Honeywell

Niagara IRM

SYSTEM ENGINEERING GUIDE

EN2B-0414GE51-R0423

DISCLAIMER

TRADEMARKS

DOCUMENT HISTORY

Date	Description
October, 2021	- First version
April, 2022	- Sylk Actuator on page 300. - Terminal Assignment View on page 146. - Onboard IO Package on page 141. - Reset Overrides on page 169. - Configuring IP Settings for Multiple Controllers on page 123. - Configuring Bluetooth for Multiple Devices on page 225. - Global Balancing Object on page 370.
July, 2022	- Rename Bacnet Objects on page 393. - Replacing Defective Controller on page 414. - Configure IP Address Of Computer on page 416.
September, 2022	- Updated master-slave vs client-server details in Modbus Engineering on page 323. - Updated the global balancing point description table, Global Balancing Points on page 354.
October, 2022	- Updated the Best Practices and Troubleshooting Tips section, Best Practices and Troubleshooting Tips on page 386.
November, 2022	- Unitary (24V) controllers are added.
January, 2023	- Updated the naming convention of the Unitary and IRM N4 controllers across the - document.
April, 2023	- Merged the Centraline and HBS versions into a Honeywell-branded document.

TABLE OF CONTENT

CHAPTER

1 ABOUT THE SYSTEM ENGINEERING GUIDE

This user guide describes the configuration and management of the VAV and FCU controllers connected to a BACnet™ RJ45 (IP), T1L (IP), or MSTP network via a EAGLEHAWK or HAWK-8000 controller. Configuration and management are performed using the IRM engineering tool based on the CentraLine-N4 framework. The Engineering Tool can be used to program the controller to support various applications such as setting up the controllers for usage in BACnet™ RJ45 (IP), T1L (IP), or MSTP network, creating applications for the controllers, synchronizing applications between project and controllers, adjusting terminal layout deviations, cloning applications, firmware download etc.

Note: *In this guide, the Merlin NX is referred to as an IRM NX controller in a few sections. Details of features and configuration provided in this guide are applicable to IRMNX Compact VAV controllers, IRM N4 controllers, and IP/MSTP VAV controllers. However, few features might not be supported by VAV or IRM N4 controllers.*

Note: *It is recommended to carefully, read, understand, and consider the Notes and Important provided to address the differences in supported features per controller model.*

The user guide covers the following topics:

- Chapter 1: About the System Engineering Guide
  This section describes the engineering tool's essential information, specific operation details, and system overview of the IRM controller.
- Chapter 2: Introduction
  This section describes the engineering tool's essential information, specific operation details, and system architecture of the IRM Controller.
- Chapter 3: Overview of the Engineering Tool
  This section describes the properties of BACnet device, components of control manager, and procedure to configure periodic program, event program, and On board IO.
- Chapter 4: Configure IRM NX controllers
  This section describes the steps to configure the IRM NX controller, IP settings, linking of controller IO points to the BACnet points, and terminal assignment view.
- Chapter 5: Engineer the Controllers (Engineering Modes)
  This section describes steps to setup controller with or without using serial number, common operations of IRM program, Bluetooth configuration, On board IO migration, and alarms configuration.
- Chapter 6: Sylk Device Programming
  The IRM controllers support the Sylk bus. The Sylk devices and Sylk parameters are part of the engineering tool palette. This section describes step by step process to program the Sylk device.

- Chapter 7: Modbus Engineering
  This section describes the Modbus Interface rules, as well as the procedure for configuring Modbus device settings and verifying communication
- Chapter 8: Other Operations
  This section describes other operations such as firmware download, bulk operation, creating controller backup, and commissioning.
- Chapter 9: Pre-Engineered Templates and Balancing
  This section describes procedure to configure the Flow Balancing View and Global Balancing Object. Also describes steps to deploy the Global VAV Template.
- Chapter 10: Troubleshooting
  This section describes the procedure for resolving the problem, specifically when working on an engineering tool, as well as best practices for designing a controller. This section also includes workarounds, a diagnosis report, and a system status check.

Applicable Technical Literature

Table 1 Applicable Technical Literature

Document Title	Reference
IP/ MSTP VAV Technical Literature (Centraline)	
Merlin NX IP VAV Product Datasheet	EN0Z-1073-GE51
Merlin NX MSTP VAV Product Datasheet	EN0Z-1072-GE51
Merlin NX IP and MSTP VAV Installation Instructions	EN1Z-1076-GE51
Merlin NX IP and MSTP VAV Mounting Instructions	EN1Z-1074-GE51
Merlin NX Compact VAV Product Datasheet	EN0Z-1061-GE51
Merlin NX Compact VAV Installation Instructions	EN1Z-1061-GE51
Merlin NX Compact VAV Mounting Instructions	MU1Z-1061-GE51
IP/ MSTP VAV Technical Literature (HBS)	
IP Product Datasheet	EN0B-0301-IE10
MSTP Product Datasheet	EN0B-0300-IE10
Mounting Instructions	MU1B-0300-IE10
Installation Instructions	EN1B-0301-IE10
IRM Migration Guide	EN2B-0428-IE67
Compact VAV Controller Product Datasheet	EN0B-0078-IE10
Compact VAV Mounting Instructions	MU1B-0590-GE5
Compact VAV Installation Instructions	EN1B-0591-GE51
Other Supported Technical Literature	
Honeywell Unitary Controller 24V - Datasheet	31-00571
Honeywell Unitary Controller 24V - Mounting Instructions	31-00572
Honeywell Unitary Controller 24V - Installation Instructions	31-00614

Table 1 Applicable Technical Literature

Document Title	Reference
IRM Function Blocks User Guide	EN2B-0415-GE51
Global VAV Balancing Tool User Guide	EN2B-0041-IE10
Honeywell Connect Mobile User Guide	31-00472
NIAGARA IRM Application Guide	EN2B-0416-GE51
NIAGARA Hardening Guide	EN2Z-0985-GE51
MERLIN N4 Product Data	EN0Z-1035-GE51
MERLIN N4 Installation Instructions	EN1Z-1035-GE51
EAGLEHAWK NX Product Data	EN0Z-1039-GE51
EAGLEHAWK NX Installation & Commissioning Instructions	EN1Z-1039-GE51
EAGLEHAWK NX Panel Bus Driver User Guide	EN2Z-1043-GE51
EAGLEHAWK NX Onboard IO Driver User Guide	EN2Z-1044-GE51

IRM related technical literature can be downloaded at buildings.honeywell.com.

System Requirements

Compatibility	CentraLine-N4.9.xx.xxx and higher.
Firmware	Refer to the latest release notes for the updated firmware details. Download the latest firmware from buildings.honeywell.com.
Engineering Tools	Refer to the latest release notes for the updated IRM engineering tool details. Download the latest IRM Engineering Tool from buildings.honeywell.com.
Migration Tool	spyderToIrmNxMigrator-wb.jar

Table 2 Supported Controller Models

Controller Model	Description
IRM N4 Controller (Centraline)	
CLMERL4N	IRM N4 Controller with large housing.
CLMERL6N	
CLMERL8N	
CLMERS4N	IRM N4 Controller with small housing.
CLMERS5N	
IRM N4 Controller (HBS)	
CPO - RL4N	IRM N4 Controller with large housing.
CPO - RL5N	
CPO - RL6N	
CPO - RL8N	
CPO - RS3N	IRM N4 Controller with small housing.
CPO - RS4N	
CPO - RS5N	
Compact VAV Controller (Centraline)	
CLMEVA423B24N	IRM compact VAV controller with an integrated actuator.
CLMEV423B24N	Replacement IRM compact VAV controller without an integrated actuator.
Compact VAV Controller (HBS)	
CPO - VA423B24N	IRM compact VAV controller with an integrated actuator.
CPO - V423B24N	Replacement IRM compact VAV controller without an integrated actuator.
IP VAV Controller (Centraline)	
CLMEVA75I24NM	IP VAV controller
CLMEVA00IB4NM	IP VAV controller with Bluetooth (without UIO and SSR support).
CLMEVA75IB24NM	IP VAV controller with Bluetooth.
IP VAV Controller (HBS)	
CPO - VA75I24NM	IP VAV controller
CPO - VA00IB4NM	IP VAV controller with Bluetooth (without UIO and SSR support).
CPO - VA75IB24NM	IP VAV controller with Bluetooth.
MSTP VAV Controller (Centraline)	
CLMEVA75M24NM	MSTP VAV controller
CLMEVA00MB24NM	MSTP VAV controller with Bluetooth support (without UIO and SSR support).
CLMEVA75MB24NM	MSTP VAV controller with Bluetooth support.

Table 2 Supported Controller Models

<table>
<tr><th>Controller Model</th><th>Description</th></tr>
<tr><td colspan="2">MSTP VAV Controller (HBS)</td></tr>
<tr><td>CPO - VA75M24NM</td><td>MSTP VAV controller</td></tr>
<tr><td>CPO - VA00MB24NM</td><td>MSTP VAV controller with Bluetooth support (without UIO and SSR support).</td></tr>
<tr><td>CPO - VA75MB24NM</td><td>MSTP VAV controller with Bluetooth support.</td></tr>
<tr><td colspan="2">Unitary Controller</td></tr>
<tr><td>UN-RS0844ES24NMC / D</td><td rowspan="2">Honeywell Unitary IP controllers with small housing.</td></tr>
<tr><td>UN-RS0844ESB24NMC / D</td></tr>
<tr><td>UN-RS0844MS24NMC / D</td><td rowspan="2">Honeywell Unitary MSTP controllers with small housing.</td></tr>
<tr><td>UN-RS0844MSB24NMC / D</td></tr>
<tr><td>UN-RS0844TS24NMC / D</td><td rowspan="2">Honeywell Unitary T1L controllers with small housing.</td></tr>
<tr><td>UN-RS0844TSB24NMC / D</td></tr>
<tr><td>UN-RL1644ES24NMC / D</td><td rowspan="2">Honeywell Unitary IP controllers with large housing.</td></tr>
<tr><td>UN-RL1644ESB24NMC / D</td></tr>
<tr><td>UN-RL1644MS24NMC / D</td><td rowspan="2">Honeywell Unitary MSTP controllers with large housing.</td></tr>
<tr><td>UN-RL1644MSB24NMC / D</td></tr>
<tr><td>UN-RL1644TS24NMC / D</td><td rowspan="2">Honeywell Unitary T1L controllers with large housing.</td></tr>
<tr><td>UN-RL1644TSB24NMC / D</td></tr>
</table>

Engineering Recommendations

For successful and seamless engineering, follow the below recommendations.

Table 3 IRM NX Engineering Specifications

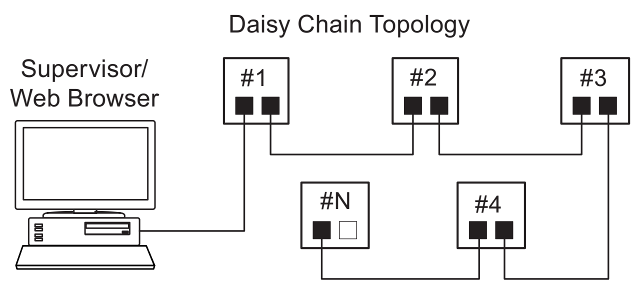
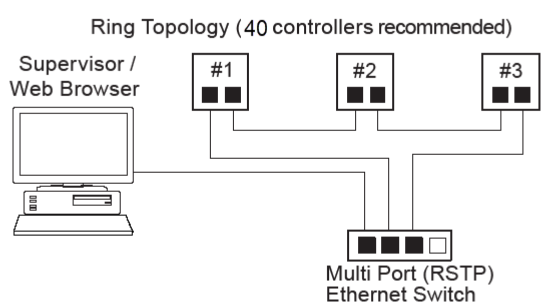
Specification	Description
Recommended number of BACnet IP controllers	• **Daisy chain topology** The recommendation is no more than 100 controllers per BACnet IP port. In the daisy connection, it is recommended to add 15 proxy points and 20 ref in or ref out to each BACnet IP controller. To optimize the Niagara station performance, the tool uses the Niagara BACnet worker pool to manage communication between controllers and synchronize user changes. A station with more proxy points (than recommended) will have a very busy BACnet worker pool. When the worker pool is busy, there will be a delay in processing the messages sent to the controller and thus impacting tool performance. As a result, some of the tool features will not function correctly. For example, delays in synchronizing live changes or probable failures in synchronizing user changes with the controller. When there are failures, the user needs to redo the tool operation or perform a full application teach to synchronize the changes..  **Figure 1. Daisy Chain Topology** ***Note:*** *Engineering on 100 controllers in a daisy chain is only possible in swap out mode.* • **Ring network topology** The maximum number of controllers that can be connected in the ring network topology is 40 with 1 switch. The switch manages the connection of the loop. For optimal performance and bus traffic, it is recommended to limit the number of controllers upto 40.  **Figure 2. Ring Topology**

Table 3 IRM NX Engineering Specifications (Continued)

Specification	Description
Recommended number of BACnet MSTP controllers	• 40 controllers per BACnet MSTP bus. It is recommended to add 15 proxy points and 20 ref in or ref out to each BACnet MSTP controller.
Available Memory	• **Compact VAV:** 344 KB • **IRM N4:** 344 KB • **IP/ MSTP VAV:** 2 MB • **Unitary:** 2 MB

Baud rate	• **BACnet MSTP**
	  • **Supported Baud Rate:** 9600, 19200, **38400** (default), 57600, and 76800.
	• **Modbus**
	  • **Supported Baud Rate:** 1200, 2400, 4800, 9600, 14400, **19200** (default), 38400, and 57600.

Maximum function blocks usage	• Maximum 32 folders overall (IRM CVAV/FCU controller). • Maximum 100 folders overall (IRM IP/MSTP VAV controller). • Maximum 100 folders overall (Unitary IP/MSTP/T1L controller). • IRM controllers allows to add total of 150 function blocks per folder with four folders reserved by default. ***Note:*** *It is recommended to add 100 function blocks per folder for optimum performance.* *Each folder used by the program consumes 8 KB of memory.* • Maximum 2000 function blocks (IRM CVAV/FCU controller). • Maximum 6000 function blocks (IRM IP/MSTP VAV controller). • Maximum 6000 function blocks (Unitary IP/MSTP/T1L controller). • Sylk device configuration limited by Sylk power usage. ***Note:*** *The WmConfigHvacA function block can be placed not more than three times onto the wiresheet. It can only be configured as a Sylk wall module once. Instead of using the Sylk wall module, the function block can also be configured as a wired or external wall module (a Modbus wall module). This limitation applies to both IrmFolder and IrmSubFolder.*
Modbus	• Maximum 8 Modbus devices. • Maximum 155 read or write data points for all the Modbus devices per IRM CVAV, IP/MSTP VAV, and Unitary IP/MSTP/T1L controller. • Maximum number of high priority registers per controller is 6.
Maximum Sylk wall modules	The maximum number of wall modules depends on the following factors: • Sylk bus power consumption. • Number of parameters used. • Total config file size. The IRM NX tool has an inbuilt resource calculator to calculate the amount of Sylk wall modules.

Table 3 IRM NX Engineering Specifications (Continued)

Specification	Description
BACnet device discovery over BLE Controller gateway	• **IP Controllers Limitation**: For IP controllers, the entered Instance Id range between two instance ids should not exceed 30. • **MSTP Controllers Limitation:** For MSTP controllers, the entered Instance Id range between two instance ids should not exceed 30. ***Note:*** *If more than 30 IP or MSTP controllers are discovered, the HCM will connect to a random group of 30 controllers* ***Note:*** *It is recommended to use BACnet Instance Range search for BACnet device discovery using Bluetooth gateway.*

Security Best Practices

The purpose of this section is to provide information to those involved in the installation and maintenance of a product or system so that they can understand the requirements for configuring and managing the security of the product or system.

- Use the latest version of the engineering tool and firmware.
- CentraLine-N4 installation files, configuration files (including station backup), certificates, and licenses are included in the disaster recovery plan.
- The PC running CentraLine-N4 should be protected from unauthorized physical access wherever feasible.
- The Ethernet network (and any other networks to which the PC is connected) is protected, for example, using firewalls and intrusion detection systems.
- The PC is running the latest version of the Windows operating system, with all updates and service packs.
- The PC has anti-virus software.
- Appropriate user accounts are created on the PC, and file access is restricted to only authorized users.
- The CentraLine-N4 is configured to use HTTPS (Hypertext Transfer Protocol Secure) with a certificate from a trusted Certificate Authority.
- Make sure the CentraLine-N4 is configured to backup data regularly to a secure location as per your company's backup policy.
- Ensure that complete commissioning is carried out in a closed local area network without connecting to the internet to avoid unauthorized detection of BACnet message packets.
- Use encrypted communication between the engineering tool and the controller.

For additional information refer following documents:

- **NX General Security Best Practices (EN0Z-1040GE51)**
- **Niagara 4 Hardening Guide — EN2Z-0985GE51**

CHAPTER

2 INTRODUCTION

The IRM engineering tools provide flexible and fully programmable control, resulting in real benefits such as lower energy costs while driving new levels of functionality and performance.

Basic Concepts

Table 4 Engineering Configurations

Configuration	Description
Engineer the Controllers (Engineering Modes)	There are three way of engineering IRM NX controller: • Add Controller Setup with Service Pin: Use this procedure when you do not have the controller's serial number. • Controller Setup using Serial Number: Use this procedure when you have the controller's serial number. • Discover Online Controller: In this method, the devices are discovered on the BACnet network in the first stage and used simultaneously for application engineering. Online engineering is recommended when undertaking engineering directly with devices already installed on the BACnet network.
Synchronization Status	Synchronization status check allows monitoring the running project and status of the connected IRM NX controllers by the control manager (online engineering only). Any modification detected in the controller, project, or both can be synchronized by applying the following actions. • Teach to controller • Learn from controller • Clear project (as required) • Clear controller (as required)
Tuning Policies.	Defines rules for evaluating both write requests, which is to writable proxy points, and the acceptable “freshness” of reading requests that result from polling. It includes standard tuning policy properties and additional properties related to client-side usage of the BACnet subscribe cov service.

Table 4 Engineering Configurations (Continued)

Configuration	Description
Configure MSTP VAV Controllers	IP setting operation is provided to ease the IP configuration for multiple IP VAV controllers from a single window. This feature allows users to perform many of the following functions. • Batch update of IP configuration. • Auto-increment of IP addresses. • Visual indication of modifications to IP addresses. • Reporting of errors in IP configuration. • Offline and online IP configuration.
Bluetooth Configuration	Bluetooth configuration allows configuring the Bluetooth enabled IP/ MSTP VAV controller in a batch. This feature enables users to perform the following operations. • Configure the Bluetooth property of the IP/ MSTP VAV controller. • Enable or disable Bluetooth function. • Setting a Bluetooth passcode. • Setting Bluetooth passcode validity to enable mobile balancing application to connect to the devices over Bluetooth.
New Controller Configuration	All new IRM NX controllers are assigned with default factory device ID = 4194302. However, if multiple controllers have the same device ID, they cannot talk via the BACnet protocol (Who is? - I am broadcast messages). The new controllers on the MSTP bus will not be visible after discovery. When working with multiple controllers, you must also set a unique device ID to each controller.
Flow Balancing View	A variable air volume (VAV) system allows a single IRM NX controller to provide the appropriate amount of cooling to multiple zones with different cooling loads. The VAV regulates the air volume to the zone by opening or closing the damper. This damper is controlled by a floating motor installed on an integrated actuator of the IRM NX controller. The flow balancing tool can be configured with various parameters and indicators to optimize the calibrations used to balance the airflow.
Modbus Engineering	The IRM NX VAV controller is conditionally compliant with the “regular” Modbus device standard. The controller features a removable 2-wire with shield, non-isolated, RS-485 interface suitable for Modbus communication (terminal 16, 17, and 18).
Terminal Assignment View	This function enables you to assign or swap (UIO to BO terminals and vice versa) the IO terminals of the controller without modifying the Onboard IO configuration.
Application Details	Using the details from the flash memory exceeded function block and IRM folder section, the user can verify the property sheet and re-configure the respective function block, IRM folders, or subfolders to the defined limit.
Custom Sensor Configuration Details	If the sensor does not meet any standard characteristics of the available sensors, you can select the type as a custom sensor and set its characteristics. There are three types of custom sensors: current, voltage, and resistive.
Day Light Savings settings	The daylight savings setting is a part of the control manager and enables the user to configure the daylight setting, if required.

Table 4 Engineering Configurations (Continued)

Configuration	Description
Global Balancing Object	The global balancing object is a component of the engineering tool. It allows you to configure the balancing object based on the project requirements and generates the controller's balancing data report.
Alarms	Provides the notification classes for establishing alarming.
Irm Controller Diagnostics	The IRM NX controller diagnostics monitor the control engine's activity, BACnet, Modbus trace, and Sylk trace.
Master Sync	The master sync function is based on multiple devices that must have the same application type. This is called a master sync group. The master sync group is established via the clone application function, which clones the application of one selected device (template) to multiple devices.
Clone Application	This function enables you to clone the device application based on a selectable template (device) to selectable devices. As result, all devices will receive the same application type which is the basis of a master sync group.
Split Application	This function enables you to split the unique application of the master sync group into a new application and keep the existing application. For the new application, you can enter a different project program name. A new project application type is issued automatically by the software. The new application can then be cloned to form the new master sync group.
Controller Firmware Download	This function enables you to update the firmware in the controller via download.
Sylk Device Programming	Sylk enabled sensors and actuators save I/O on the controller and are faster and cheaper to install since only two wires are needed, and the bus is polarity insensitive.
Reference Datapoints Usage	The reference datapoint is used to set up communication between BACnet controllers using reference input and reference output points. This data communication is achieved through the use of reference input and reference output points, which are assigned to physical or value BACnet points.
Create a Backup Controller and Application	This function enables you to create a controller or application backup.
Reset to Factory Default	This function enables you to reset controller.

System Architecture of IP VAV Controller

The following schematic shows a BACnet IP based system connected to two IP VAV controllers. The system is engineered using the engineering tool based on the CentraLine-N4 workbench.

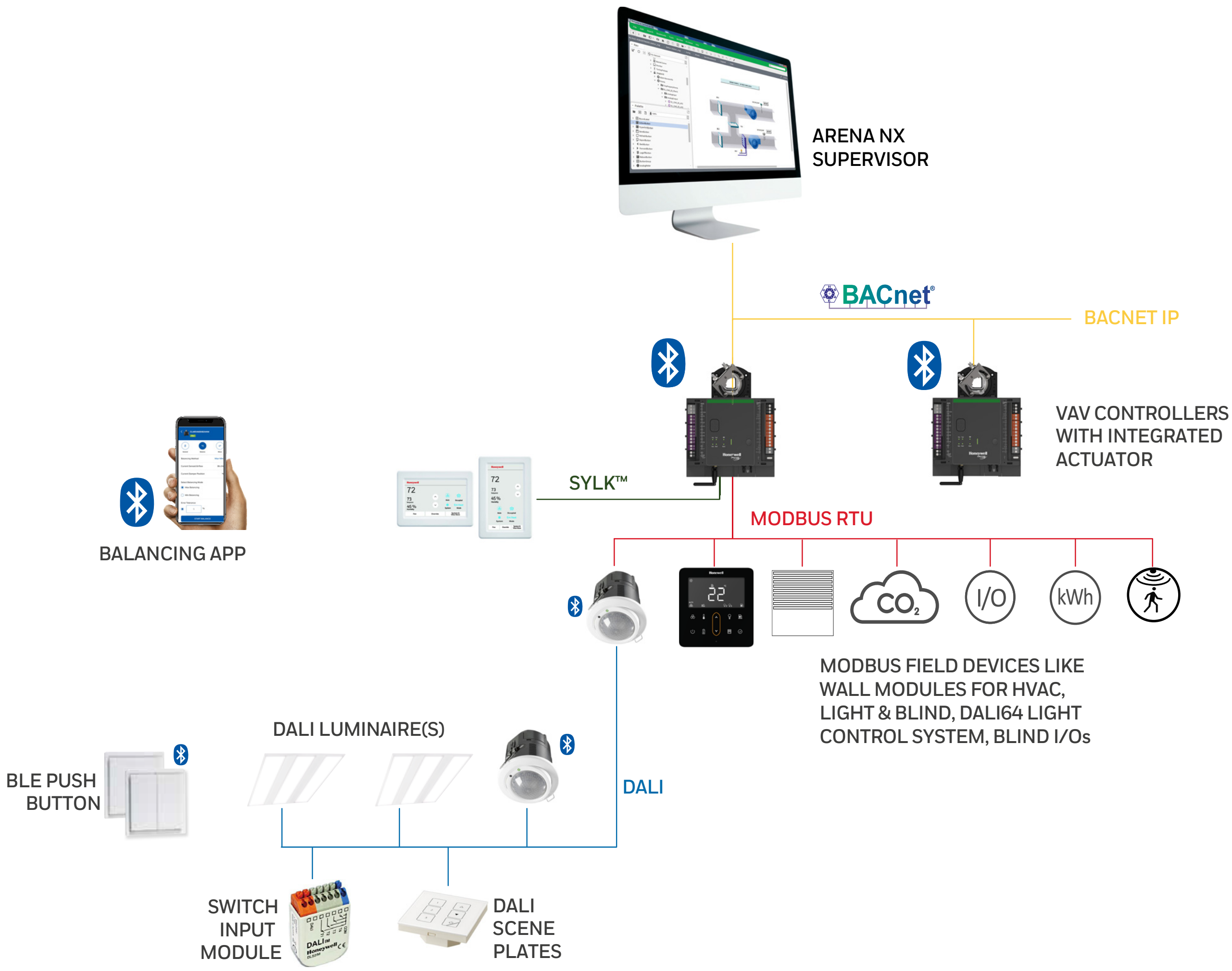


Fig. 3 System Architecture of IP VAV Controller

System Architecture of MSTP VAV Controller

The following schematic shows a BACnet MSTP based system containing a HAWK-8000 controller as a router and MSTP VAV controllers. The system is engineered using the engineering tool based on the CentraLine-N4 workbench.

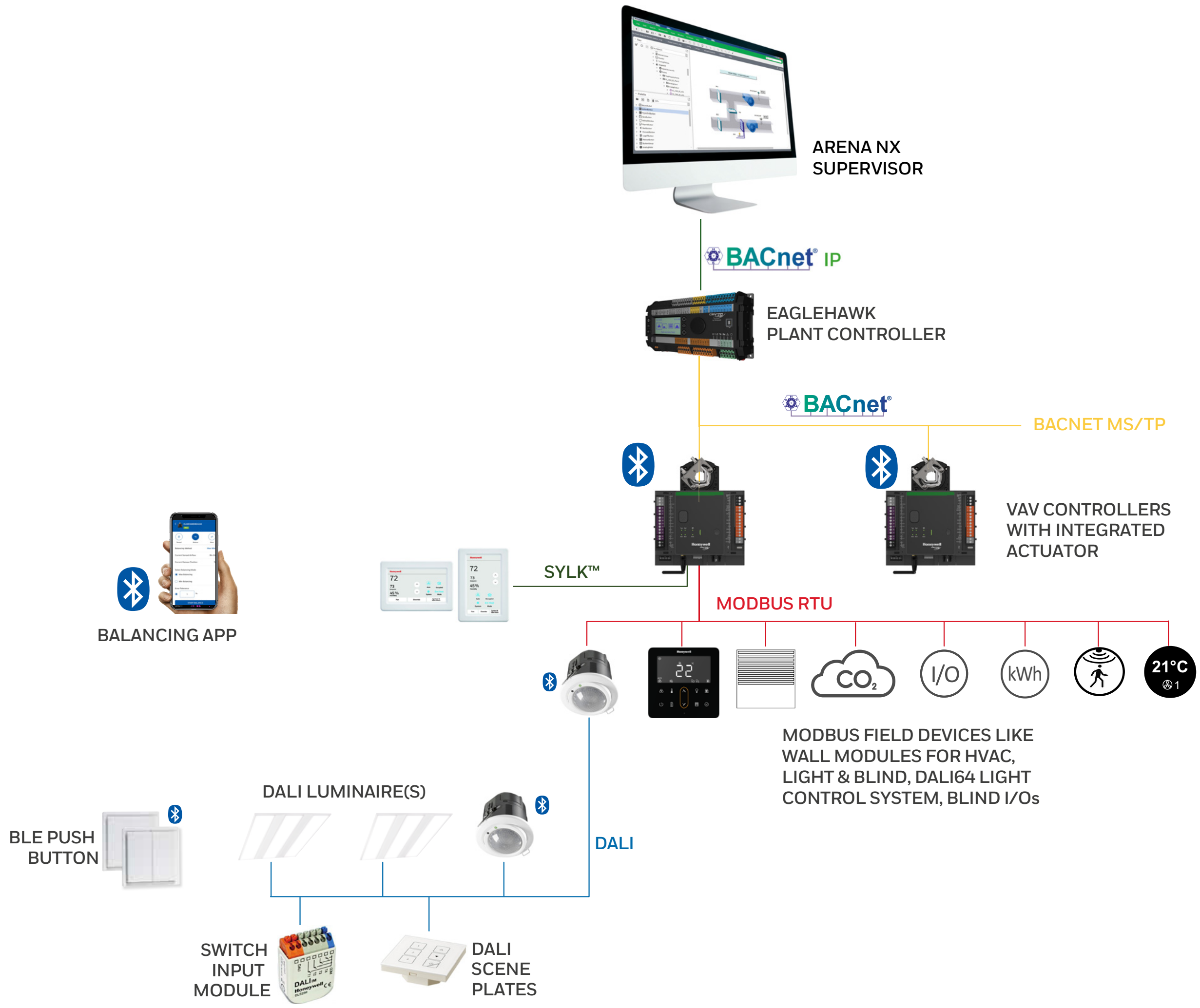


Fig. 4 System Architecture of MSTP VAV Controller

System Architecture of Unitary Controller

The following schematic shows a BACnet™ RJ45 (IP), T1L (IP), or MSTP based system containing a Honeywell Advanced Plant controller as a router and Honeywell Unitary T1L (IP), RJ45 (IP), and MSTP controllers. The system is engineered using the engineering tool based on the Centraline-N4 workbench.

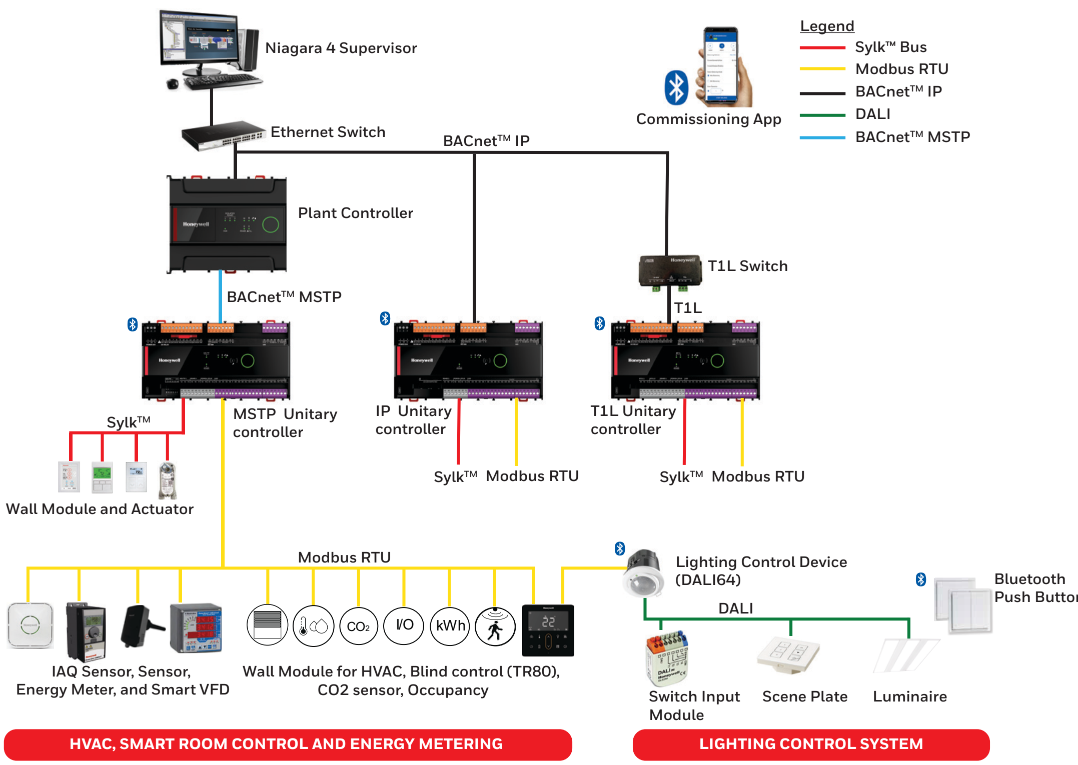


Fig. 5 System Architecture of Unitary Controller

Control Palette

The “honIrmControl” palette is used for creating the application, which includes all necessary components such as logic function blocks and physical points for BACnet devices, IRM programs, and folders.

