services
Multi-state Input	13	Represents the states of the process, such as OFF, ON, AUTO
Multi-state Output	14	Represents the desired states of the process
Multi-state Value	19	Represents multi-state indicators

There are many properties of the object types that are used to monitor and control a BACnet-compatible device. Some properties apply only to certain object types, but every object type must have at least three properties, including **Object_Identifier**, **Object_Name**, and **Object_Type**. For example, the table below shows you some of the properties within Analog input, instance number 1. A BACnet IP client issues the **Read_Property** service to the BACnet IP server in order to get temperature data from the **Present_Value** property.

Properties Name	Properties Value
Object_Identifier	Analog input, instance 1
Object_Name	Office temperature
Object_Type	Analog input

Present_Value	72.2
Event_State	normal
Units	Degrees Fahrenheit
High_Limit	95.0
Low_Limit	40.0

The object types supported by a BACnet device can be found under the Protocol Object Types Supported property of the **Device** object type or in the user manual of the device.



BACnet IP Object Modeling

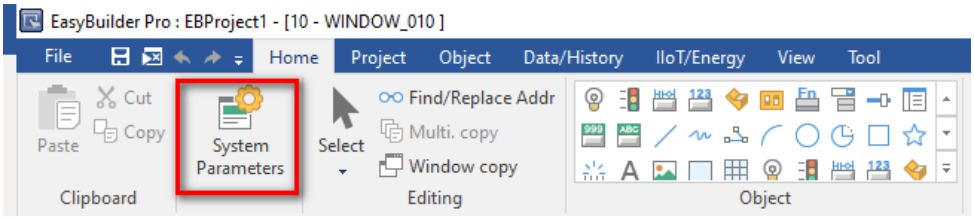
Equipment & Software:

1.EasyBuilder Pro v6.03.02.294

2. Weintek HMI cMT3090

3. BACnet IP server device

Detail of the HMI Programming: Open a new project and choose the HMI model cMT3090. To get the HMI talking to the BACnet IP server, go to the [HOME] tab on the top of the menu and then click on the [System Parameters] button.

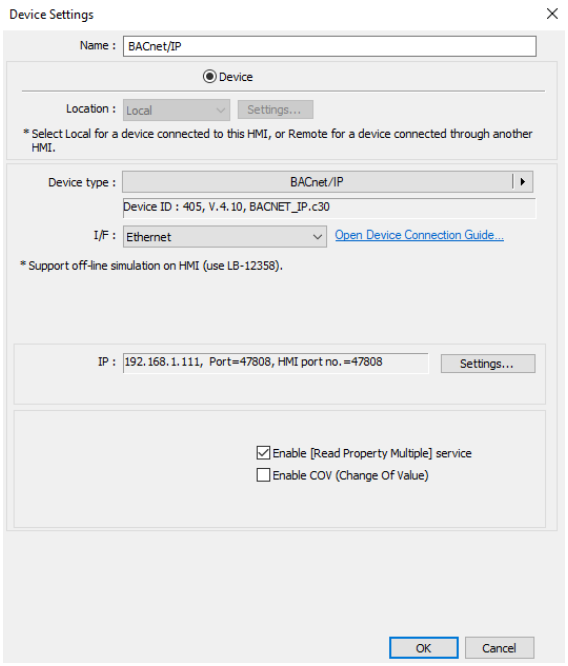


Search for **[BACnet/ IP]** driver from the list of the device drivers.

I/F: Ethernet

Enable [Read Property Multiple] Service: This option depends on the server device.

Enable COV (Change of Value): If enabled, enter the number of seconds between two COV subscriptions. Please check with the device manufacturer if your device supports the COV feature.

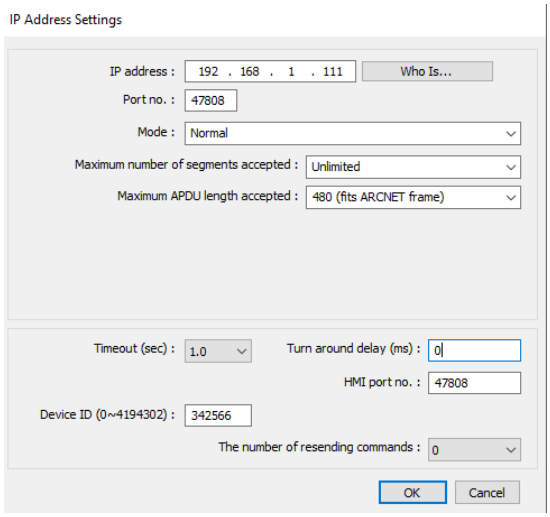


IP address: Enter the IP address of the device.

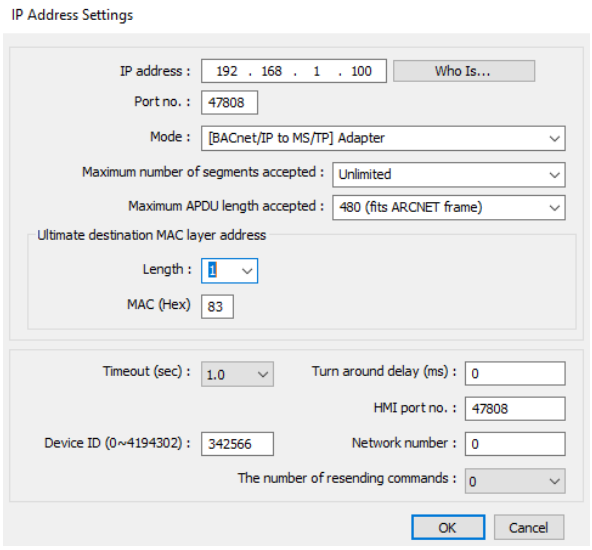
Port no.: Enter the port number of the device. By default the BACnet device uses 47808.

