

# Weintek HMI to BACnet IP Device



Weintek USA, Inc.  
[www.WeintekUSA.com](http://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

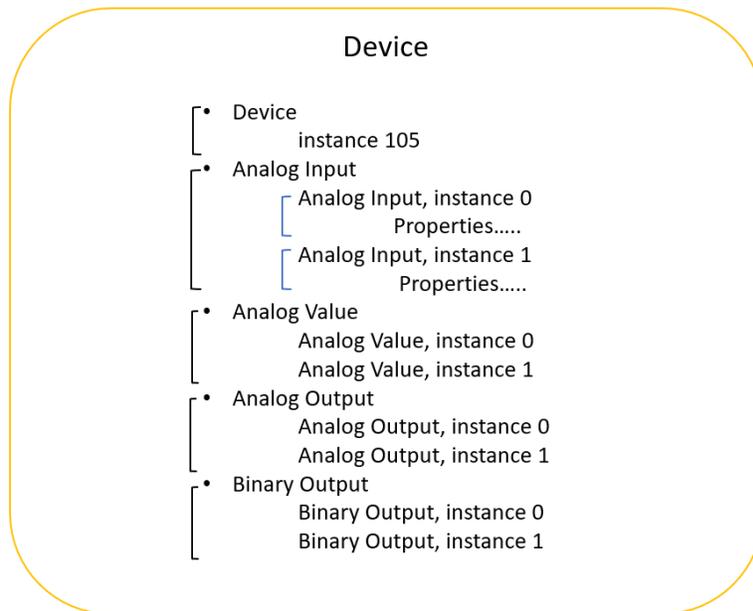
There are many properties of the object types that are used to monitor and control a BACnet-compatible device. Some properties apply only to certain object types, but every object type must have at least three properties, including **Object\_Identifier**, **Object\_Name**, and **Object\_Type**. For example, 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

## Weintek HMI to BACnet IP Device

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.



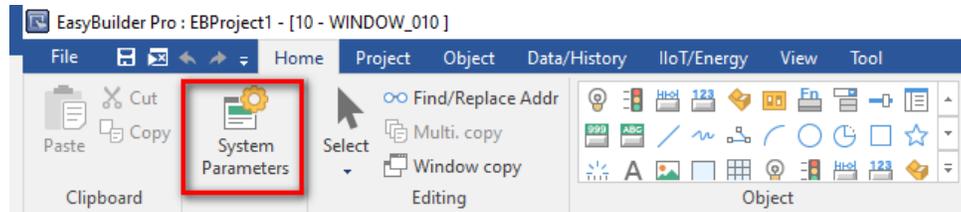
### *BACnet IP Object Modeling*

#### **Equipment & Software:**

1. EasyBuilder Pro v6.03.02.294
2. Weintek HMI cMT3090
3. BACnet IP server device

## Weintek HMI to BACnet IP 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.



## Weintek HMI to BACnet IP Device

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.)

The screenshot shows the 'IP Address Settings' dialog box. The 'IP address' field is set to '192 . 168 . 1 . 111'. The 'Port no.' is '47808'. The 'Mode' dropdown is set to 'Normal'. Other settings include 'Maximum number of segments accepted' (Unlimited), 'Maximum APDU length accepted' (480 (fits ARCNET frame)), 'Timeout (sec)' (1.0), 'Turn around delay (ms)' (0), 'HMI port no.' (47808), 'Device ID (0~4194302)' (342566), and 'The number of resending commands' (0). 'OK' and 'Cancel' buttons are at the bottom.

- [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**.

The screenshot shows the 'IP Address Settings' dialog box with the 'Mode' dropdown set to '[BACnet/IP to MS/TP] Adapter'. The 'IP address' is '192 . 168 . 1 . 100'. The 'Port no.' is '47808'. The 'Mode' dropdown is '[BACnet/IP to MS/TP] Adapter'. Other settings include 'Maximum number of segments accepted' (Unlimited), 'Maximum APDU length accepted' (480 (fits ARCNET frame)), 'Ultimate destination MAC layer address' section with 'Length' (1) and 'MAC (Hex)' (83), 'Timeout (sec)' (1.0), 'Turn around delay (ms)' (0), 'HMI port no.' (47808), 'Device ID (0~4194302)' (342566), 'Network number' (0), and 'The number of resending commands' (0). 'OK' and 'Cancel' buttons are at the bottom.