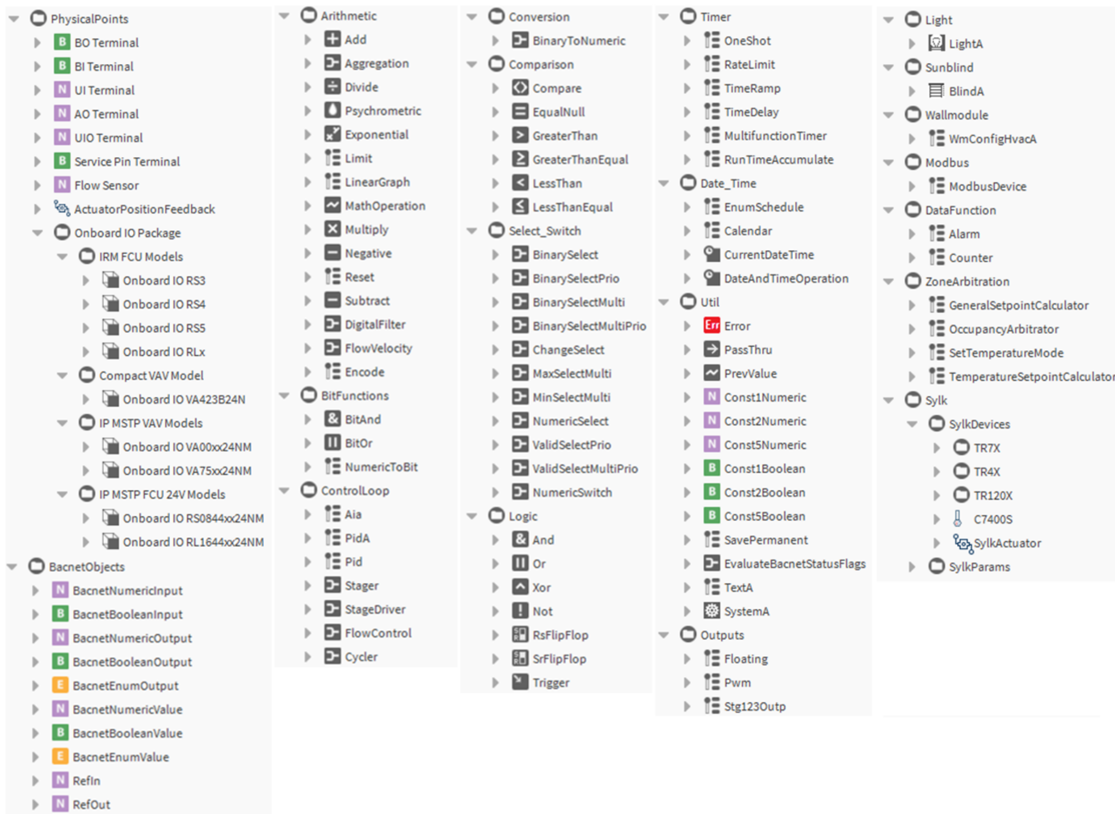


Fig. 6 Control Logic Palette

Overview of the Engineering Tool (IRM)

The engineering tools provide flexible and freely programmable control, resulting in tangible benefits such as lower energy costs while driving new levels of functionality and efficiency.

Site engineers can use smart engineering and commissioning procedures to configure multiple flexible applications.

Bacnet Network Property Sheet

This component is the base container for all BACnet components (devices and proxy points). It resides under the station's Drivers container. Its default view is the "Hon Bacnet Device Manager".

In addition to devices and proxy points, this component contains the station's BACnet communications protocol stack (Bacnet Comm), and a Local Bacnet Device, which configures the station's representation as a BACnet device. For more details about properties of Bacnet Network, refer to Bacnet Device Property Sheet on page 56.

Steps to open Bacnet Network property sheet:

Step 1. Right click on **Bacnet network > Views > AX Property Sheet.**

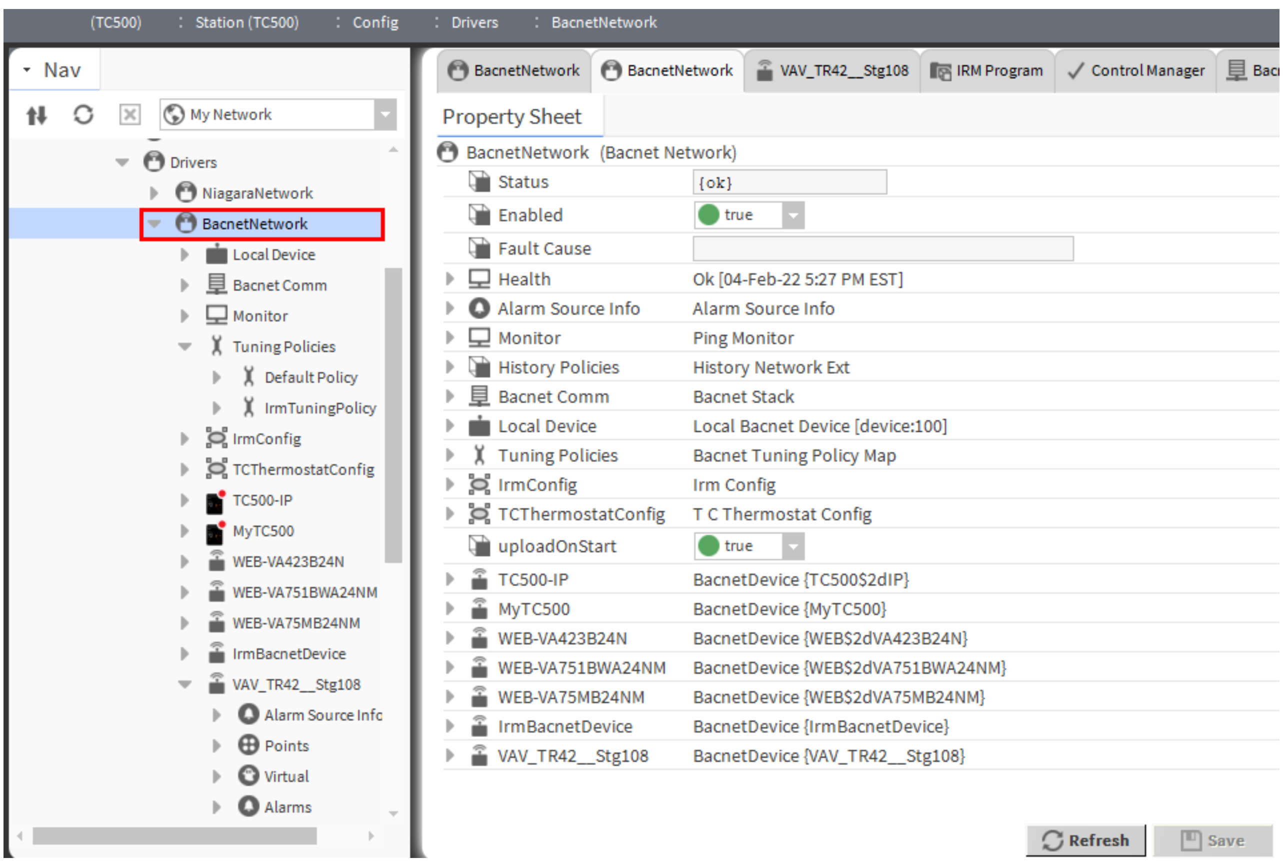


Fig. 7 Bacnet Network Property Sheet

Bacnet Network Tuning Policies Property Sheet

This component is a container for one or more BACnet tuning policy.

When using the BACnet driver you can create multiple tuning policies and assign specific tuning policies to BACnet proxy points as needed based on the Bacnet Comm > Network port used (IP Port, Ethernet Port, Mstp Port). For more details on configuring Tuning policies, refer to Tuning Policies on page 231.

Step to open Bacnet Network Tuning Policies property sheet:

Step 1. Right click on **Tuning Policies > AX Property Sheet.**

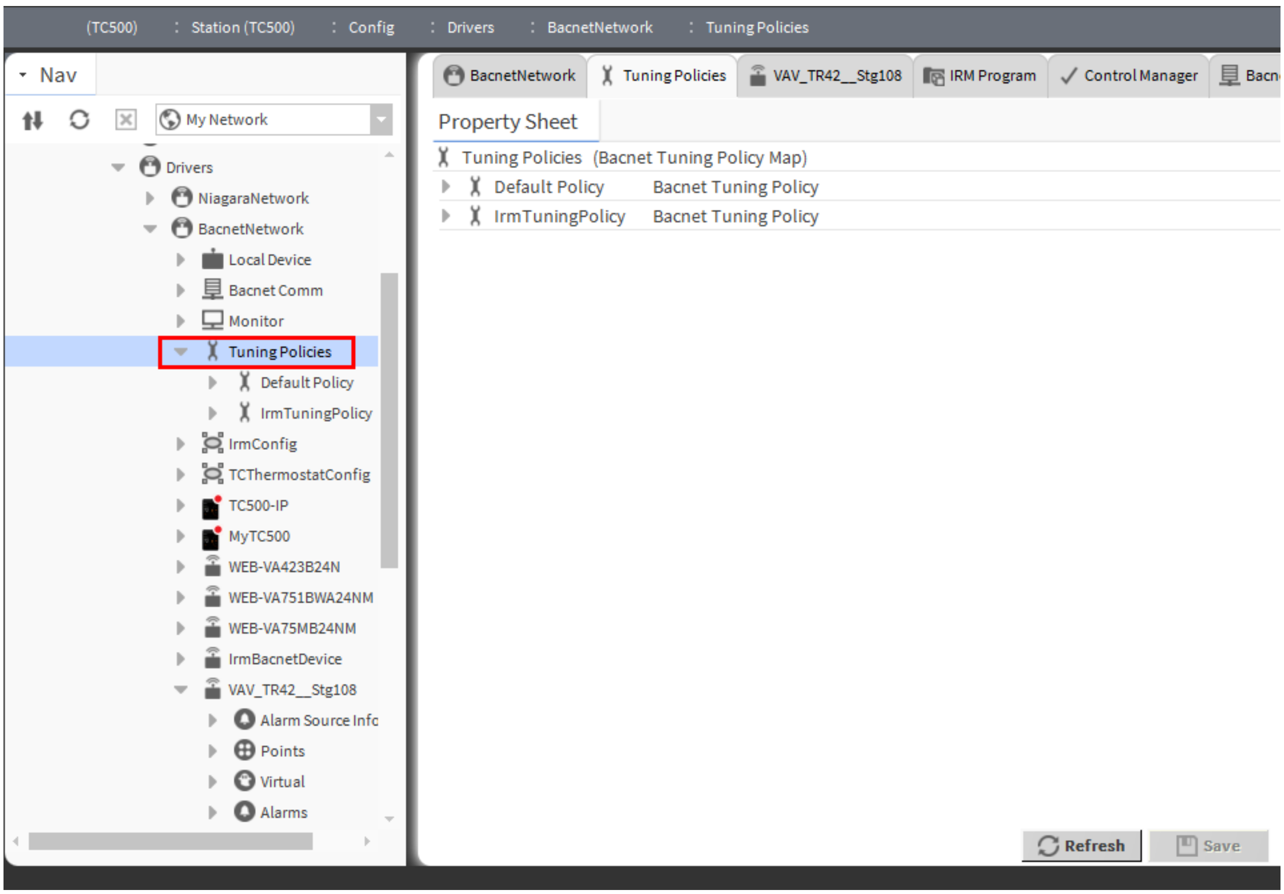


Fig. 8 Bacnet Network Tuning Policies Property Sheet

Bacnet Network Irm Bacnet Device Manager View

The engineering tool has several views to assist with programming the controllers. The figures below are navigating within the CentraLine workbench from the top down.

Most of the items seen in the figure and table below can also be used from the Irm Program view. The actions will perform the same for either view. There are additional options to select from the Irm Bacnet Device Manager view which can be used for multiple controllers. The Irm program view can be used for individual controllers.

The Irm Bacnet device manager view is used for the IRM NX controllers.

Step to open Bacnet Network Irm Bacnet Device Manager property sheet:

Step 1. Right click on **BacnetNetwork**, select **Views > Irm Bacnet Device Manager** view.

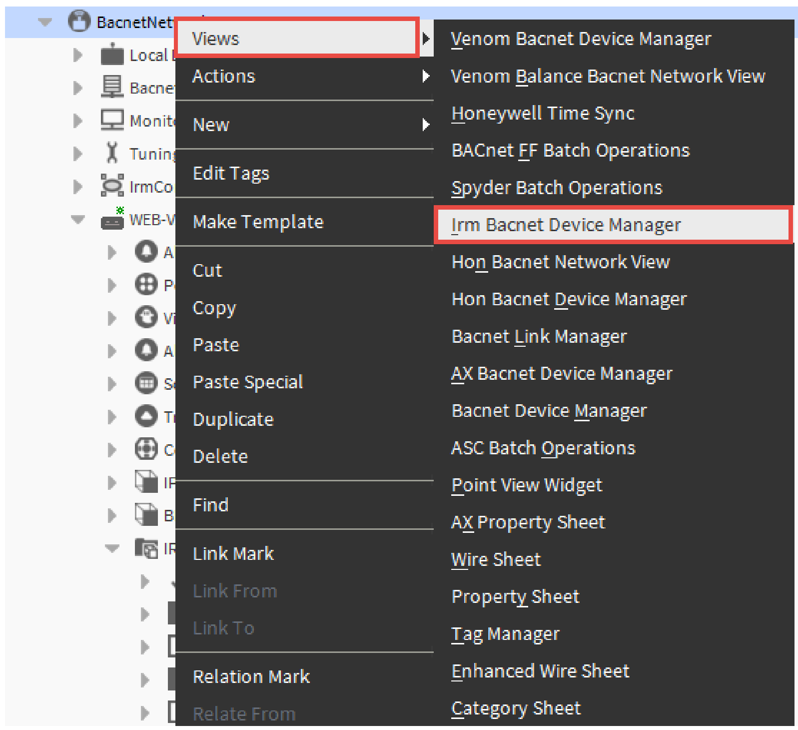


Fig. 9 Irm Bacnet Device Manager view

The Irm Bacnet Device Manager view allows you to perform batch operations on multiple controllers.

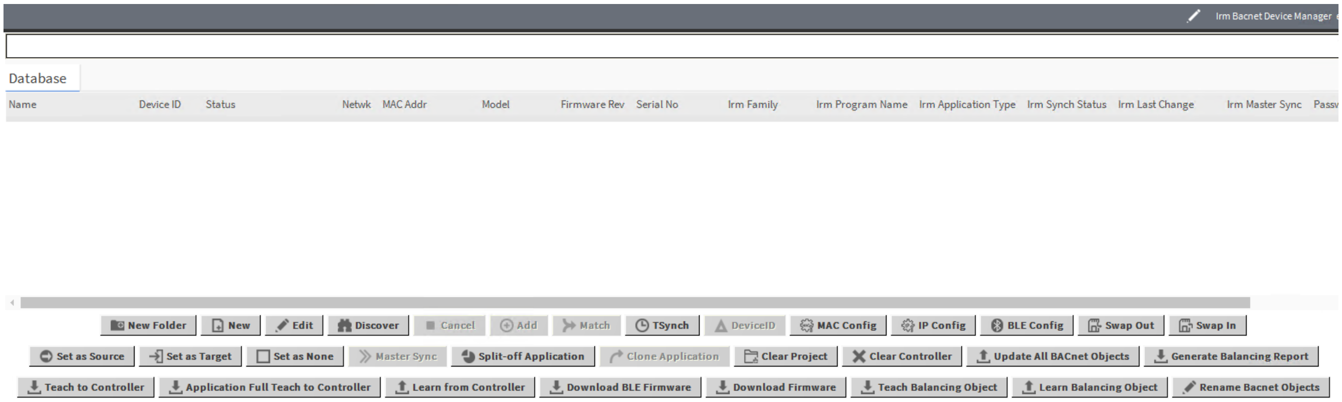


Fig. 10 Irm Bacnet Device Manager view

The following table shows the options indicated on the Irm Bacnet Device Manager and the IRM Program views.

Table 5 Description of Irm Bacnet Device Manager and IRM Program Views

Options	Descriptions
New Folder	To create new device folder.
New	To create/add new device.
Edit	To edit device.
Discover	To discover devices.
Add	To add device from discovered pane.
Match	To match device in database with discovered device.
TSynch	To synchronize device time with PC time. For more details, refer to Synchronizing Controller Time on page 54.
MAC Config	To update MAC Address configurations; enable or disable auto MAC feature. For more details refer to Controller MAC Address Configuration on page 133.
IP Config	To change ethernet settings; set IP Address type (DHCP/Static). For more details refer to IP Configuration on page 117.
BLE Config	Bluetooth port configuration; generate passcode for balancing. For more details refer to Bluetooth Configuration on page 222.

Table 5 Description of Irm Bacnet Device Manager and IRM Program Views

Options	Descriptions
Swap Out	To makes application backup and swaps application out of RAM. For more details refer to Swap on page 187.
Swap In	To restore the saved application to RAM. For more details refer to Swap on page 187.
Set as Source	To makes the selected device a source for a group of devices (targets). For more details refer to Master Sync on page 208.
Set as Target	To makes the selected devices a target for a group of devices. For more details refer to Master Sync on page 208.
Set as None	To removes device from being a source or target (remove from group).
Master Sync	To force the application (or changes) to a group of target devices. For more details refer to Master Sync on page 208.
Split-off Application	To split off application from a Master Sync group. For more details refer to Split Application on page 214.
Clone Application	To copy the application from one device to one or more device. For more details refer to Clone Application on page 210.
Clear Project	To deletes the application from the project of the selected devices. For more details refer to Clear Project on page 183.
Clear Controller	To delete the application from the selected devices. For more details refer to Clear Controller on page 181.
Update All BACnet Objects	To updates all BACnet Object values from the controller to the application. For more details refer to Update All Bacnet Object Values from Controller to Application on page 204.
Generate Balancing Report	To create a balancing report from online controller values or wire sheet values. For more details refer to Generating Balancing Report on page 375.
Teach to Controller	To download the application changes in the project to the devices. For more details refer to Teach To Controller on page 172.
Application Full Teach to Controller	To downloads the whole application to the devices. For more details refer to Teach Full Application To Controller on page 174.

Table 5 Description of Irm Bacnet Device Manager and IRM Program Views

Options	Descriptions
Learn from Controller	To uploads the current application from the devices in the project. For more details refer to Learn from Controller on page 177.
Download BLE Firmware	To downloads Bluetooth firmware to the device(s). For more details refer to Download Bluetooth Firmware on page 403.
Download Firmware	To downloads controller firmware to the device(s). For more details refer to Controller Firmware Download on page 340.
Teach Balancing Object	To downloads the balancing object values from the station's balancing object to the device. For more details refer to Teach Balancing Values to Controller on page 373.
Learn Balancing Object	To uploads the balancing object values from the device to the station's balancing object. For more details refer to Learn Balancing Object from Controller on page 373.

Controller View

The view below may or may not be seen depending on the controller you are working with and if a template was used.

Step to open Controller view:

Step 1. Navigate to **Config** > **Drivers** > **Bacnet Network**.

Step 2. Expand **BacnetNetwork**, right click on a **controller** > **Views**.

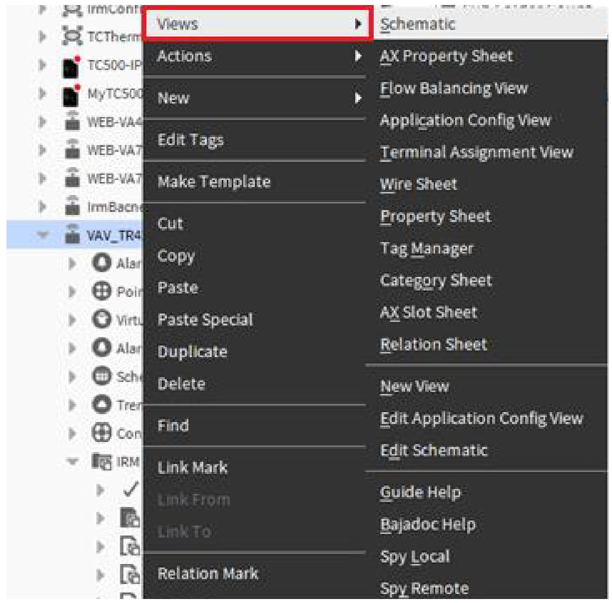


Fig. 11 Controller View

Table 6 Controller View Options

Components	Description
Schematic	Represent the VAV Controller status and Setpoint controls.
AX Property Sheet	This is default property sheet view for the HAWK-N4.
Flow Balancing View	The flow balancing tool can be configured with various parameters and indicators to optimize the calibrations used to balance the airflow. For more details, refer to Flow Balancing View on page 359.
Application Config View	This contains the configuration details for various parameters in application.
Terminal Assignment View	The Terminal Assignment View allows the user to assign or swap the controller's IO terminals without opening the Onboard IO configuration. This feature allows users to change the IO terminal assignment even if the device is swapped out. For more details, refer to Terminal Assignment View on page 146.

Controller Point View

This is the default view for the Points extension (or Points folder) under any BacnetDevice, and works similarly to the way other point managers work, which support online point discovery.

Step to open controller Irm Bacnet Point Manager view:

Step 1. Navigate to **Config** > **Drivers** > **Bacnet Network.**

Step 2. Expand **BacnetNetwork** > **Controller**, right click on a **Points** > **Views> Irm Bacnet Point Manager.**

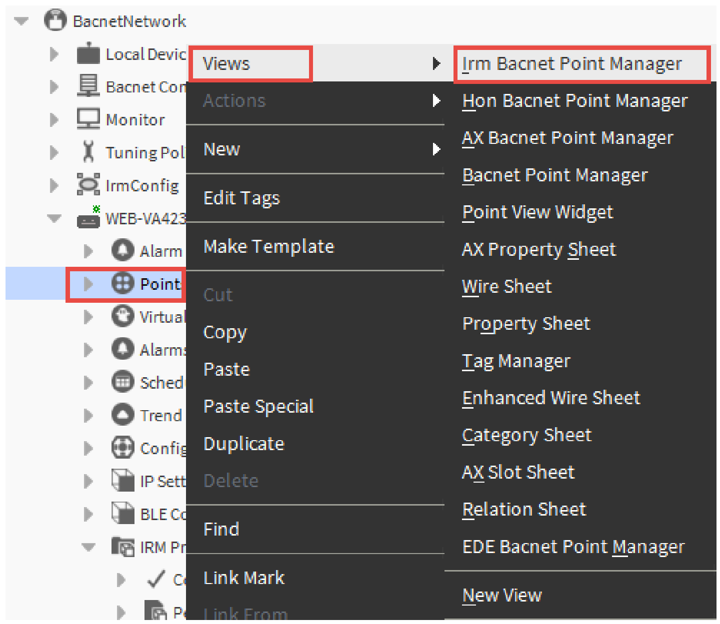


Fig. 12 Controller Point View

Table 7 Irm Bacnet Point Manager Description

Component	Description
Irm Bacnet Point Manager	The Irm Bacnet Point Manager allow to discover and add BACnet points when the controller is online. The default view for the BACnet points extension is the IRM Bacnet Point Manager. • To sort objects click on any column header. To group like type objects together, sort by Object ID (BACnet object type). • To select other properties (apart from Present_Value) as a candidate to proxy, click the plus (+) icon to expand the object. For more details about configuring Irm Bacnet Point Manager, refer to below ORD in the Niagara help. *module://docBacnet/doc/ControllerConfiguration-C76D113B.html*

Controller IP Settings

IP Settings allows configure IP setting and network time server for multiple IP/ MSTP VAV controller from a single window. For more details about configuring controller IP Settings, refer to Configure MSTP VAV Controllers on page 125.

Step to open controller IP Settings property sheet:

Step 1. Navigate to **Config** > **Drivers** > **Bacnet Network.**

Step 2. Expand **BacnetNetwork** > **Controller** > right-click **IP Settings** > **Views> AX Property Sheet.**

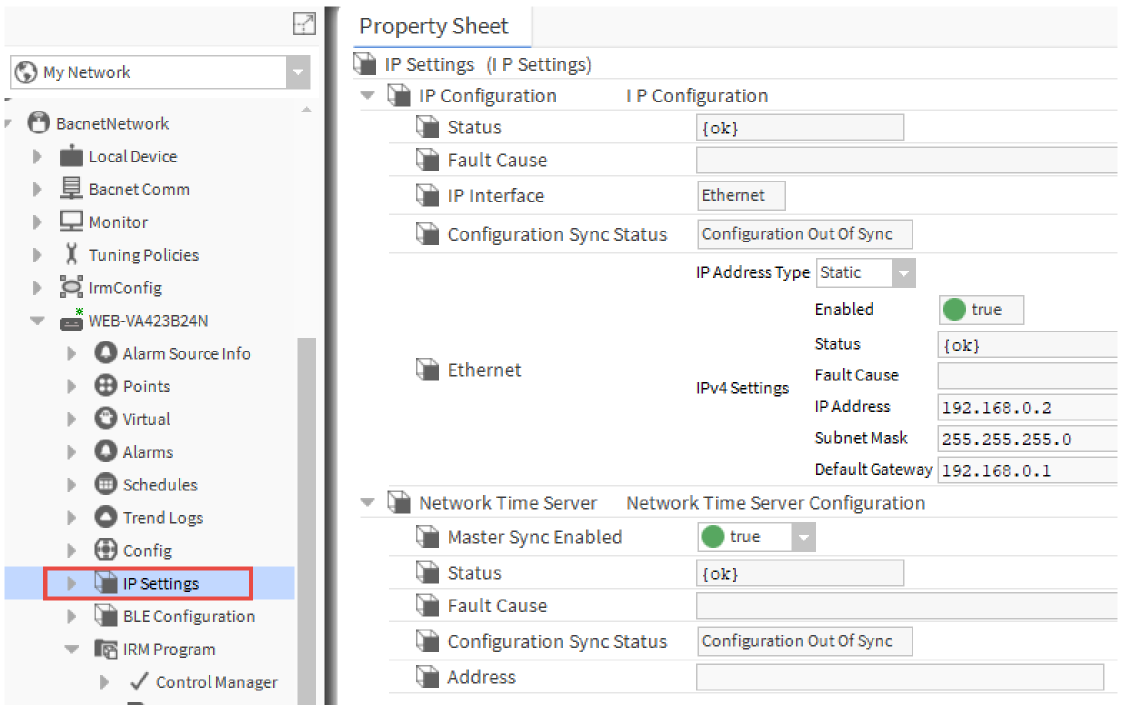


Fig. 13 IP Settings Property Sheet

Controller BLE Configuration

The Bluetooth configuration allows to configure bluetooth setting for IP/ MSTP VAV controllers. This feature allows enabling or disabling the Bluetooth functionality and setting up a Bluetooth password.

For more details about configuring controller BLE Configuration, refer to Bluetooth Configuration on page 222.

Step to open controller BLE Configuration property sheet:

Step 1. Expand **BacnetNetwork** > **Controller** > right-click **BLE Configuration** > **Views**> **AX Property Sheet.**

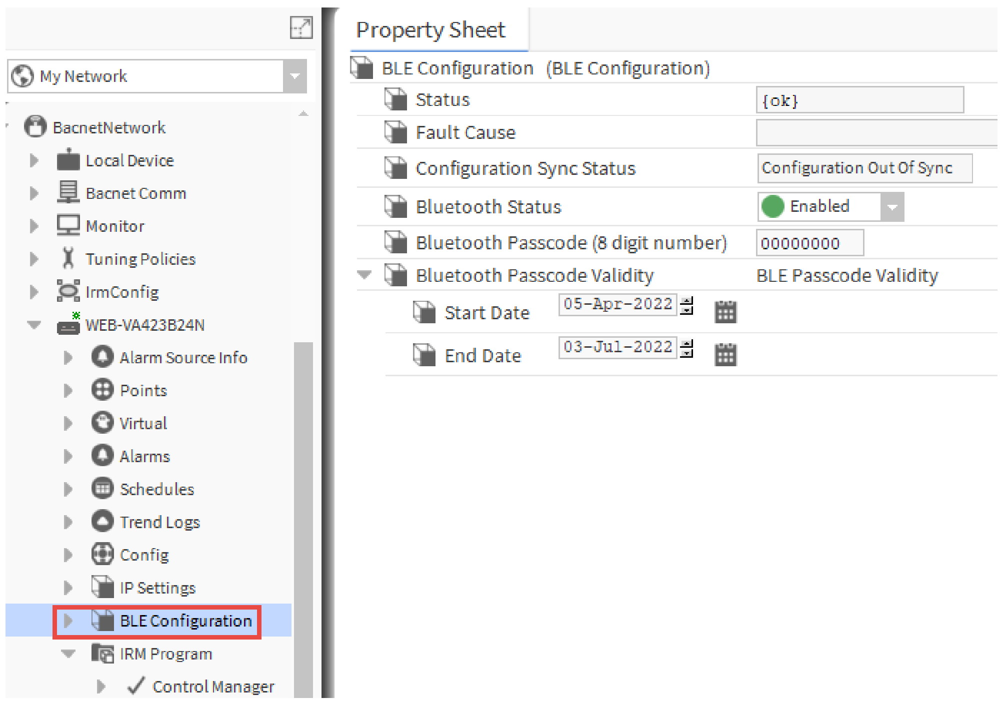


Fig. 14 Controller BLE Configuration

The following are the actions you can perform from BLE Configuration.

Table 8 BLE Configuration Actions

Actions	Description
Write BLE Configuration To Device	To send the Bluetooth configuration modifications to the controller.
Read BLE Configuration From Device	To read the Bluetooth configuration from the controller.
Generate Passcode	To set a passcode for the connected Bluetooth controller, which helps you to authenticate the correct controller.

IRM Program

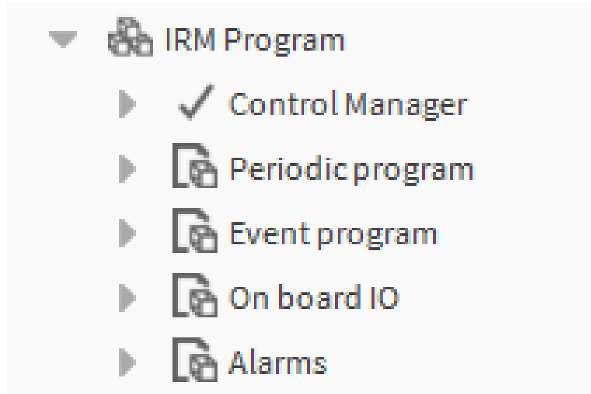


Fig. 15 IRM Program Folder

Following are the available components in IRM Program.

Table 9 IRM Program Folder

Components	Description
Control Manager	To configure controller or application property.
Periodic Program	To create a control strategy program running cyclically on a fixed time base.
Event Program	To create a event-driven control strategy running during event program executed.
Onboard IO	To configure hardware configuration of the application with the physical points.
Alarms	To configure the extension for BACnet event notifications (alarms) sent to the station by that device.

Irm Program View

Step to open Irm Program View:

Step 1. Expand **BacnetNetwork** > **Controller** > right-click **IRM Program** > **Views.**

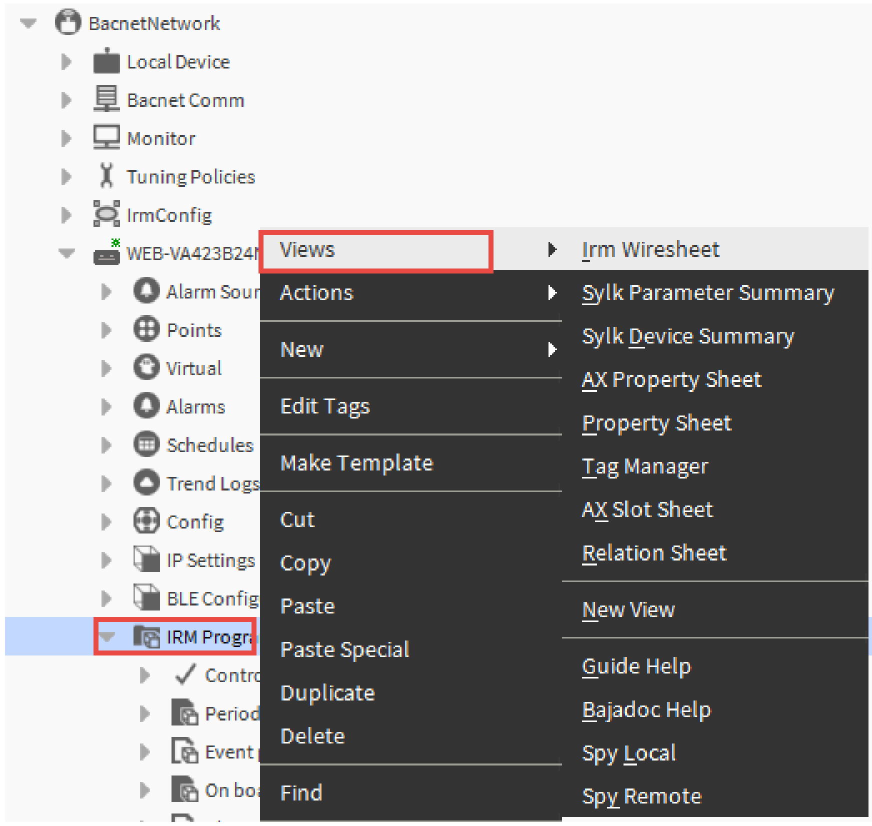


Fig. 16 Irm Program View

The following are the views available in the IRM Program.

Table 10 IRM Program View

Components	Description
Irm Wiresheet	The Irm Wiresheet is the location where the Control Manager, Periodic and event program objects, as well as the Onboard IO and Alarms are programmed.
Sylk Parameter Summary	Provides a summary of the Sylk parameters which are programmed.
Sylk Device Summary	Provides a summary of every Sylk device which is programmed.

Irm Program Actions

Step to open Irm Program actions:

Step 1. Expand **BacnetNetwork** > **Controller** > right-click **IRM Program** > **Actions**.

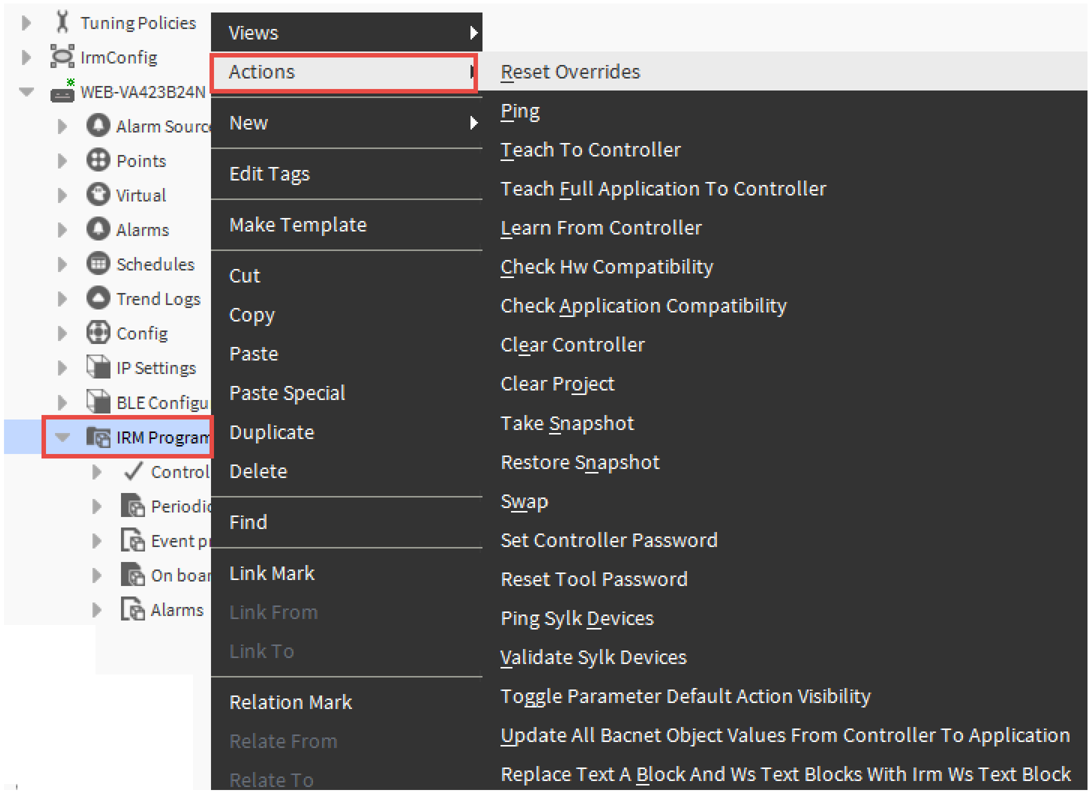


Fig. 17 Irm Program actions

Following are the actions you can perform in IRM Program.