Mode: Select a correct mode according to the specification of the device.

- Normal (the **Normal** mode is used in this manual.)



- [BACnet/IP to MS/TP] Adapter
- [BACnet/IP] Server
  If selected, enter the **Length** and **MAC(Hex)** within **Ultimate destination MAC layer address.** Enter the MS/TP network number to **Network number**.

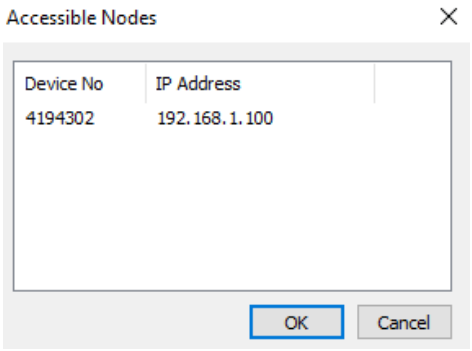


Maximum number of segments accepted: The number of segments sent before sending a reply. It is specified by the device's **Segmentation_Supported**.

Maximum APDU length accepted: The actual packet length on BACnet network. It is specified by the device's **Max_APDU_Length_Accepted**.

Device ID: Enter the instance number of the device.

You can click on the [Who is] button to discover the device on the BACnet network. Make sure your PC and the device are on the same subnet. If the device is discovered, the **IP address** and **Device ID** of the device will be shown as below.

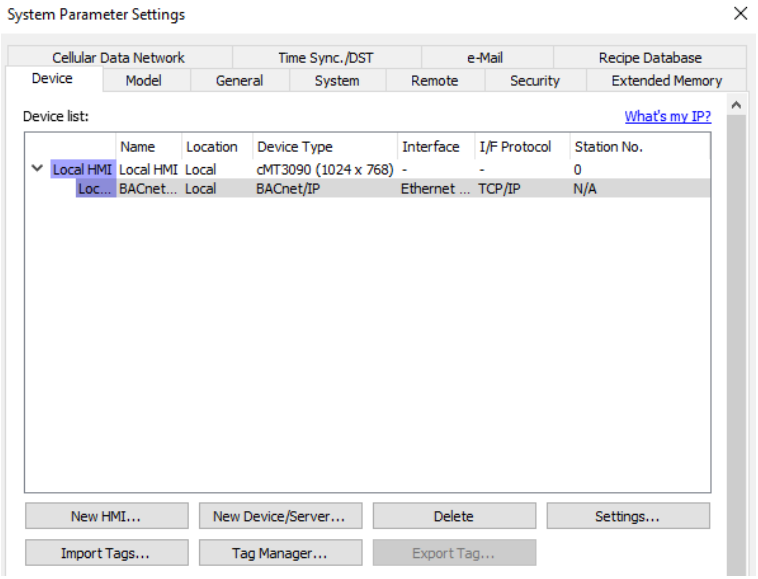


After the above communication settings are finished, you will need to import tags (BACnet object types). Easybuilder Pro supports the following two methods.

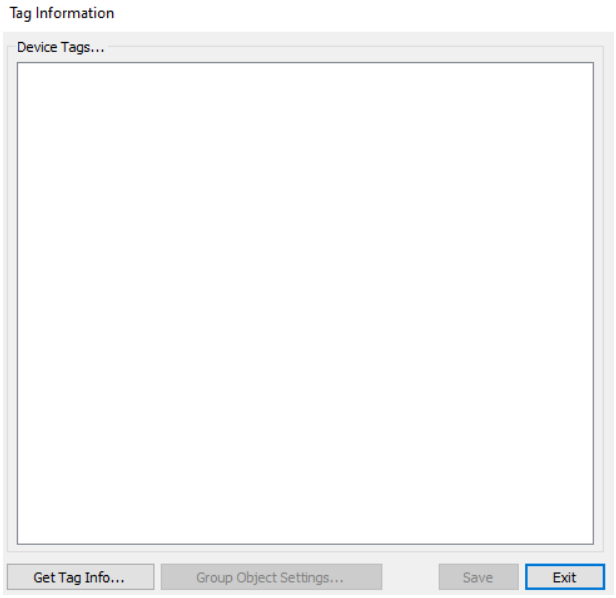
- [Tag Manager…]: It reads the tag information from the device directly.
- [Import Tag…]: Certain BACnet IP clients, such as SCADA, have the capability to export tag information as a CSV or EDE (Engineering Data Exchange) file from a discovered device. These files can be imported into Easybuilder Pro.

Method 1- Tag Manager

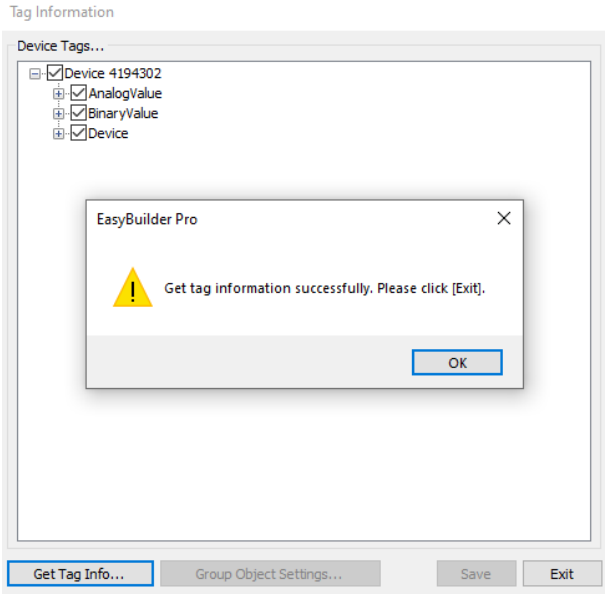
Click on the [Tag Manager…] button.