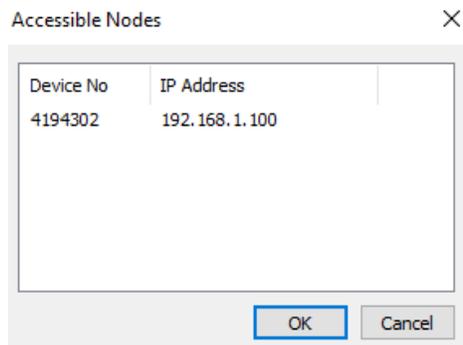
## Weintek HMI to BACnet IP Device

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.



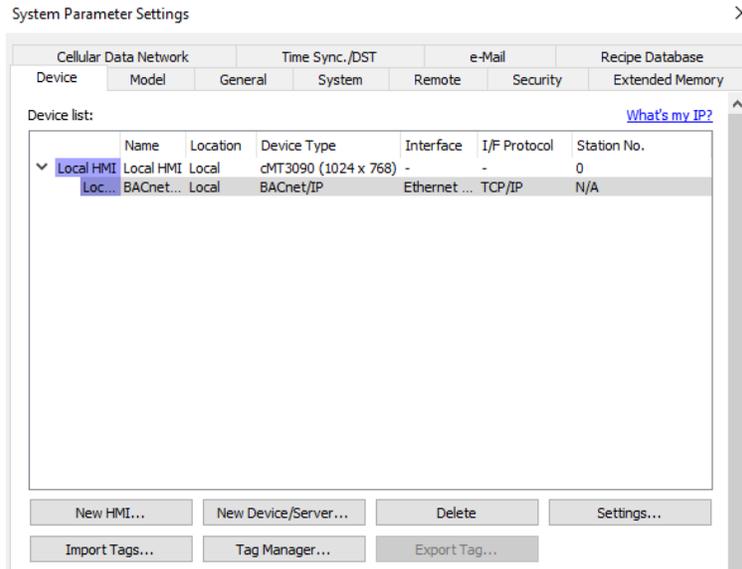
After the above communication settings are finished, you will need to import tags (BACnet object types). Easybuilder Pro supports the following two methods.

- [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.

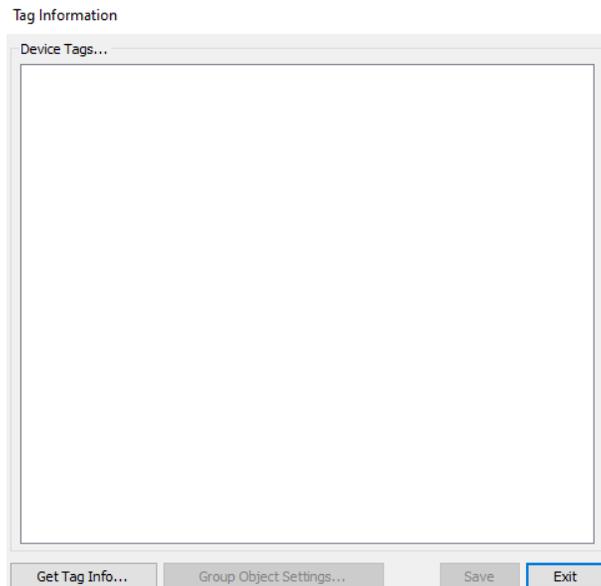
# Weintek HMI to BACnet IP Device

## Method 1- Tag Manager

Click on the [Tag Manager...] button.

