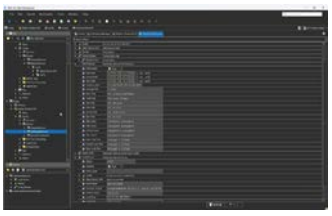
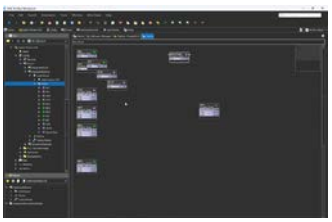
KMC Fusion® Hardware Network

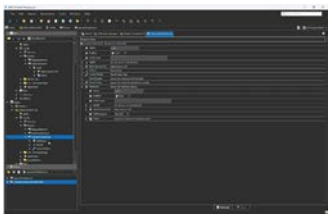
Application Driver Guide

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GENERAL INFORMATION

About KMC Fusion

KMC Fusion® controllers are fully programmable, native Niagara controllers with integrated alarming, trending, and scheduling. This applications guide provides network connection information, expanded installation information, troubleshooting, and other information. For additional installation instructions, see the installation guides for the respective products.

TERMINAL COLOR CODE	
Black	24 VAC/VDC Power
Gray	CAN Communications
Green	Inputs and Outputs

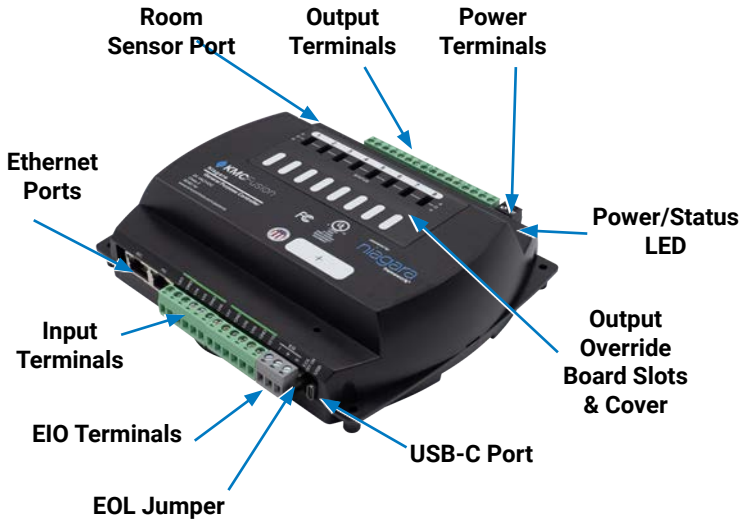


Illustration: Controller Overview (KMN-5901E shown)

Specifications, Accessories, and Installation

For information on specifications and accessories, see the relevant **KMC Fusion Data Sheet**. See also the **KMC Fusion Selection Guide.**

For information on hardware installation and operation, refer to the **KMC Fusion Installation and Operation Guide.**

For information on using the Fusion devices with other related KMC hardware, refer to the **Fusion Controller Application Guide**.

See also the **BAC-5051AE BACnet Router**.

For information on Niagara Framework programming and setup, see Tridium's Niagara Workbench documentation.

Support

Additional resources for installation, configuration, application, operation, programming, upgrading and much more are available on the KMC Controls web site (**www.kmccontrols.com**). Log-in to see all available files.



Important Notices

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Specifications and design are subject to change without notice.

Notes and Cautions

NOTE: In this document, a **NOTE** provides additional information that is important.

⚠ CAUTION

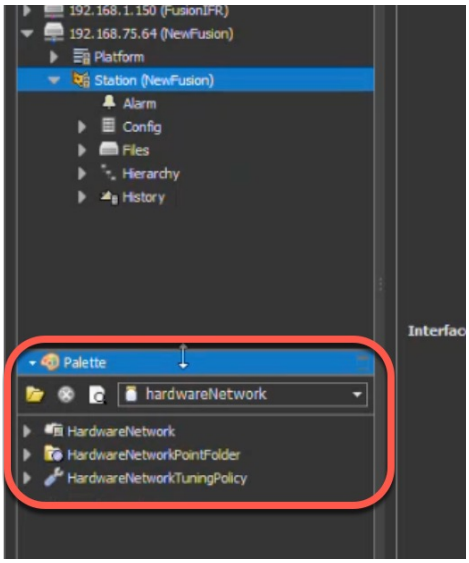
In this document, a CAUTION indicates potential personal injury or equipment or property damage if instructions are not followed.

Handling Precautions



For **digital and electronic** sensors, thermostats, and controllers, take reasonable precautions to prevent electrostatic discharges to the devices when installing, servicing, or operating them. Discharge accumulated static electricity by touching one's hand to a securely grounded object before working with each device.

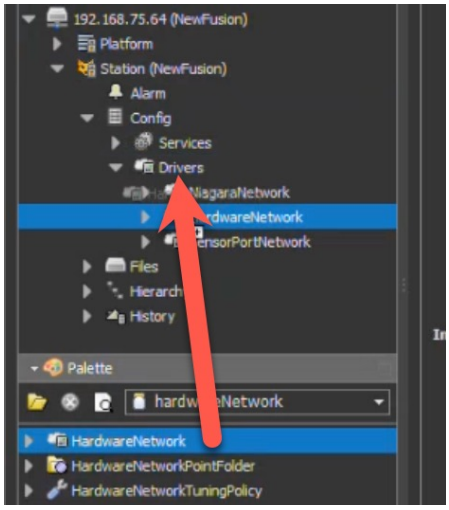
ADDING THE DRIVER



To access a KMC Fusion Controller and connect to a Niagara station, refer to Tridium's Niagara Workbench documentation.

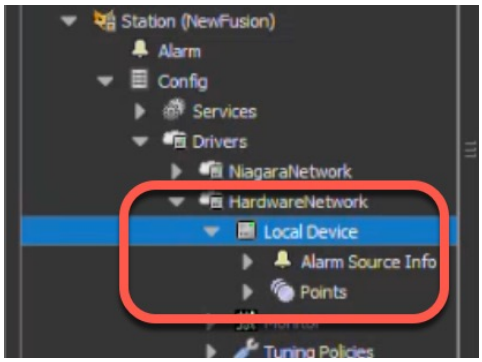
To add the Hardware driver to the Station, do the following:

1. From the KMC Workbench, open a Palette sidebar for the **HardwareNetwork**.
2. In the Nav tree, click to expand: **Station > Config > Drivers**.
3. Locate **HardwareNetwork** in the Palette, click and hold, and then drag and drop it into the Drivers container.



NOTE: You must install the HardwareNetwork jar files on the KMC Fusion device's platform before adding the driver to the station.