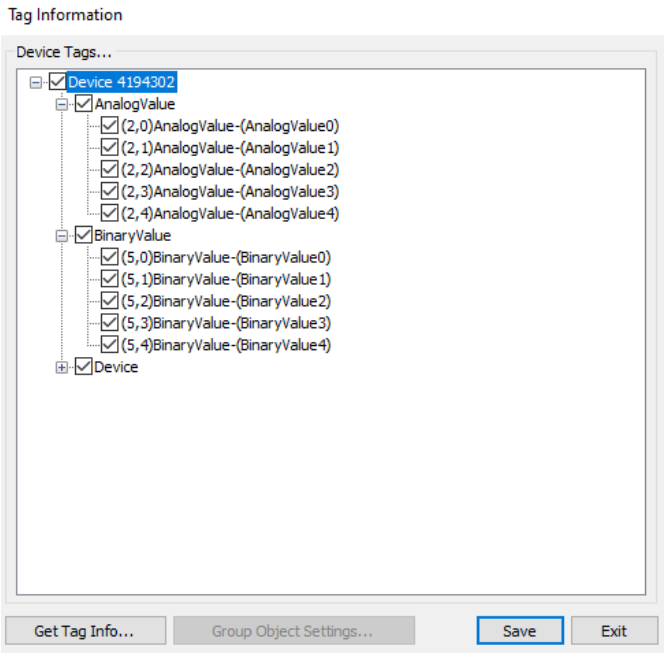
Click on the [Get Tag Info…] button. The tag information will be gathered.



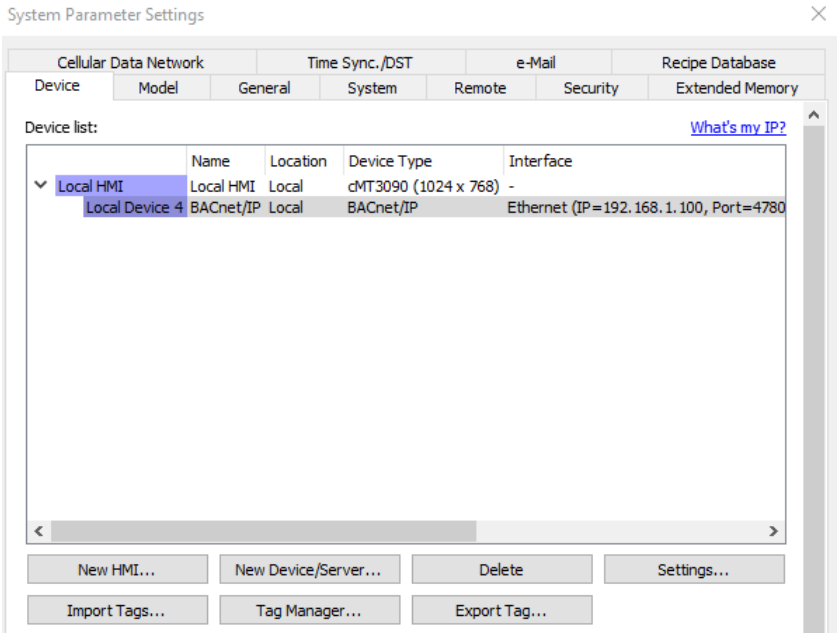
The available object types will be listed as below once it succeeds.



You can select which object types you need to use in this project or select all of the objects. Click the [Save] button to confirm.



You can create a CSV file that contains the object types in the project using the [Export Tag...] button and import into another project.



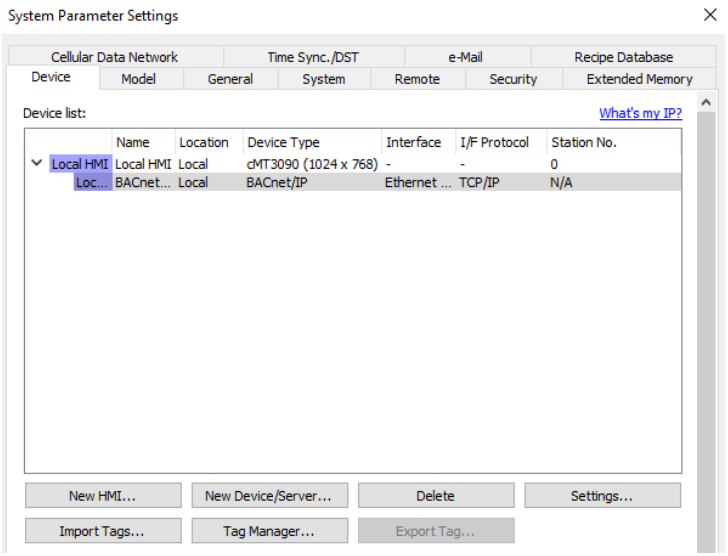
The CSV file can be opened in Excel. The tags starting at line 6 are listed in the following format.