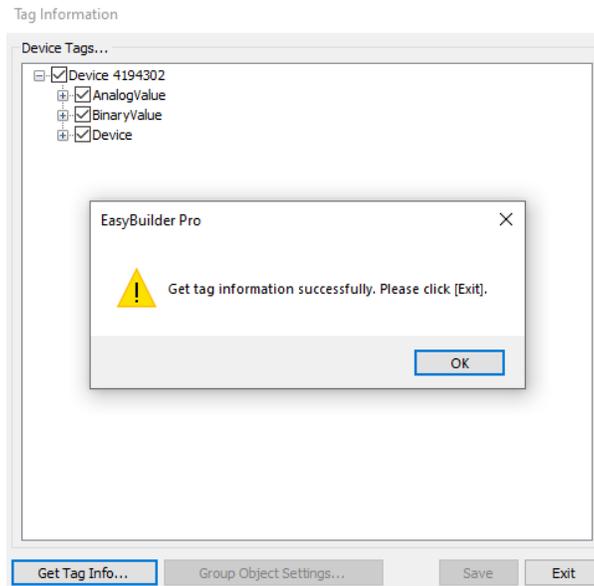


Click on the [Get Tag Info...] button. The tag information will be gathered.

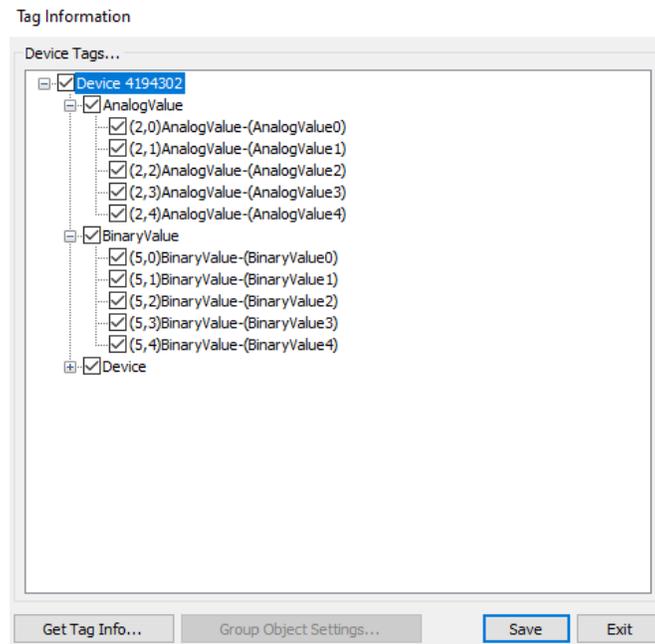


## Weintek HMI to BACnet IP Device

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

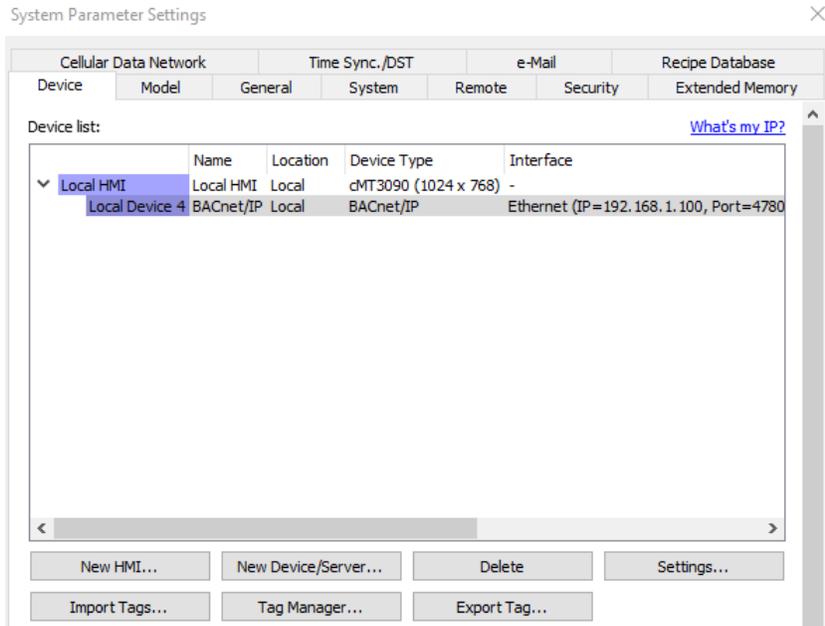


You can select which object types you need to use in this project or select all of the objects. Click the [Save] button to confirm.