4. In the Nav tree, expand the HardwareNetwork and verify that you see **Local Device > Points** under it.



CONFIGURING THE NETWORK

Local Device

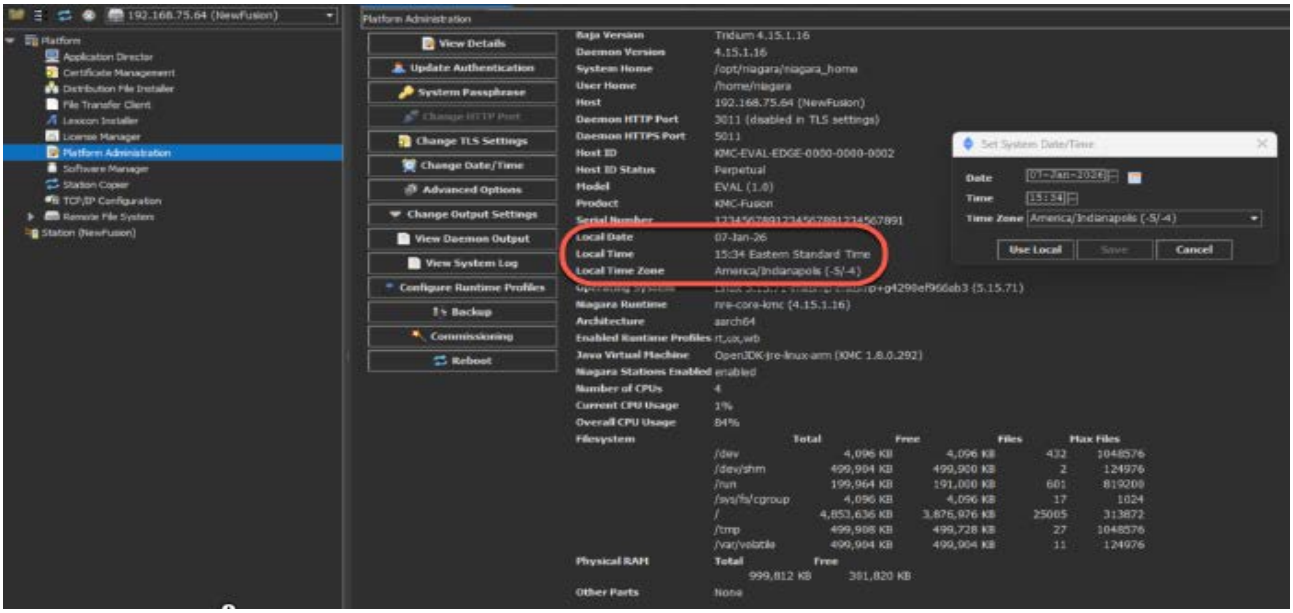
Synchronize Date and Time

After adding the driver, the Local Device date and time might not be correct. To update the time, you need to first update the Platform time and then synchronize the Local Device time.

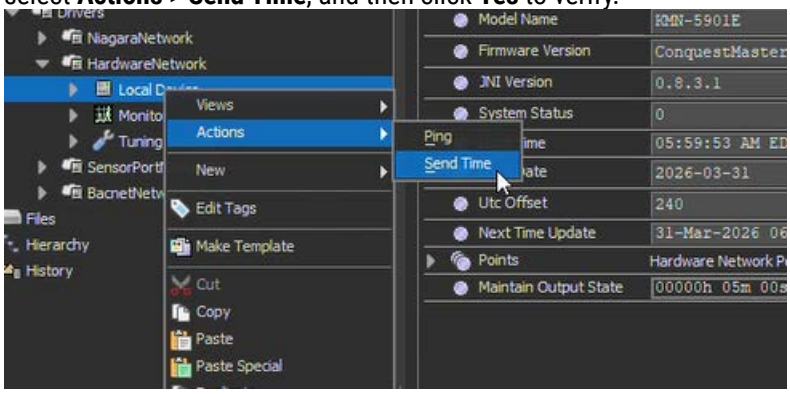
NOTE: The Local Device time is what feeds the time display to the NetSensor.

To update the date and time, do the following:

1. Expand **Platform** and then double-click **Platform Administration**.



2. Verify the Platform time is accurate. If the time is not accurate, update the time accordingly.
3. In the Local Device, under the HardwareNetwork, right-click **Local Device**, select **Actions > Send Time**, and then click **Yes** to verify.



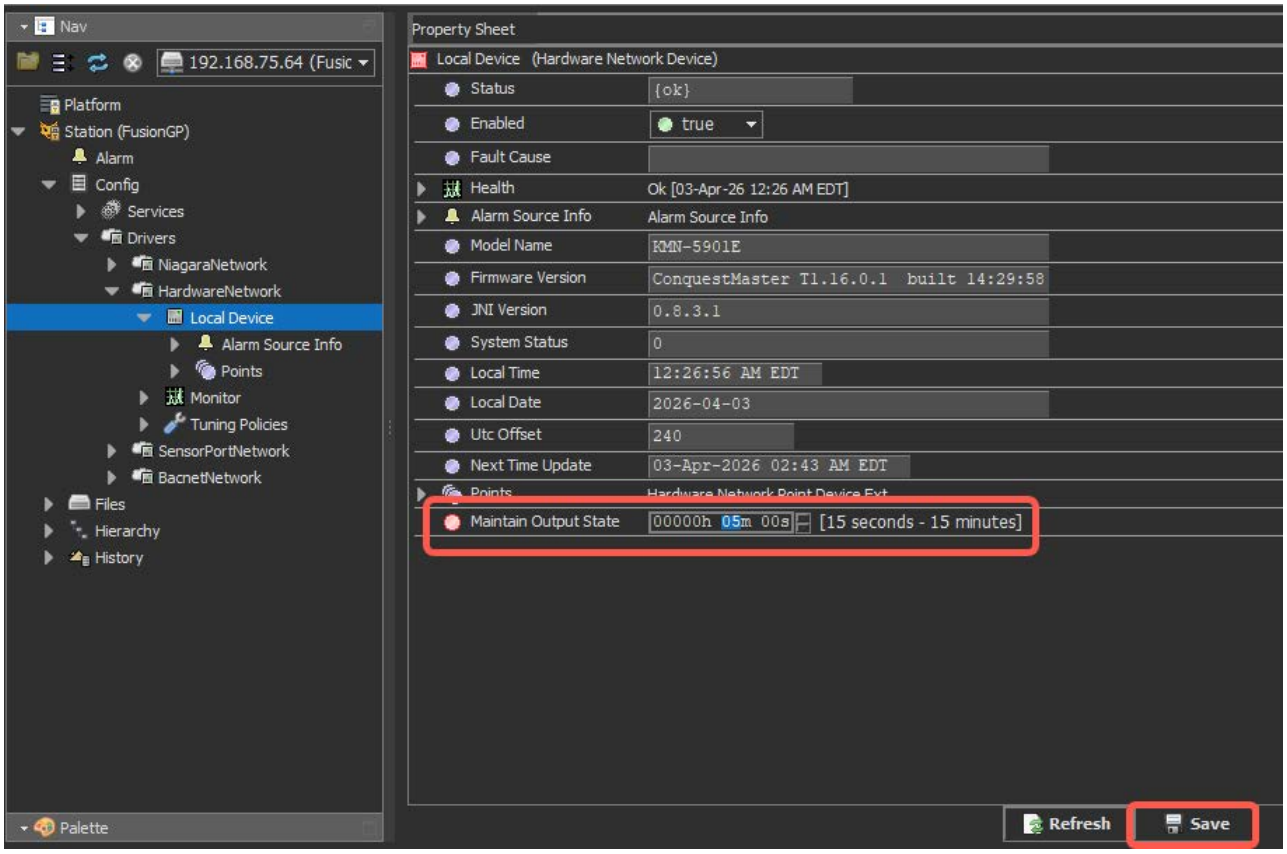
4. Right-click **Local Device**, and then select **Actions > Ping**
   This refreshes the time on the Local Device.

Maintain Output State

The outputs defined in the Hardware Network have the ability to maintain their last commanded state for a defined period of time, should communication between the I/O Processor and the Station ever be lost.

To configure the time duration for this period, do the following:

1. Open the property sheet of the Local Device.



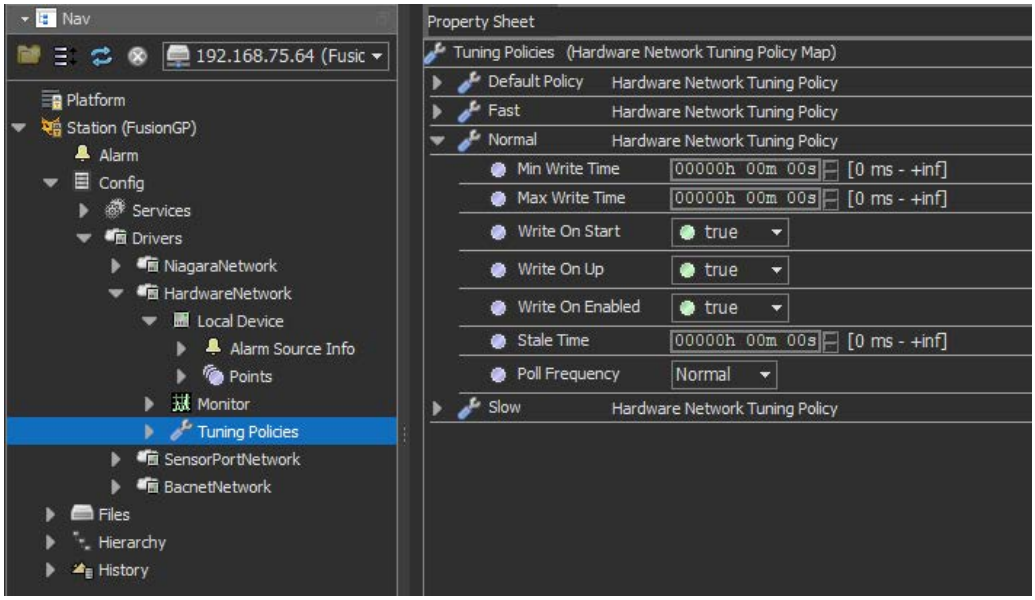
2. Set the **Maintain Output State** property to your desired time.
3. Click **Save**.