Table 11 IRM Program Actions

Actions	Description
Reset Overrides	This action is used to clear the overrides on all the function blocks.
Ping	To verify the connectivity between engineering tool and controller.
Teach To Controller	Download application changes in the project to the device(s); select to ‘overwrite BACnet objects in’ device OR application.
Teach Full Application To Controller	Downloads the whole application to the device(s); select to ‘overwrite BACnet objects in’ device OR application
Learn from Controller	Uploads the current application from the device(s) in the project.
Check Hw Compatibility	Compares the hardware used in the controller and the hardware defined for in the application can be verified. Any differences are indicated on the Hw compatibility job log.

Table 11 IRM Program Actions (Continued)

Actions	Description
Check Application Compatibility	Compares the application to determine if it is compatible with the hardware chosen
Clear Controller	Deletes the application from the controller.
Clear Project	Deletes the application from the selected device(s).
Take Snapshot	Allows for a backup and restore with the current status of an application.
Restore Snapshot	Allows for user to restore from a previous snapshot.
Swap	A swapped device is frozen and saved to a project repository on the PC hard drive.
Set Controller Password	Allows user to set a password in the controller.
Reset Tool Password	Allows user to reset the password in the controller.
Ping Sylk Devices	Verifies and displays the Sylk device status based on the device connected to the network at the configured address.
Validate Sylk Device	Verifies and displays the Sylk device status based on the device connected to the network at the configured address.
Toggle Parameter Default Action Visibility	To hide or show parameter default action.
Update All Bacnet Object Values from Controller to Application	Verifies and displays the Sylk device status based on the device connected to the network at the configured address.
Replace Text A Block and Ws Text Blocks with Irm Ws Text Block	Convert any TextA Function Block to the IRMWsTextBlock Function Block.

Control Manager View

The figures below show the areas which may need to be configured, depending on the controller model. After adding a new controller into the database, you can edit the controller model.

Open the Control Manager view:

Step 1. Expand the controller, expand **IRM Program**, and double-click on **Control Manager**.

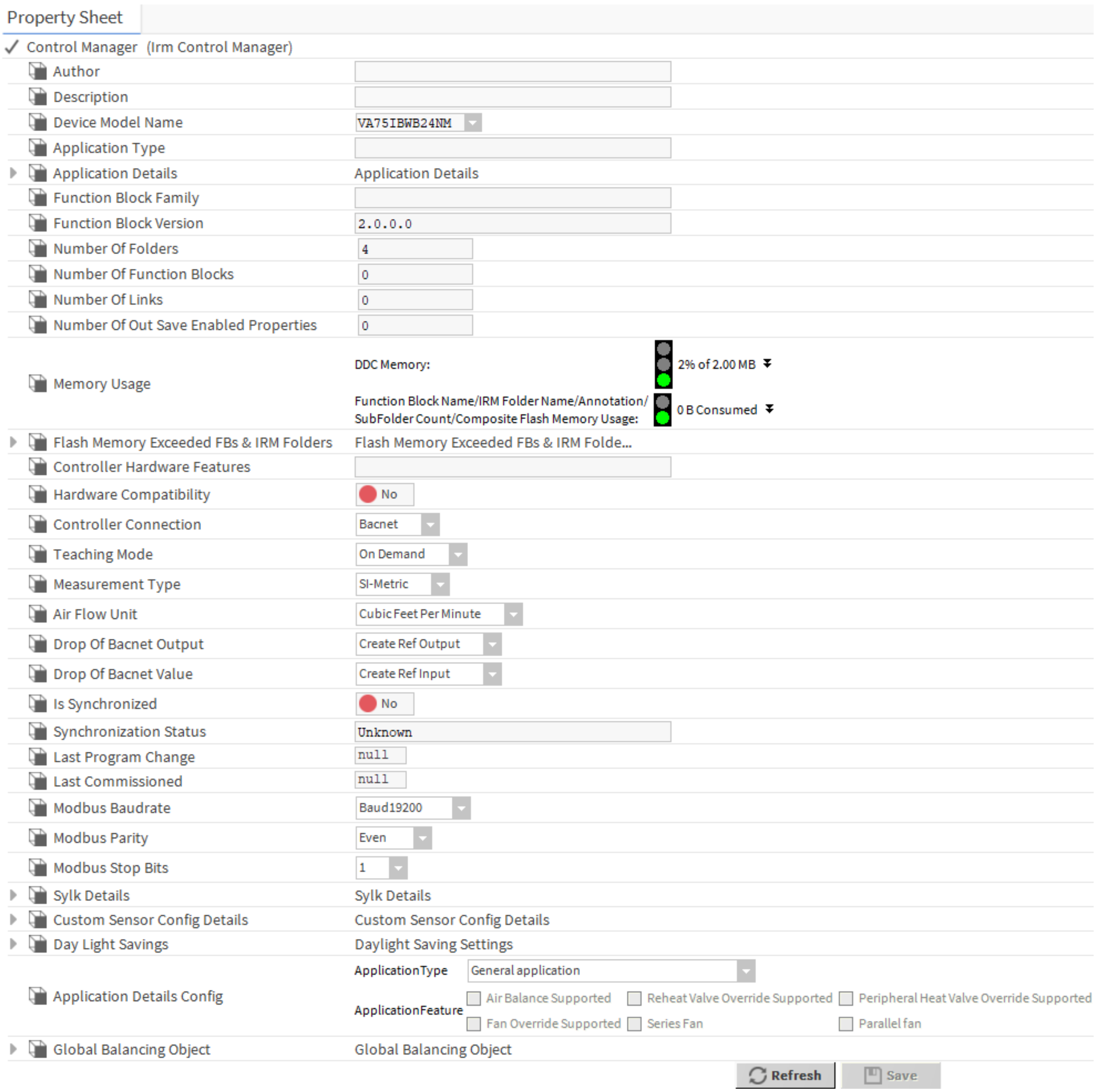


Fig. 18 Control Manager View

The following are the properties you can configure in the Control Manager.

Table 12 Control Manager Task Description

Task	Description
Device Model Name	Select device model from the drop-down list.
Controller Connection	Set the controller connection from the drop-down list. • Offline • Bacnet
Teaching Mode	Set the teach mode from the drop-down list. • **Immediate**: Changes are written to the controller automatically and immediately. • **On Demand**: Changes are written to the controller manually and explicitly when the Teach to Controller operation is performed. ***Note:*** *For both teaching modes, only the changes are written to the controller; hence the process is very fast.*
Measurement Type	Set engineering units from the drop-down list. • **SI-metric**: To set measuring unit as SI-Metric, select Measurement Type as SI-Metric and Air Flow Unit as Cubic Meter Per Hour or Liter Per Second. • **Imperial:** To set measuring unit as Imperial, select Measurement Type as Imperial and Air Flow Unit as Cubic Meter Per Hour.
Air Flow Unit	Set airflow units from the drop-down list.
Drop of Bacnet Output	Set the type of reference point, reference input, or output is created when dropping a Bacnet output from another device. • **Create Ref Output:** Allows you to specify Bacnet output as Ref output that are shared with another controller. • **Create Ref Input:** Allows you to specify Bacnet output as Ref input that are shared with another controller.
Drop of Bacnet Value	Set the type of reference point, reference input, or output is created when dropping a Bacnet value point from another device. • **Create Ref Output:** Allows you to specify Bacnet value as Ref output that are shared with another controller. • **Create Ref Input:** Allows you to specify Bacnet value as Ref input that are shared with another controller.
Custom Sensor Config Details	If the sensor does not meet any standard characteristics of the available sensors, you can select the type as a custom sensor and set its characteristics.
Custom Sensor 1: Enable	Select true to enable the selected custom sensor configuration

Table 12 Control Manager Task Description (Continued)

Task	Description
Custom Sensor Config Data: Sensor Name	Enter the name of the sensor.
Custom Sensor Config Data: Sensor Type	Select sensor input (current, voltage, and resistive) from the sensor type drop-down menu.
Custom Sensor Config Data: Specification Unit	Select the specification unit option from the drop-down menu depends upon the data type selected while configuring the details on the add window.
Day Light Savings	Configure the daylight setting.
Day Light Savings: Enable	Set true to enable the day light saving feature.
Day Light Savings: Start Month	Set the start month (January - December).
Day Light Savings Stop Month	Set the end month (January - December).
Day Light Savings: Start Day	Set the start week (Week Day 1 - Week Day 31).
Day Light Savings: Stop Day	Set the end week (Week Day 1 - Week Day 31).
Day Light Savings: Start Time	Set the start time in hours (0 - 23).
Day Light Savings: End Time	Set the end time in hours (0 - 23).
Day Light Savings: Off Set Minutes	Set the off set time in minutes (0 - 240).
Application Details Config: Application Type	Choose VAV Zone Terminal Single Duct Application from drop-down. ***Note:*** *Must click save before you can choose the features required.*
Application Details Config: Application Feature	Select the application feature.
Global Balancing Object	Map the balancing objects with Bacnet Objects. ***Note:*** *Global balancing object are within the firmware of the IP/MSTP controller only. If creating a custom application or using a migrated venom application, links will need to be made from the global balancing object to the application to use the Honeywell global balancing tool.*

Control Manager Actions

Steps to open Control Manager actions:

Step 1. Navigate to **Config** > **Drivers** > **Bacnet Network**.

Step 2. Expand **BacnetNetwork** > **Controller** > **IRM Program** > right-click **Control Manager** > **Actions**.

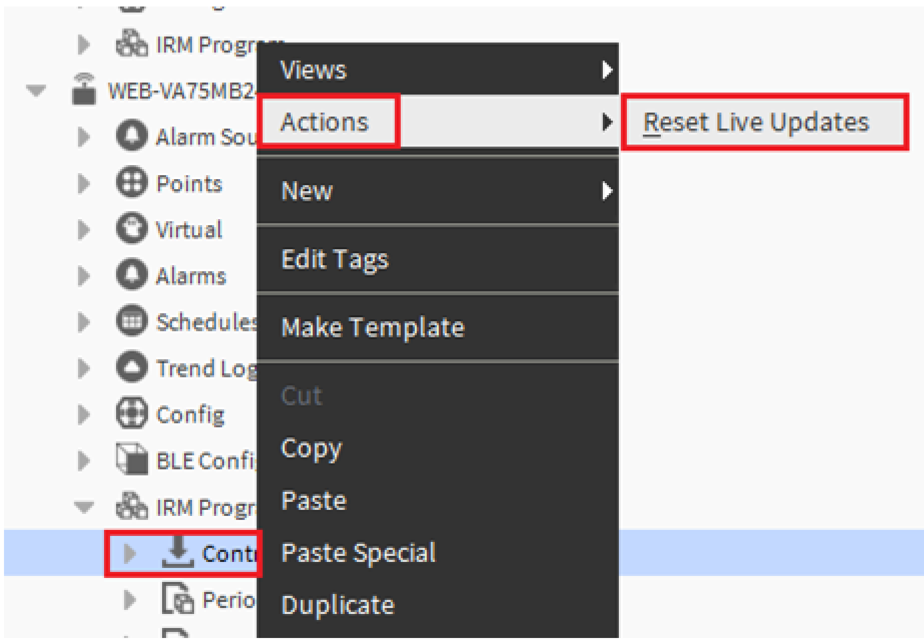


Fig. 19 Control Manager actions

Following are the actions you can perform on Control Manager.

Table 13 Control Manager actions

Action	Description
Reset Live Updates	If the wiresheet doesn't appear to display the latest data, perform a Reset Live Updates.

Application Details

The Application Details allows you to create a version for the application.

Steps to open Application Details property sheet:

Step 1. Expand **BacnetNetwork** > **Controller** > **IRM Program** > **Control Manager** > right-click **Applications Details** > **Views**> **AX property.**

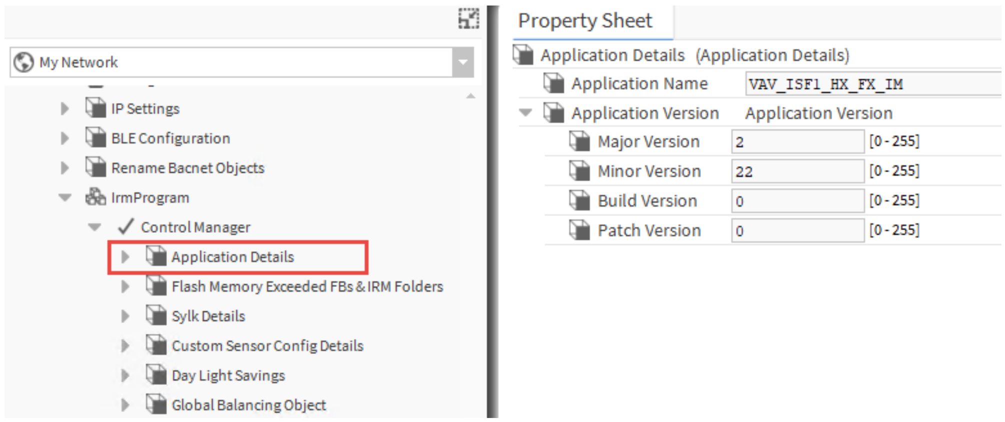


Fig. 20 Application Details Property Sheet

The following are the actions you can perform on Application Details.

Table 14 Control Manager actions

Action	Description
Application Name	Enter the name of the application.
Application Version	
Major Version	Enter the major value between 0 and 255.
Minor Version	Enter the minor value between 0 and 255.
Build Version	Enter the build value between 0 and 255.
Patch Version	Enter the patch value between 0 and 255.

After configuring application details, perform Teach To Controller.

Flash Memory Exceeded FBs & IRM Folders

The Flash Memory Exceeded FBs & IRM Folder list the details of the Function block, Irm folders, or subfolders configuration that exceed the defined memory limit (900 bytes).

Steps to open Flash Memory Exceeded FBs & IRM Folders property sheet:

Step 1. Expand **BacnetNetwork** > **Controller** > **IRM Program** > **Control Manager** > right-click **Flash Memory Exceeded FBs & IRM Folders** > **Views**> **AX property.**

For more details about Flash Memory Exceeded FBs & IRM Folders, refer to the Flash Memory Exceeded FBs & Irm Folder on page 72.

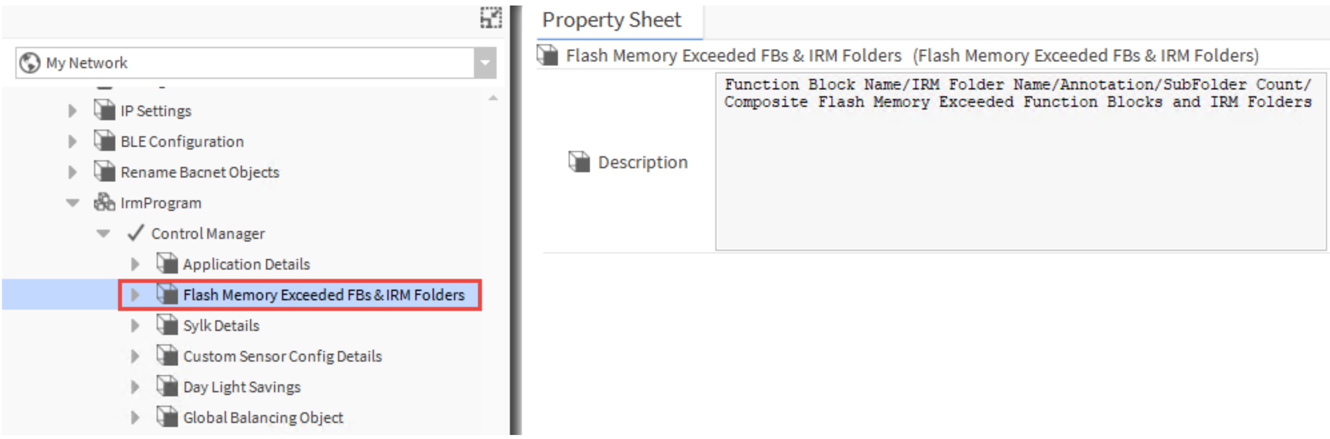


Fig. 21 Flash Memory Exceeded FBs & IRM Folders Property Sheet

Sylk Details

After configuring the Sylk devices on the wire sheet, you may check the power consumption, Sylk proxy file size, and host Sylk config file size of the configured Sylk devices.

Steps to open Sylk Details property sheet:

Step 1. Expand **BacnetNetwork** > **Controller** > **IRM Program** > **Control Manager** > right-click **Sylk Details** > **Views**> **AX property.**

For more details about the Sylk Details, refer to the Sylk Details on page 73.

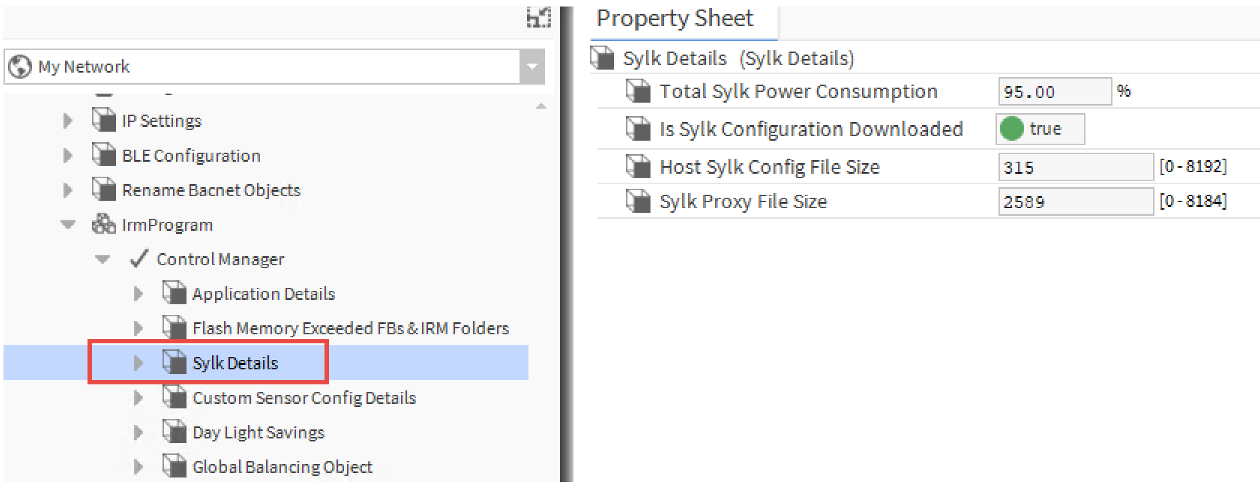


Fig. 22 Sylk Details Property Sheet

The following are the actions you can perform on Sylk Details property sheet.

Table 15 Sylk Details Actions

Action	Description
Total Sylk Power Consumption	Perform this option in case the wiresheet does not show the updated values. The accumulated Sylk power will be displayed here.
Is Sylk Configuration Downloaded	The flag is indicating whether Sylk configuration has downloaded to controller or not. • True: When the Sylk configuration needs to download. • False: When the modified Sylk configuration needs to be downloaded.
Host Sylk Config File Size	The total file size of the Sylk configuration.
Sylk Proxy File Size	Only shows proxy file size, which has to be downloaded to the controller.

Custom Sensor Config View

If the sensor does not meet any standard characteristics of the available sensors, you can select the type as a custom sensor and set its characteristics.

Steps to open Custom Sensor Config Details property sheet:

Step 1. Expand **BacnetNetwork** > **Controller** > **IRM Program** > **Control Manager** > right-click **Custom Sensor Config Details** > **Views**> **AX property.**

For more details about configuring the Custom Sensor Config Details, refer to the Custom Sensor Configuration Details on page 74.

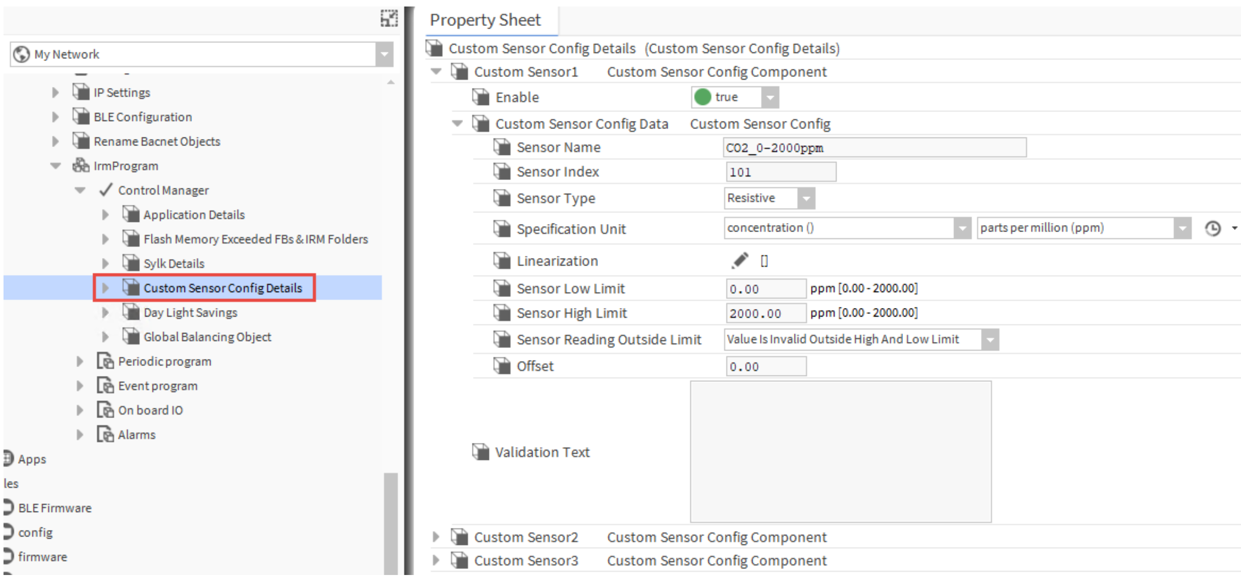


Fig. 23 Custom Sensor Config Details Property Sheet

The following are the actions you can perform on Custom Sensor Config Details property sheet.

Table 16 Custom Sensor Config Details Property Sheet

Name	Description
Enable	Select true to enable the selected custom sensor configuration.
Sensor Name	Enter the name of the sensor.
Sensor Type	Select sensor input (current, voltage, and resistive) from the sensor type drop-down menu.
Sub Type	Select a sensor type from the sub-type drop-down menu.
Specification Unit	The specification unit option in the drop-down menu depends upon the data type selected while configuring the details on the add window.
Linearization	The linearization field, where the linearization points are provided to define the characteristics of the sensor. The tabular conversion dialog window is displayed.
Sensor Low Limit	Set the lower limit the of the sensor as per project requirement. ***Note:*** *The configured lower limit should not be below than the sensor's manufacturer low limit.*

Table 16 Custom Sensor Config Details Property Sheet

Name	Description
Sensor High Limit	Set the high limit the of the sensor as per project requirement. ***Note:*** *The configured high limit should not be exceed than the sensor's manufacturer high limit.*
Sensor Reading Output Limits	Select the value for sensor reading output limits from the respective drop-down menus. • **Value Is Invalid Outside High And Low Limit:** when output crosses the limit, the output becomes invalid. • **Clamp Value To High And Low Limits:** when output crosses the high limit or low limit, and the output is clamped to a low or high limit; it doesn't become invalid. • **Continue Linearization Without Clamp:** when the user wants to continue sensor reading outside the high limit.
Offset	Offset is the precision limit of the curve.
Validation Text	This field verifies the configuration of the custom sensor. If any of the fields are not configured, it will display a message.

Day Light Savings View

The daylight saving setting is a part of the control manager, and it enables when Day Light Saving comes into effect.

Steps to open Day Light Savings View property sheet:

Step 1. Expand **BacnetNetwork** > **Controller** > **IRM Program** > **Control Manager** > right-click **Day Light Savings View** > **Views> AX property.**

For more details about configuring the Day Light Savings View, refer to the Day Light Savings settings on page 78.

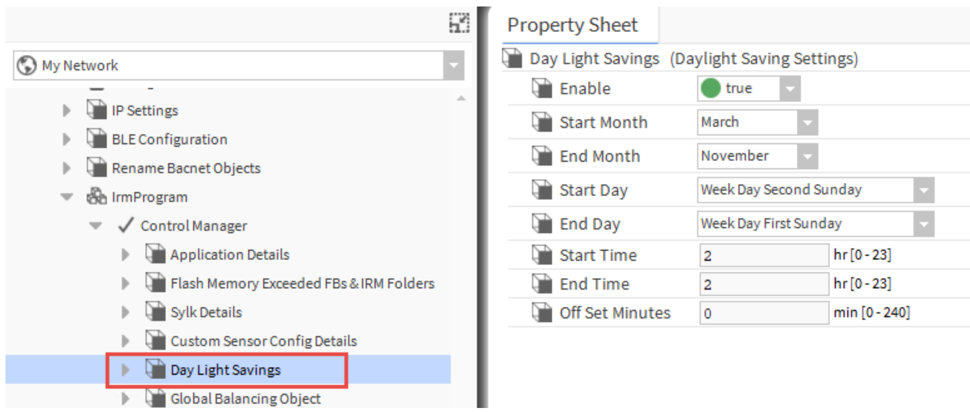


Fig. 24 Day Light Savings View Property Sheet

The following are the actions you can perform on Day Light Saving property sheet.

Table 17 Day Light Saving Property Sheet

Task	Description
Enable	Select true to enable the day light saving feature.
Start Month	Select the start month of day light saving (January - December).
End Month	Select the end month of day light saving (January - December).
Start Day	Select the start week of day light saving (Week Day 1 - Week Day 31).
End Day	Select the end week of day light saving (Week Day 1 - Week Day 31).
Start Time	Set the start time of day light saving in hours (0 - 23).
End Time	Set the end time of day light saving in hours (0 - 23).
Off Set Minutes	Set the off set time for day light saving in minutes (0 - 240).

Global Balancing Object

The Global balancing objects are part of the engineering tool. The application allows you to configure the balancing object according to the project requirements and generates a balancing data report.

Steps to open Global Balancing Object property sheet:

Step 1. Expand **BacnetNetwork** > **Controller** > **IRM Program** > **Control Manager** > right-click **Global Balancing Object** > **Views**> **AX property.**

For more details about configuring the Global Balancing Object, refer to the Global Balancing Object on page 370 .

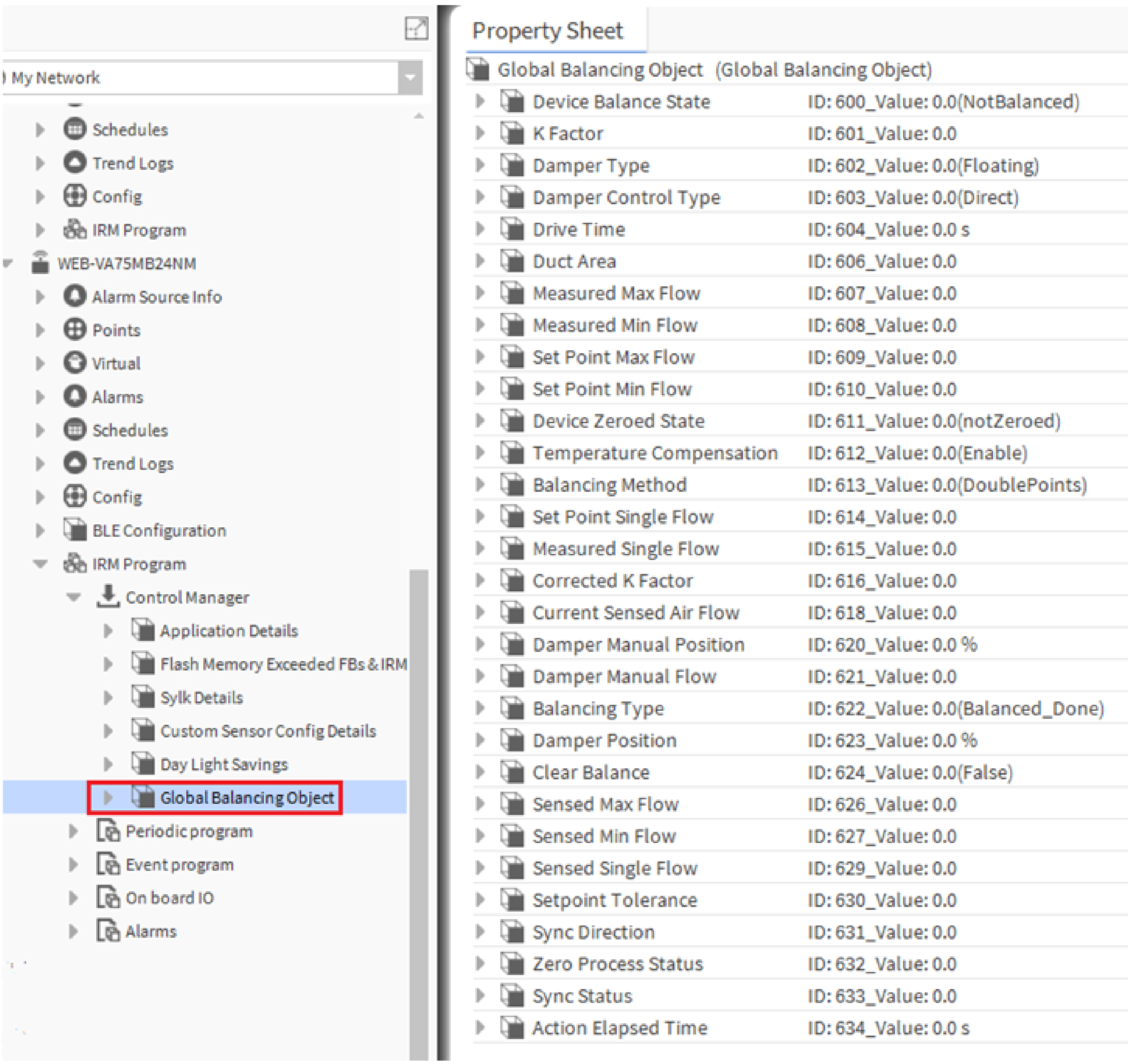


Fig. 25 Global Balancing Object Property Sheet

The following are the available balancing points in Global Balancing Object property sheet.

Table 18 Global Balancing Object Description

Balancing Point Name	Object ID	Point Type	Object Mapping	Description
Device Balance State	600	N/A	No	Indicates whether or not the device is balanced. After balancing is complete, the controller sets this value.
K Factor	601	BACnet numeric value	Yes	Flow pickup factor, as determined by the field engineer. This parameter can be ignored if the Manufacturer K factor is used. The controller's default value is 0.813.
Damper Type	602	N/A	No	The input cannot be changed by the user. Floating is the default setting.
Damper Control Type	603	BACnet Enum value	Yes	Direct "CW" or Reverse "CCW" floating actuator configuration.
Drive Time	604	BACnet numeric value	Yes	Drive time for a floating actuator.
Duct Area	606	BACnet numeric value	Yes	Area of the VAV box duct.
Measured Max Flow	607	N/A	No	When performing maximum balancing, the maximum flow is measured.
Measured Min Flow	608	N/A	No	When performing min balancing, the minimum flow is measured.
Set Point Max Flow	609	BACnet numeric value	Yes	Setpoint for maximum flow in a VAV box.
Set Point Min Flow	610	BACnet numeric value	Yes	Setpoint for the minimum flow in a VAV box.
Device Zeroed State	611	N/A	No	VAV Box zero balancing state.
Temperature Compensatio n	612	N/A	No	The input cannot be changed by the user.

Table 18 Global Balancing Object Description (Continued)

Balancing Point Name	Object ID	Point Type	Object Mapping	Description
Balancing Method	613	N/A	No	Method of balancing: Setpoint balancing, K factor balancing or Min-Max balancing. In the IO terminal view, the user can obtain the same status for the Air flow sensor function block. All the fields are Read-only.
Set Point Single Flow	614	N/A	No	Setpoint used by user when performing setpoint or K factor balancing. All the fields are Read-only.
Measured Single Flow	615	N/A	No	Measured air flow entered by user when performing setpoint, K factor balancing. All the fields are Read-only.
Corrected K Factor	616	N/A	No	Corrected K factor for flow setpoint balancing. All the fields are Read-only.
Current Sensed Air Flow	618	N/A	No	Current sensed air flow. All the fields are Read-only.
Damper Manual Position	620	N/A	No	Manual position entered by user to move the damper. All the fields are Read-only.
Damper Manual Flow	621	N/A	No	Manual flow entered by user to move the damper. All the fields are Read-only.
Balancing Type	622	N/A	No	Indicates balancing type performed. All the fields are Read-only.
Damper Position	623	N/A	No	Current damper position when performing balancing. All the fields are Read-only.
Clear Balance	624	N/A	No	Clear balancing command. All the fields are Read-only.
Sensed Max Flow	626	N/A	No	Maximum sensed flow when performing balancing. All the fields are Read-only.
Sensed Min Flow	627	N/A	No	Minimum sensed flow when performing balancing. All the fields are Read-only.
Sensed Single Flow	629	N/A	No	Sensed flow when performing setpoint or K factor balancing. All the fields are Read-only.