## Weintek HMI to BACnet IP Device

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.

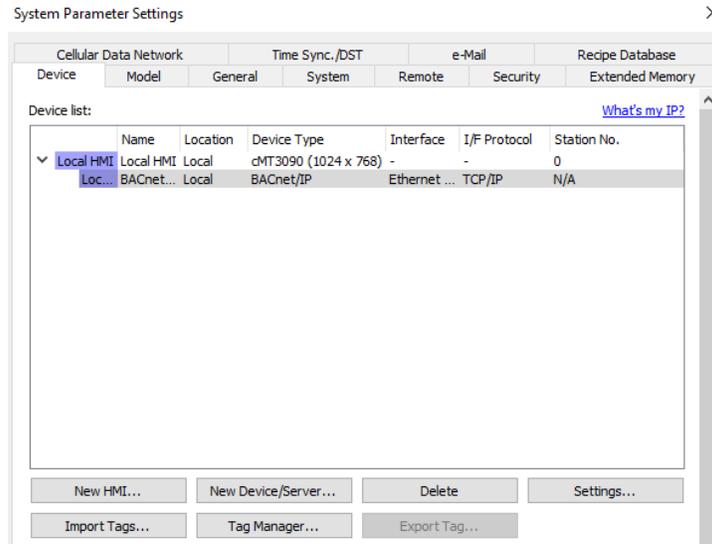
[Device\_ID], [Object\_Type], [Object\_Instance], [Object\_Name], [Description]

	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					

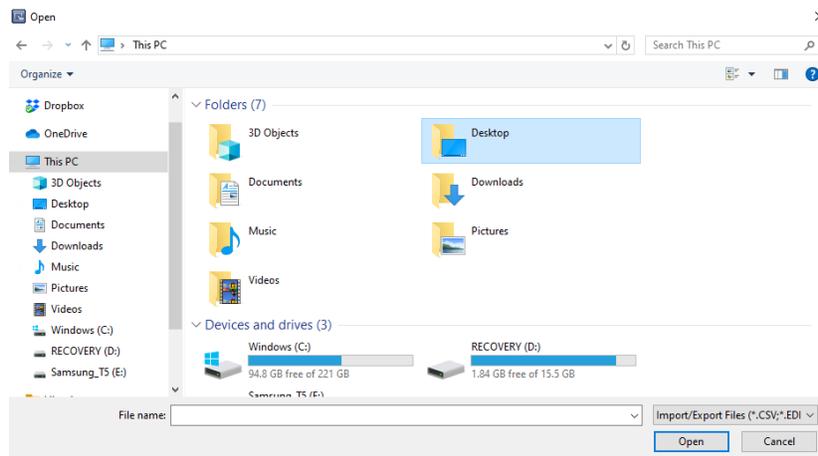
# Weintek HMI to BACnet IP Device

## Method 2- Import Tags

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

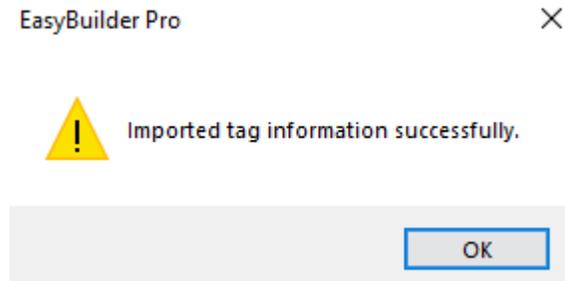


Navigate to your EDE file or the CSV file you exported from EasyBuilder Pro using Method 1.