NOTE: After the set time expires, the outputs revert to their default value state, as you have defined them. For more details on sequence and operation, see the Power and Communication section in the **KMN-5900E Series Installation Guide**.

Tuning Policy

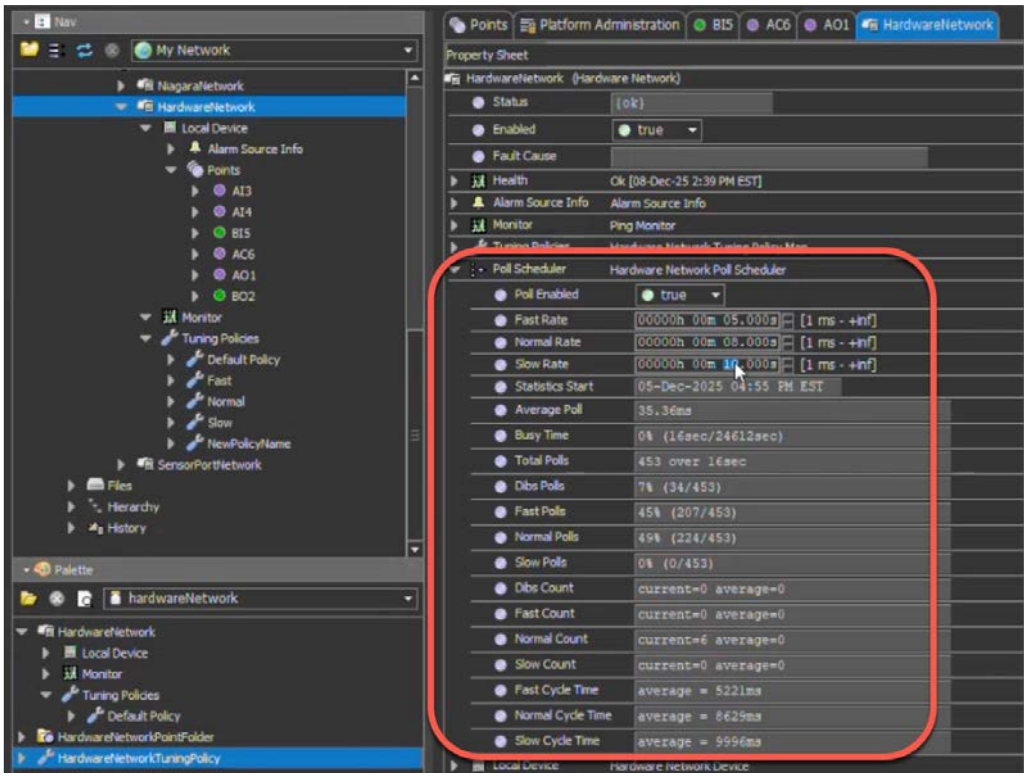
The Hardware Network supports Niagara tuning policies, which allows you to select a poll frequency for each tuning policy. You can add a new tuning policy by duplicating the default policy or adding a policy from the module's palette.

You can add as many custom Tuning Polices as necessary. For details on tuning policy operations, refer to Tridium's Niagara Workbench documentation.



Poll Scheduler

You can configure your poll rates and speeds within the Poll Scheduler. For more information, refer to Tridium's Niagara Workbench documentation.

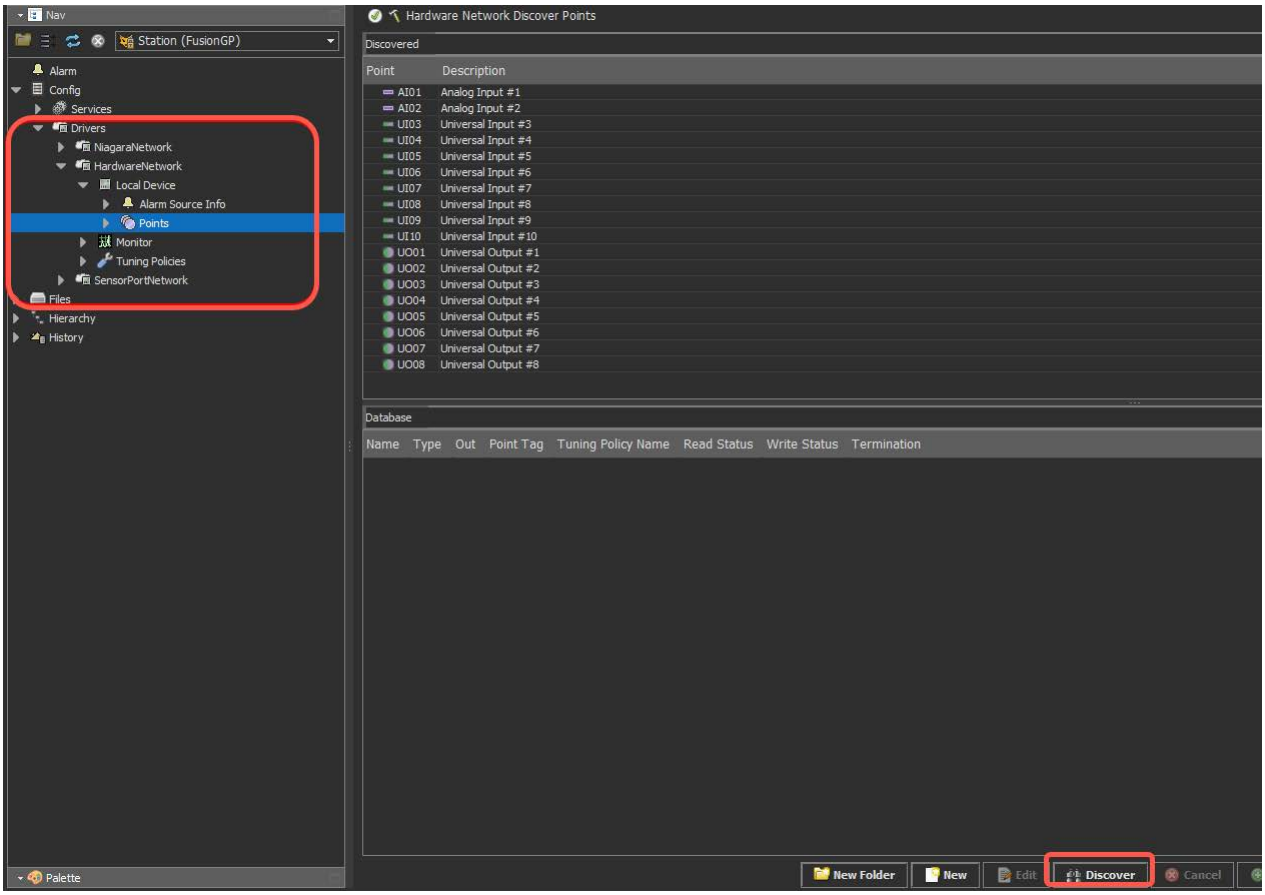


DISCOVERING AND ADDING POINTS

To discover and add points in the KMC Fusion controller and any connected CAN-5900-FSN Series expansion modules, do the following.

NOTE: CAN-5900-FSN Series expansion modules must be wired, powered, and connected to KMC Fusion to be discovered.

1. In the Nav tree, expand the **HardwareNetwork > Local Device**, double-click **Points**, and then click **Discover**.



NOTE: On the Discovered list, points AI1 and AI2 are from the sensor port. If you have a NetSensor plugged in, you do not see those two points.