[Device_ID], [Object_Type], [Object_Instance], [Object_Name], [Description]

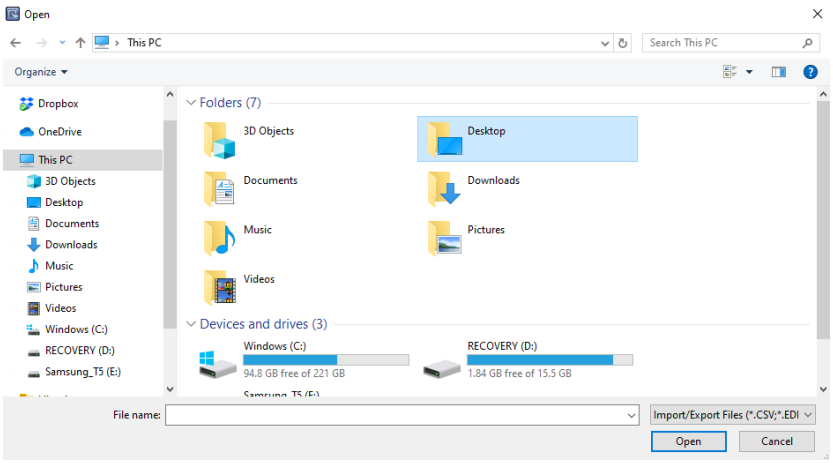
	A	B	C	D	E
1	GROUP_ID	GROUP_NAME			
2	1	New Group			
3	DEVICE_ID	GROUP_ID	DEVICE_NAME		
4	4194302	1	Device		
5	DEVICE_ID	OBJECT_TYPE	INSTANCE	OBJECT_NAME	DESCRI
6	4194302	2	0	AnalogValue	AnalogValue0
7	4194302	2	1	AnalogValue	AnalogValue1
8	4194302	2	2	AnalogValue	AnalogValue2
9	4194302	2	3	AnalogValue	AnalogValue3
10	4194302	2	4	AnalogValue	AnalogValue4
11	4194302	5	0	BinaryValue	BinaryValue0
12	4194302	5	1	BinaryValue	BinaryValue1
13	4194302	5	2	BinaryValue	BinaryValue2
14	4194302	5	3	BinaryValue	BinaryValue3
15	4194302	5	4	BinaryValue	BinaryValue4
16	4194302	8	4194302	Device	BACnet Server
17					

Method 2- Import Tags

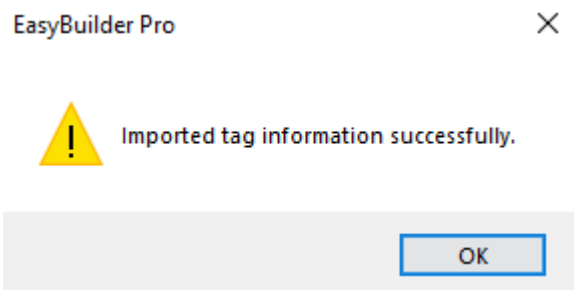
Click on the [Import Tags...] button.



Navigate to your EDE file or the CSV file you exported from EasyBuilder Pro using Method 1.



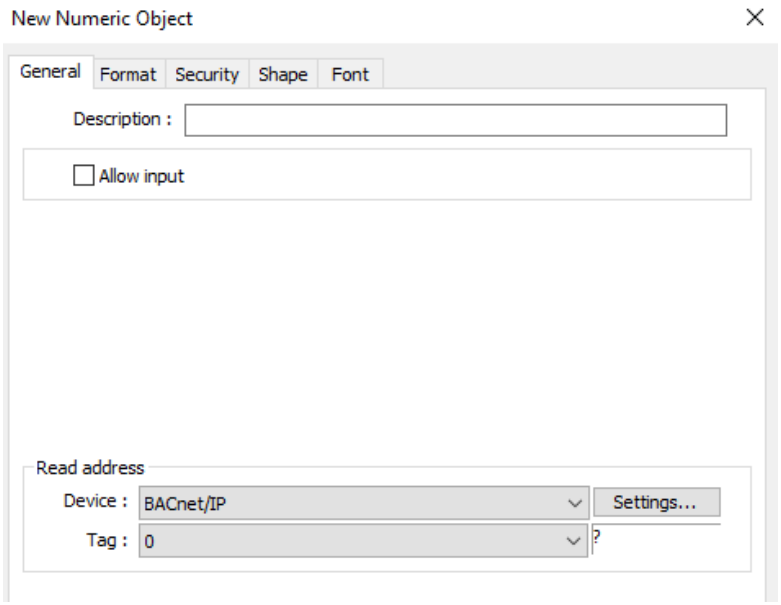
Once the tags are imported, click the [OK] button on the following dialog.