## Weintek HMI to BACnet IP Device

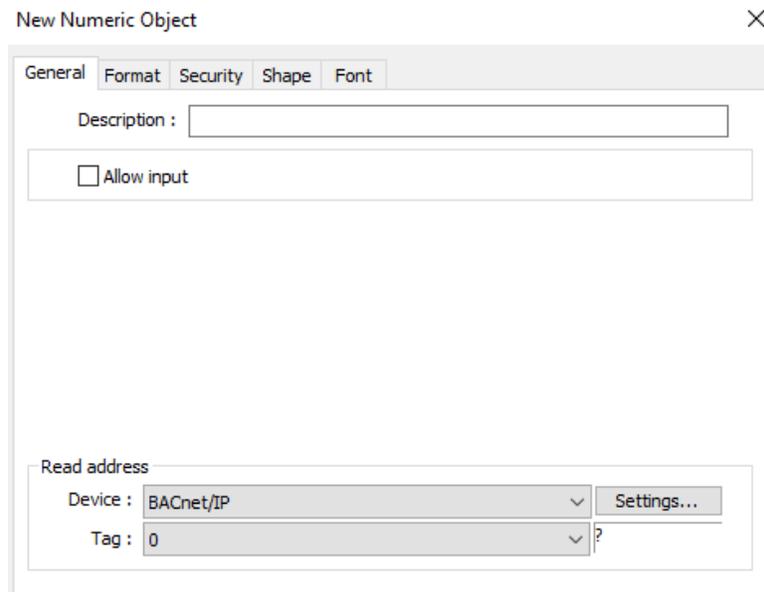
Once the tags are imported, click the [OK] button on the following dialog.



### 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.



## Weintek HMI to BACnet IP Device

Select the Present\_Value under (2,0) Analog Value, which is the instance 0 of Analog Value.

The screenshot shows the 'Tags' tree on the left and a table of tag properties on the right. The 'PresentValue(ID#85)' tag is selected and highlighted in blue.

Name	Data type	Description
ObjectName(ID#77)	SINT[32]	
ObjectIdentifier(ID#75)	DINT	
ObjectType(ID#79)	INT	
PresentValue(ID#85)	REAL	
PresentValueArray(ID#85)	REAL[100]	
EventState(ID#36)	DINT	
Units(ID#117)	DINT	
Priority(ID#85)	SINT	
PriorityArray(ID#87)	REAL[17]	
RelinquishDefault(ID#104)	REAL	
SubscribeCovTime(ID#75)	DINT	
HighLimit(ID#45)	REAL	
LowLimit(ID#59)	REAL	
DeadBand(ID#25)	REAL	
NotificationClass(ID#17)	DINT	
NotifyType(ID#72)	SINT	
TimeDelay(ID#113)	DINT	

Tag: (2,0)AnalogValue.PresentValue(ID#85) [Ok]

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

The 'New Numeric Object' dialog box is shown with the 'Format' tab selected. The 'Description' field is empty. The 'Allow input' checkbox is unchecked. The 'Read address' section shows the 'Device' set to 'BACnet/IP' and the 'Tag' set to '(2,0)AnalogValue.PresentValue(ID#85)' with a data type of 'REAL'.

General **Format** Security Shape Font

Description :

Allow input

Read address

Device : BACnet/IP

Tag : (2,0)AnalogValue.PresentValue(ID#85) REAL

## Weintek HMI to BACnet IP Device

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.

The screenshot shows the 'Numeric Object's Properties' dialog box with the 'Format' tab selected. The 'Display' section includes a 'Device data format' dropdown set to '32-bit Float' and a 'Mask' checkbox. The 'Number of digits' section is highlighted with a red box, showing 'Left of decimal Pt.' set to 4 and 'Right of decimal Pt.' set to 1. The 'Scaling' section has a 'Method' dropdown set to 'None'. The 'Limits' section has 'Direct' selected, and the 'Device low' and 'Device high' fields are highlighted with a red box, containing the values 0 and 9999 respectively. The 'Input low' and 'Input high' fields contain 0.0 and 9999.0.

Place the Numeric object onto the editing area.



# Weintek HMI to BACnet IP Device

## How to read/write Present\_Value property of Binary Value

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

New Bit Lamp/Toggle Switch Object

General Security Shape Label

Comment :

Bit Lamp  Toggle Switch

Read address

Device : BACnet/IP

Tag : 0

Invert signal

Select the Present\_Value under (5,1) Binary Value, which is the instance 1 of Binary Value.