2. Click on the point you want to add from the Discovered list, and then click **Add** from the buttons across the bottom of your screen to open the Add dialog.
3. Refer to the following sections for procedures on configuring the various types of input and output points.

CONFIGURING POINTS

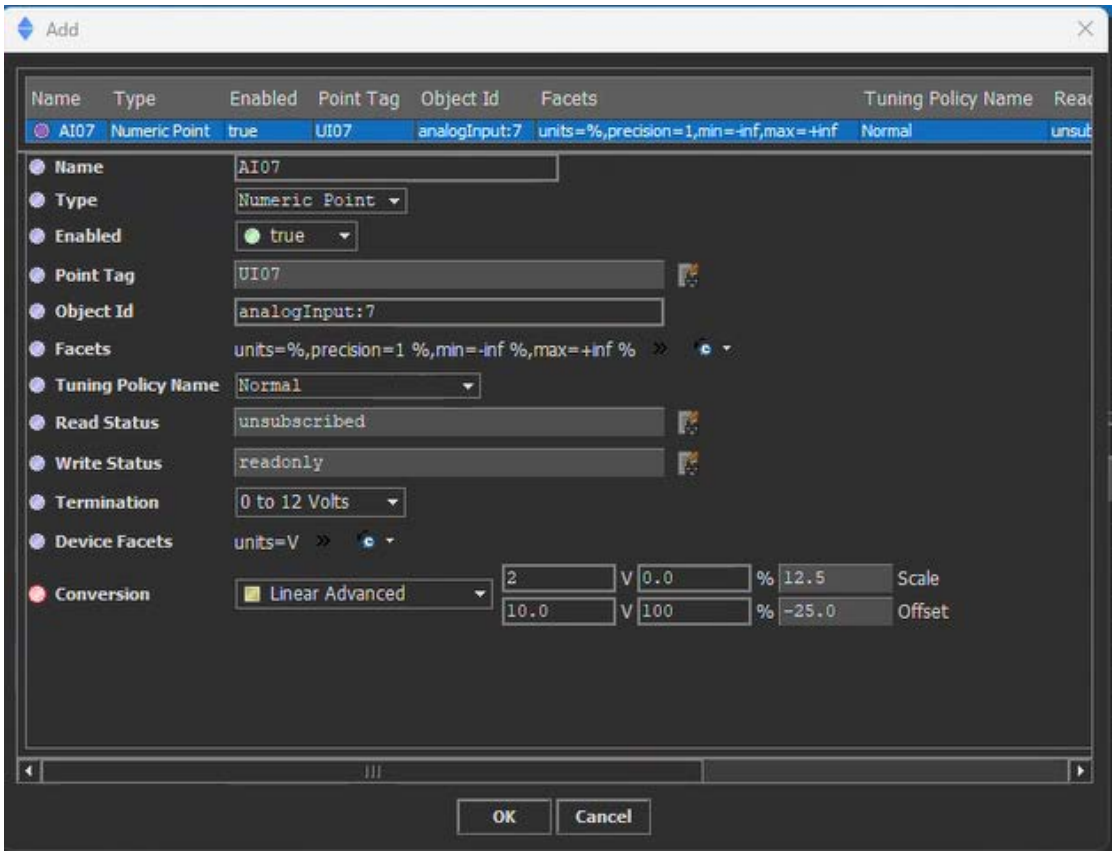
These procedures detail the KMC-specific items you need to be aware of when configuring points and are not intended to be a comprehensive set of steps. For detailed instructions on adding a points, refer to Tridium's Niagara Workbench documentation.

Skip to the appropriate sections to add your desired type of points.

Configure a Numeric Input Point

To configure a Numeric input point, do the following:

1. Select the point to add from the discovered list, as described in the section **Discovering and Adding Points.**
2. Select **Type > Numeric Point**



NOTE: Grayed-out fields are read-only and cannot be changed in this dialog, and please note that some fields auto-update based on the selection you make.

3. Type a unique **Name** that describes the input you are configuring.
4. Configure the **Facets** as appropriate for the input point type that you are configuring.
5. Select the **Tuning Policy Name**.
6. Select the **Termination** type:

Termination	Type
0 to 12 Volts	Voltage sensor
4 to 20 mA	Milliamp sensor
10k Ohm Pullup	Resistive input sensor
1k Ohm Pullup	Resistive input sensor

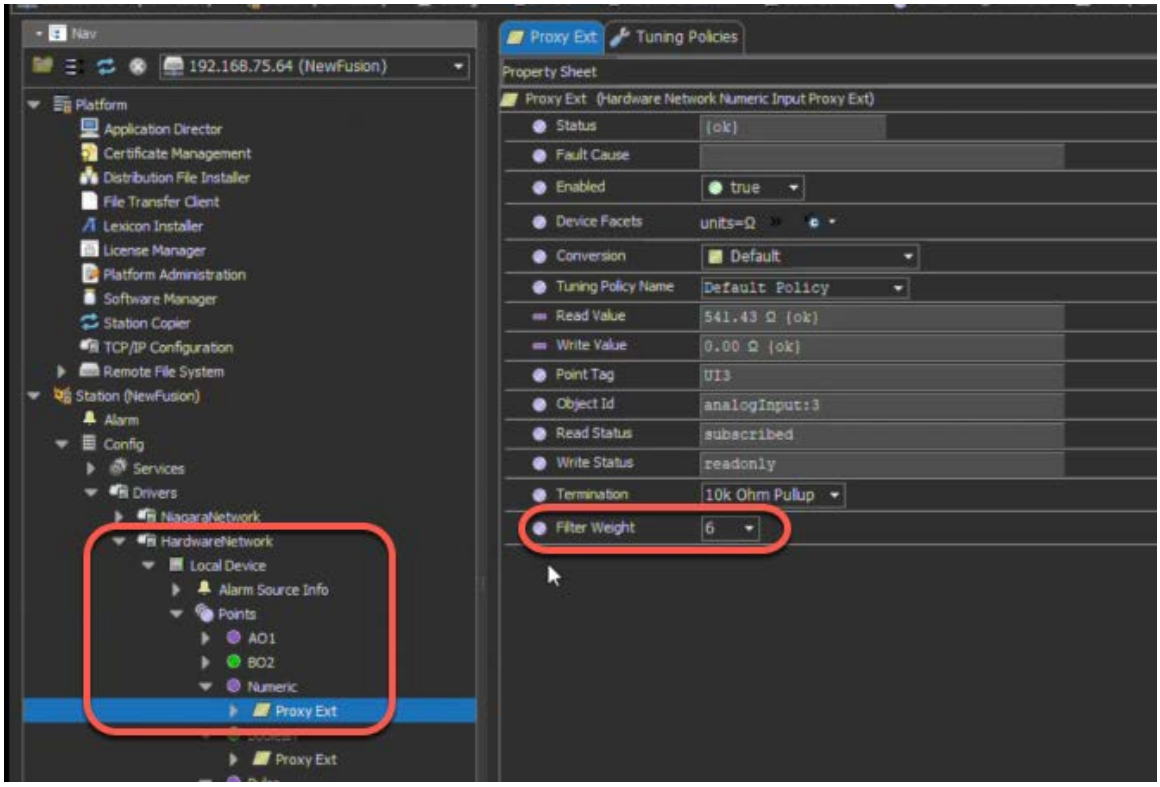
7. Select the **Conversion** type.
   NOTE: Some Conversion types require the use of Tridium's kitIo module. You might need to install the kitIo module on the platform for proper operation.
   Warning! You can apply conversions improperly, based on input type. Please use caution and review your selection based on input type.

Conversion	Type
Custom Thermistor	Refer to Tridium's Niagara Workbench documentation.
Default	*No conversion is applied. Refer to Tridium's Niagara Workbench documentation.
Generic Tabular	Refer to Tridium's Niagara Workbench documentation.
Linear	Refer to Tridium's Niagara Workbench documentation.
Linear Advanced	This conversion type created by KMC makes it easier for you to set up analog input scaling, which has a two-column grid display with units shown to the right of the value. As you change the **to** and **from** range values, the **Scale** and **Offset** auto-calculates for you. Use this calibration for both input and output objects.
Linear with unit	Refer to Tridium's Niagara Workbench documentation.
Reverse Polarity	Refer to Tridium's Niagara Workbench documentation.
Thermistor 10k Type II	This conversion type created by KMC is preconfigured and makes it easier for you to set up standard 10k Ohm thermistors.
Thermistor 10k Type III	This conversion type created by KMC is preconfigured and makes it easier for you to set up standard 10k Ohm thermistors.