Table 18 Global Balancing Object Description (Continued)

Balancing Point Name	Object ID	Point Type	Object Mapping	Description
Setpoint Tolerance	630	N/A	No	Tolerance set by user when performing balancing. All the fields are Read-only.
Sync Direction	631	N/A	No	Sync direction 0 % or 100 % when synchronizing the damper before balancing. All the fields are Read-only.
Zero Process Status	632	N/A	No	Zero balancing process status. All the fields are Read-only.
Sync Status	633	N/A	No	Damper sync status. All the fields are Read-only.
Action Elapsed Time	634	N/A	No	Action elapsed time. All the fields are Read-only.
Manufacturer K Factor	635	BACnet numeric value	Yes	Manufacturer K factor.
K Factor Offset	636	BACnet numeric value	Optional	Offset value calculated after performing setpoint or K factor balancing.
Pressure Offset	637	BACnet numeric value	Optional	Pressure offset value calculated after performing zero balancing.
Reheat Ovrd	638	BACnet numeric value	Yes	Override point used to command reheat valve when performing water balancing.
Reheat Eff Pos	639	BACnet numeric value	Optional	Effective status read point to display in balancing tool.
Periphheat Ovrd	640	BACnet numeric value	Yes	Override point used to command peripheral valve when performing water balancing.
Periphheat Eff Pos	641	BACnet numeric value	Optional	Effective status read point to display in balancing tool.
Vav Fan Spd Ovrd	642	BACnet numeric value	Yes	Command point to override the fan start or stop or fan speed.
Vav Sys Type	643	N/A	No	VAV system type used by controller to enable reheat, peripheral heat or fan override options. All the fields are Read-only.

Synchronizing Controller Time

This feature sends a synchronization message from the Supervisor station to selected BACnet devices on the network. This resets the time of host controllers to the same time.

Open Synchronizing Controller Time property sheet:

Step 1. Right-click on **BacnetNetwork > Views > Irm Bacnet Device Manager** view.

Step 2. Select the controller from the device list and click **TSynch.**

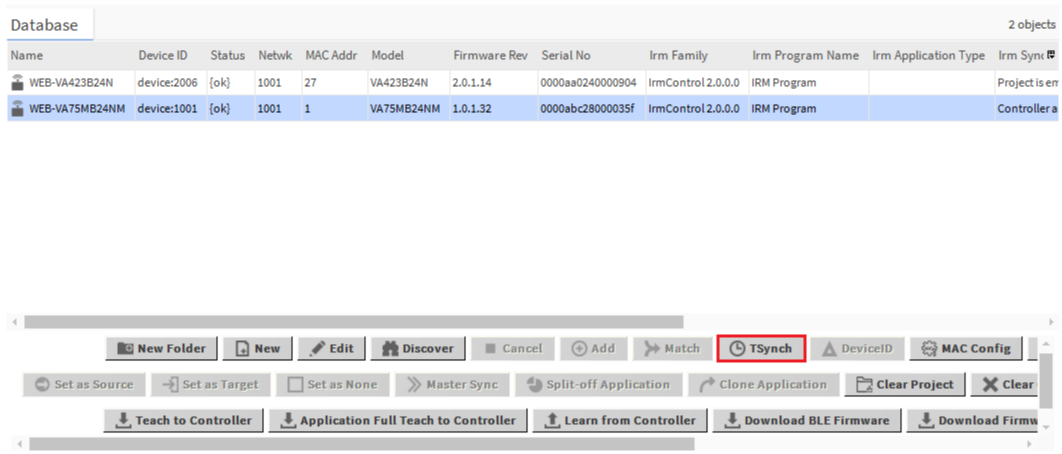


Fig. 26 Database Pane

Step 3. Click **Yes** to confirm.

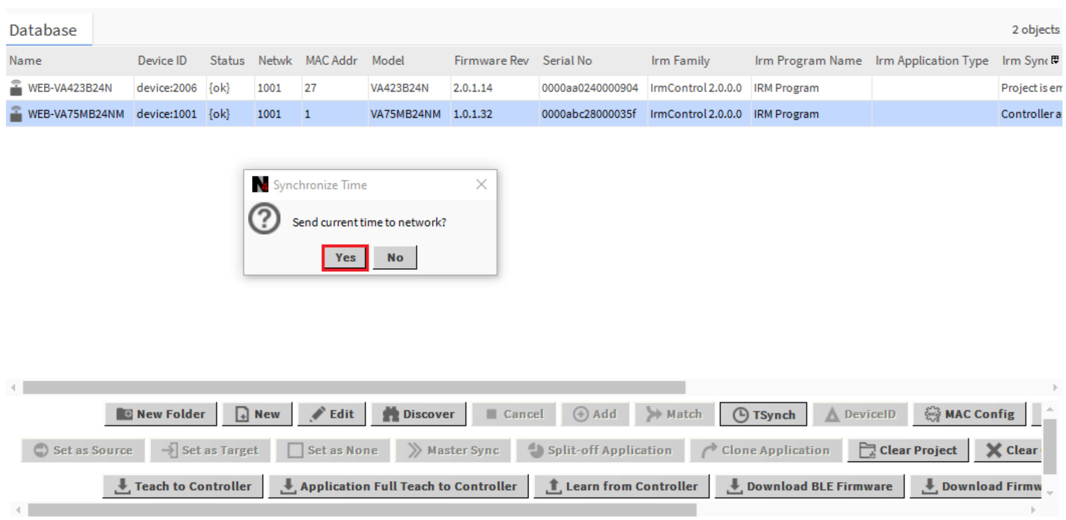


Fig. 27 Dialogue Box

As per the supervisor's workbench, the controller's time is updated.

Teach and Learn Operation Guidelines

Synchronization can be performed in two ways:

- **Teaching to Controller:** Downloads the application modification from the project to the controller.
- **Learning from Controller:** Uploads the changes from the controller to the project.

When in teaching mode, application changes of the project can be written to the controller in two ways:

- **Immediate:** Changes are written to the controller automatically and immediately.
- **On demand:** Changes are written to the controller manually and explicitly when the Teach to Controller operation is performed.

Fig. 28 Teaching Mode

The explicit usage of the teaching and learning actions and the time when an action is used depends on the application status in the project and the connected controller, and the result you want to achieve.

Important: *When working on the application, the control manager detects every modification and is indicated graphically by a yellow warning symbol that replaces the original symbols at the modified item on the wire sheet and in the tree.*

This feature is applicable when the Teaching mode is set to On demand. If the teaching mode is set to Immediate, the changes are not indicated graphically in the workbench since they are written instantly to the controller.

Important: *If the cut-paste or copy-paste action is performed on multiple functional blocks in the Immediate mode, the modification causes the project to go in Out of Sync. In that scenario, you need to perform teach to controller. Whenever moving or copying multiple function blocks from one folder to another, it is advised to be in On demand mode.*

Recommendations for an empty controller (factory delivery, cleared, no application) or controller have a history (engineered with application). Make sure to ask the following questions before performing engineering on the controller.

- Do you want to keep the application in the controller or the project?
- Do you want to change the application in the project and teach it to the controller?
- Do you want to learn an application from the controller to the project?

Important: *If you want to keep the application in the project, learn the controller application. Clear the controller histories before performing learn from controller operation; it will prevent the destruction of the application in the project.*

Note: *If there are too many changes in the project or the controller, learn and teach operation does not work. The engineering tool displays appropriate messages which describe the status and how to proceed.*

CHAPTER

3

OVERVIEW OF THE ENGINEERING TOOL

This chapter describes the BACnet device's properties and the control manager's components. Additionally describes the procedure to configure and perform synchronization check on the periodic program, event program, and On board IO in the engineering tool.

Bacnet Device Property Sheet

Steps to configure Bacnet Device property:

Step 1. Double-click the **IRM** in the Nav tree.

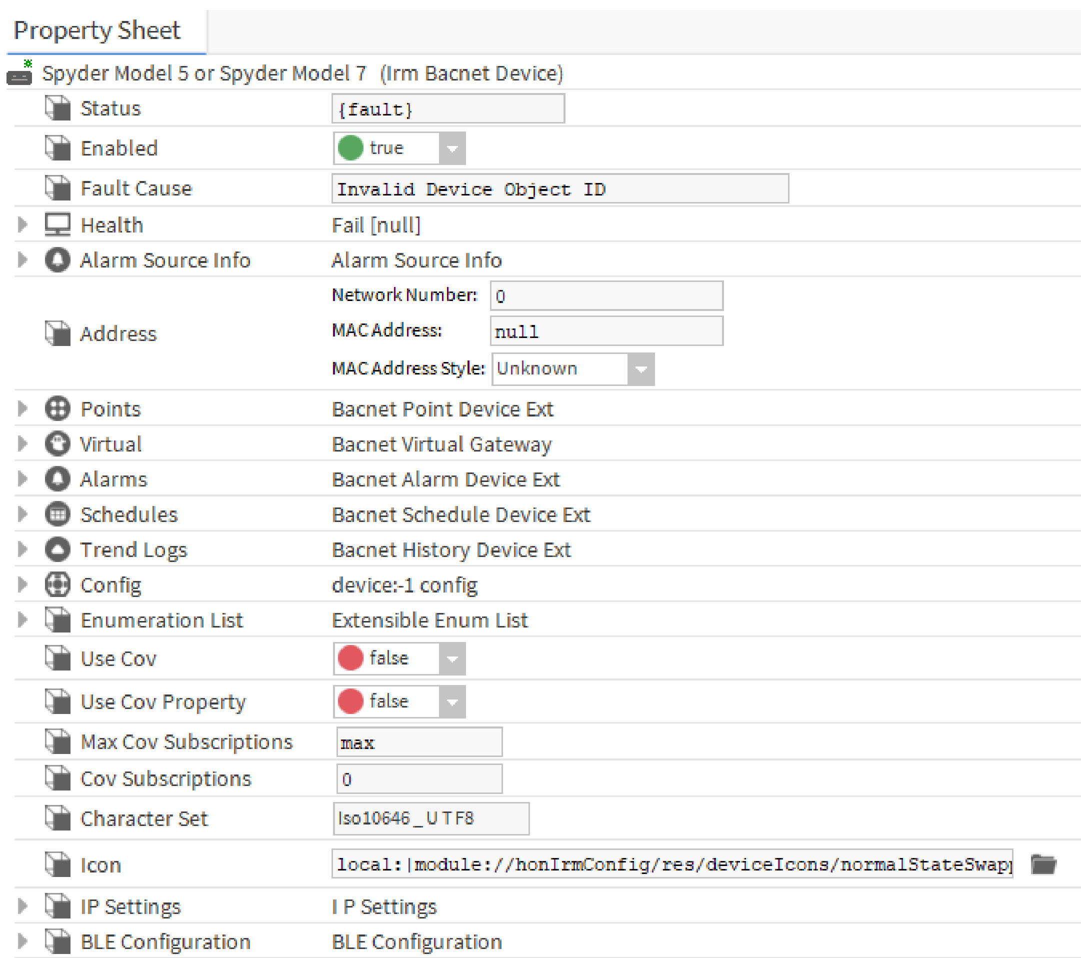


Fig. 29 IRM device property sheet

Table 19 IRM device Properties Details

<table>
<tr><th>Property</th><th>Description</th></tr>
<tr><td>Status</td><td>This field is read-only and displays the physical status of the port (OK or fault).</td></tr>
<tr><td>Enabled</td><td>Allows the user to enable or disable the IRM NX controller.</td></tr>
<tr><td>Fault Cause</td><td>Indicates why a system object (network, device, component, extension, etc.) is not working properly {in fault}. This property is empty unless a fault exists.</td></tr>
<tr><td>Health</td><td>Reports the status of the network, device, or component. This advisory information includes a time stamp and helps you recognize and troubleshoot problems, but it provides no direct management controls.

Down: Displays network’s health (true or false).
Alarm: Contains a set of properties for configuring and routing alarms when this component is the alarm source.
Last OK Time: Displays the network’s last ok time.
Last Fail Time: Displays the network’s last fail time.
Last Fail Cause: Displays the network’s last fail cause.

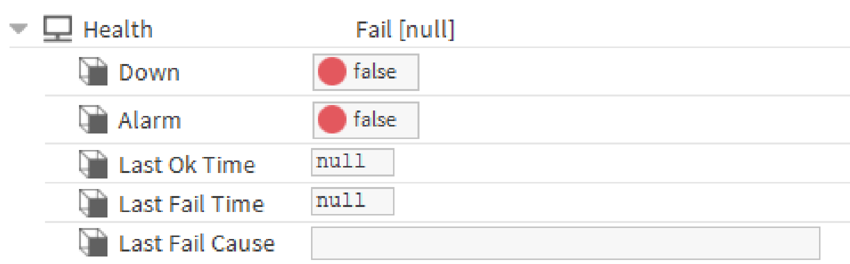


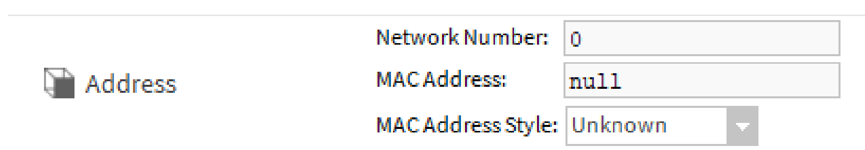
Fig. 30 Controller Health Properties</td></tr>
<tr><td>Alarm Source Info</td><td>This container slot is available on all network and child device components. The slot’s properties populate the alarm record when the network or device does not respond to a monitor ping. This ping is configured at the network level.
Each parent and a child device object has its alarm source info slot with identical (but independently maintained) properties.</td></tr>
<tr><td>Address</td><td>Specifies the data link layer MAC address of the device.


Fig. 31 Address Property
For the IP devices, the address is an IP address: 0xBAC0 or 47808.
For the MSTP devices, it is an 8-bit address (0 - 254) unique on its RS-485 trunk.</td></tr>
<tr><td>Points</td><td>The BACnet point device ext (points folder in the Nav tree) is the BACnet implementation of the pointdeviceext, a frozen container under every BacnetDevice. Its primary view is the Bacnet Point Manager.
BACnet proxy points are similar to other driver proxy points.</td></tr>
<tr><td>Virtual</td><td>A virtual gateway is a component located under the station's component space and provides access to the station's virtual component space.</td></tr>
</table>

Table 19 IRM device Properties Details (Continued)

<table>
<tr><th>Property</th><th>Description</th></tr>
<tr><td>Alarms</td><td>
Each BACnet device has an alarms device extension. This extension applies to BACnet event notifications (alarms) sent to the station by that device.

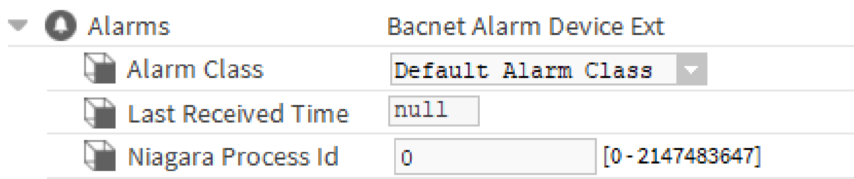


Fig. 32 Alarms Property

To view the alarm properties, expand BacnetNetwork > Sypder Model 5 or Sypder Model 7 Device > double-click on the Alarms in the Nav tree.
</td></tr>
<tr><td>Schedules</td><td>
This component is the implementation of a schedules device extension.
A device’s schedules extension is the parent container for imported schedules components with a ScheduleImportExt (the schedule imports events from the remote station). The imported schedule is read-only. By default, the schedules extension contains a Retry Trigger.

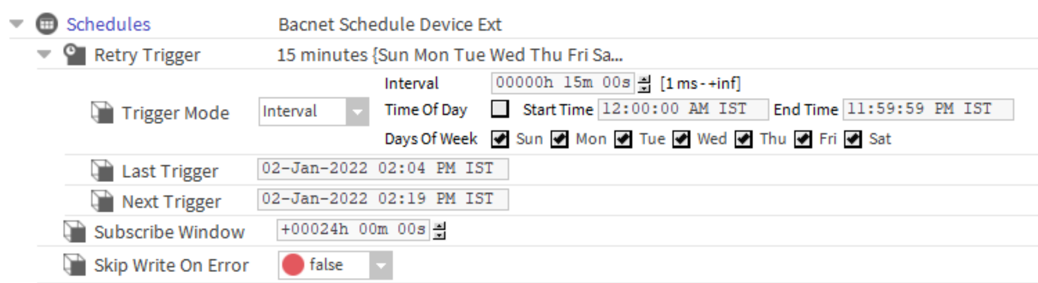


Fig. 33 Schedule Property

- Retry Trigger: Appears in the Nav tree but not in any manager view. The Retry Trigger is unique because it requires no linking of its output for operation. If the schedule import descriptor fails, the Retry Trigger defines show frequently to attempt the import again (the default value is every 15 minutes). This continues until successful execution occurs.
- Subscribe Window: Sets up a period of time during which the subscription is possible.
- Skip Write On Error: Configures what happens when an error occurs, true skips a write when an error occurs, and false always write the record.
</td></tr>
</table>

Table 19 IRM device Properties Details (Continued)

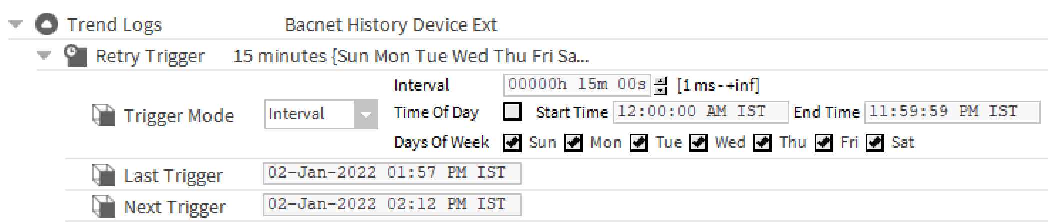
<table>
<tr><th>Property</th><th>Description</th></tr>
<tr><td>Trend Logs</td><td>This component is a frozen device extension under every BACnet device and the container for “Bacnet History Import” components. The default view is the Bacnet History Import Manager, used to import data from trend log objects in the device into the station as histories.
The directory under the BacnetNetwork > BacnetDevice node in the Nav tree serves as the container for BACnet history objects, which you import from a device into a station.
A BACnet device must contain trend log objects (and/or trend log multiple objects) to use histories. A discover command determines this. The trend logs extension has no practical application if it finds no such objects.
This component also has a Retry Trigger for automatic usage as needed by default. The default view of this component is the Bacnet History Device Ext.


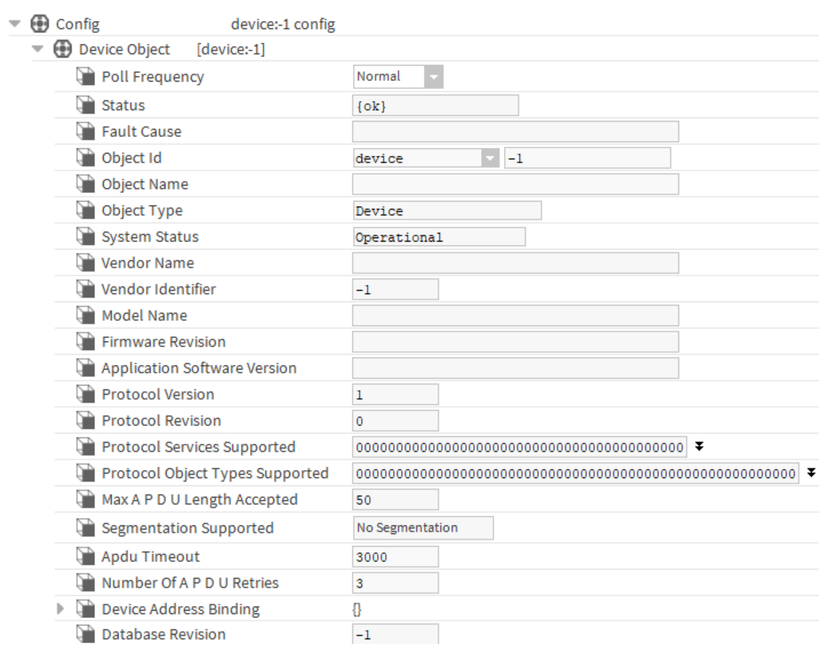
Fig. 34 Trend Logs Property</td></tr>
<tr><td>Config</td><td>This frozen device extension under every BACnet device functions as the container for config-type objects, representing individual BACnet objects in the device. By default, it contains a BACnet object.


Fig. 35 Config Property</td></tr>
</table>

Table 19 IRM device Properties Details (Continued)

<table>
<tr><th>Property</th><th>Description</th></tr>
<tr><td>Enumeration List</td><td>
Contains the list of the BACnet properties that can be exported to configure the data exchange. The list provides access to each property's configuration facets.

- To check the Enum list, expand the **Bacnet Network** and double-click on **Bacnet Device**.
  In the BACnet device property sheet, you can check the Enumeration List

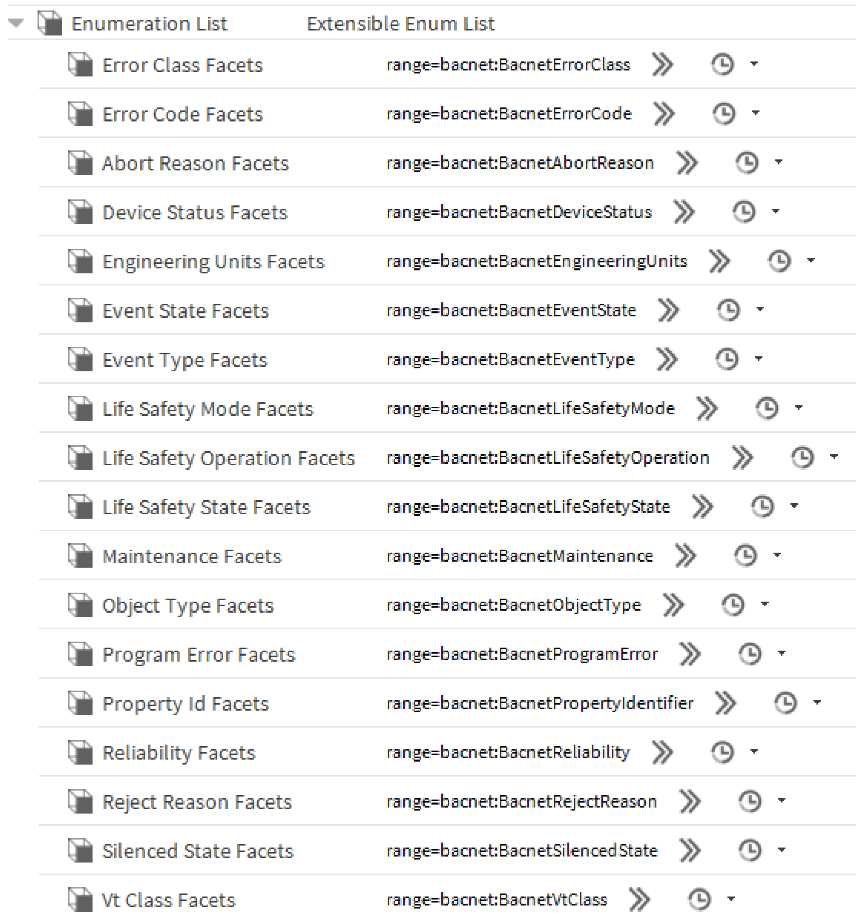


Fig. 36 Enumeration List
</td></tr>
<tr><td>Use Cov</td><td>
Enables and disables a device’s support for COV (change of value) as a way to monitor proxy point values.
True triggers the driver to attempt the necessary updates (proxy subscriptions) to the value of each point. If the subscription attempt succeeds, the read status property of the point’s BacnetProxyExt displays the change of value. If the subscription attempt fails, the driver uses normal polling, and the read status property shows as polled.
When true, individual proxy points under the device may use COV subscriptions depending on their assigned tuning policy.
When false, the driver ignores any proxy subscription updates.
How to find:

- Expand the **Bacnet network > Bacnet device.** Also available on the Device Manager Add window.
</td></tr>
</table>

Table 19 IRM device Properties Details (Continued)

Property	Description
Use Cov Property	If enabled, and the assigned proxy points are under a BACnet device that supports confirmed COV notifications, the driver attempts any necessary updates (proxy subscriptions). If disabled (false), the driver ignores this property. **How to find:** • Expand **Config > Drivers >Bacnet network >Tuning Policies > Default Policy.**
Max Cov Subscription	Specifies the maximum number of change of value (COV) subscriptions that the database attempts to use with this device. This restriction prevents the station from consuming all of the available subscription space in the device. Applies only if use Cov is true.
Cov Subscription	Reports number of active change of value (COV) client subscriptions to the device.
Character Set	Defines the character set supported. **Location**: Expand the **Bacnet network > Bacnet device.**
IP Setting	IP setting comprises IP Configuration and Network Time Server. The IP configuration operation allows to configure IP for multiple IP VAV and Unitary controllers from a single window. This feature enables you to perform a variety of productivity operations such as batch IP configuration updates, auto-increment of IP addresses, visual indication of IP address changes, user errors in IP configuration, and offline and online IP configuration. This configuration interface is used for any wired IP connections made via one of the controller's Ethernet Switch primary or secondary connectors. The Network Time Server allows you to configure the Network Time Server address. For more details refer, to Configure MSTP VAV Controllers on page 125.
BLE Configuration	BLE configuration enables batch configuration of IP controllers. This feature allows you to perform operations such as enabling or disabling the BLE function. and setting the password. For more details, refer to Bluetooth Configuration on page 222.

Control Manager

The control manager allows you to configure properties according to the controller model. You can edit the controller model after adding a new controller into the database.

Steps to open the Control Manager:

Step 1. In the Nav tree, expand the **IRM Program** folder.

Step 2. Double-click the **Control Manager** icon.

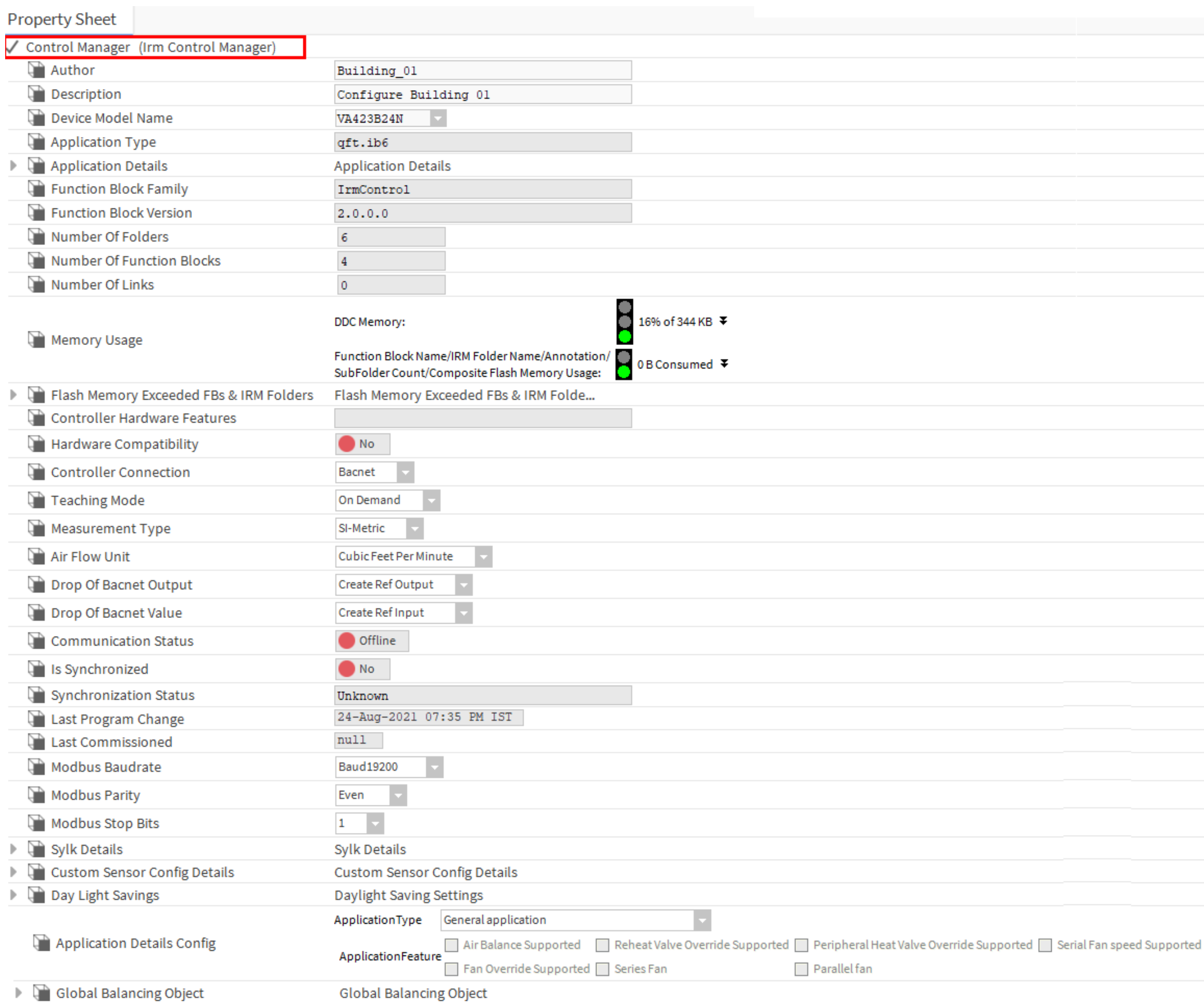


Fig. 37 Control Manager property sheet

Table 20 IRM Control Manager Property

Name	Description
Author of the application	Name of the controller or building.
Description	Description of the controller or building.
Device Model Name	Select device model from the drop-down list.

Table 20 IRM Control Manager Property (Continued)

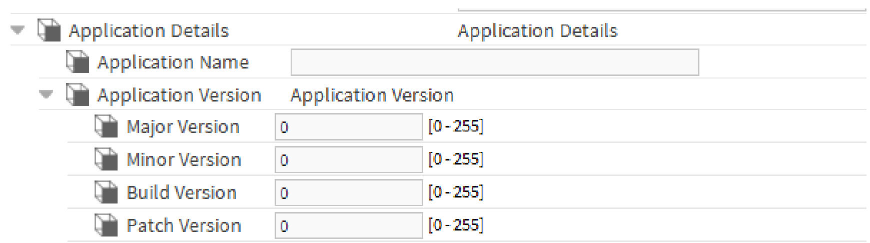
Name	Description
Application Type	Read-only. Type of application.
Application Details	Read-only. Displays the application name and version details.  **Fig. 38 Application Details**
Function Block Family	Read-only. Displays the name of the function block family.
Function Block Version	Read-only. Displays the function block version.
Number of Folders	Read-only. Displays the number of folders. • Maximum 32 Irm folders overall (IRM CVAV/FCU controller). • Maximum 100 Irm folders overall (IP/MSTP VAV controller).
Number of Function blocks	Read-only. Displays the number of function blocks.
Number of Links.	Read-only. Displays the number of links.
Memory usage	Read-only. Shows the device's memory usage, application, and parameters in percentage and graphically.
Flash Memory Exceeded FBs & IRM Folders	The Flash Memory Exceeded FBs & Irm Folder list the details of the Function block, Irm folders, or subfolders configuration.
Controller Hardware features	Read-only. Displays the I/O configuration (online available in online mode).
Hardware Compatibility	Read-only. Indicates whether the terminal layout of the application is compatible with the hardware layout of the physical controller.
Controller Connection	Allows selecting the connection type among network: • Offline • Bacnet

Table 20 IRM Control Manager Property (Continued)

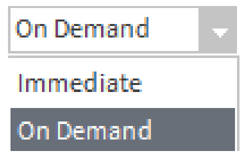
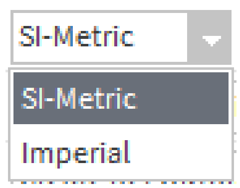
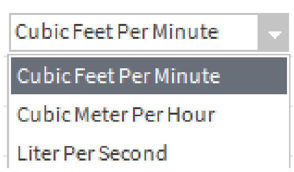
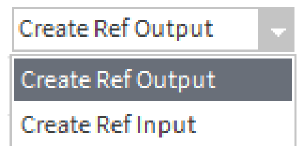
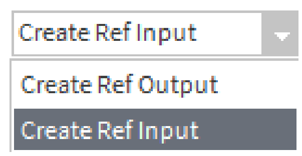
Name	Description
Teaching Mode	Use the drop-down list to set the teach mode between On demand and Immediate, refer to Teach and Learn Operation Guidelines on page 55. • **Immediate**: Changes are written to the controller automatically and immediately. • **On Demand**: Changes are written to the controller manually and explicitly when the Teach to Controller operation is performed.  **Fig. 39 Configuring Teaching Mode** ***Note:*** *For both teaching modes, only the changes are written to the controller; hence the process is very fast.*
Measurement Type	Use the drop-down list to set engineering units. • **SI-metric**: To set measuring unit as SI-Metric, select Measurement Type as SI-Metric and Air Flow Unit as Cubic Meter Per Hour or Liter Per Second. • **Imperial:** To set measuring unit as Imperial, select Measurement Type as Imperial and Air Flow Unit as Cubic Meter Per Hour.  **Fig. 40 Measurement Type**
Air Flow Unit	Use the drop-down list to set airflow units.  **Fig. 41 Air Flow Unit**

Table 20 IRM Control Manager Property (Continued)

Name	Description
Drop of Bacnet Output	Defines which type of reference point, reference input, or output is created when dropping a Bacnet output from another device.  **Fig. 42 Drop of Bacnet Output** • **Create Ref Output:** Allows you to specify Bacnet output as Ref output that are shared with another controller. • **Create Ref Input:** Allows you to specify Bacnet output as Ref input that are shared with another controller.
Drop of Bacnet Value	Defines which type of reference point, reference input, or output is created when dropping a Bacnet value point from another device.  **Fig. 43 Drop of Bacnet Value** • **Create Ref Output:** Allows you to specify Bacnet value as Ref output that are shared with another controller. • **Create Ref Input:** Allows you to specify Bacnet value as Ref input that are shared with another controller.
Is Synchronized	Read-only. Indicates whether the project and the controller are synchronized (yes) or not (no).

Synchronization status	Displays the controller's or project's current synchronization status. The engineering tool has the following available status:
	• **Unknown:** This status is displayed under the following circumstances:
	  • When the device is not connected to the internet.
	  • When full teach is triggered, the controller is swapped in until the full teach is completed.
	• **In Sync:** This status is displayed when there is no difference between the station and the controller.
	• **Out Of Sync:** This status is read-only and displayed when a modification in the project differs from the controller or vice versa.