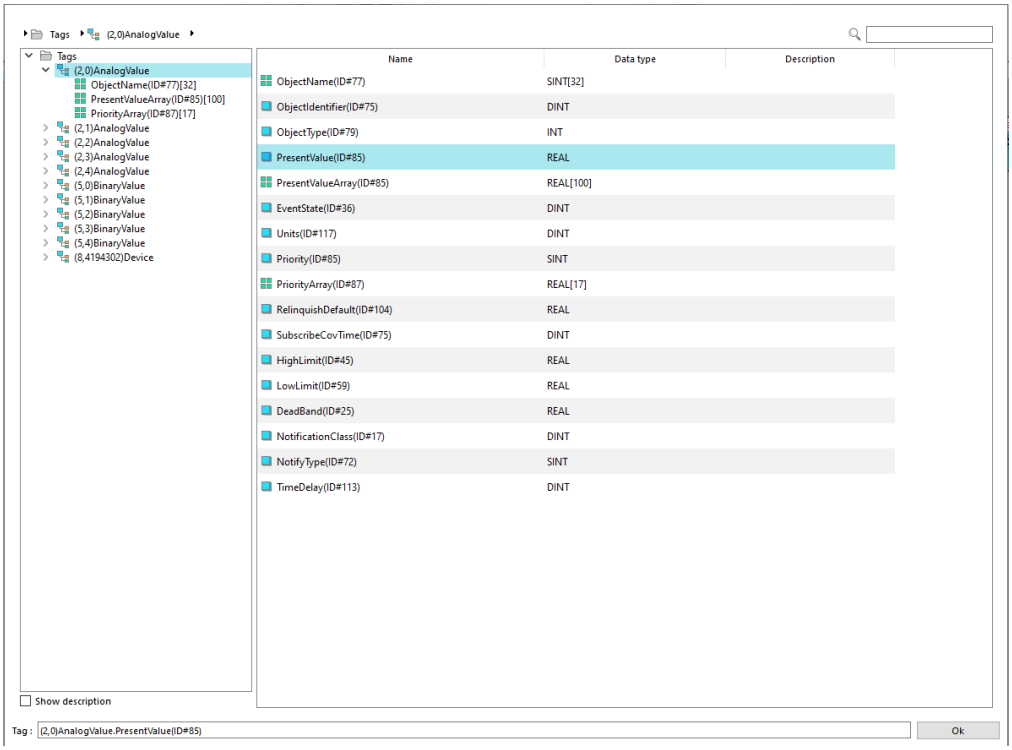
How to read Present_Value property of Analog Value

Create a Numeric object and specify the tag by clicking the [Tag] box.

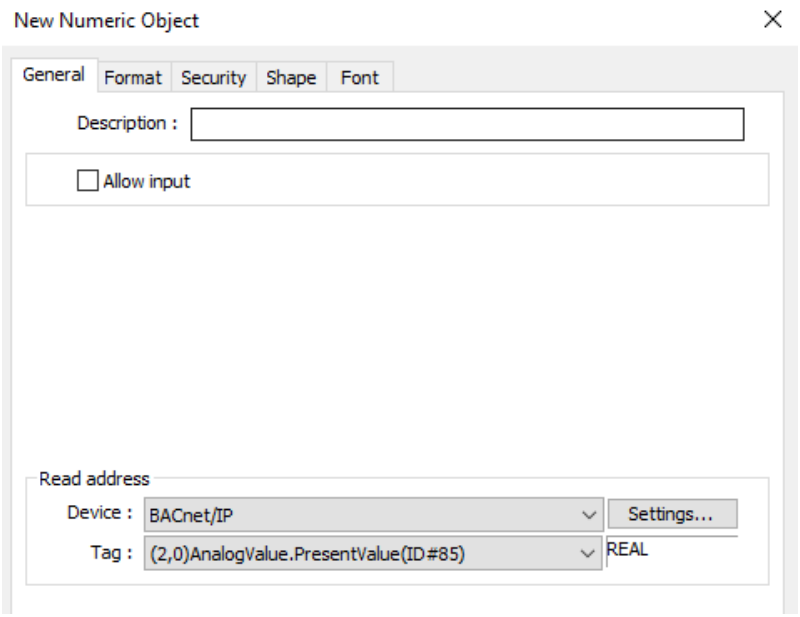
In this case, the Present_Value is read-only data. Unchecking [Allow input] is necessary.



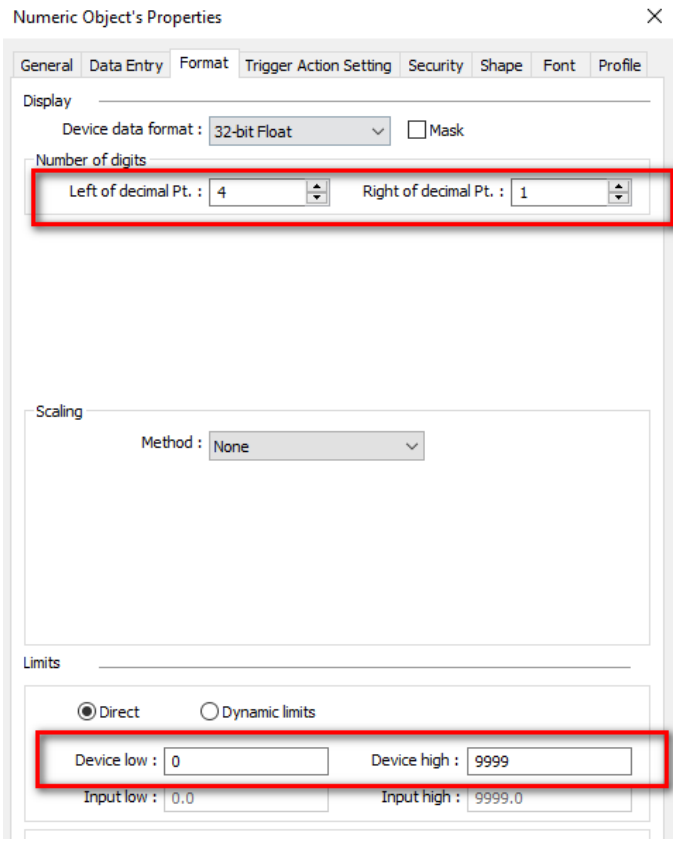
Select the Present_Value under (2,0) Analog Value, which is the instance 0 of Analog Value.