8. Click **OK** to add the point to the station.
   The point appears in the Database list.

NOTE: The following steps are optional.

9. Locate the new Numeric point under **HardwareNetwork > Local Device > Points**, and double-click **Proxy Ext**.

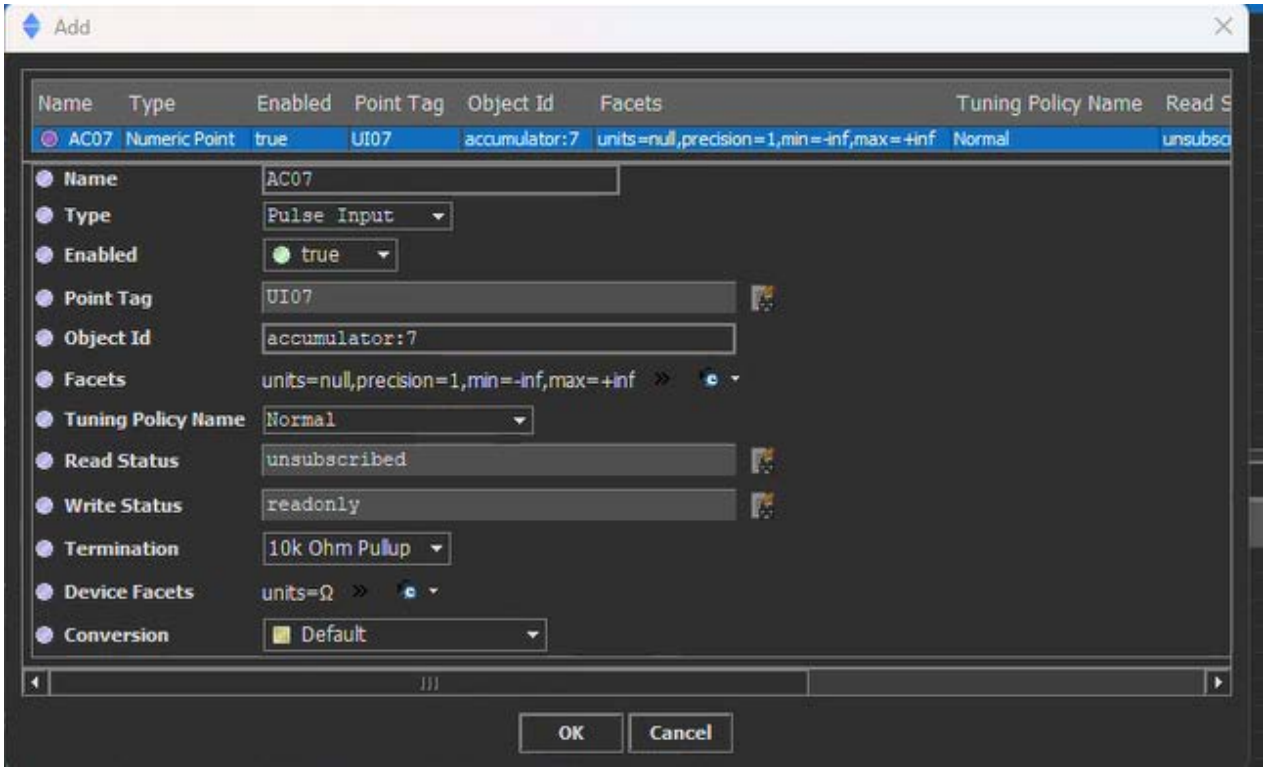


10. Verify the **Filter Weight** and update accordingly.
    NOTE: Filter Weight is a software setting used to smooth (dampen) input readings, reducing sensitivity to signal noise and spikes. A higher filter weight value increases stability (slower reaction), while a lower filter weight value increases sensitivity (faster reaction).
11. Add all Numeric input points as necessary.

Configure a Pulse Input Point

To configure a Pule Input, do the following:

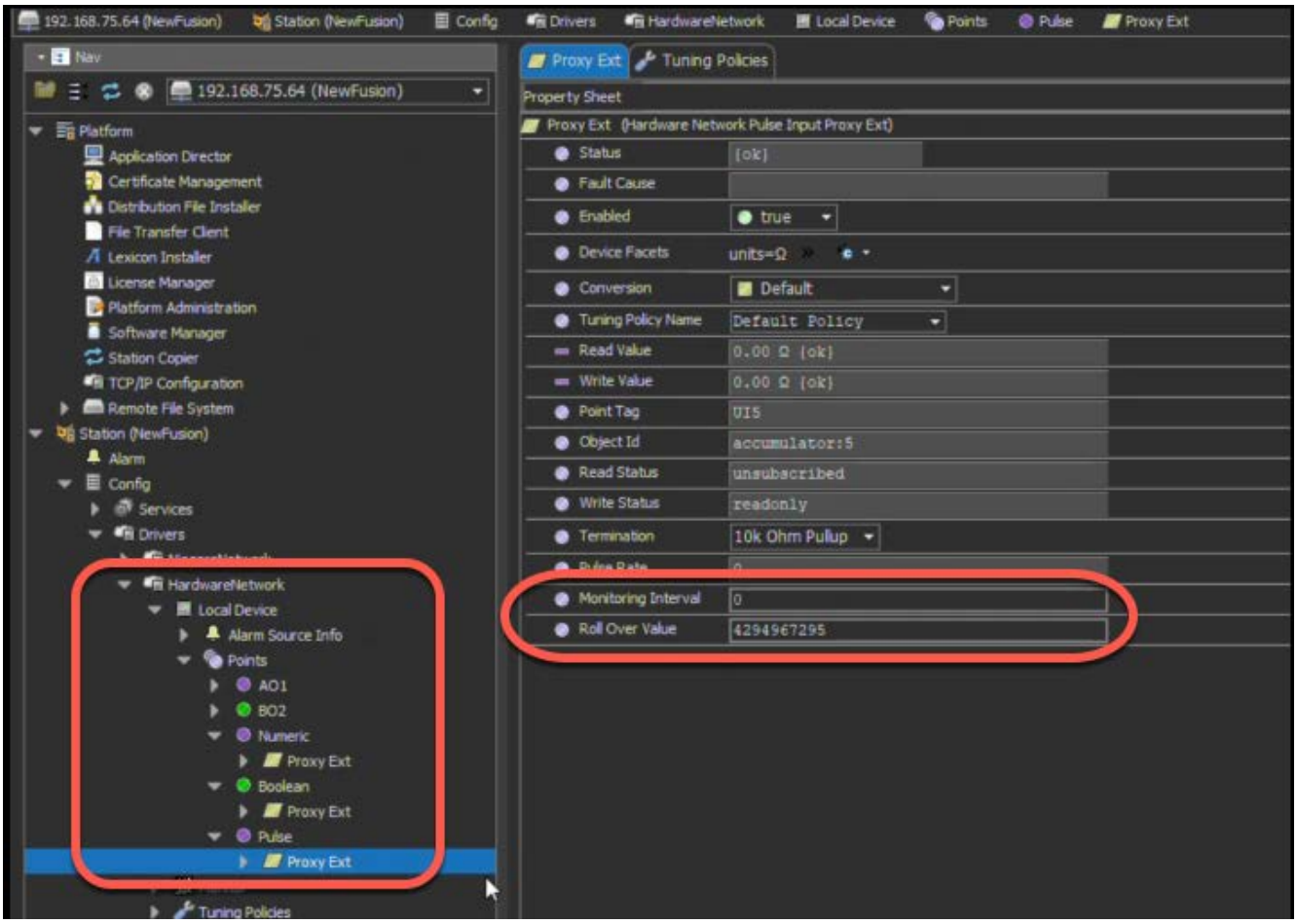
1. Select the point to add from the discovered list, as described in the section **Discovering and Adding Points**.
2. Select **Type > Pulse Input**.
   NOTE: Grayed-out fields are read-only and cannot be changed in this dialog, and please note some fields auto-update based on the selection you make.