Table 20 IRM Control Manager Property (Continued)

Name	Description

	• **Controller differs from Project:** This status is read-only and displayed when some changes happen in controllers, simulated by having two stations having the same controller.
	    • From station 1, perform full teach to the controller and mark the controller In Sync, stop station 1 and start station 2.
	    • From station 2, teach another application to the same controller. Stop station 2 and reopen station 1 and check the sync status.
	• **Project has modifications:** This status is displayed when a station is modified.
	• **Project is empty:** This status is displayed when the clear project operation is performed from the IRM Bacnet Device Manager view (only for swapped In) or from IRM Program.
	• **Controller is empty:** This status is displayed when the clear project and clear controller operation is performed from the IRM Bacnet Device Manager view (only for swapped In) or from the IRM Program.
	• **Controller and Project empty:** This status is displayed when the clear project and clear controller operation is performed from the IRM Bacnet Device Manager view (only for swapped In) or from the IRM Program.
	• **BACnet Object configuration changed:** This status is displayed when the BACnet points in the application is modified.
	• **Project modified and BACnet Object config. changed in controller :**This status is displayed when the project is modified and BACnet changes occur in the controller.

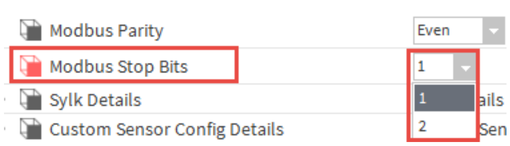
Last program change	Read-only. Displays the date of the last program change.
Last Commissioned	Read-only. Displays the date of the last commissioning.
Modbus Baud Rate	Modbus devices must have an identical baud rate, an identical parity, and an identical number of stop bits, refer to Modbus Engineering on page 323.
Modbus Parity	Modbus devices may have a configurable parity. For more details, refer to Modbus Engineering on page 323.
Modbus Stop Bits	If Modbus Parity = None, select Modbus Stop Bits = “2”. If Modbus Parity = Even or Odd, select Modbus Stop Bits = “1”. For more details, refer to Modbus Engineering on page 323.  **Fig. 44 Modbus Stop Bits**
Sylk Details	Displays Sylk Device usage details. For more details, refer to Sylk Details on page 73.
Custom Sensor Configuration	If the sensor does not meet any standard characteristics of the available sensors, you can select the type as a custom sensor and set its characteristics, for more details refer to Custom Sensor Configuration Details on page 74.

Table 20 IRM Control Manager Property (Continued)

<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>Daylight Saving</td><td>This feature is integrated when the daylight setting is enabled, refer to Day Light Savings settings on page 78.</td></tr>
<tr><td>Application Details Config</td><td>

The “Application Details Config” allows you to configure the legacy VAV templates which uses standard BACnet object based of VAV balancing procedure. Using “Application Type” and “Application Feature” you can set up the VAV balancing using standard BACnet object.

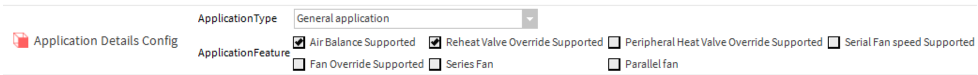


Fig. 45 Application Details Config

Note: *Only the "VAVZone Terminal Single Duct Application Remaining" application type is available for balancing; all other application type options under "Application Type" are non - functional. It's there for future developments.*

Note: *It recommended not to use Application Details Config when you use Global balancing tool or VAV balancing mobile app for balancing Global balancing objects.*

Example:

- In the below example the “VAV Zone Terminal Single Duct Application” is selected without peripheral reheat valve override so in the balancing view peripheral valve override option is hidden.

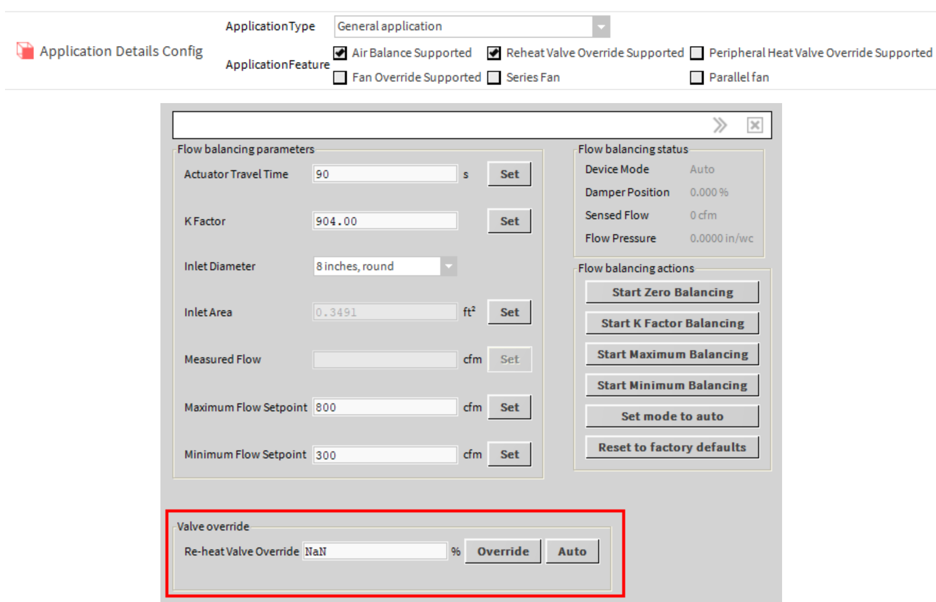
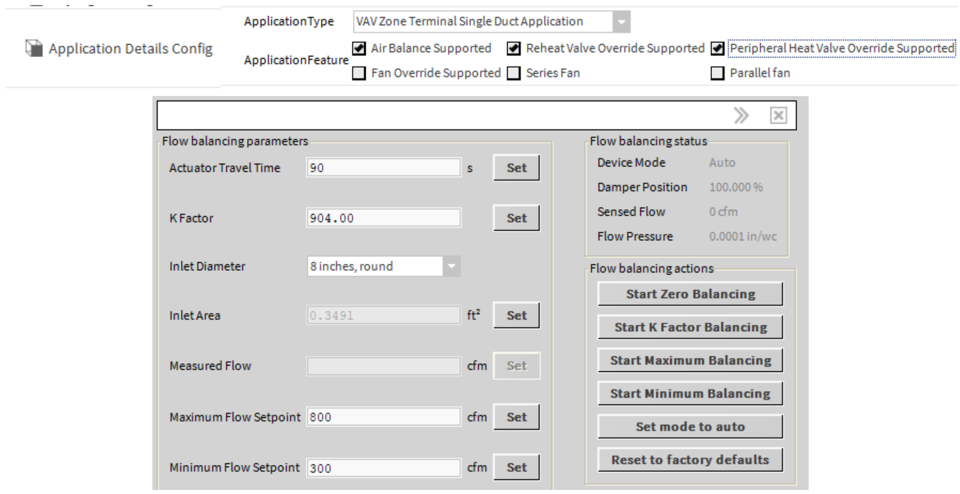


Fig. 46 VAV Balancing View

</td></tr>
</table>

Name	Description
	• In the below example the "VAV Zone Terminal Single Duct Application" is selected with "Peripheral reheat valve override" and "Reheat valve Override" so in the balancing view both the features are displayed.  Fig. 47 Application Details Config

Memory Usage

The memory (RAM) of the controllers varies based on the memory utilized by the device, application, and parameters.

Table 21 Controller Memory Details

Controller	Maximum Memory
CVAV/FCU controller	344 KB
IP/MSTP VAV controller	2 MB
Unitary	2 MB

You can use the memory usage parameters to check the memory consumption of the current application. This is an approximate calculation of the application in the tool but not a real-time consumption within the controller.

To check the memory usage of IRM Bacnet device.

Step 1. Expand the **Bacnet Network > Irm Bacnet device > IRM Program** and double-click on **Control Manager.**
In the control manager property sheet, you can check the memory usage of the BACnet device

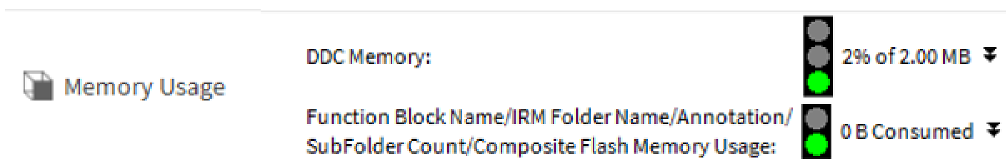


Fig. 48 Memory Usage parameters

The memory usage parameters also displays the application or client data's memory (Function Block Name, Irm Folder Name, Annotation, Subfolder Count, Composite Flash Memory) for the whole application. Under client data, you can see the distribution of client data memory usage.

- **Memory Usage:** Memory utilized by the application folders.
- **Function Block Name/Annotation/Composite Flash Memory Usage:** Memory utilized by the function block folders.

The sum of memory utilized by the Irm folder client data and a Irm function block client data is sent to the controller.

Note: *Teach time can vary based on the Client Data memory usage, irrespective of the memory usage.*

The memory usage can be viewed on the property sheets of the different levels:

To check the memory usage of the IRM program:

Step 1. Expand the **Bacnet Network** > **Irm Bacnet Device** > right-click **IRM Program** > **Views** > **AX property Sheet.**
In the IRM program property sheet, you can get the sum of memory utilized by applications, irmfolders, and functional blocks

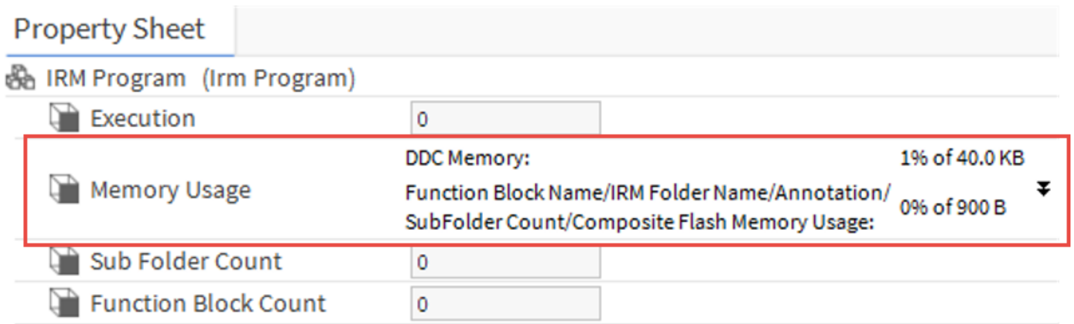


Fig. 49 Irm Program AX property sheet

To check the memory usage of the periodic program:

Step 1. Expand the **Bacnet Network** > **Irm Bacnet Device** > **IRM Program** > right-click **Period program** > **Views** > **AX property Sheet.**
In the periodic program property sheet, you can get the sum of memory utilized by applications, irmfolders, and functional blocks.

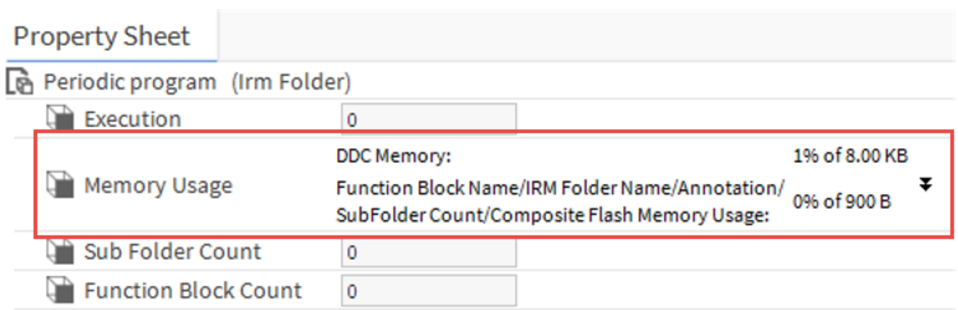


Fig. 50 Periodic Program Property Sheet

To check the memory usage of the IRM folder:

Step 1. Expand the **Bacnet Network** > **Irm Bacnet Device** > **IRM Program** > **Period program** > right-click **IrmFolder** > **Views** > **AX property Sheet.**

In the memory usage property sheet, you can get the sum of memory utilized by applications, irmfolders, irmsubfolders, and functional blocks.

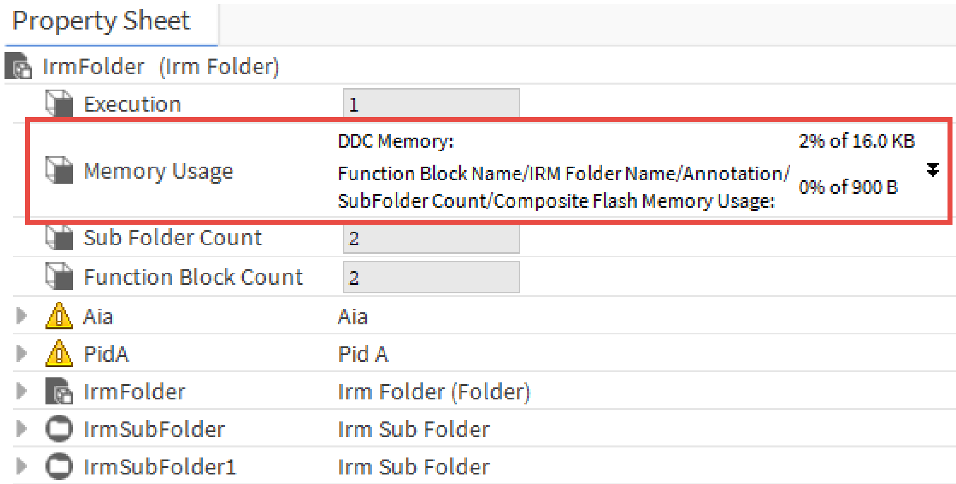


Fig. 51 Irmfolder Property Sheet

Each controller model has a different maximum memory capacity

Sub Folder Count: This field is read-only and displays the number of sub-folder configured per Irmfolder.

Function Block Count: This field is read-only and displays the number of function blocks configured per Irmfolder.

Note: *To optimize memory usage, keep the number of folders as low as possible and the number of function blocks per folder as high as possible.*

The calculated memory consumption will be indicated graphically and as a percentage in the traffic light symbol as follows:

- Green > 80 %
- Yellow < 80 %
- Red > 90 %

To check the memory usage of the functional block:

Step 1. Expand the **Bacnet Network** > **Irm Bacnet Device** > **IRM Program** > **Period program** > right-click **functional block> Views** > **AX property Sheet.**
In the memory usage property sheet, you can get the sum of memory utilized by applications functional block.

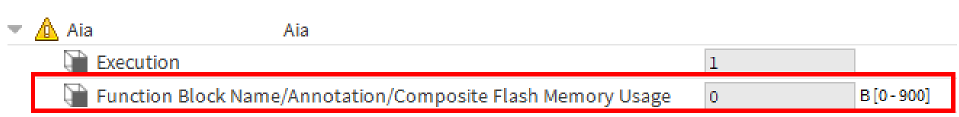


Fig. 52 Function Block AX Property Sheet

Flash Memory Exceeded FBs & Irm Folder

The Flash Memory Exceeded FBs & Irm Folder list the details of the Function block, Irm folders, or subfolders configuration that exceed the defined memory limit (900 bytes).

To check the flash memory details of Irm Bacnet Device:

Step 1. Expand **BacnetNetwork** > **Controller** > **IRM Program** > **Control Manager** > **Flash Memory Exceeded FBs & IRM Folders.**
In the description you can check the Flash Memory Exceeded FBs & Irm Folder details.

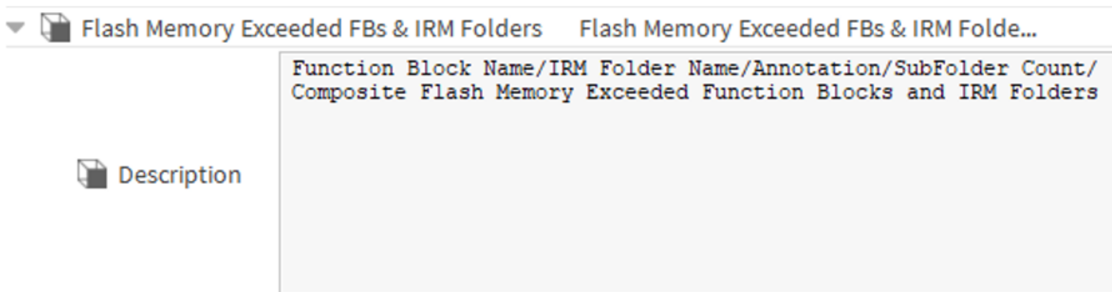


Fig. 53 Flash Memory Exceeded FBs

Using the details from Flash Memory Exceeded FBs & Irm Folder section, you can verify the property sheet and re-configure the respective function block, Irm folders, or subfolders to meet the design limit.

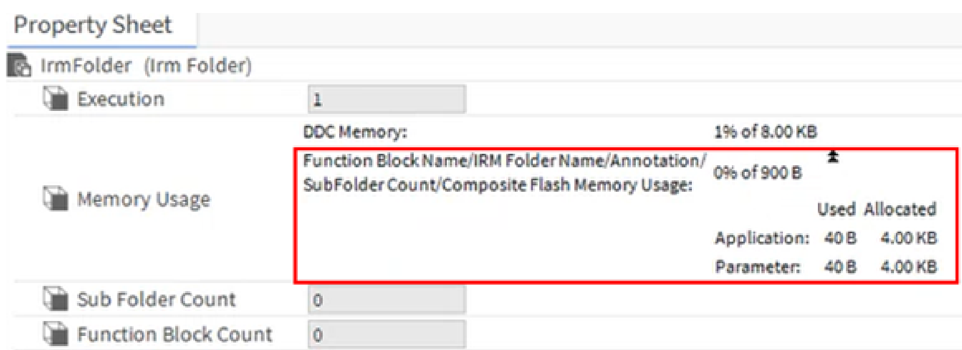


Fig. 54 Irm Folder

Sylk Details

You can check the Sylk device power consumption, Sylk proxy file size, and host Sylk config file size of the configured Sylk device after configuring the Sylk devices on the wire sheet. Navigate to Sylk details under the control manage to view the details.

To check the Sylk details of Irm Bacnet Device:

Expand **BacnetNetwork** > **Controller** > **IRM Program** > **Control Manager** > **Sylk Details.**

Fig. 55 Sylk Details

In the Sylk details, you can check the total Sylk power consumption, host Sylk config file size, Sylk proxy file size, and the Sylk configuration downloaded status.

Custom Sensor Configuration Details

If the sensor you want use is not available in the predefined list, you can configure a custom sensor and use in the logic.

Note: *Users can configure up to ten custom sensor configurations in the engineering tool.*

Custom sensor can be configured for these 3 types: current, voltage, and resistive

- **Resistive Input:** A resistive input point is an analog point which configures an UI to read resistance from 0 to 300,000 ohms.
- **Voltage Input:** A voltage input point is an analog point that configures an UI to read a voltage signal from 0 to 10.3 Volt.
- **Current Input:** A current input point is an analog point that configures an UI to read resistance from 0 to 20 mA.

Note: *The note below is only applicable to IRM compact VAV controller.*
To perform the current sensor type connection in the custom sensor configuration, connect an external 500 Ohm resistor to convert current to volt to measure 0 (2) to 20 mA, which works without hardware change.

0 (4) ... to 20 mA (via external 499 Ω / 0.25 % resistor).

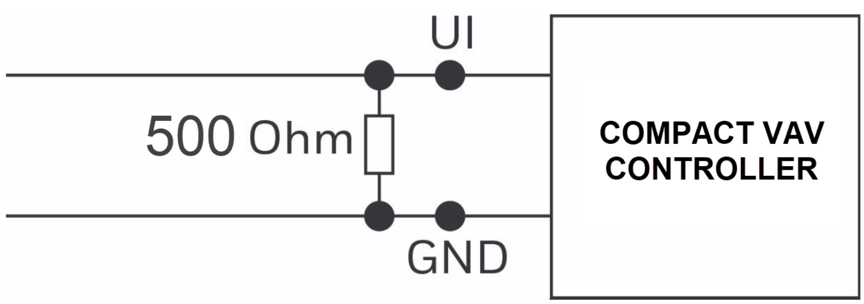


Fig. 56 Current Sensor Type Connection

The following table describes the configuration properties and their definitions.

Table 22 Custom Sensor Property

Name	Description
Enable	Select true to enable the selected custom sensor configuration.
Sensor Name	Configure the name for the custom sensor. Once the custom sensor is configured, user can identify the custom sensor using this name when configuration Analog Input.
Sensor Type	Select sensor input (current, voltage, and resistive) from the sensor type drop-down menu.
Specification Unit	The specification unit option in the drop-down menu depends upon the data type selected while configuring the details on the add window. This is the sensor manufacture specified unit
Linearization	The linearization field, where the linearization points are provided to define the characteristics of the sensor. The tabular conversion dialog window is displayed.
Sensor Low Limit	Set the lower limit the of the sensor as per project requirement. **Note:** *The configured lower limit should not be below than the sensor's manufacturer low limit.*

Table 22 Custom Sensor Property (Continued)

Name	Description
Sensor High Limit	Set the high limit the of the sensor as per project requirement. ***Note:*** *The configured high limit should not be exceed than the sensor's manufacturer high limit.*
Sensor Reading Outside Limits	This is used to configure the sensor output behavior based on the low and high limits and what should happen when the value falls outside of the limits • **Value Is Invalid Outside High And Low Limit:** when output crosses the limit, the output becomes invalid. • **Clamp Value To High And Low Limits:** when output crosses the high limit or low limit, and the output is clamped to a low or high limit; it doesn't become invalid. • **Continue Linearization Without Clamp:** when the user wants to continue sensor reading outside the high limit.
Offset	Offset value to add on top of value measured by the sensor. This field is used to correct the sensor reading errors
Validation Text	Used to report the errors in the custom sensor configuration, to enable user to correct the errors

Steps to configure Custom Sensor:

Step 1. Navigate to **IRM Bacnet Device > IRM Program** and expand the **Control Manager** details.

Step 2. Select the **Custom Sensor Details** and configure the fields.

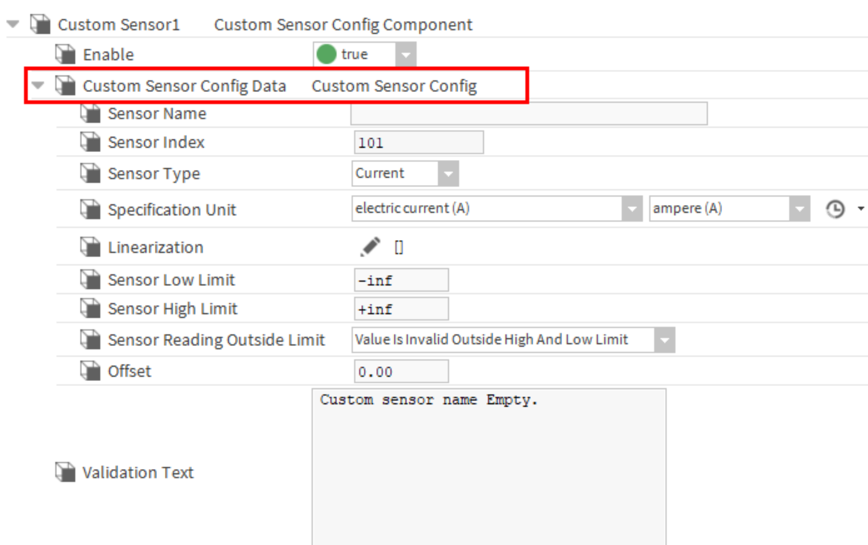


Fig. 57 Custom Sensor Details

Step 3. Select **Sensor Type** as current, resistive, or voltage.

Step 4. Enter the **Sensor Name**.

Step 5. Select the **Specification Unit** from the drop-down list.

Step 6. Click on the edit icon next to the **Linearization** field.

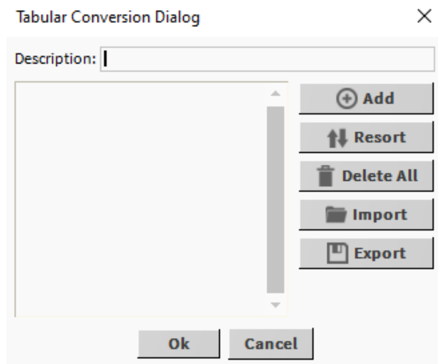


Fig. 58 Tabular Conversion Dialog Box

Step 7. Click **Add.**Update the sensor source and target values as per the manufactures sensor specification sheet.

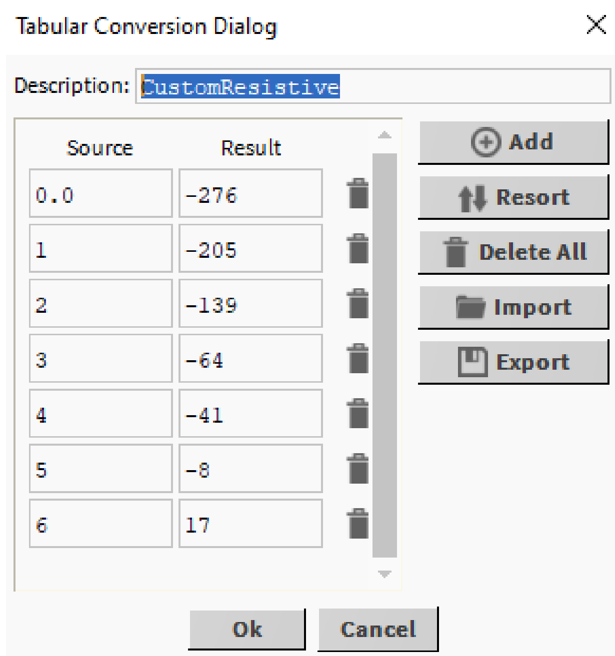


Fig. 59 Tabular Conversion Dialog Box

Step 8. Enter the low and high limit sensor values in the **Sensor Low Limit** (sensor value at 0 mA) and **Sensor High Limit** (sensor value at 20 mA) fields respectively, as per sensor data sheet.

Similarly, enter a value for the sensor resistance and sensor voltage.

Step 9. Select the **Sensor Reading Output Limits** from the drop-down menu.

- **Value is invalid outside High Limit option:** If the output exceeds the limit, the output is becomes invalid.
- **Clamp Value as High and Low Limit option:** If the output crosses the high or low limit, it is locked to the low or high limit and remains valid.
- **Continue Linearization Without Clamp option:** If the user wants to continue the sensor reading outside the high limit.

Step 10. Enter the **Offset** value.

Step 11. Click **Save** after entering the required details.

If any field is not configured, the **Validation Text** will display the error message.

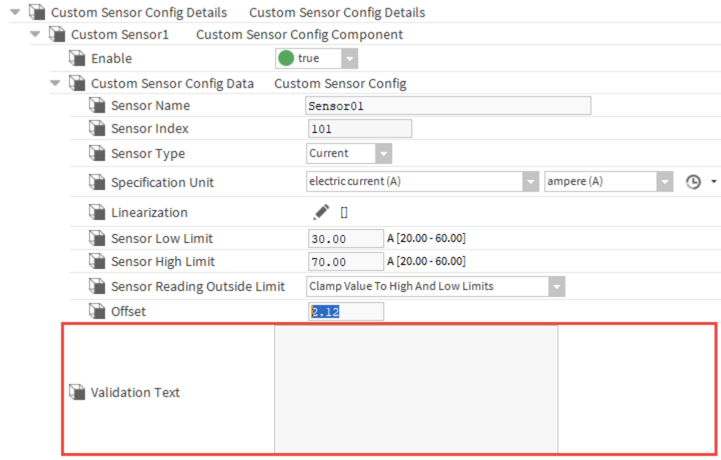


Fig. 60 Custom Sensor Config Details

Once the custom sensor is configured, you can use these custom sensor configurations into the UI terminals of the controller. All the custom sensor configurations are available under characteristic in the UI terminal.

To use the custom sensor:

Step 1. Open the **UI terminal** and select custom sensor from the **Characteristic** drop-down list.

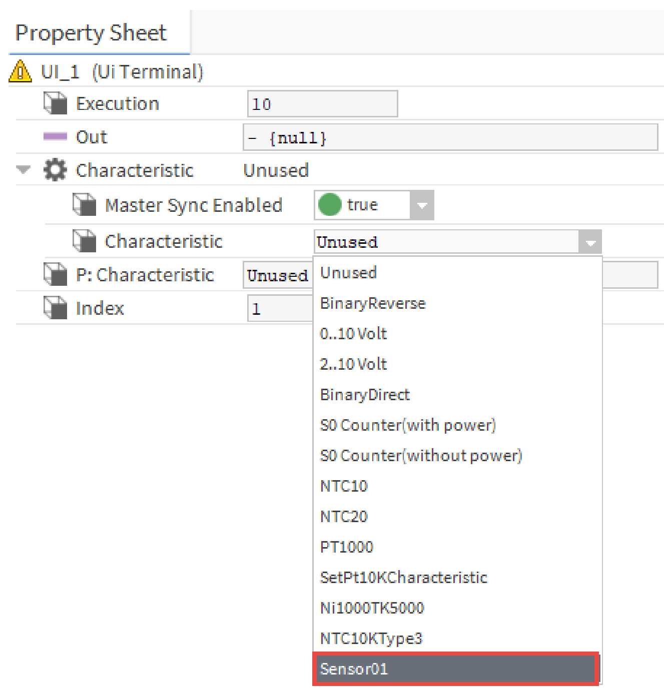


Fig. 61 UI Terminal

Day Light Savings settings

The daylight saving setting is a part of the control manager, and it enables when it comes into effect.

Steps to configure Day Light Savings settings:

Step 1. Navigate to the **BacnetNetwork** > **IrmBacnetDevice** > **IRM Program** > expand the **Control Manager**.

Step 2. Double-click **Day Light Saving** and set **Enable** field to "true".

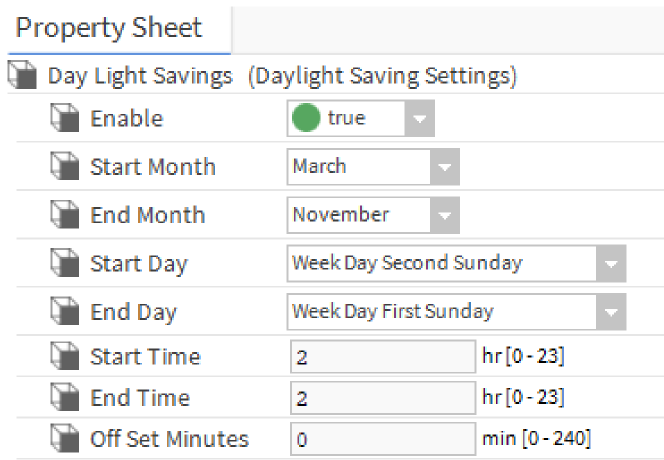


Fig. 62 Day Light Saving configuration

Step 3. Configure the following parameters of Day Light Savings:

- **Start Month:** January - December
- **End Month:** January - December
- **Start Day:** Week Day 1 - Week Day 31
- **End Day:** Week Day 1 - Week Day 31
- **Start Time:** hr [0 - 23]
- **End Time:** hr [0 - 23]
- **Off Set Minutes:** min [0 - 240]

Clear the daylight savings check box and download it to the controller for the controller to stop using daylight savings.

Periodic Program

Periodic program creates the control strategy running cyclically on a fixed time base. All the function blocks in the root folder and its subfolders are processed. The periodic program is executed every 500 ms within the controller.

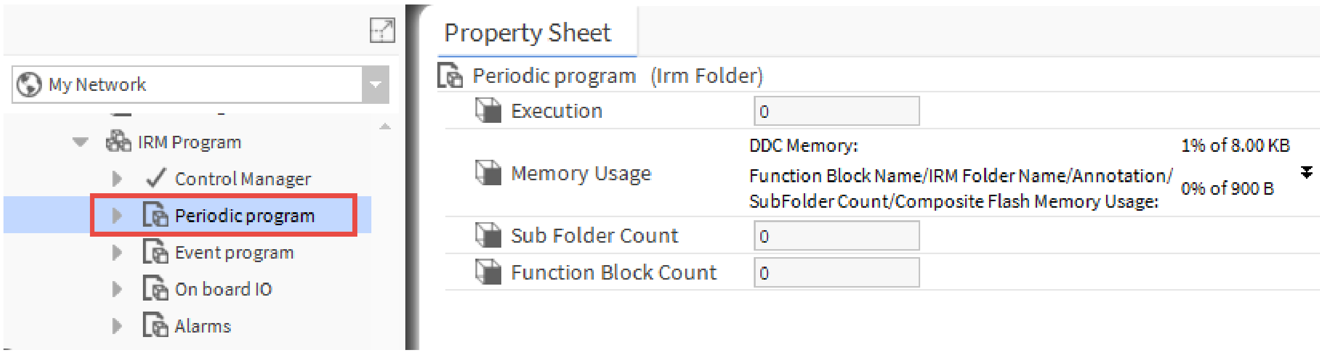


Fig. 63 Periodic Program property sheet

Steps to configure Periodic Program:

Step 1. Navigate to the **BacnetNetwork > IrmBacnetDevice > IRM Program** > Double-click on the **Periodic Program** in the tree and select the wire sheet view.

Step 2. Open the **honIrmControl** palette.

Step 3. Add control items from the palette to the wire sheet via drag and drop and / or copy / paste.

Step 4. Create or change the control logic by adding, deleting, moving icons, or adding and deleting connections.