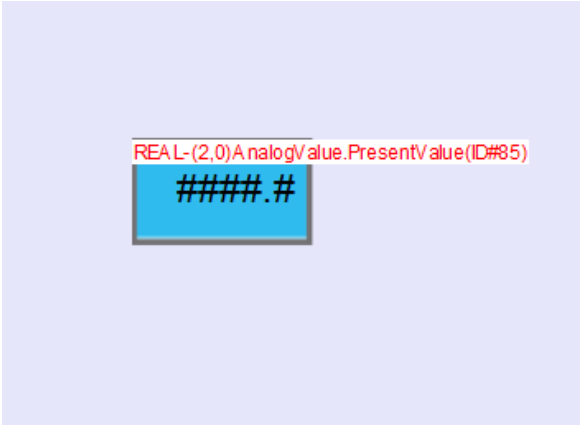
Once the tag is selected, go to the [Format] tab.



Under the [Format] tab, enter the number of digits used in this tag as well as the device's low limit and high limit. Click the [OK] button to finish setting up this object.

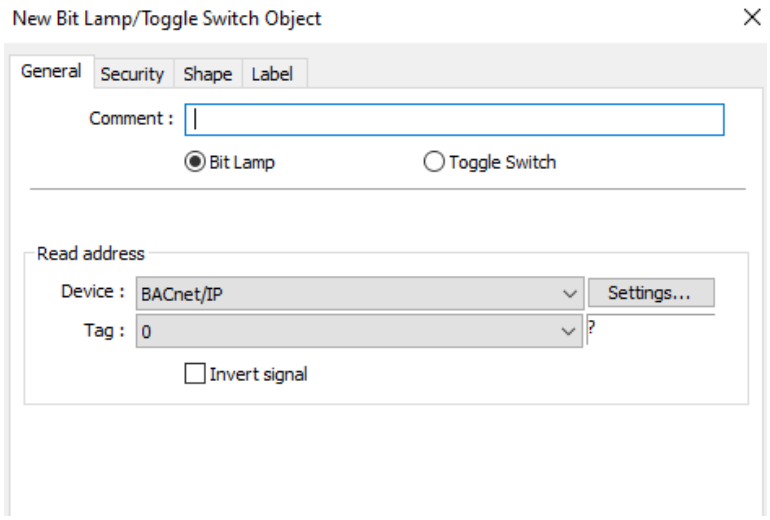


Place the Numeric object onto the editing area.

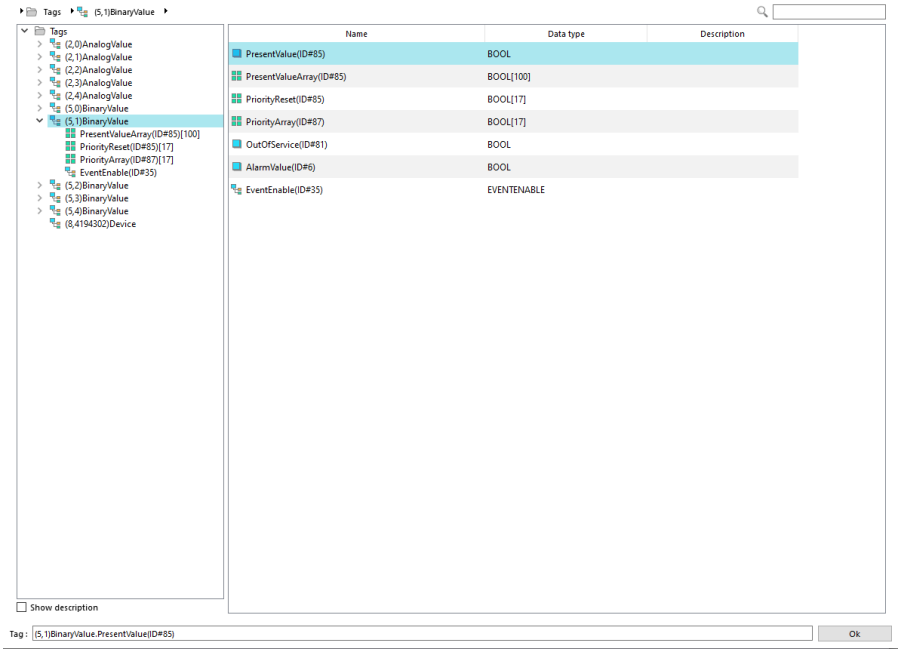


How to read/write Present_Value property of Binary Value

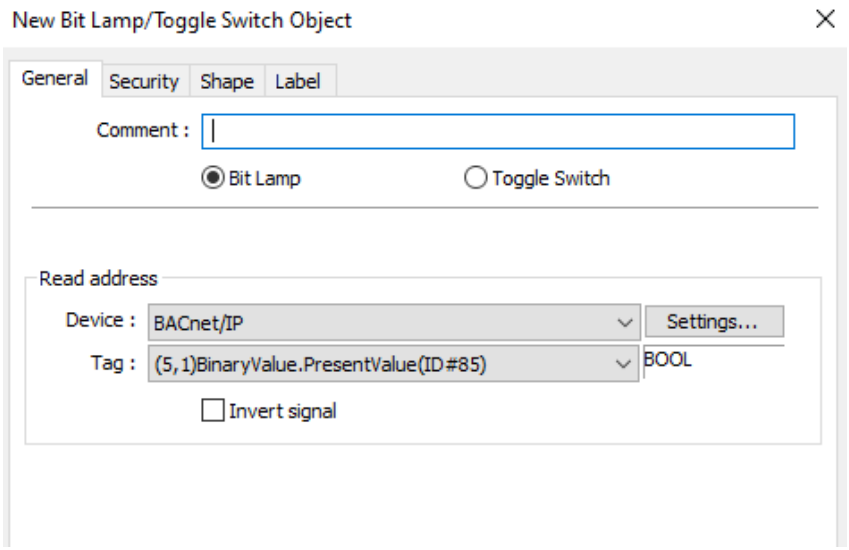
Create a Bit Lamp object and specify the tag by clicking the [Tag] box.