3. Type a unique **Name** that describes the input you are configuring.
4. Configure the **Facets** as appropriate for the input point type that you are configuring.
5. Select the **Tuning Policy Name**.
6. Leave **Termination** set to the default **10k Ohm Pullup**.
7. Leave **Conversion** set to **Default**.
8. Click **OK** to add the point to the station.
   The point appears in the Database list.

NOTE: The following steps are optional.

9. Locate the new Pulse Input under **HardwareNetwork > Local Device > Points**, and double-click **Proxy Ext**.

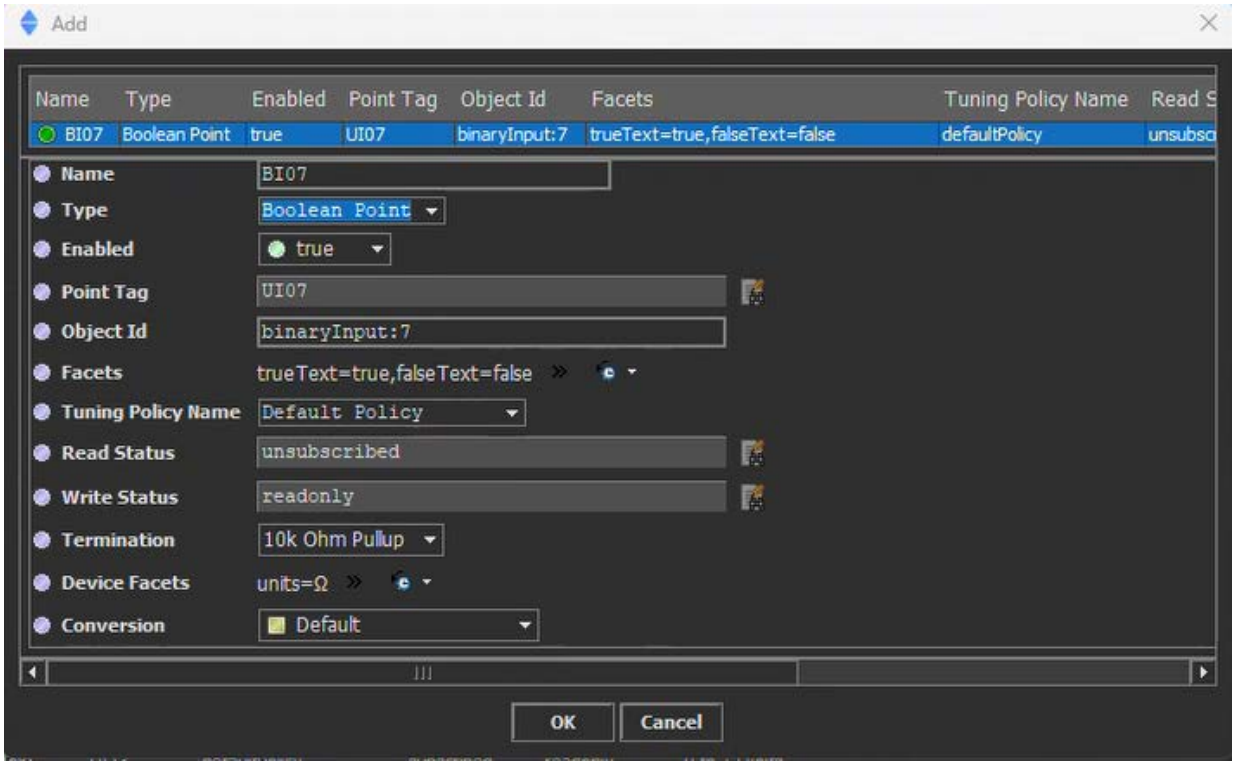


10. Verify the **Monitoring Interval**
    NOTE: The monitoring interval (in seconds) is used to generate the value that displays in the Pulse Rate property.
11. Verify the **Roll Over Value** and update accordingly.
    NOTE: The roll over value is the setting in which the read value (pulse counts) resets to zero and begin counting again. Ensure you align value with any other respective logic/programming in your station database.
12. Add all Pulse Inputs as necessary.

Configure a Boolean Input Point

To configure a Boolean Point, do the following:

1. Select the point to add from the discovered list, as described in the section **Discovering and Adding Points**.
2. Select **Type > Boolean Point**.



3. Type a unique **Name** that describes the input you are configuring.
4. Configure the **Facets** as appropriate for the input point type that you are configuring.
5. Select the **Tuning Policy Name**.
6. Select the **Termination** type. For Boolean points, the default **10k Ohm Pullup** is commonly used. While not as common, you can also use **0 to 12 Volts**.

Termination	Type
0 to 12 Volts	Voltage sensor
4 to 20 mA	Milliamp sensor
10k Ohm Pullup	Resistive input sensor
1k Ohm Pullup	Resistive input sensor

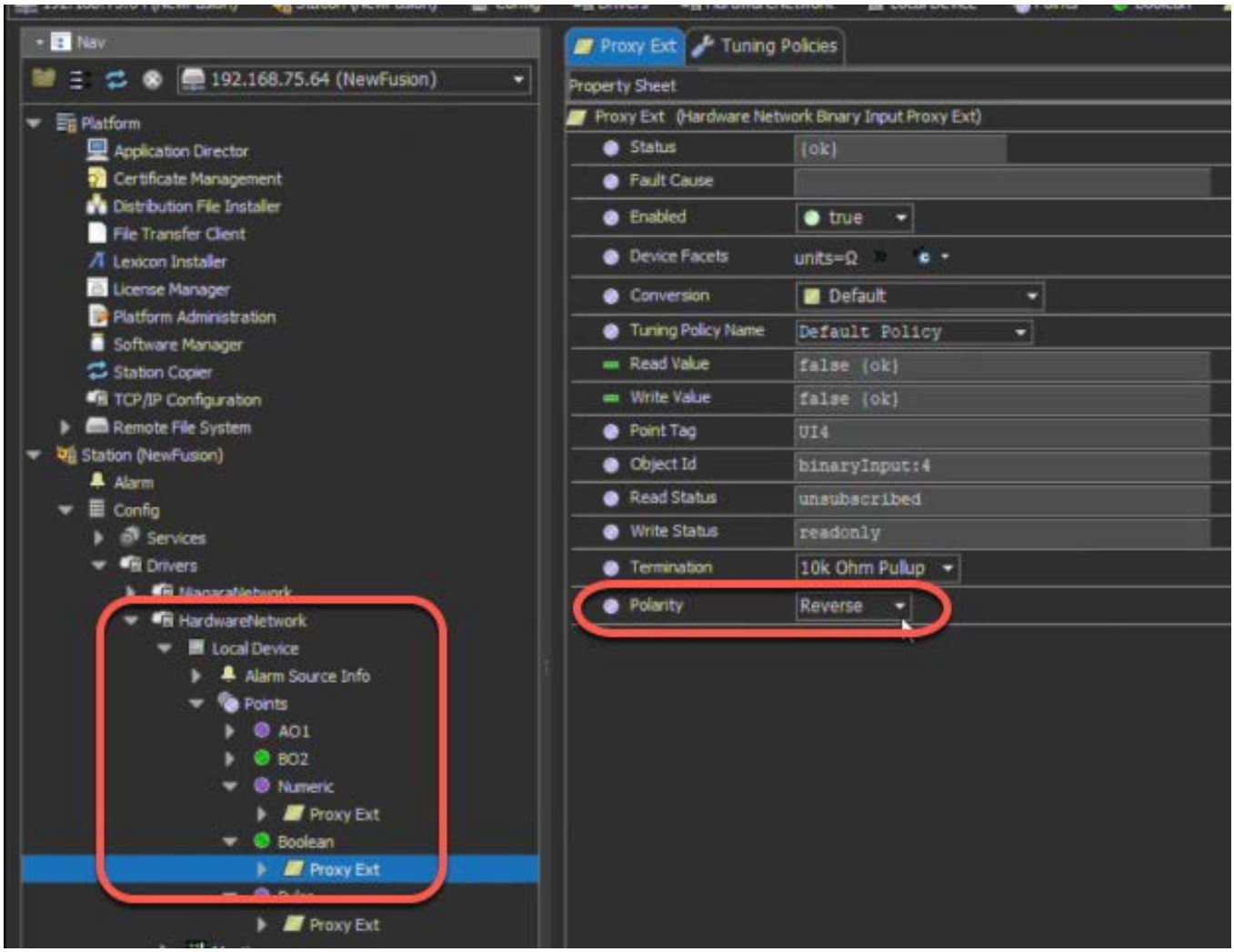
7. Select the **Conversion** type.