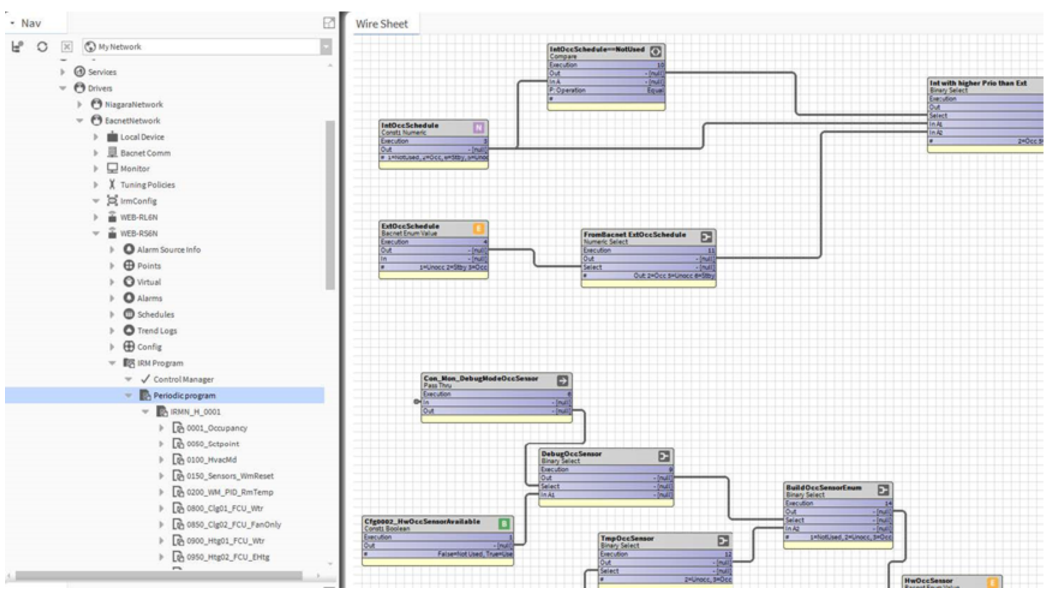


Fig. 64 Periodic program wire sheet

Note: *Irmfolders support a maximum of five levels of nesting. The sixth level would be the component in the ord.*

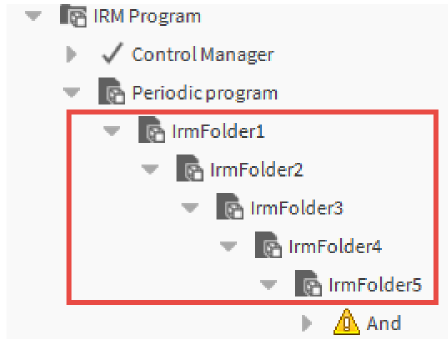


Fig. 65 IRM Folders

Note: *A Periodic Program can have up to five nested folders. If the maximum folder nesting level is exceeded, the engineering tool validates it. If an application with more than five nested folders fails the validation, the teach will fail with the controller error DDC ERR NESTING LEVEL EXCEEDED.*

Periodic Program Synchronization Check

The control manager detects any modifications on the periodic program wire sheet function blocks. You can perform add, delete, move, connection deleted or added modifications. As a result of the modification, a yellow “warning” symbol is displayed on the modified function block, indicating the application is in out of sync stat.

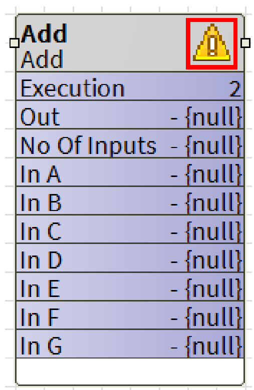


Fig. 66 Warning

The application synchronization status depends on the teach mode configuration (On demand or Immediate). After synchronization, the warning symbol is removed from the function block, indicating the synchronized state. Synchronization happens immediately in the "Immediate" mode. For more details, refer Control Manager on page 62.

Event Program

The Event program creates an event-driven control strategy. All the function blocks in the root folder and its subfolders are processed.

The event program is executed:

- When the time interval of 1000 ms has elapsed.
- When a Binary Input value is changed in On board IO folder.
- If the value of any Modbus read register changes.

When the service pin is pressed.

Steps to configure Event program:

Step 1. Navigate to the **BacnetNetwork** > **IrmBacnetDevice** > **IRM Program** > Double-click on the **Event Program** in the tree and select the wire sheet view.

Step 2. Open the **honIrmControl** palette.

Step 3. Add control items from the palette to the wire sheet via drag and drop or copy and paste.

Step 4. Create or change the control logic by adding, deleting, moving icons, or adding and deleting connections.

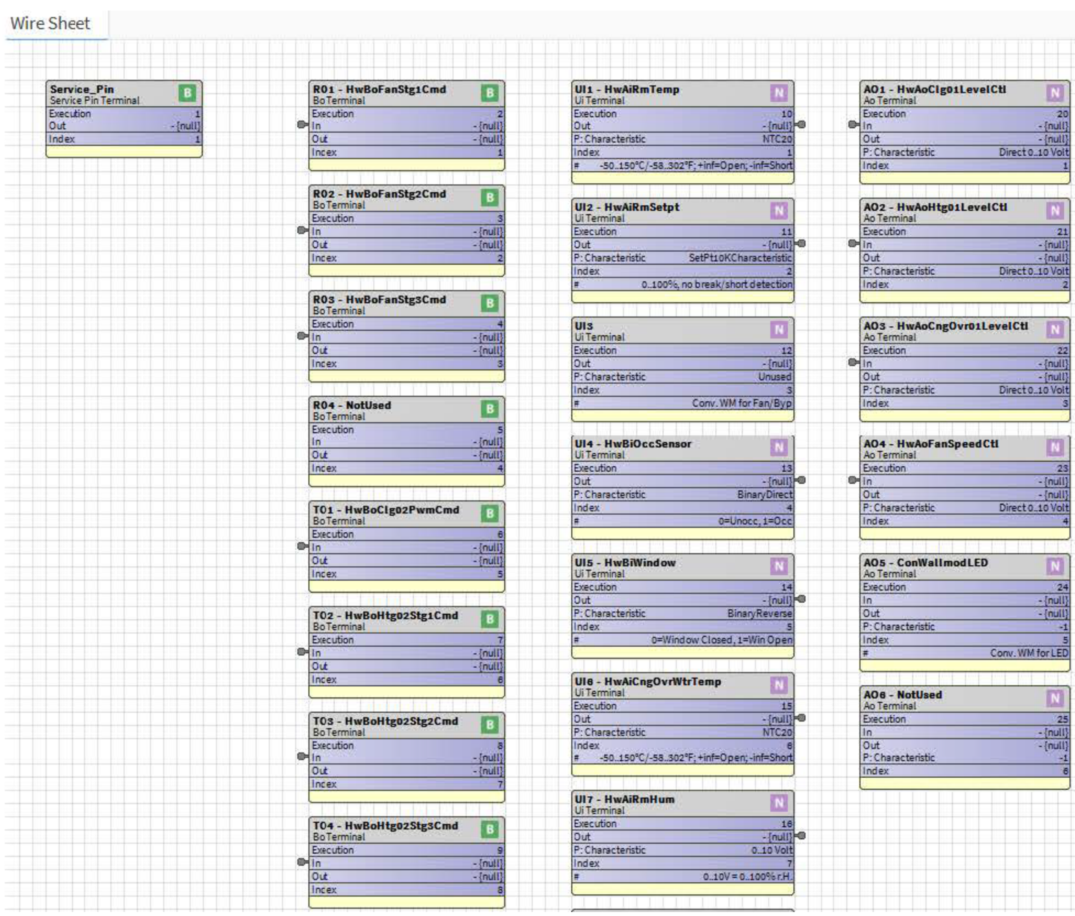


Fig. 67 Wire sheet

Note: *A Event Program can have up to five nested folders. If the maximum folder nesting level is exceeded, the engineering tool validates it. If an application with more than five nested folders fails the validation, the teach will fail with the controller error DDC ERR NESTING LEVEL EXCEEDED.*

Event Program Synchronization Check

The control manager detects any modifications on the event program wire sheet function blocks. You can perform add, delete, move, connection deleted or added modifications.

As a result of the modification, a yellow "warning" symbol is displayed on the modified function block, indicating the application is in out of sync state.

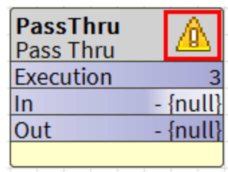


Fig. 68 Synchronization Check

The application synchronization status depends on the teach mode configuration (On demand or Immediate). After synchronization, the warning symbol is removed from the function block, indicating the synchronized state. Synchronization happens immediately in the "Immediate" mode. For more details, refer Control Manager on page 62.

Onboard IO

Onboard IO shows the hardware configuration of the application. The hardware details displayed in Onboard IO can differ from the actual hardware layout of the physical controller. For proper operation, the project hardware properties does not have to match completely with the physical controller hardware.

But, if the difference is too much, the control manager will show incompatibilities, and the engineering tool will tell you what to do for synchronization.

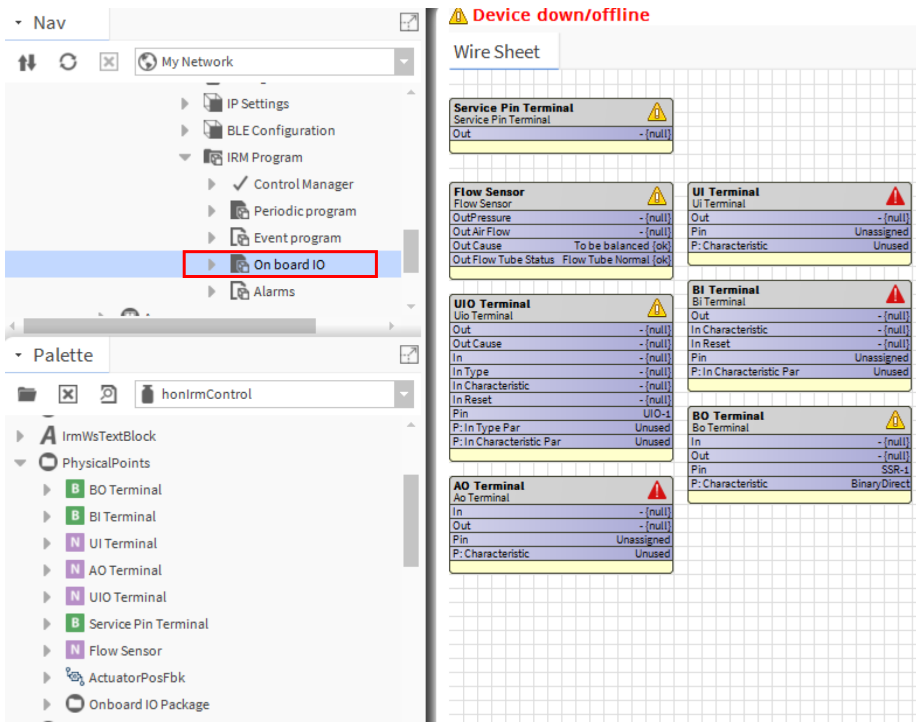


Fig. 69 On board IO

Steps to use Onboard IO components:

Step 1. Navigate to the **BacnetNetwork** > **IrmBacnetDevice** > **IRM Program** > Double-click on the **Onboard IO** in the tree and select the wire sheet view.

Step 2. Open the honIrmControl palette and add the single physical terminals to the wire sheet via drag and drop or copy / paste.

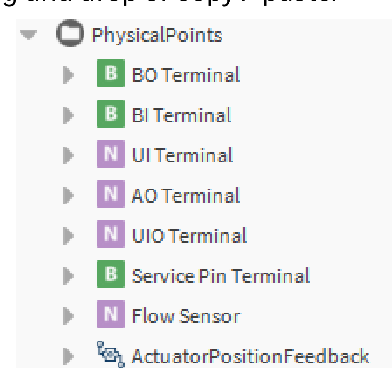


Fig. 70 Physical Points

Step 3. Create or change the control logic by adding, deleting, moving icons, or adding and deleting connections.

Note: *When discovering points on the Bacnet Network via Irm Bacnet Device Manager, the hardware I/O points of the* IRM NX controllers *are not detected or visible by default. To expose hardware I/O points on the Bacnet Network, refer to the* Onboard IO Links from hardware to BACnet on page 141.

Onboard IO Synchronization Check

Any modifications on the onboard IO wire sheet are detected by the control manager. You can perform add, delete, move, connection deleted or added modifications.

As a result of the modification, a yellow "warning" symbol is displayed on the modified function block, indicating the application is in out of sync state.

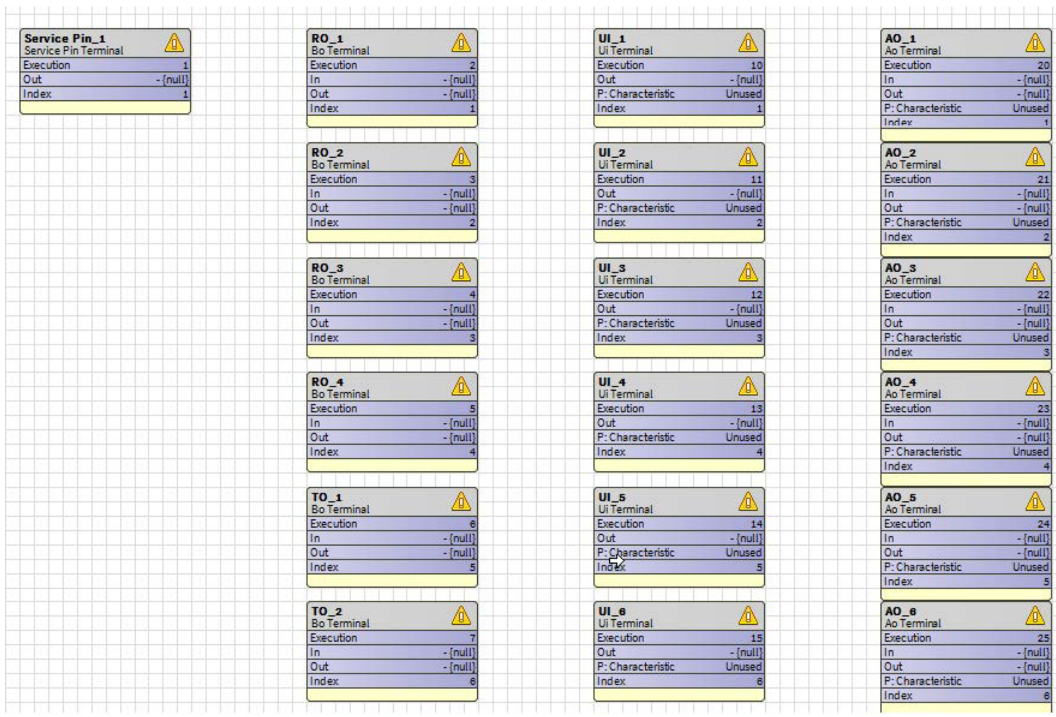


Fig. 71 Synchronization Check

The application synchronization status depends on the teach mode configuration (On demand or Immediate). After synchronization, the warning symbol is removed from the function block, indicating the synchronized state. Synchronization happens immediately in the "Immediate" mode. For more details, refer Control Manager on page 62.

Reference Datapoints Usage

The reference datapoint is used to set up communication between BACnet controllers using reference input and reference output points.

When more than one BACnet controller is present in the control and monitoring system, the devices communicate with one another using the BACnet MSTP protocol. This allows one controller to read values from other controllers while also setting values on other controllers.

This data communication is achieved through the use of reference input and reference output points, which are assigned to physical or value BACnet points.

- The device instance, object instance, and object ID of the physical and value Bacnet points are manually entered for manual creation and mapping.
- The device instance, object instance, and object ID of the physical and value Bacnet points are automatically performed for automatic creation via drag and drop.

Note: *The engineering tool reference input and output function is a proprietary Honeywell Bacnet function.*

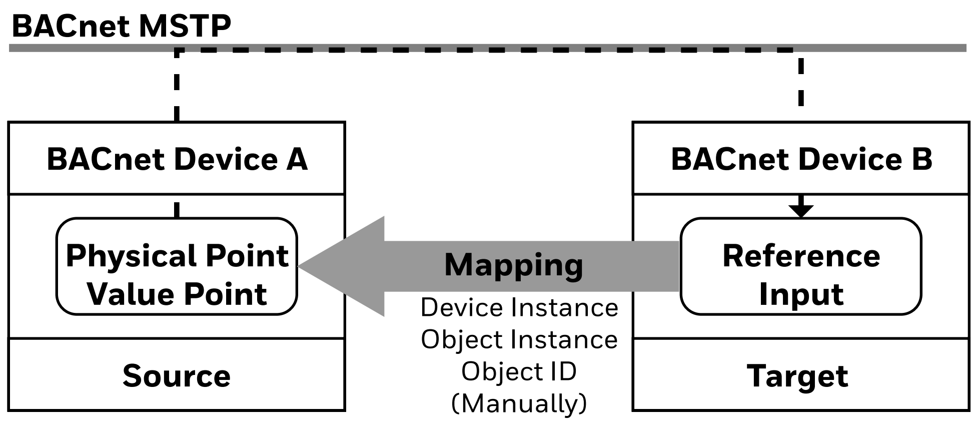


Fig. 72 Manual Mapping of Reference Input Point with Physical Point

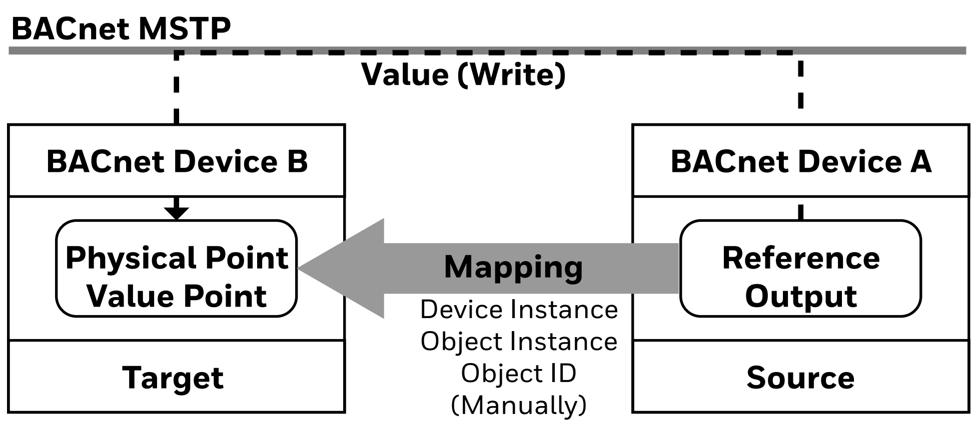


Fig. 73 Manual Mapping of Reference Output Point with Physical Point

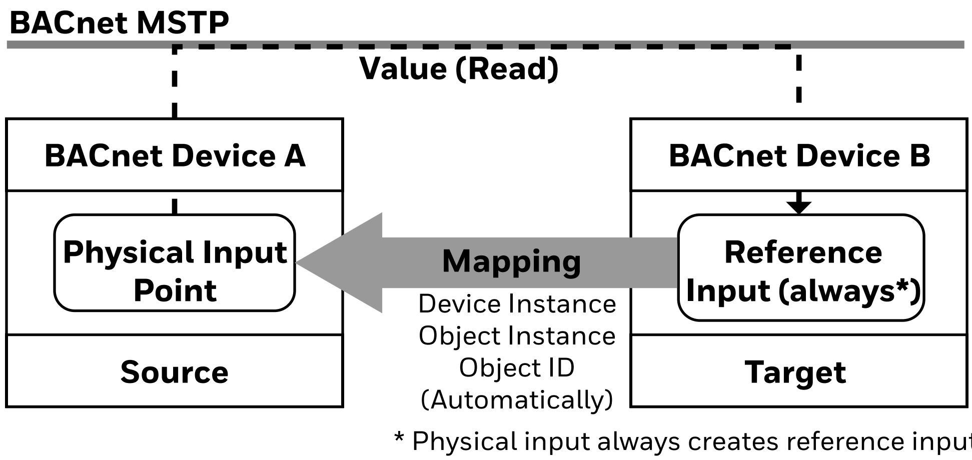


Fig. 74 Automatic Mapping of Physical Input Point with Reference input

/

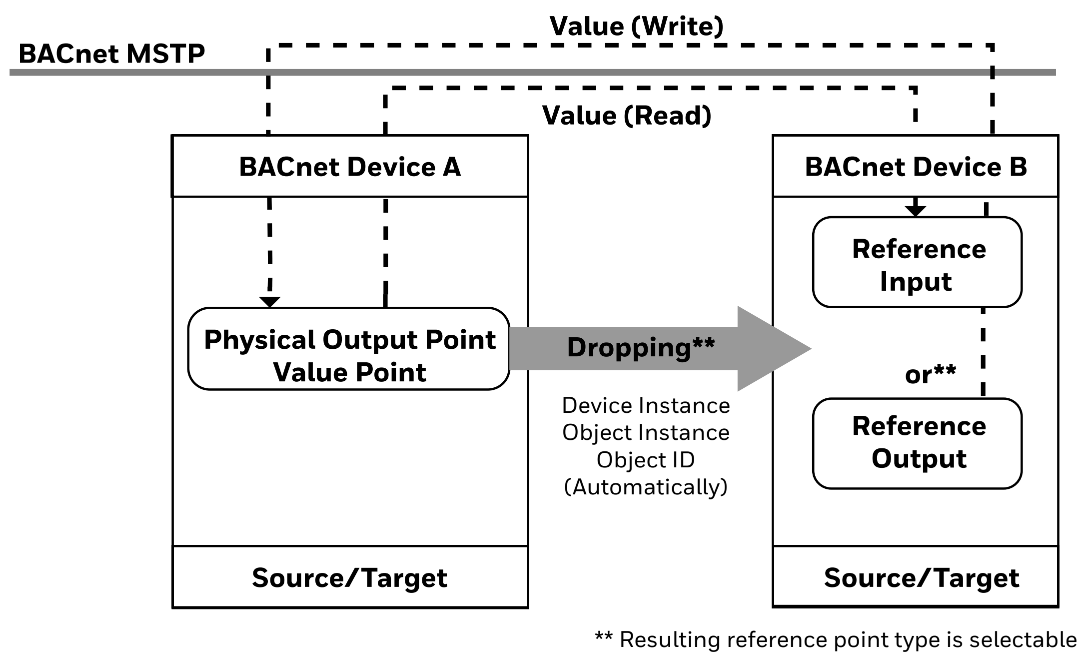


Fig. 75 Automatic Mapping of Physical Input Point with Reference input and output

Example

There are two controllers (BACnet device A and BACnet device B) in two different rooms on the BACnet MSTP bus. Controller BACnet device A has an outside air temperature sensor connected. The outside air temperature value sensed by controller BACnet device A should be provided to controller BACnet device B.

A third-party Bacnet MSTP wall module connected to an IRM NX controller should process values coming from the wall module.

Read or Write Directions

Reading a value: A reference input point (target) is used for reading a value from a physical or value Bacnet point (source).

Writing a value: A reference output point (source) is used for writing a value to a physical or value point (target).

COV and Polling

- If COV reporting is possible, the reference point's controller subscribes to the mapped physical or value point.
- If COV reporting is not possible, the mapped physical or value point is polled.

There are two ways for applying reference points in the application:

- Manual creation and mapping of reference points to Bacnet points (A).
- Automatic creation and mapping of reference points via drag and drop of Bacnet points (B).

Manual Reference Point Creation and Mapping

Reference input point (target): Manually creating and mapping the reference input point (target) to the physical or value Bacnet point is used to establish the reference input Bacnet point connection (source).

Reference output point (source): Manual mapping of the reference output point (source) to the physical or value Bacnet point is used to establish the reference output connection (target).

In both cases, the following device and object information from the Bacnet source or target points must be entered during the mapping:

- Device Instance (ID)
- Object type (Bacnet point type) = object ID
- Object Instance = object ID

Automatic Reference Point Creation and Mapping (A)

Reference points are created and mapped automatically by dragging and dropping physical or value Bacnet points onto the wire sheet.

The corresponding device and object information is included with the corresponding Bacnet point and does not need to be entered manually.

Client-Server Configurations: A client-server configuration with one client controller connected to multiple server controllers or third-party Bacnet devices is a typical application scenario for using reference points. The client implements the main control logic, writes values to server controllers or third-party Bacnet devices, and receives values from server controllers or third-party Bacnet devices.

Example:

The client controller:

- Reads the window contact status [EffWindow] from the server controller via RefIn.
- Reads the room temperature [ExtWmRmTemp] from the external Bacnet Wall Module via RefIn.
- Writes the occupancy status [EffOccMd] to an external Bacnet Wall Module via RefOut.

The server controller:

- Reads the fan output status [FanStage] of the staged fan (slow, medium, high) from the client controller via RefIn.

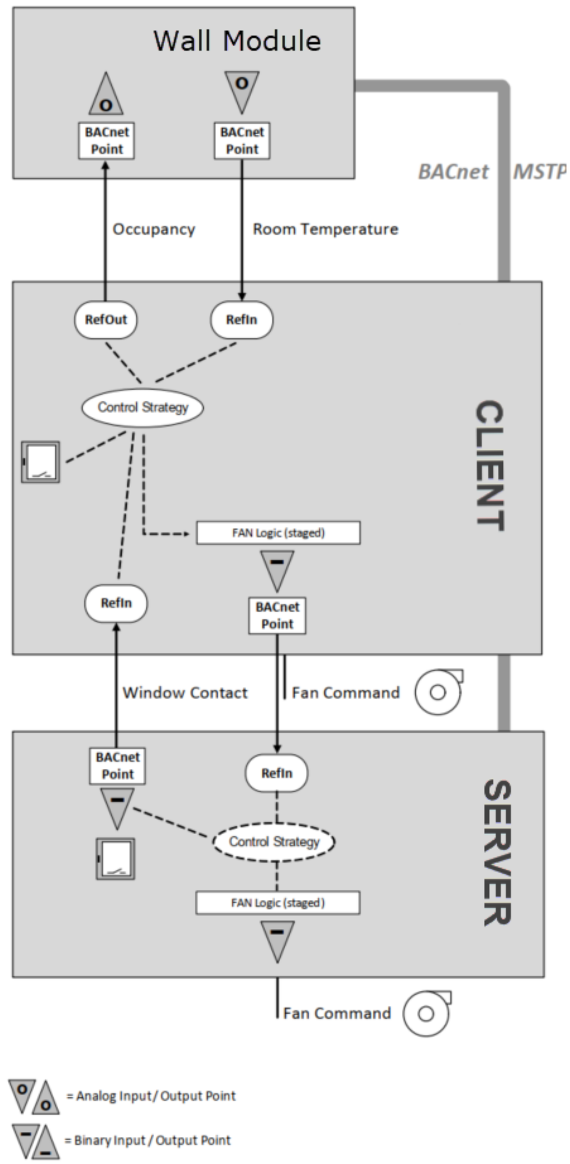


Fig. 76 Client-Server Configuration Using Reference Points

Manual Mapping of Reference Points (A)

Example:

Two IRM NX controllers and a wall module are on the MSTP bus in the client-server configuration:

- CLME-RL6N (client)
- CLME-RS5N (server)
- External Bacnet wall module

The CLME-RL6N client controller:

- Reads the window contact status [EffWindow] from the server controller via RefIn.
- Reads the room temperature [ExtWmRmTemp] from the Bacnet Wall Module via RefIn.
- Writes the occupancy status [EffOccMd] to an external Bacnet Wall Module via RefOut.

The CLME-RS5N server controller:

- Reads the fan output status [FanStage] of the staged fan (slow, medium, high) from the client controller via RefIn.

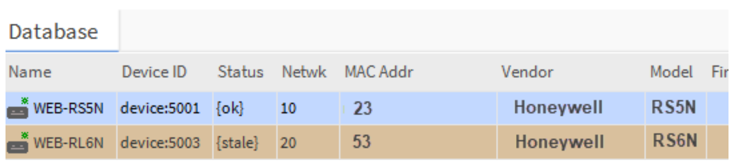
Reference Inputs

Based on the example above, the reference input functions of the CLME-RL6N client controller are described in the following.

The CLME-RL6N client controller:

- Reads the window contact status [EffWindow] from the server controller via RefIn.
- Reads the room temperature [ExtWmRmTemp] from the Bacnet Wall Module via RefIn.

Note: *The device IDs of the CLME-RL6N client and CLME-RS5N server controllers. In the below image, "5003" and "5001" (displayed in the discovered and database pane).*



Database

Name	Device ID	Status	Netwk	MAC Addr	Vendor	Model	Fir
WEB-RS5N	device:5001	{ok}	10	23	Honeywell	RS5N	
WEB-RL6N	device:5003	{stale}	20	53	Honeywell	RS6N	

Fig. 77 Discovered view

Note: *The read function of the CLME-RS5N server controller is described using the automatic creation via drag and drop, see* Automatic Creation and Mapping of Reference Points (B) on page 98.

Steps to create reference input operation:

Step 1. In the Nav tree, expand the bacnet network and browse to the points directory of the CLME-RS5N server controller.

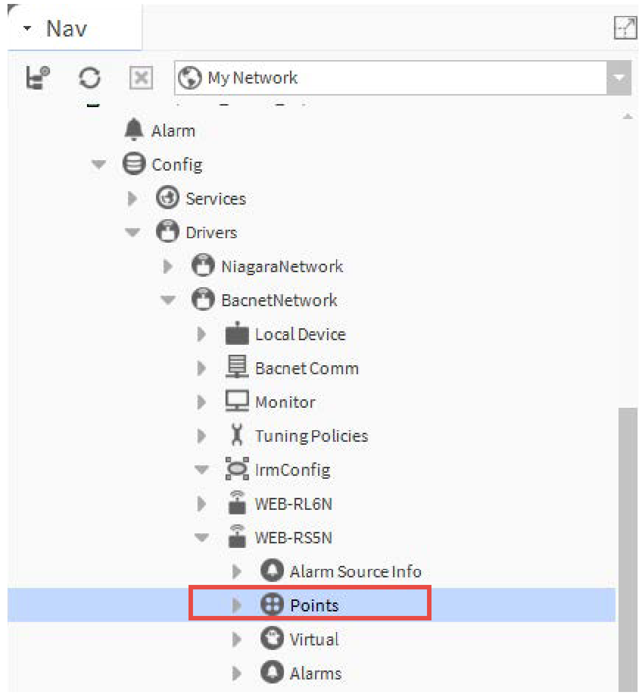


Fig. 78 Points

Step 2. Double-click the points directory. This action opens Hon Bacnet Point Manage view.

Step 3. Click **Discover**. This action discovers all the offline points.

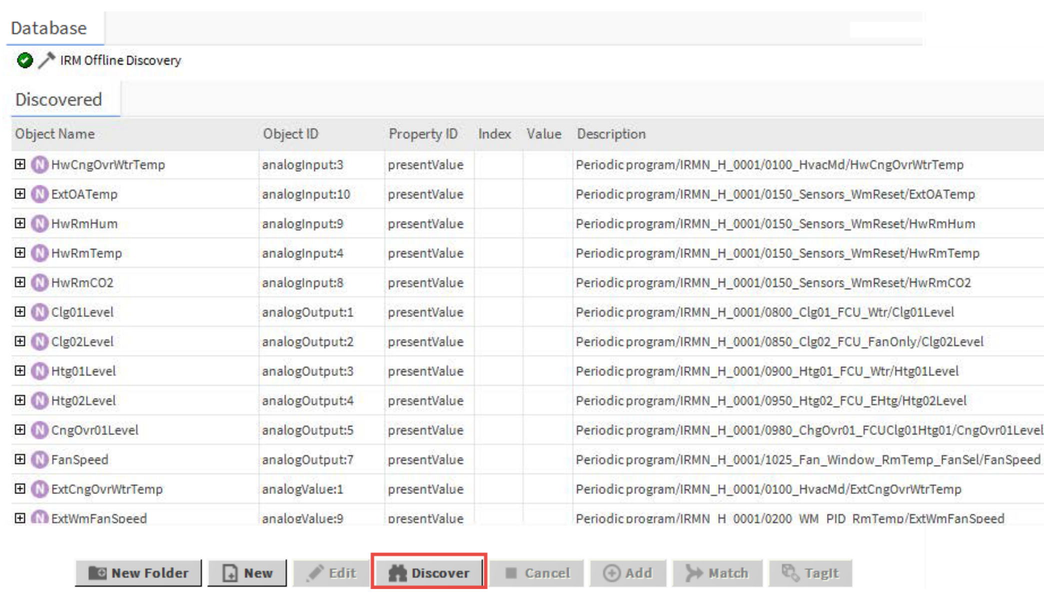


Fig. 79 Irm offline Discover

Step 4. Sort the discovered points by clicking on the **Object Name** column.

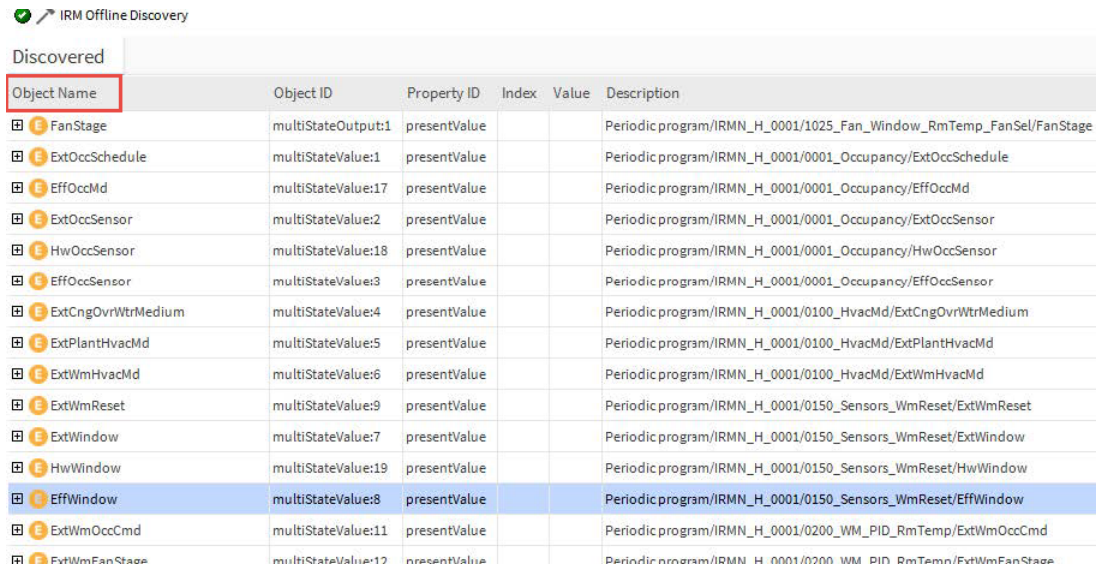


Fig. 80 Discovered Pane

Step 5. In the point list, scroll to the 'EffWindow' Bacnet point.

The Object ID, in this case 'multiStateValue:8'.

Step 6. In the Nav tree, expand to the CLME-RL6N client controller.

Step 7. Expand the **IRM Program** and double-click **Periodic Program** to add the reference input point.