Tags > (5,1) BinaryValue

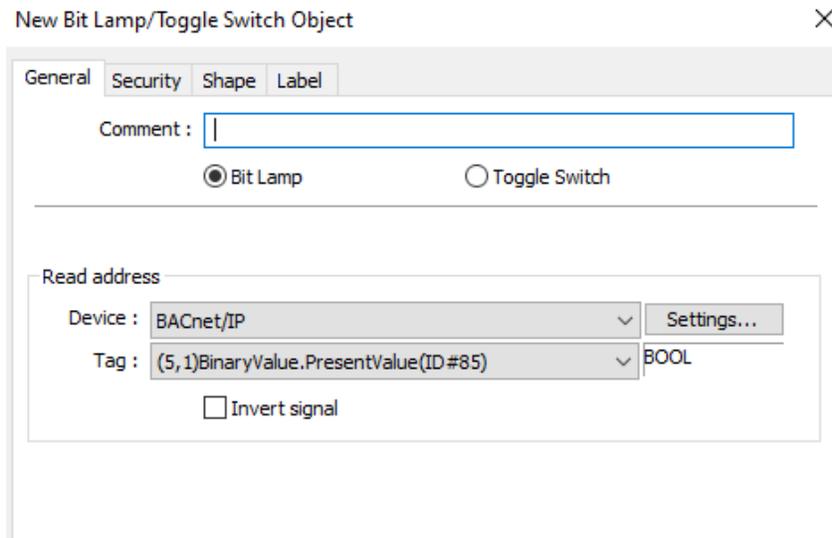
Name	Data type	Description
PresentValue(ID#85)	BOOL	
PresentValueArray(ID#85)	BOOL[100]	
PriorityReset(ID#85)	BOOL[17]	
PriorityArray(ID#87)	BOOL[17]	
OutOfService(ID#81)	BOOL	
AlarmValue(ID#6)	BOOL	
EventEnable(ID#55)	EVENTENABLE	

Show description

Tag : (5,1) BinaryValue.PresentValue(ID#85)