Conversion	Type
Default	No conversion is applied. Refer to Tridium's Niagara Workbench documentation.
Reverse Polarity	Refer to Tridium's Niagara Workbench documentation.

8. Click **OK** to add the point to the station. The point appears in the Database list.

NOTE: The following steps are optional.

9. Locate the new point under **HardwareNetwork > Local Device > Points**, and double-click **Proxy Ext**.

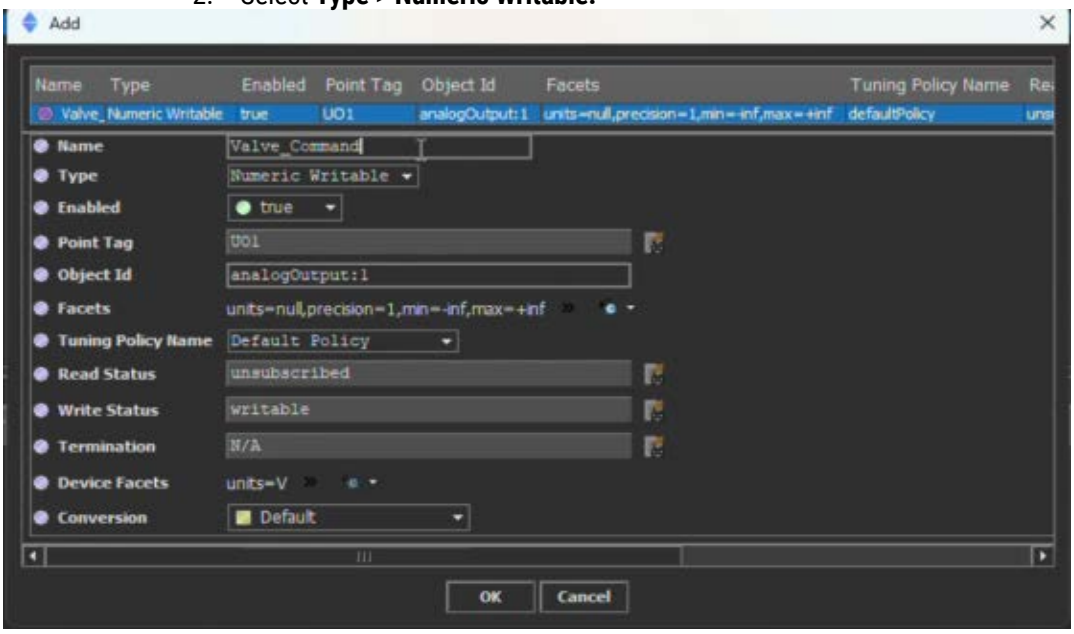


10. Verify the **Polarity** setting and update accordingly.
    NOTE: Industry standard settings for KMC configurations are **Reverse** (10k Pullup) and **Normal** (0-12v).
    Warning! The Polarity setting in the Proxy Ext automatically sets based upon the configuration of the input to the station database. Changing this property can have adverse effects on operation. Ensure you make any desired changes in polarity from the Conversion property.
11. Add all Boolean Input points as necessary.

Configure a Numeric Output Point

To configure an Numeric Writable Output point, do the following:

1. Select the point to add from the discovered list, as described in the section **Discovering and Adding Points**.
2. Select **Type > Numeric Writable.**



NOTE: Grayed-out fields are read-only and cannot be changed in this dialog, but some fields auto-update based on the selection you make.

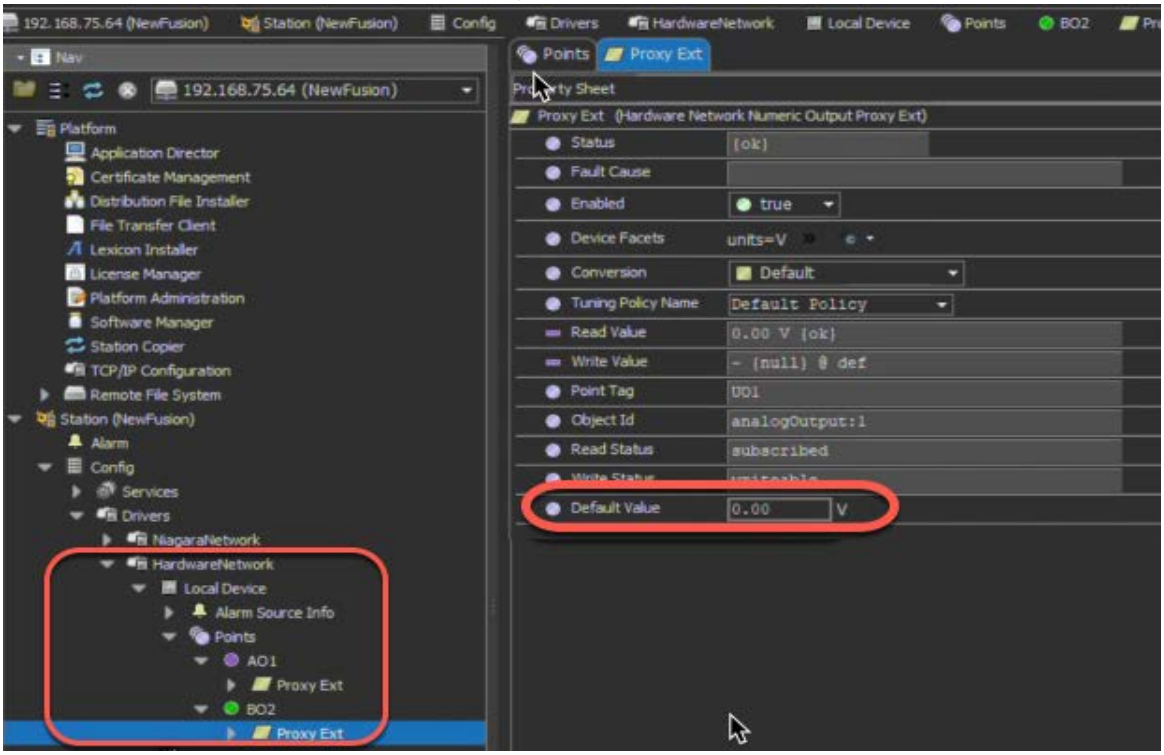
3. Type a unique **Name** that describes the input you are configuring.
4. Configure the **Facets** as appropriate for the output point type that you are configuring.
5. Select the **Tuning Policy Name**.
6. Select the **Conversion** type.
   Warning! You can apply conversions improperly, based on output type. Please use caution and review your selection based on output type.

Conversion	Type
Custom Thermistor	Refer to Tridium's Niagara Workbench documentation.
Default	*No conversion is applied. Refer to Tridium's Niagara Workbench documentation.
Generic Tabular	Refer to Tridium's Niagara Workbench documentation.
Linear	Refer to Tridium's Niagara Workbench documentation.
Linear Advanced	This conversion type created by KMC makes it easier for you to set up analog input scaling, which has a two-column grid display with units shown to the right of the value. As you change the **to** and **from** range values, the **Scale** and **Offset** auto-calculates for you. Use this calibration for both input and output objects.

Conversion	Type
Linear with unit	Refer to Tridium's Niagara Workbench documentation.
Reverse Polarity	Refer to Tridium's Niagara Workbench documentation.
Thermistor 10k Type II	This conversion type created by KMC is preconfigured and makes it easier for you to set up standard 10k Ohm thermistors.
Thermistor 10k Type III	This conversion type created by KMC is preconfigured and makes it easier for you to set up standard 10k Ohm thermistors.