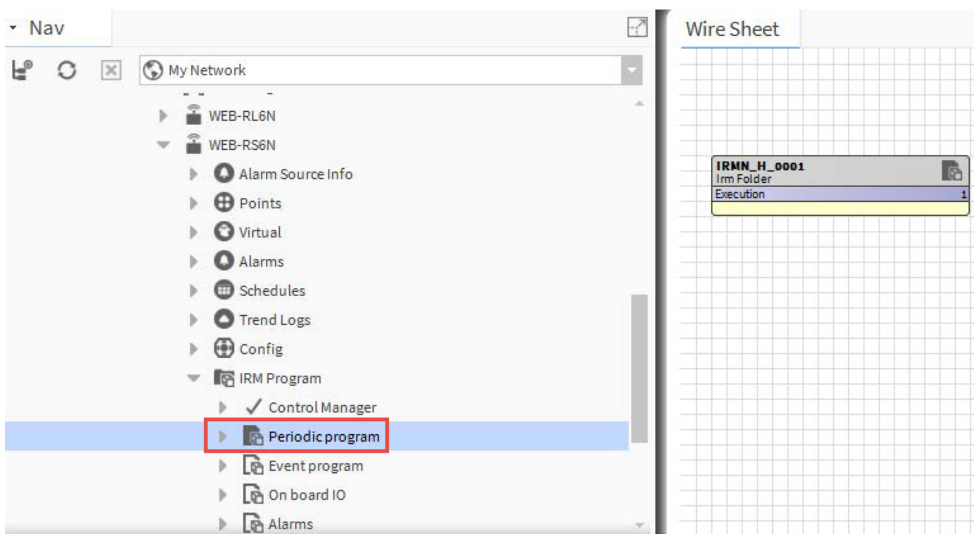


Fig. 81 Periodic program folder

Step 8. Go to the honIrmControl palette, expand **BacnetObjects**, and drag and drop the **RefIn** to the wire sheet.

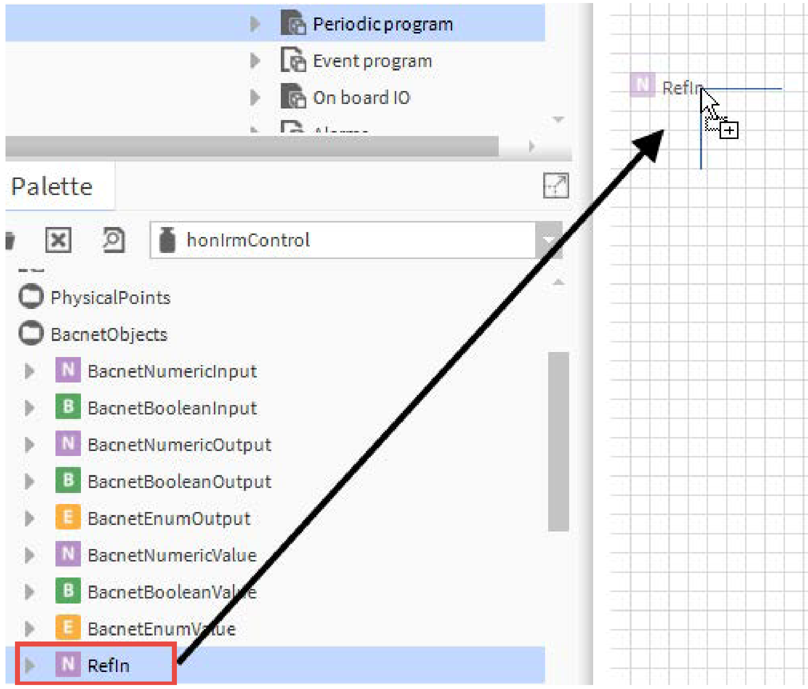


Fig. 82 Periodic program wire sheet

Step 9. In the Name dialog box, change the name to EffWindow, and then click **OK**.

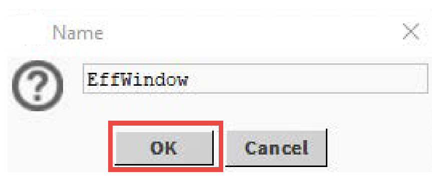


Fig. 83 Name dialog box

The EffWindow RefIn is added to the wire sheet.

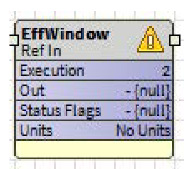


Fig. 84 wire sheet

Step 10. Double-click the symbol to display the property sheet for the EffWindow RefIn.

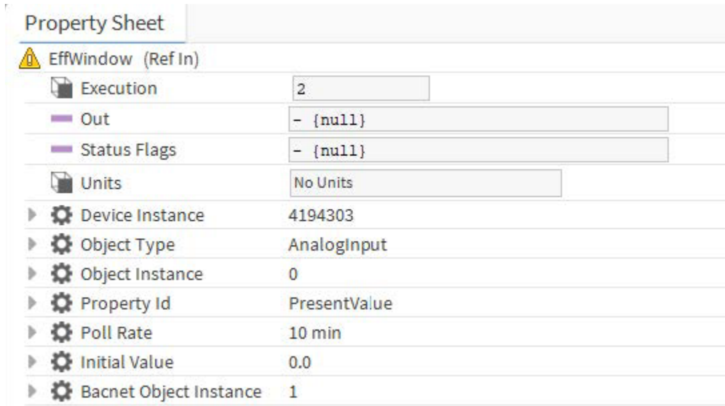


Fig. 85 EffWindow Refin property sheet

Step 11. On the property sheet, expand device instance, object type, and object instance.

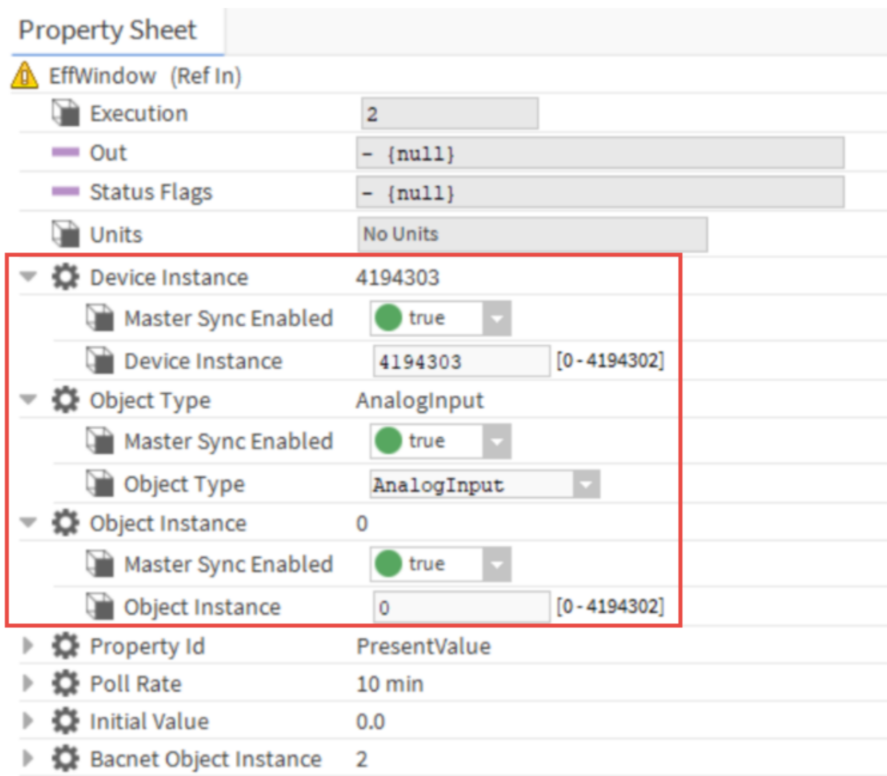


Fig. 86 EffWindow RefIn property sheet

Step 12. Enter in the values for the wall module and the EffWindow multistate value point as shown below.

- **Device Instance**: device ID = 5001
- **Object Type**: object ID = MultistateValue
- **Object Instance**: object ID = 8

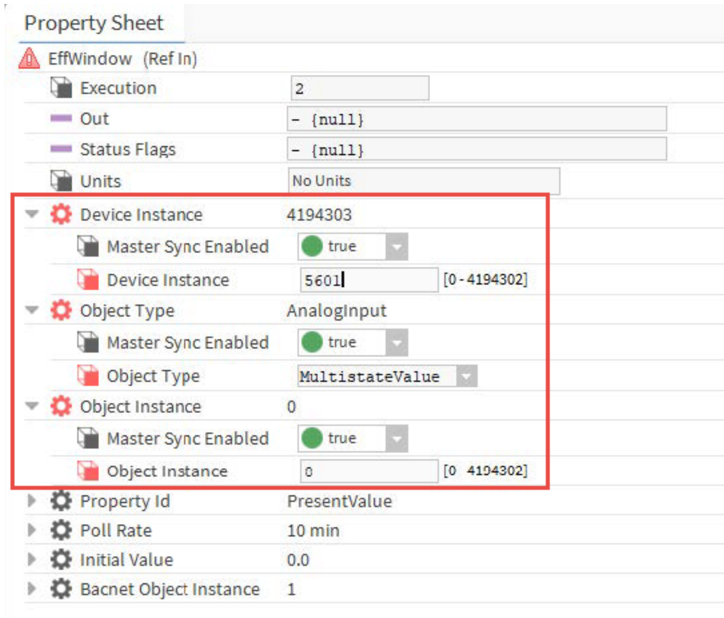


Fig. 87 EffWindow RefIn property sheet

Step 13. Click **Save.**

The reference input in the CLME-RL6N client controller is mapped to the multistate value point EffWindow in the CLME-RS5N controller which provides the window contact status.

Step 14. Apply the procedure in the same way for:

- Reading the room temperature by mapping a reference input from the client controller to the analog value [ExtWmRmTemp] of the external Bacnet wall module.
- Reading the fan stage by mapping a reference input from the CLME-RS5N server controller to the multistate output [FanStage] of the CLME-RL6N client controller.

Step 15. For writing the occupancy status from the client controller to the external Bacnet wall module, please, see Reference Outputs on page 94 below.

Alternatively, you can use the "Automatic Reference Point Creation and Mapping (A) on page 87" method described in the section. Automatic Creation and Mapping of Reference Points (B) on page 98. This section uses fan stage reading as an example.

Step 16. If desired, you can change the setting for client sync or other settings.

Reference Outputs

In the following procedure, the reference output of the CLME-RL6N client controller is described below.

- The CLME-RL6N client controller writes the occupancy status [EffOccMd] to an external Bacnet wall module via RefOut.

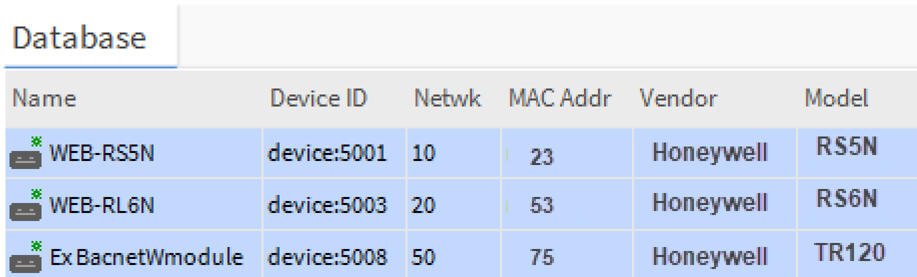
Example:

Two IRM NX controllers and a wall module are on the MSTP bus in the client-server configuration:

- CLME-RL6N (client)
- CLME-RS5N (server)
- External Bacnet wall module

Steps to create reference output functions:

Note: *The device ID of the external Bacnet wall module is 5008 (displayed in the Discovered and Database pane).*



Database

Name	Device ID	Netwk	MAC Addr	Vendor	Model
WEB-RS5N	device:5001	10	23	Honeywell	RS5N
WEB-RL6N	device:5003	20	53	Honeywell	RS6N
Ex BacnetWmodule	device:5008	50	75	Honeywell	TR120

Fig. 88 Controller and external Bacnet wall module

Step 1. In the Nav tree, expand the Bacnet network and browse to the points directory of the wall module.

Step 2. Double-click the points directory and click **Discover** to discover the points.

Step 3. Sort the discovered points by clicking on the **Object Name** column.

Step 4. In the point list, scroll to the "EffOccMd" Bacnet point.

Note: *The Object ID, in this case, for example, 'multiStateValue:13'.*

Step 5. In the Nav tree, expand to the CLME-RL6N client controller.

Step 6. Expand the **IRM Program** and double-click the **Periodic Program** to add the reference output point.

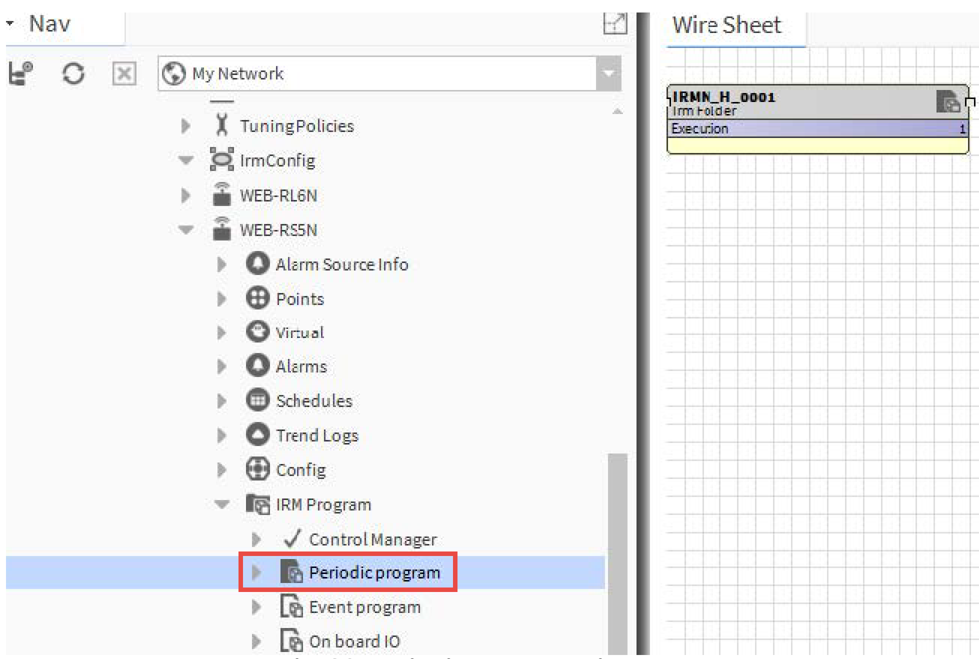


Fig. 89 Periodic program wire sheet

Step 7. In the honIrmControl palette, expand **BacnetObjects**, and drag and drop the **RefOut** to the wire sheet.

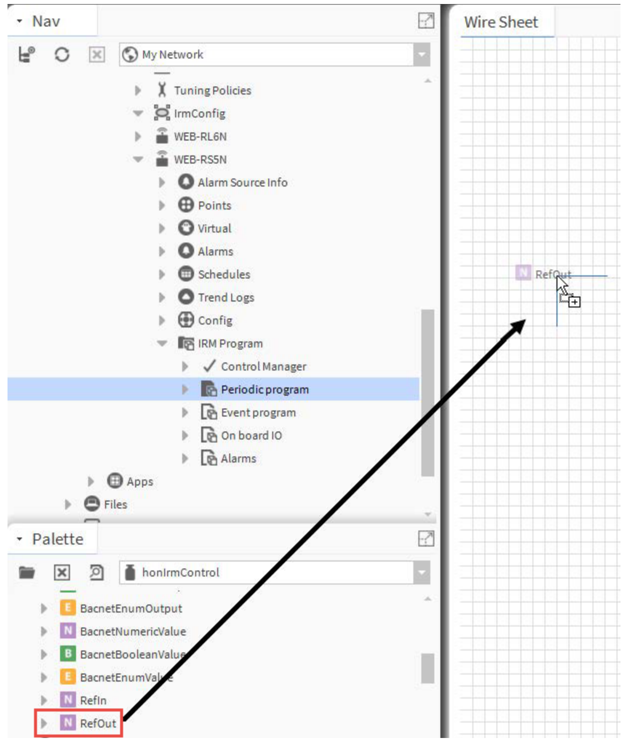


Fig. 90 Periodic program wire sheet

Step 8. Change the name to "EffOccMd" in the Name dialog box, and then click **OK.**

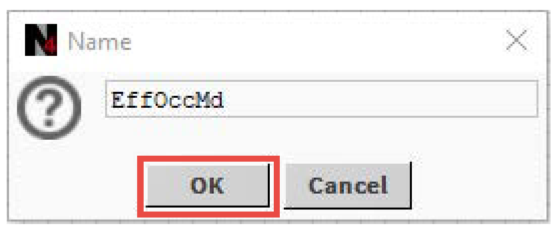


Fig. 91 Name dialog box

Step 9. The EffOccMd RefOut is added to the wire sheet.

Fig. 92 wire sheet

Step 10. Double-click the symbol to display the property sheet for the reference output.

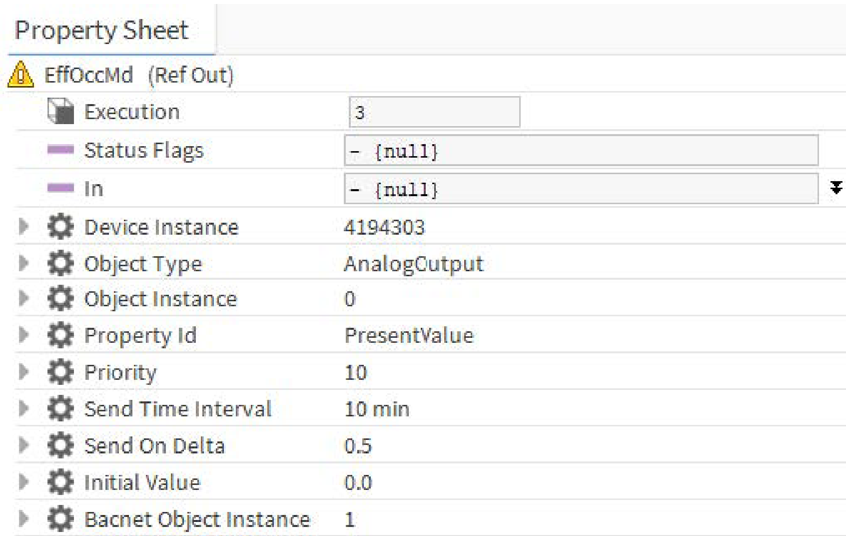


Fig. 93 EffOccMd RefOut property sheet

Step 11. On the property sheet, expand device instance, object type, and object instance**.**

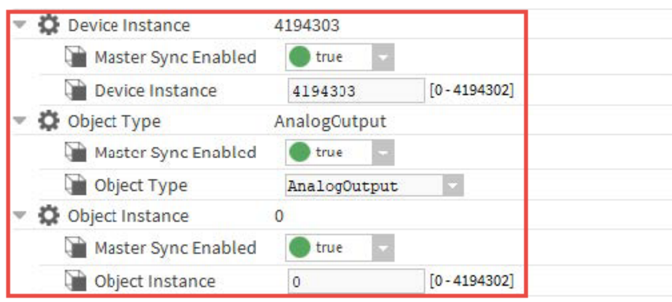


Fig. 94 EffOccMd RefOut property sheet

Step 12. Enter the values of the external bacnet wall module and the EffOccMd multistate value point as shown in steps 1 and 4.

- **Device Instance**: device ID = 5008
- **Object Type**: object ID = multistateValue
- **Object Instance**: object ID = 13

Step 13. Click **Save.**

The reference input in the CLME-RL6N client controller is mapped to the multistate value point EffOccMd in the wall module.

Step 14. If desired, you can change the setting for client sync.

Client-Server Synchronization

- If client Sync Enabled is set to true, this property will be synchronized between the client and the server whenever a client sync operation is performed.
- If the flag on the source device is set to false, this parameter will not be synchronized to all target devices.

Automatic Creation and Mapping of Reference Points (B)

The engineering tool automatically creates reference points when Bacnet points are copied onto the wire sheet. Therefore, you do not have to enter the values for device instance, object type, an object instance of the target controller, and point manually since they automatically come with the Bacnet point.

This automatic creation is always executed whenever a Bacnet point is copied onto the wire sheet of a different controller or an external Bacnet device. In the drop result, the type of reference point, input or output, is to be created are defined in the control manager as described in the drop settings.

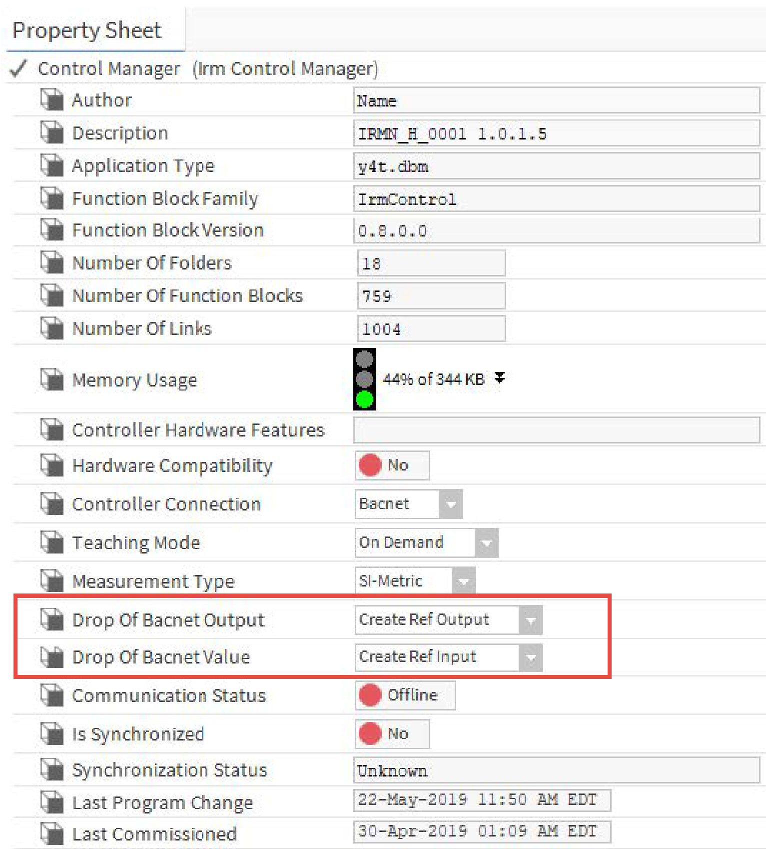


Fig. 95 Irm Control Manager property sheet

In the control manager, the result for drop of a Bacnet output and a Bacnet value point can be selected. For both point types, either a reference output or a reference input can be selected as a drop result.

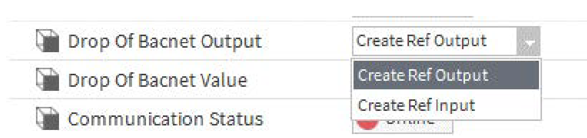


Fig. 96 Create Ref Output

Note: *Another controller cannot override the input points. Hence, a reference input is always created when dropping an input onto the wire sheet, and a drop setting for inputs in the control manager is not provided.*

Example: Two IRM NX controller and a wall module are on the MSTP bus in the client-server configuration:

- CLME-RL6N (client)
- CLME-RS5N (server)
- External Bacnet wall module

The CLME-RL6N client controller:

- Reads the window contact status [EffWindow] from the server controller via RefIn.
- Reads the room temperature [ExtWmRmTemp] from the Bacnet wall module via RefIn.
- Writes the occupancy status [EffOccMd] to an external Bacnet wall module via RefOut.

The CLME-RS5N server controller:

- Reads the fan output status [FanStage] of the staged fan (slow, medium, high) from the client controller via RefIn.

Based on the example above, the reference input function of the CLME-RS5N server controller is described.

Steps to create and Map of Reference Points:

Step 1. In the Nav tree, expand the Bacnet network and browse to the points folder of the CLME-RL6N client controller.

Step 2. Double-click the points folder and discover the points by clicking discover on the bottom.

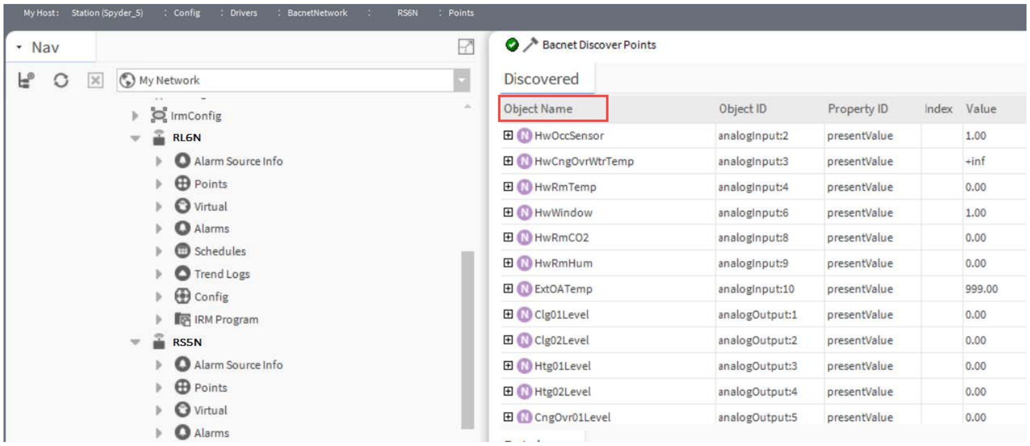


Fig. 97 Bacnet Discover Points

Step 3. Sort the discovered points by clicking on the **Object Name** column.

Step 4. In the point list, scroll to the 'FanStage' Bacnet point.

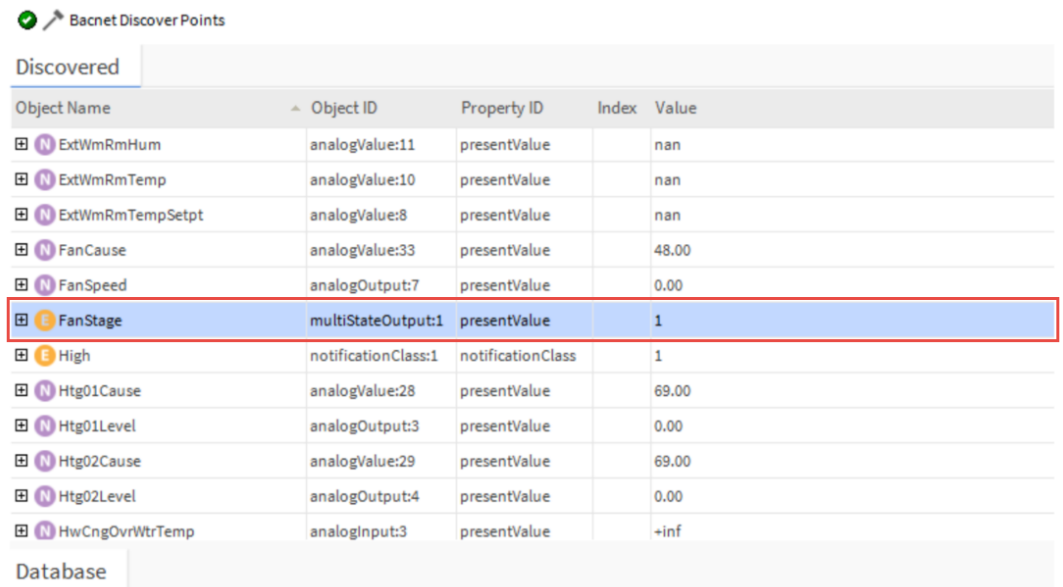


Fig. 98 FanStage Bacnet Point

Step 5. Add the 'FanStage' Bacnet point to the database by clicking Add at the bottom.

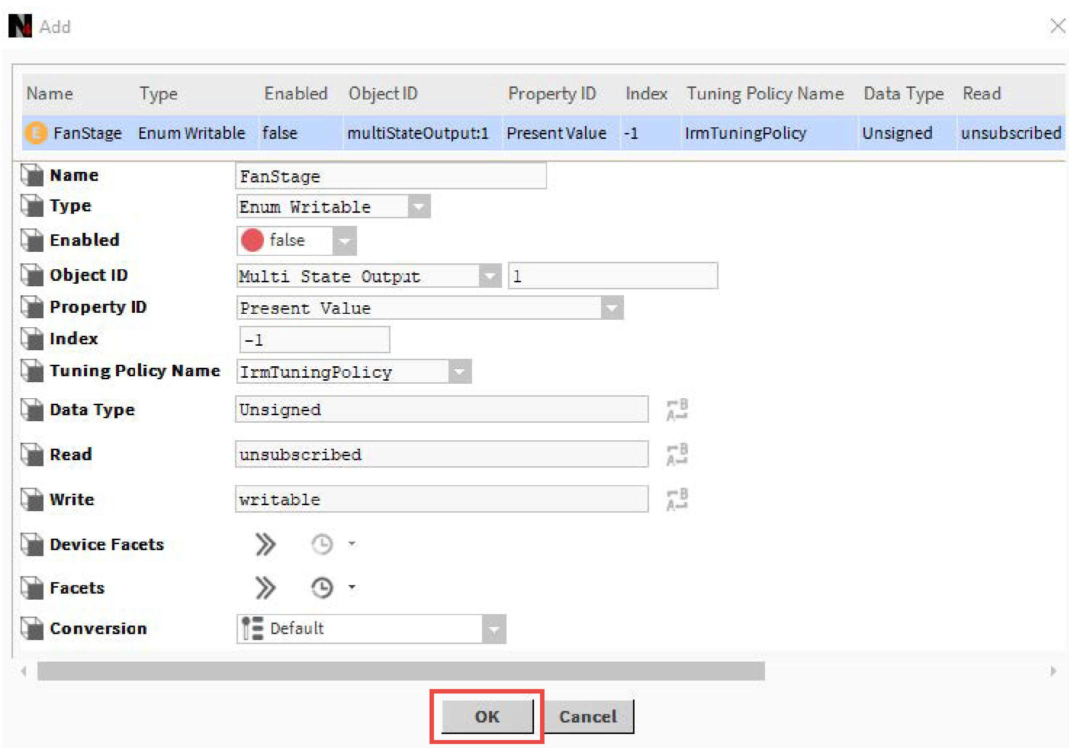


Fig. 99 Add dialog box

Step 6. Click **OK** in the Add dialog box. The point will be added to the Database and the Points folder.

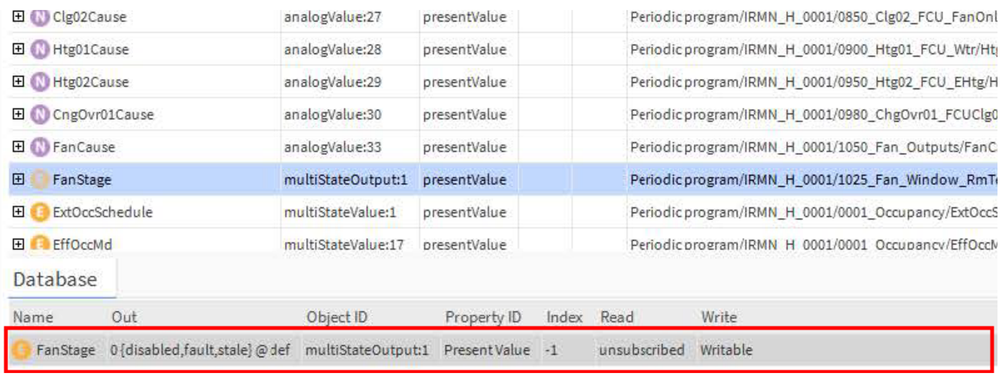


Fig. 100 Database

Step 7. In the Nav tree, browse to the CLME-RS5N server controller.

Step 8. Expand the IRM Program directory and double-click **Control Manager.**

Step 9. Select **Create Ref Input** for **Drop of Bacnet Output** property.

Note: ***Drop of Bacnet Output*** *property is mandatory for outputs and value points, but not necessary for input points.*

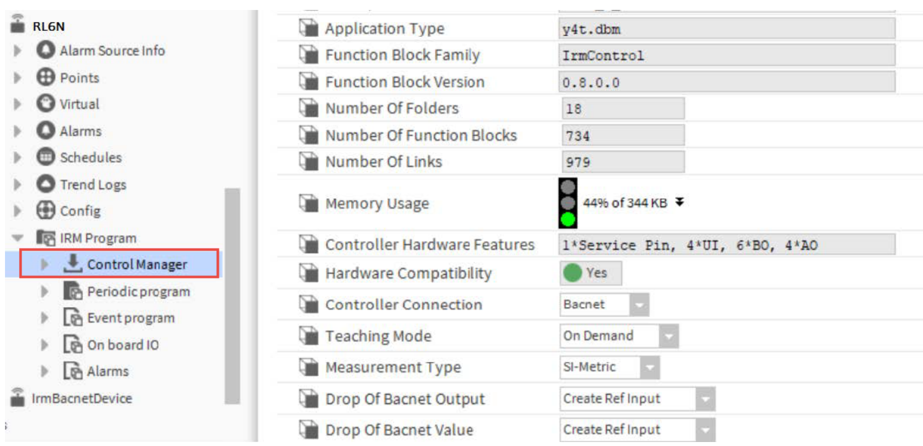


Fig. 101 IRM Program Folder

Step 10. Double-click the control manager folder, **Periodic Program** or **Event Program**, to which you want to add the FanStage Bacnet point.

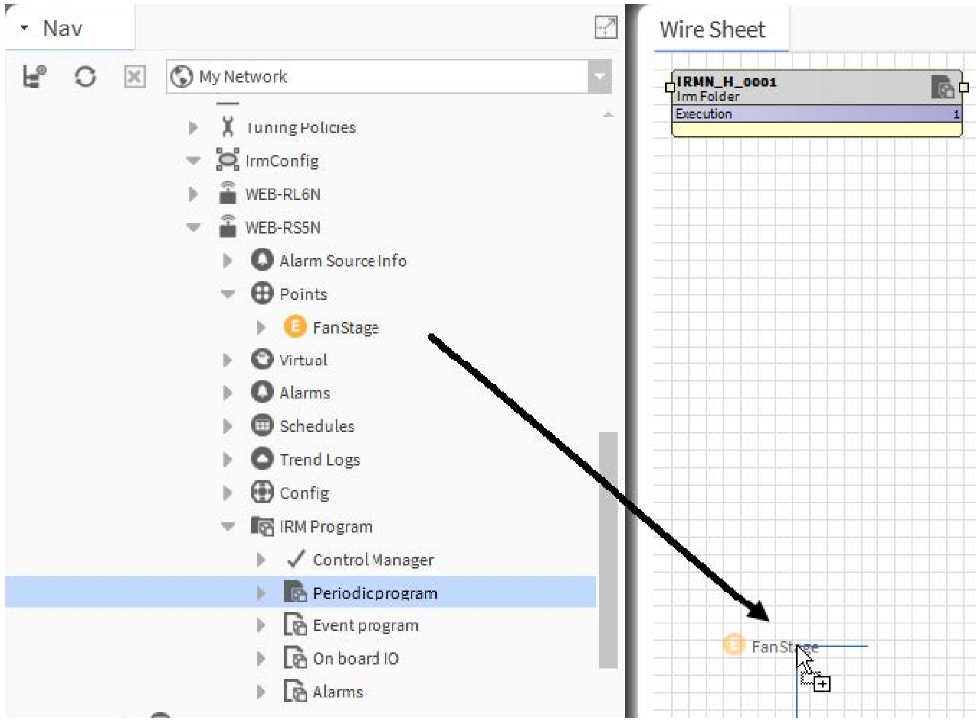


Fig. 102 wire sheet

Step 11. Navigate to the points directory of the CLME-RL6N client controller and copy the FanStage bacnet point to the wire sheet of the CLME-RS5N server controller.