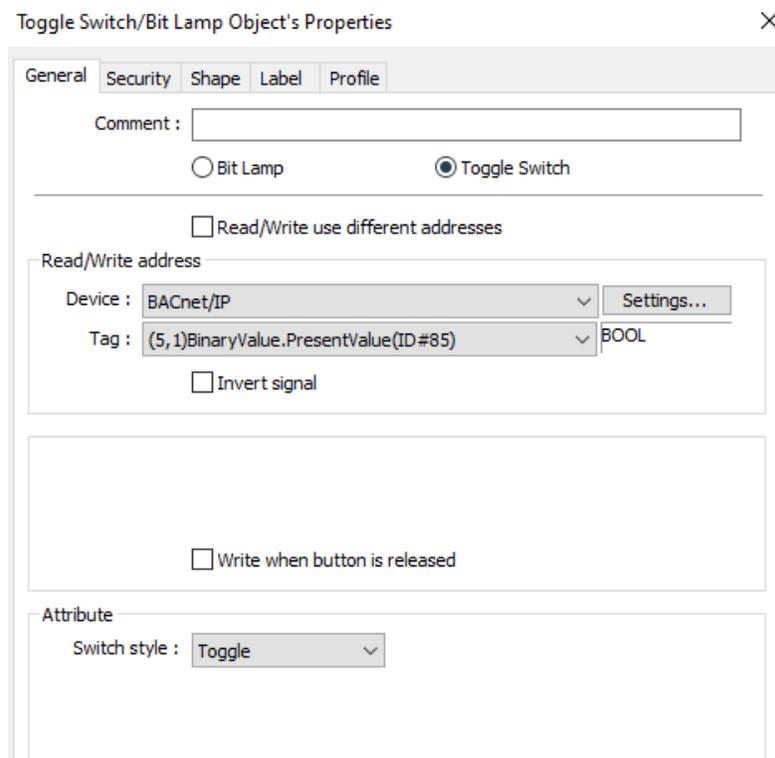
## Weintek HMI to BACnet IP Device

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



The screenshot shows a dialog box titled "New Bit Lamp/Toggle Switch Object" with a close button (X) in the top right corner. It has four tabs: "General", "Security", "Shape", and "Label". The "General" tab is active. At the top, there is a "Comment:" text box. Below it are two radio buttons: "Bit Lamp" (selected) and "Toggle Switch". A horizontal line separates this section from the "Read address" section. In the "Read address" section, there are two dropdown menus: "Device:" set to "BACnet/IP" and "Tag:" set to "(5,1)BinaryValue.PresentValue(ID#85)". To the right of the "Tag:" dropdown is a text box containing "BOOL" and a "Settings..." button. Below the dropdowns is an "Invert signal" checkbox.

Within the Attribute, select **Toggle**.



The screenshot shows a dialog box titled "Toggle Switch/Bit Lamp Object's Properties" with a close button (X) in the top right corner. It has five tabs: "General", "Security", "Shape", "Label", and "Profile". The "General" tab is active. At the top, there is a "Comment:" text box. Below it are two radio buttons: "Bit Lamp" and "Toggle Switch" (selected). Below the radio buttons is an "Invert signal" checkbox. A horizontal line separates this section from the "Read/Write address" section. In the "Read/Write address" section, there are two dropdown menus: "Device:" set to "BACnet/IP" and "Tag:" set to "(5,1)BinaryValue.PresentValue(ID#85)". To the right of the "Tag:" dropdown is a text box containing "BOOL" and a "Settings..." button. Below the dropdowns is an "Invert signal" checkbox. Another horizontal line separates this section from the "Attribute" section. In the "Attribute" section, there is a "Switch style:" dropdown menu set to "Toggle". Below the dropdown menu is a "Write when button is released" checkbox.

## Weintek HMI to BACnet IP Device

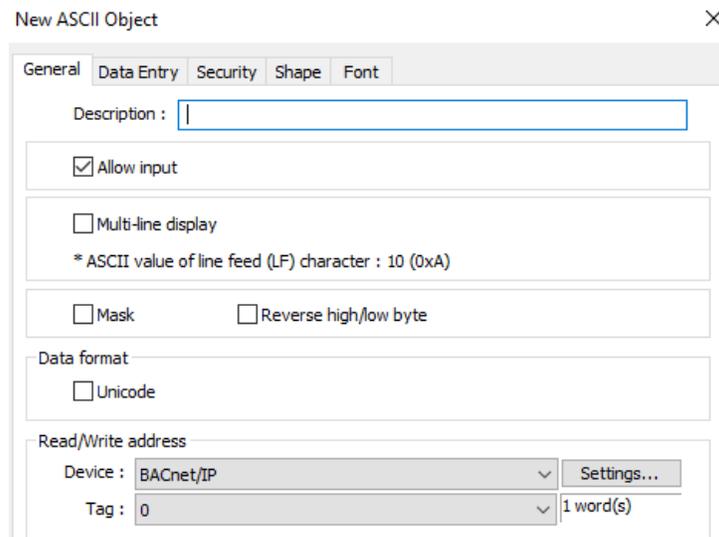
Place the Toggle Switch object onto the editing area.



### 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.



New ASCII Object

General | Data Entry | Security | Shape | Font

Description :

Allow input

Multi-line display  
\* ASCII value of line feed (LF) character : 10 (0xA)