7. Click **OK** to add the point to the station.
   The point appears in the Database list.

   NOTE: The following steps are optional.
8. Locate the new point under **HardwareNetwork > Local Device > Points**, and double-click **Proxy Ext**.

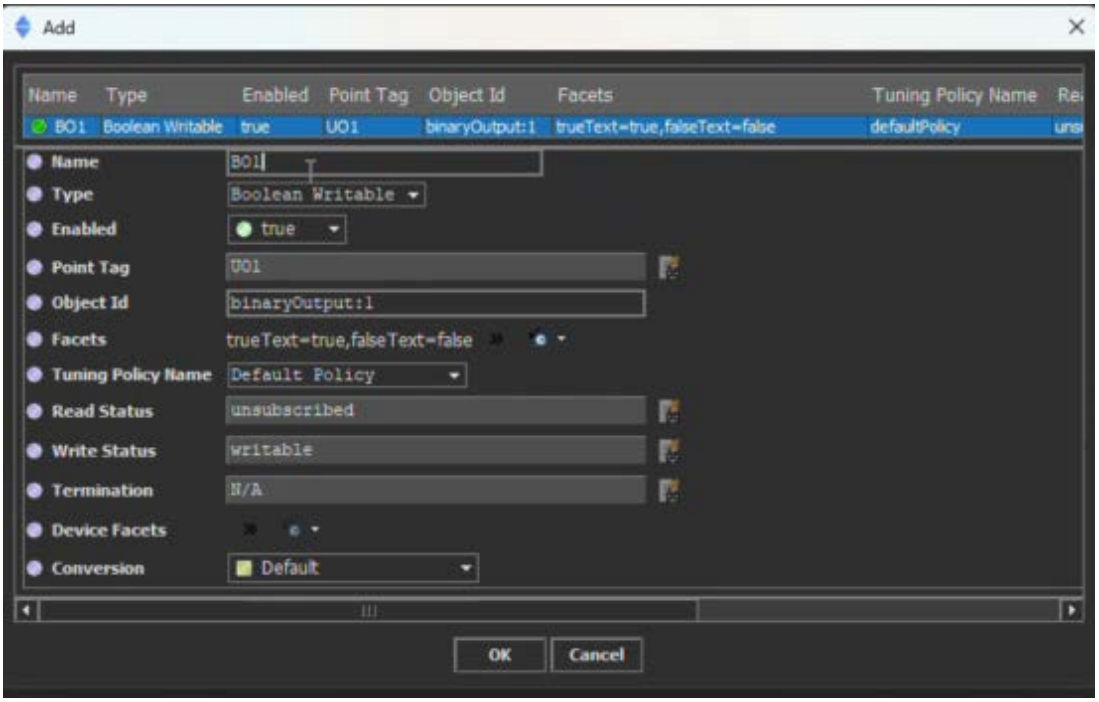


9. Verify the **Default Value** and update accordingly.
   Note: The default value (voltage) entered will be the output voltage provided on the output in the event that communication to the I/O processor is not present. See the **KMN-5900 Series Installation Guide**, section Power and Communication status for more details.
10. Add all Numeric Output points as necessary.

Configure a Boolean Output Point

To configure a Boolean Output point, do the following:

1. Select the point to add from the discovered list, as described in the section **Discovering and Adding Points**.
2. Select **Type > Boolean Writable.**



NOTE: Grayed-out fields are read-only and cannot be changed in this dialog, but some fields auto-update based on the selection you make.

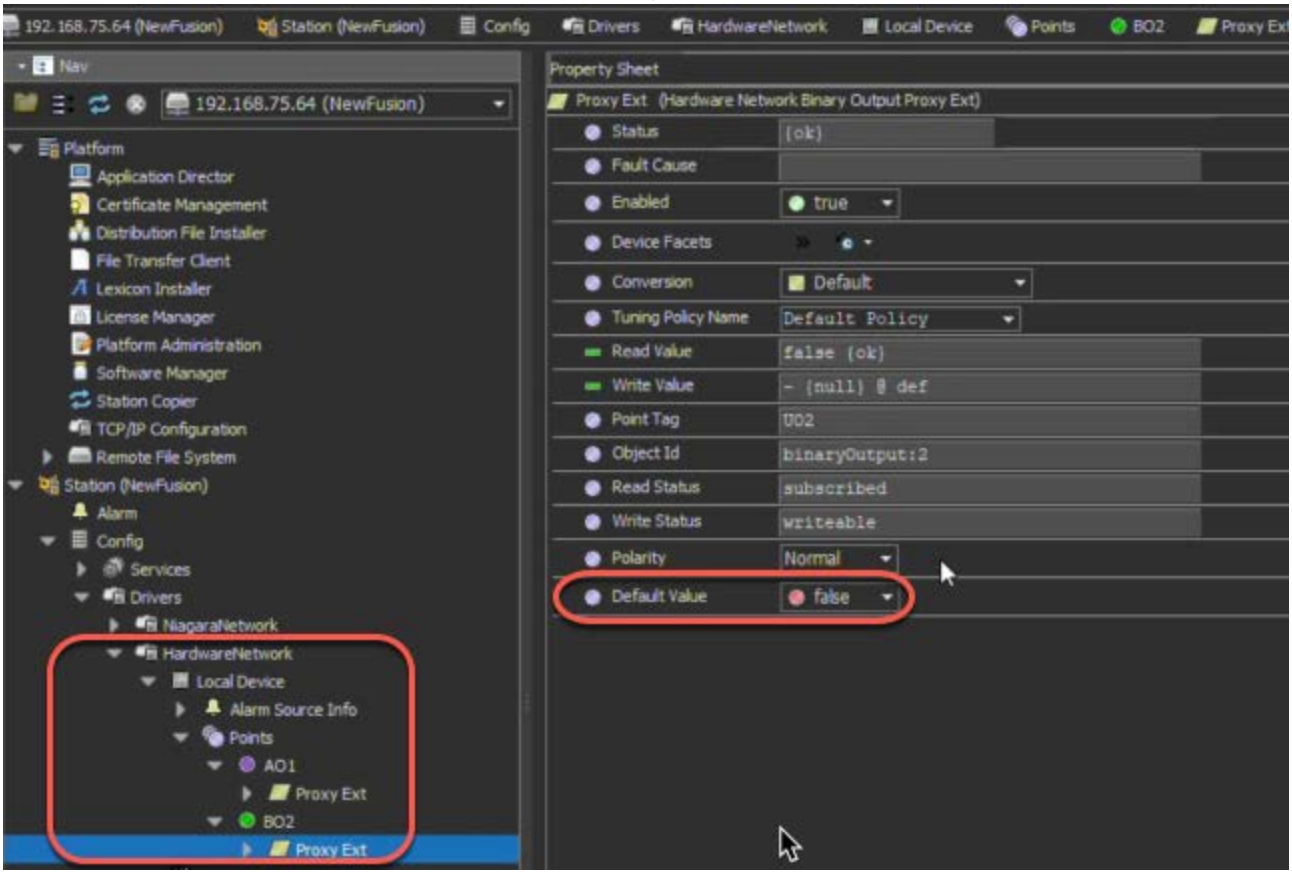
3. Type a unique **Name** that describes the input you are configuring.
4. Configure the **Facets** as appropriate for the output point type that you are configuring.
   Warning! Ensure Facets are unique enough to work properly with NetSensor configurations.
5. Select the **Tuning Policy Name**.
6. Select the **Conversion** type

Conversion	Type
Default	No conversion is applied. Refer to Tridium's Niagara Workbench documentation.
Reverse Polarity	Refer to Tridium's Niagara Workbench documentation.

7. Click **OK** to add the point to the station.
   The point appears in the Database list.

NOTE: The following steps are optional.

8. Locate the new point under **HardwareNetwork > Local Device > Points**, and double-click **Proxy Ext**



NOTE: If you need to change the polarity setting, DO NOT change the **Polarity** field. Instead, make your change to the **Conversion** setting.

9. Set the **Default Value**.
   Note: The default value (true/false) you select is the output command provided to the output in the event that communication to the I/O processor is not present. See **KMN-5900E Series Installation Guide**, section Power and Communication status for more details.
10. Add all Boolean Output points as necessary.