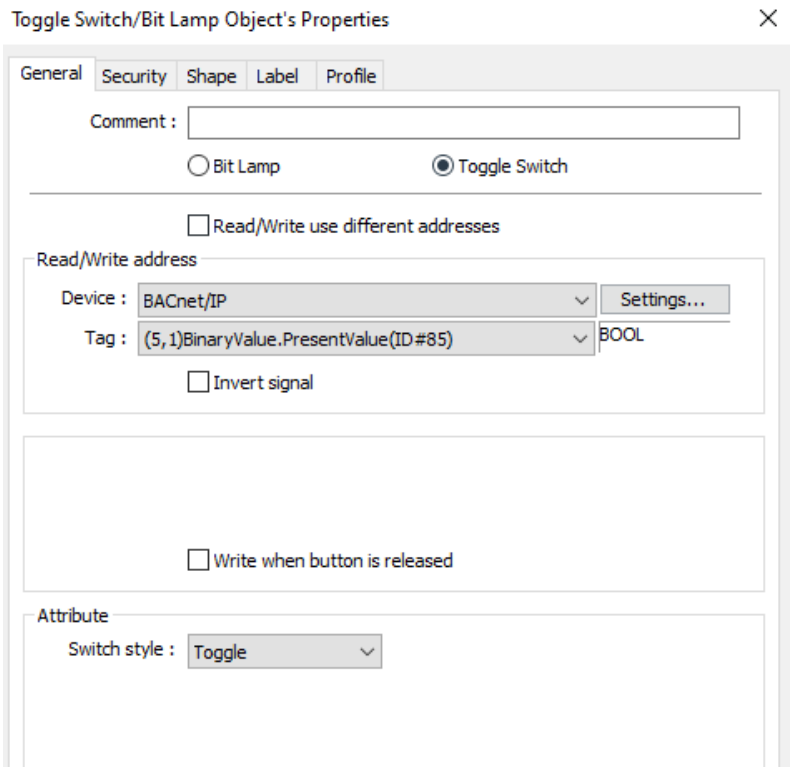
Select the Present_Value under (5,1) Binary Value, which is the instance 1 of Binary Value.



In this case, the tag allows an operator to control the device. Select **Toggle Switch** to enable the control function.



Within the Attribute, select **Toggle**.

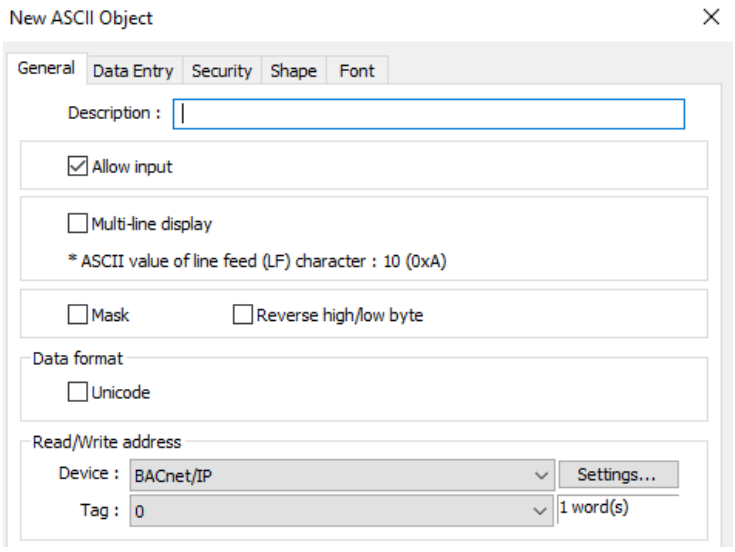


Place the Toggle Switch object onto the editing area.

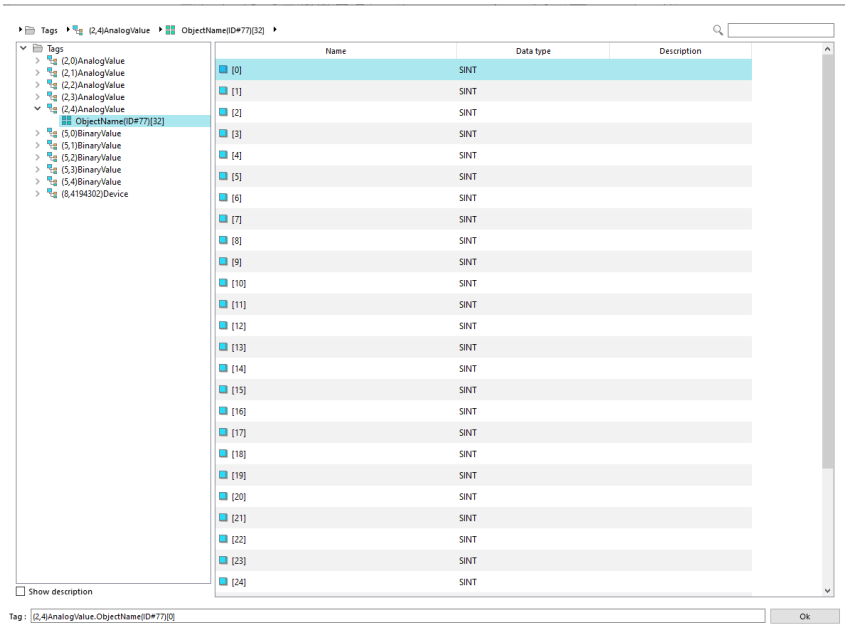
How to read/write Object_Name property

Some properties are **CharacterString** data in a BACnet device, such as **Object_Name** and **Object_Description**. Those properties in Easybuilder pro are defined as an array of SINT.