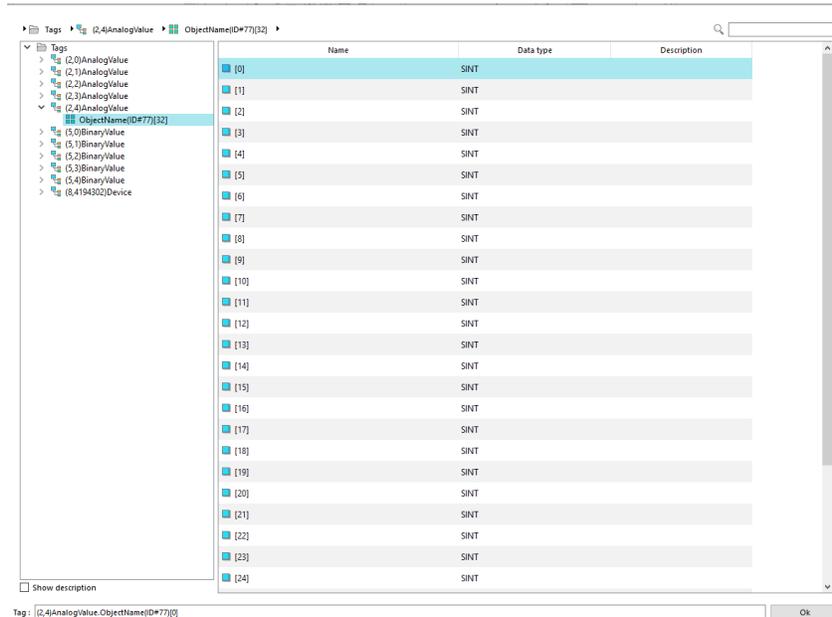
Mask  Reverse high/low byte

Data format  
 Unicode

Read/Write address  
Device : BACnet/IP   
Tag : 0

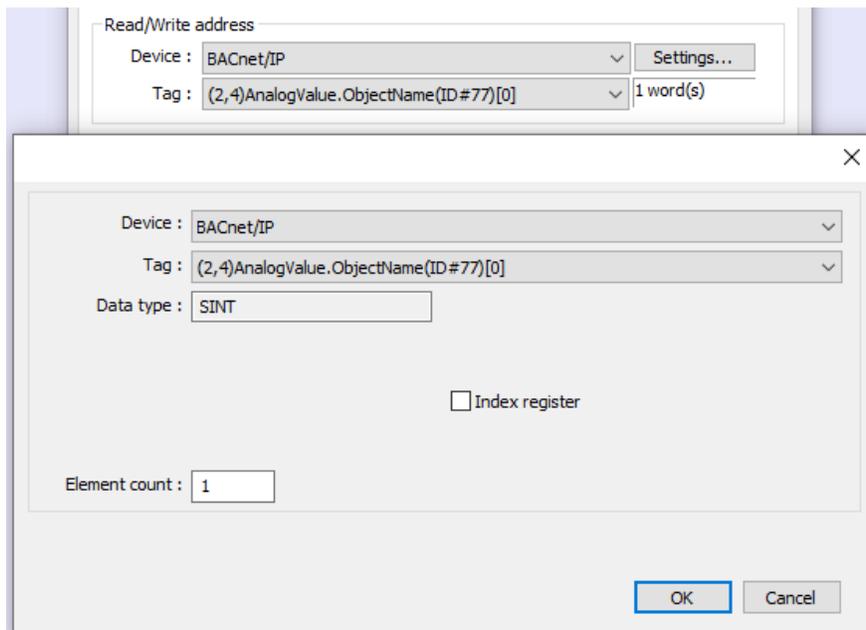
# Weintek HMI to BACnet IP Device

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**.



## Weintek HMI to BACnet IP Device

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

New ASCII Object

General | Data Entry | Security | Shape | Font

Description : |

Allow input

Multi-line display

\* ASCII value of line feed (LF) character : 10 (0xA)

Mask  Reverse high/low byte

Data format

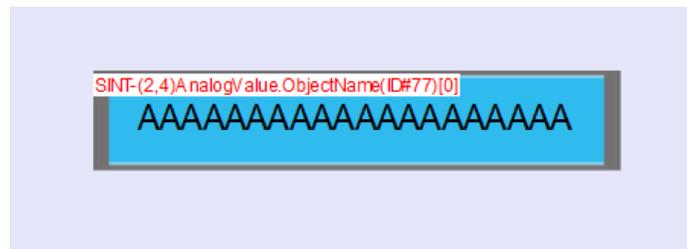
Unicode

Read/Write address

Device : BACnet/IP Settings...

Tag : (2,4)AnalogValue.ObjectName(ID#77)[0] 10 word(s)

Place the ASCII object onto the editing area.



## Weintek HMI to BACnet IP Device

**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