To access those properties, create an ASCII object. Click on the [Tag] box.

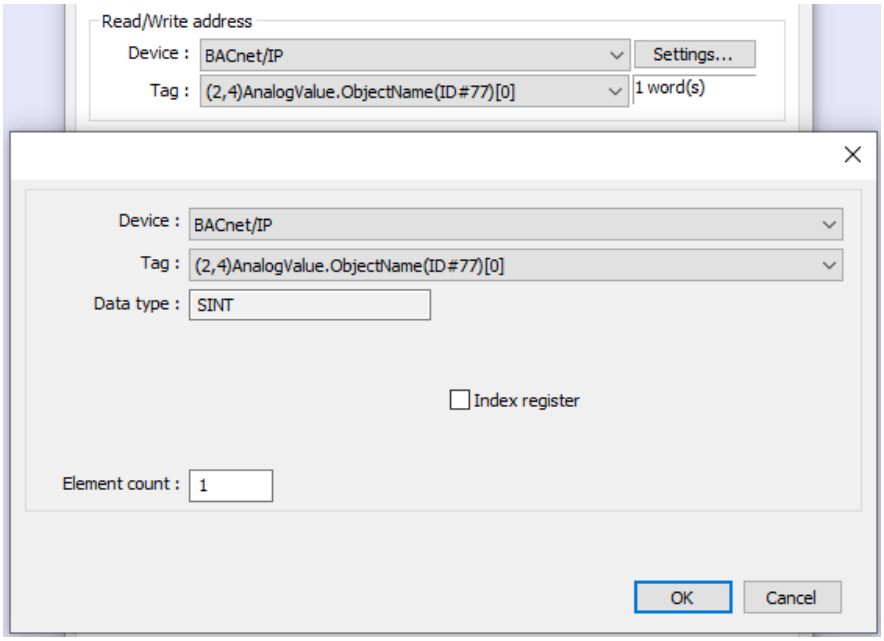


Select the first element of the array under **Object_Name**.

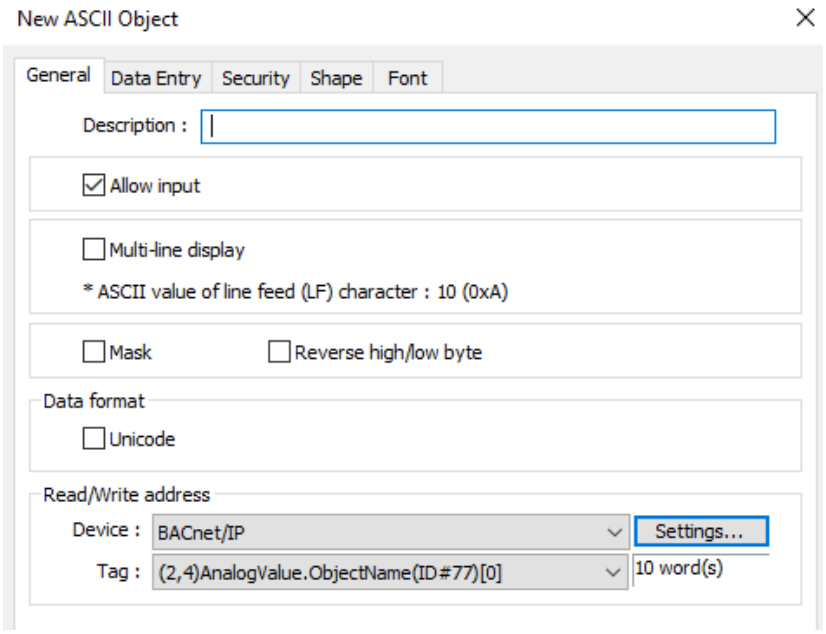


Click the [Settings…] button to enter the number of characters used by this property.

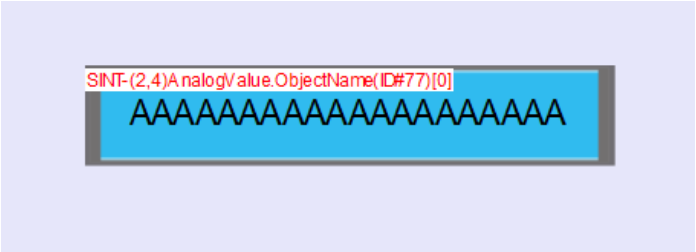
Note: the unit of string data in Easybuilder Pro is **Word**.



In this case, check [Allow input] to allow an operator to change the name of the object type on the HMI screen.



Place the ASCII object onto the editing area.



BACnet is a registered trademark of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

Founded in 1996, WEINTEK LABS is a global-leading HMI manufacturer and is dedicated to the development, design, and manufacturing of practical HMI solutions. WEINTEK LAB's mission is to provide quality, customizable HMI-solutions that meet the needs of all industrial automation requirements while maintaining customer satisfaction by providing "on-demand" customer service. WEINTEK LABS brought their innovative technology to the United States in 2016, WEINTEK USA, INC., to provide quality and expedient solutions to the North American industrial market.

6219 NE 181s Street STE 120
Kenmore, WA 98028
425-488-1100