Step 12. In the Name dialog box, click **OK**.

A reference input point with the name of the FanStage, is created.

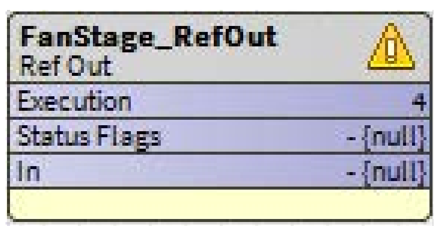


Fig. 103 FanStage RefOut function block

Step 13. Double-click the symbol of the reference input point to display the FanStage RefOut property sheet.

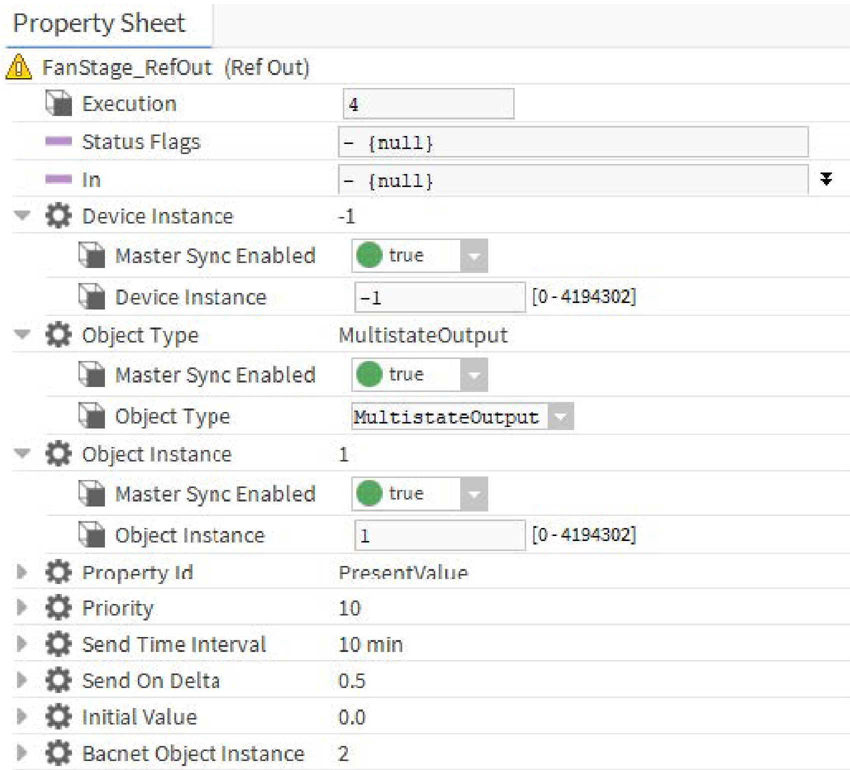


Fig. 104 FanStage RefOut property sheet

In the property sheet, you can see that the reference input is already mapped to the Bacnet multistate output point indicated by the values for device instance, object type, and object instance.

Step 14. If desired, you can change the setting for client sync.

Client-Server Synchronization

- If client Sync Enabled is set to true, this property will be synchronized between the client and the server whenever a client sync operation is performed.

If the flag on the source device is set to false, this parameter will not be synchronized to all target devices.

CHAPTER

4

CONFIGURE IRM NX CONTROLLERS

This chapter describes the steps to configure the new IRM NX controller, controller MAC address assignment, IP settings, linking of controller IO points to the BACnet points, and terminal assignment view.

Configure Air Flow Measurement Units

Before starting the application in the engineering tool, it is important to define the correct air flow measurement type.

Steps to configure air flow measurement units:

Step 1. In the Nav tree, go to **BacnetNetwork** > **Irm Bacnet Device** > expand **IRM Program** folder.

Step 2. Double click on the **Control Manager.**

Step 3. Select the desired **Measurement Type** and **Air Flow Unit** from the drop-down list.

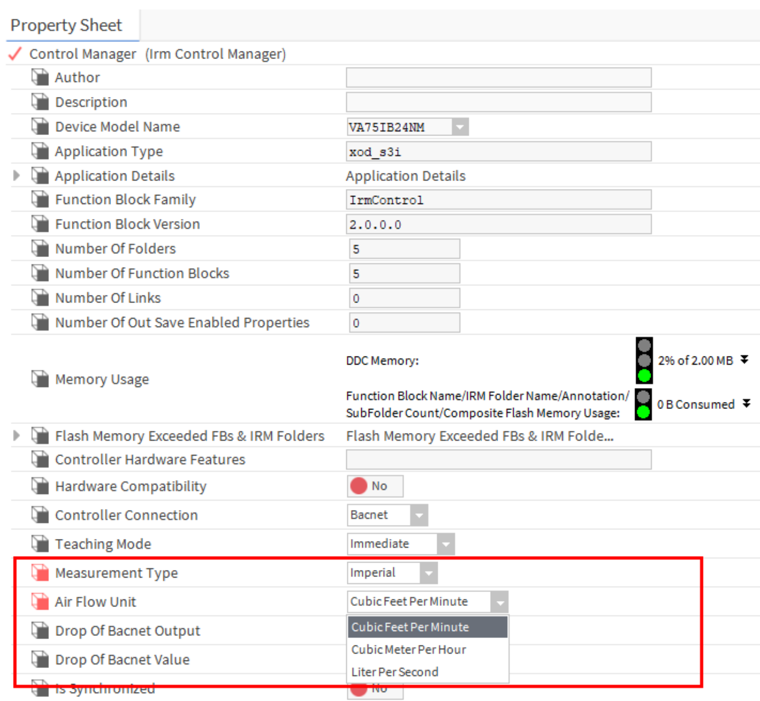


Fig. 105 Measurement Types

- For **SI-Metric** set **Air Flow Unit** as “Cubic Meter Per Hour or Liter Per Second.
- For **Imperial** set **Air Flow Unit** as “Cubic Feet Per Minute”.

New Controller Configuration

Configure Irm Config

Before engineering a IRM NX controller on a BACnet Network, you must configure the IrmConfig settings as per requirement.

Steps to configure Irm Config:

Step 1. Expand the BACnet Network folder.

Step 2. Double-click the **IrmConfig** folder in the BACnet Network to display the property sheet.

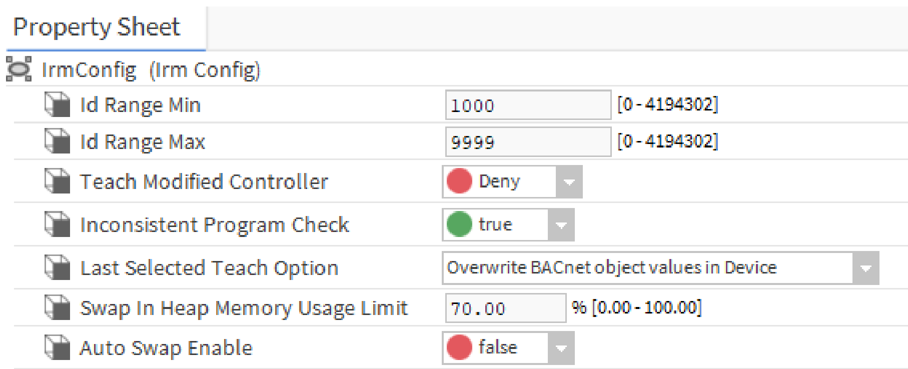


Fig. 106 Irm Config Property Sheet

Step 3. Configure the **IrmConfig** properties.

Table 23 IrmConfig Property Sheet

Property	Value	Details
Id Range Min	0 - 4194302 1000 (default)	Set the minimum Id value assigned to a device during discovery.
Id Range Max	0 - 4194302 9999 (default)	Set the maximum Id value assigned to a device during discovery.
Teach Modified Controller	Deny (default) Allow	• **Deny (Default value)**: Do not allow overwriting an existing application in the controller. While trying to teach a different application to a controller an error message is generated which requires to clear the controller. • **Allow**: Allows the unconditional overwriting of an existing application. ***Note:*** *Do not change this setting.*

Table 23 IrmConfig Property Sheet (Continued)

Property	Value	Details
Inconsistent Program Check	True (default) False	If the inconsistent program check property is true, the engineering tool checks the application for inconsistencies and displays a message. If you move or copy the application to an external location, such as changing the palette at the external location and then including it again, inconsistencies may occur. ***Note:*** *Copying-pasting parts of an application of another controller from an external location does not generate inconsistencies.*
Last Selected Teach Option	Overwrite BACnet object values in Application (default)	This option displays the last teach option used while performing or full teach application to the controller. • **Overwrite BACnet objects values in Device**: This option overwrites BACnet object values and directly teaches application in the controller. • **Overwrite BACnet object values in Application**: This option first performs an update for all BACnet object values from controller to the application. It then performs a teach application operation in the controller.
Swap In Heap Memory Usage Limit	0 - 100 % 70 % (default)	You can configure the heap memory limit for the controller or supervisor station with this option. • While working on the HAWK-8000 controller, the memory utilization should not exceed 70 %. • While working on the supervisor station, the memory utilization should not exceed 90 % to 95 % .
Auto Swap Enable	True False (default)	Using this feature, a swap-in device can be swapped-out automatically if the user forgets to do so. This allows to optimize the station memory usage.

Resource Recommendations

While performing application teach to IRM NX controllers from HAWK-8000, EAGLEHAWK or Advanced plant controller following two factors impact the performance.

- CPU of the HAWK-8000 or EAGLEHAWK.
- Available heap memory of HAWK-8000 or EAGLEHAWK.

To check the available CPU and heap memory usage of HAWK-8000 or EAGLEHAWK, check to the station resource monitor

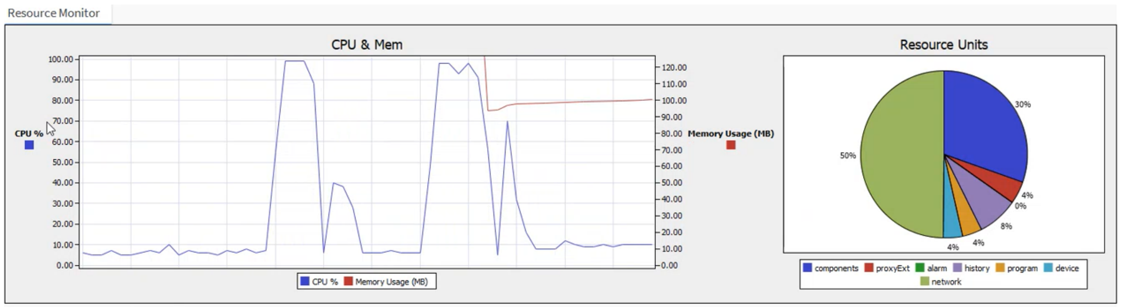
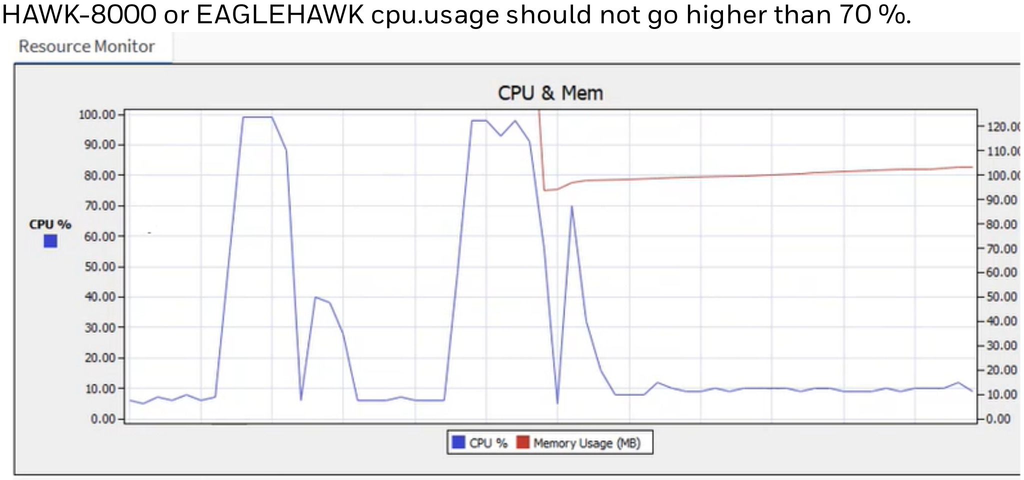


Fig. 107 Station Resource Monitor View

CPU Load Recommendation

The HAWK-8000 or EAGLEHAWK cpu.usage should not go higher than 70 %.



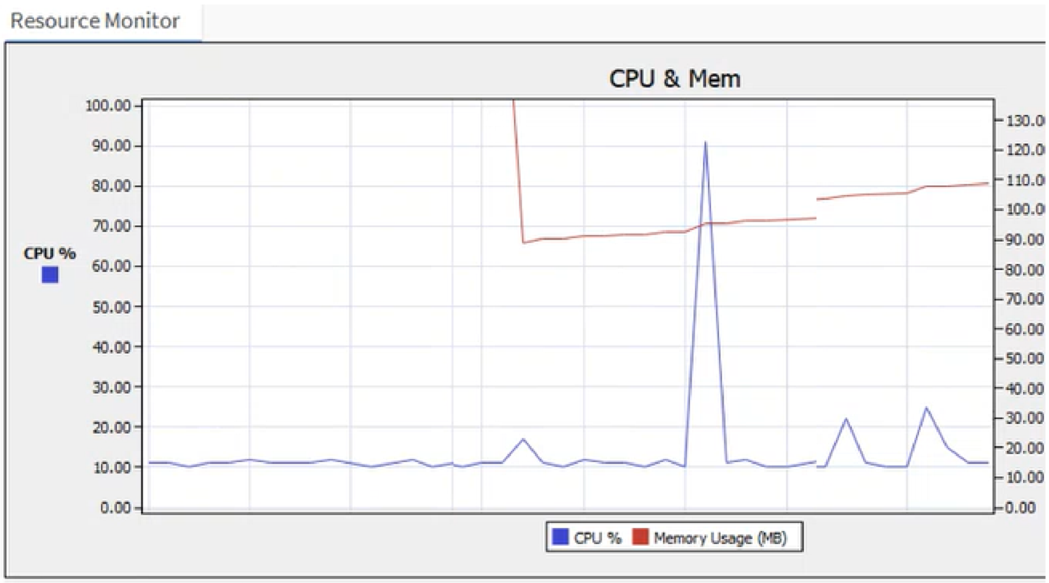
Resource Information

Name	Value
capacityLicensing.recountLastFail	never
capacityLicensing.recountLastFailReason	
capacityLicensing.recountLastRun	17-May-21 12:40 PM IST
component.count	4003
cpu.usage	9%
engine.queue.actions	0 (Peak 74)
engine.queue.longTimers	22 (Peak 24)
engine.queue.mediumTimers	4 (Peak 5)

Fig. 108 CPU Load Recommendation

Memory Load Recommendation

It is advised not to load more than 50 % of the HAWK-8000 or EAGLEHAWK heap.used memory.



Resource Information

Name	Value
globalCapacity.networks	2 (Limit: none)
globalCapacity.points	275 (Limit: 25,000)
globalCapacity.schedules	6 (Limit: none)
heap.free	264 MB
heap.max	371 MB
heap.total	371 MB
heap.used	108 MB
history.count	6
mem.total	1024 MB

Fig. 109 Memory Load Recommendation

Important: *Before initiating the batch operation, disable all the configured points, histories, and alarms. Disabling points, histories and alarms will help reduce the load on the BACnet network and help commission the application faster. After the batch operation completes, enable all the configured points, histories, and alarms.*

Based on the available memory, select the controllers. If more than 50 % of the memory space is utilized, perform the batch operation in slots. For example, select ten devices or (determine the number of devices based on the load). Perform the batch teach to the controller (refer to Teach to Multiple Controllers on page 173), then swap out. Similarly, select the next ten devices and perform the same steps.

Configure IP VAV Controllers

Using the engineering tool, you can discover and configure the IP VAV controllers on the CentraLine-N4 workbench.

Note: *It is recommended that you use the EAGLEHAWK or HAWK-8000 controller as an IP router to host and run a station while commissioning the IP VAV controller.*

Note: *When commissioning the IRM NX controller via a third-party router (non-CentraLine branded HAWK), the user must ensure that the HAWK is licensed with the DR-SPYDERTOOL option.*

IP VAV Controller System Architecture

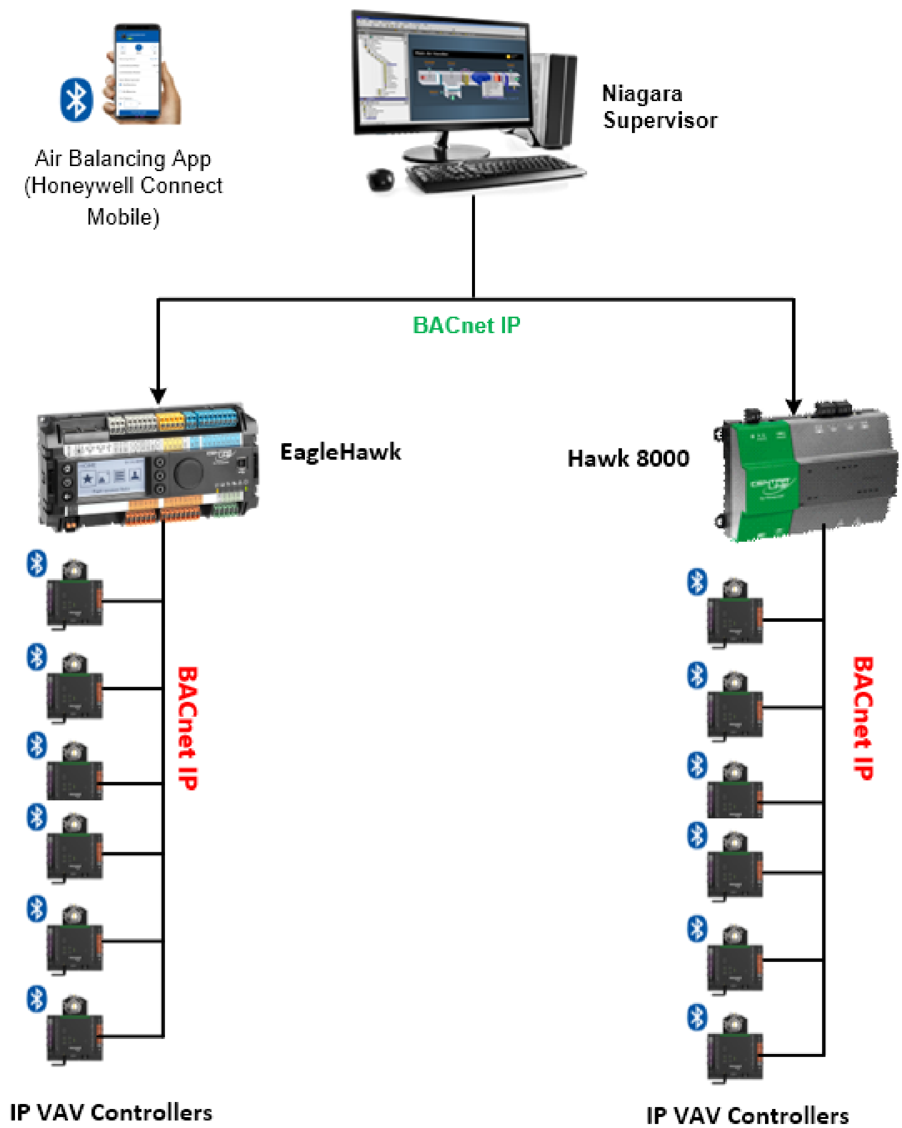


Fig. 110 IP VAV Controller System Architecture

Prerequisites

Step 1. Connect to the HAWK-8000 or EAGLEHAWK controller with the CentraLine-N4 Supervisor via ethernet cable.

Step 2. Connect the IP VAV controllers to the HAWK-8000 or EAGLEHAWK controller via BACnet IP network.

Steps to setup IP VAV controller

Follow the steps below to configure the IP VAV controller.

1. Configure the BACnet Network
2. Configure the IP Port in CentraLine-N4 Workbench
3. Commission the station
4. Transfer the station to a HAWK-8000 or EAGLEHAWK controller

Configure the BACnet Network

Steps to configure the BACnet Network:

Step 1. Open CentraLine-N4 workbench and connect the platform to the localhost.

Step 2. Create a station using the **New Station Wizard**.

Step 3. Select the **CIPer50.ntpl** as station template.

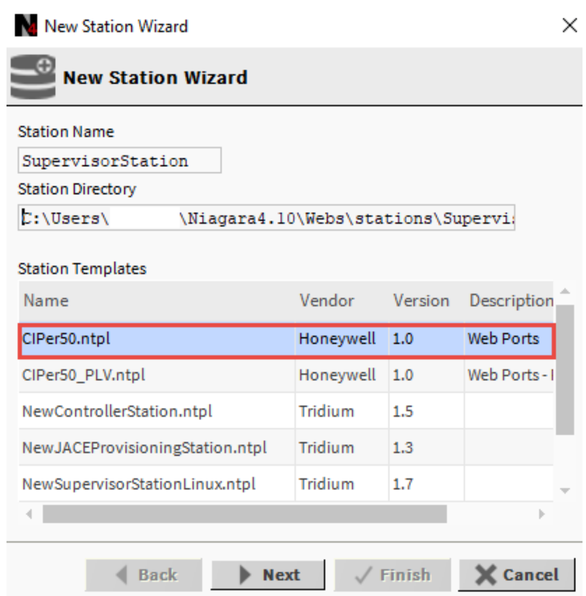


Fig. 111 New Station Wizard

Step 4. Enter the desired station name.

Step 5. Start and connect to the station.

Step 6. Expand the **Station** > **Config,** and double-click on **Drivers**.

Step 7. Click **New,** select **BacnetNetwork** from the drop-down list, and click **OK**. This adds the Bacnet Network under Nav tree.

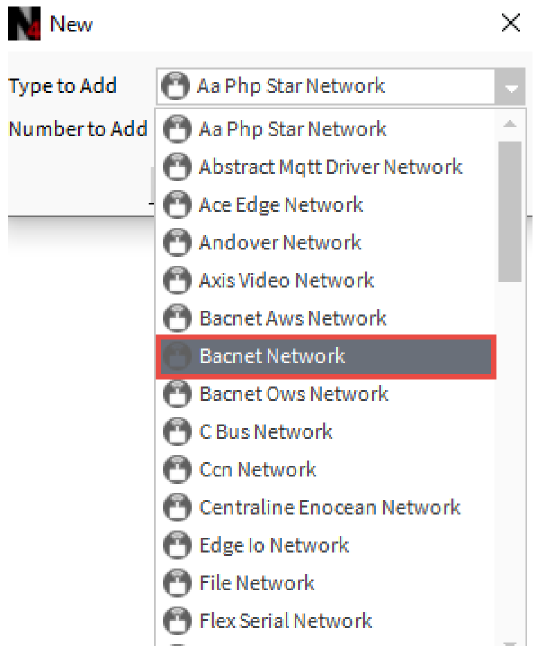


Fig. 112 Bacnet Network

Step 8. Expand **BacnetNetwork**.

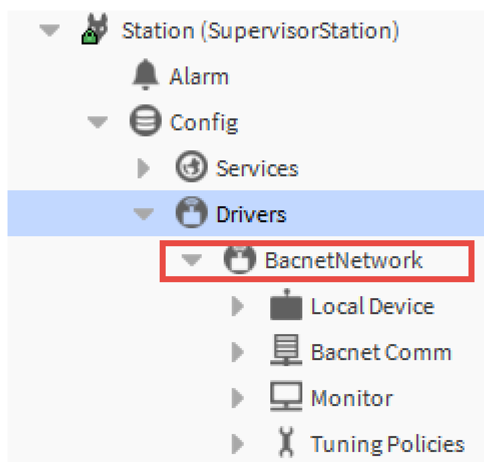


Fig. 113 Expand BacnetNetwork

Configure the IP Port in CentraLine-N4 Workbench

Configure the Ip Port in the CentraLine-N4 workbench to access the IP VAV controllers via a HAWK-8000 or a EAGLEHAWK controller.

Steps to configure the IP Port:

Step 1. Expand **Bacnet Comm** > **Network** > double-click on **Ip Port**.

Step 2. Select **Ip Port**, right-click **Action**, and select **Enable**.

Step 3. Expand the **Ip Port,** select **Link,** right-click **Actions**, and select **Query for Adapters.**

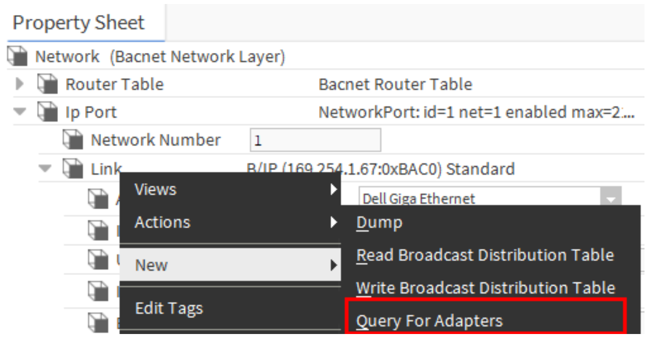


Fig. 114 Performing query for adapters.

Step 4. Select the Bacnet ethernet adapter from the drop-down list. Make sure the station and the Bacnet ethernet adapter are on the same subnet on the computer.

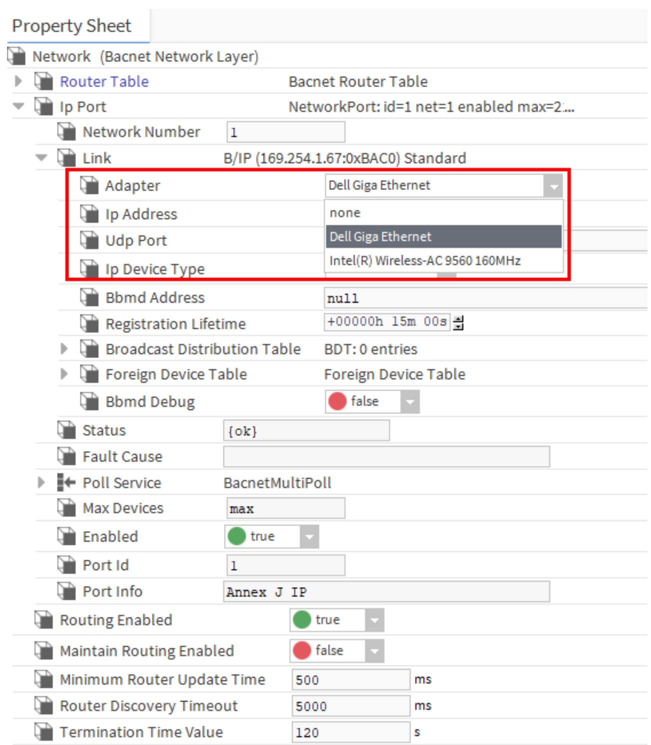


Fig. 115 Ip Port Configuration

Step 5. Click **Save.**

Step 6. Go to **Local Device** property, check the **Character Set.** Make sure the character set of the Bacnet Network is Iso10646_UTF8.

Fig. 116 Local Device property

Important: *All the IRM NX controller support the UTF-8 format. When configuring the device name using the device object, the tool should write the data in UTF-8 format.*

Step 7. Click **Save.**

Note: *If any configuration settings change during operation, you must restart the IP router (HAWK-8000 or EAGLEHAWK controller).*

Commission the Station

Steps to Commission the station:

Step 1. Right-click on **BacnetNetwork > Views > Irm Bacnet Device Manager** view.

Step 2. Click on **Discover**. All of the online IP VAV controllers displayed.

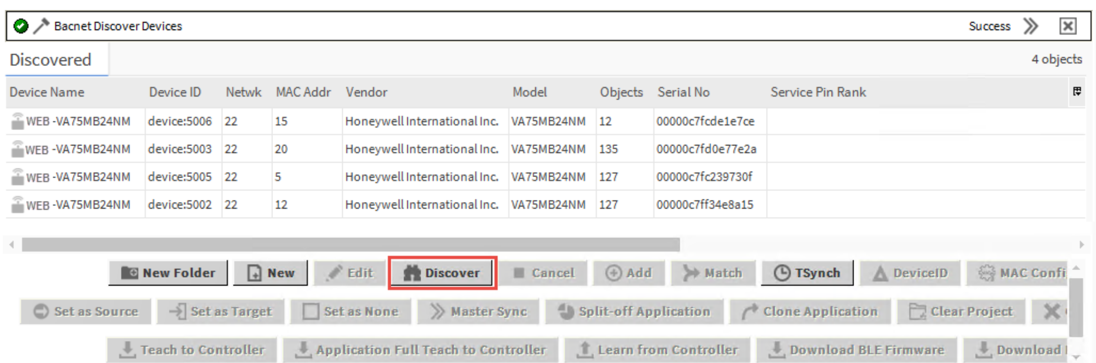


Fig. 117 Irm Bacnet Device Manager view

Step 3. Select all controllers and click **Add**. You will need to configure each highlighted controller within the Add view.

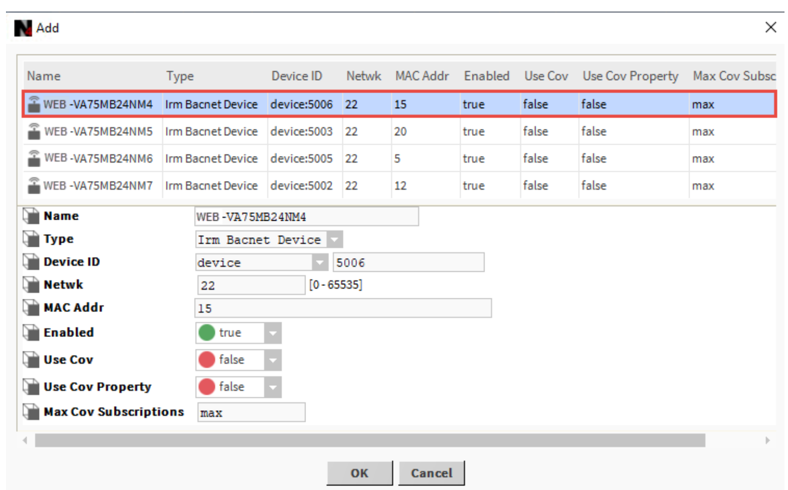


Fig. 118 Add view

Step 4. Enter the following details:

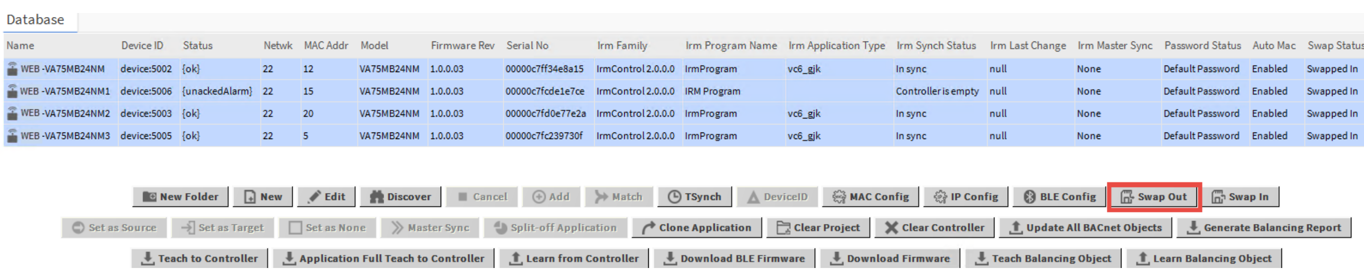
- **Name**: Rename the device name.
- **Type**: Select the device type from the drop-down list.
- **Device ID**: Enter the device ID.
- **Network address**: Enter the network address.
- **MAC Address**: Enter the MAC address.
- **Enabled**: Select true or false from the drop-down.
- **Use Cov**: Select true or false from the drop-down. Refer to the Tuning Policies on page 231.
- **Use Cov property**: Select true or false from the drop-down.
- Keep Max Cov Subscriptions as max.

Step 5. Perform the desired engineering operations in the controller.

Note: *Perform a Swap Out operation on all the controllers before transferring the local database to a HAWK-8000 or EAGLEHAWK station. Swap Out saves RAM space and reduces processor load and bus traffic. The state of a swapped-out device is frozen and saved to a project repository on the PC disk. The swapped-out device is indicated by a proxy that inherits and shows the minimum information about the device.*

Important: *For seamless performance, it is strongly recommended to Swap Out the HAWK-8000 or EAGLEHAWK controller after finishing the engineering in online or offline mode in the station.*

Step 6. Go to the **Irm Bacnet Device Manager** view, select the controllers from the database, and click **Swap Out.** This action displays the Swap Out dialog box. For more details refer to the Swap on page 187.


Database

Name	Device ID	Status	Netwk	MAC Addr	Model	Firmware Rev	Serial No	Irm Family	Irm Program Name	Irm Application Type	Irm Synch Status	Irm Last Change	Irm Master Sync	Password Status	Auto Mac	Swap Status
WEB -VA75MB24NM	device:5002	{ok}	22	12	VA75MB24NM	1.0.0.03	00000c7ff34e8a15	IrmControl 2.0.0.0	IrmProgram	vc6_gjk	In sync	null	None	Default Password	Enabled	Swapped In
WEB -VA75MB24NM1	device:5006	{unackedAlarm}	22	15	VA75MB24NM	1.0.0.03	00000c7fcde1e7ce	IrmControl 2.0.0.0	IRM Program		Controller is empty	null	None	Default Password	Enabled	Swapped In
WEB -VA75MB24NM2	device:5003	{ok}	22	20	VA75MB24NM	1.0.0.03	00000c7fd0e77e2a	IrmControl 2.0.0.0	IrmProgram	vc6_gjk	In sync	null	None	Default Password	Enabled	Swapped In
WEB -VA75MB24NM3	device:5005	{ok}	22	5	VA75MB24NM	1.0.0.03	00000c7fc239730f	IrmControl 2.0.0.0	IrmProgram	vc6_gjk	In sync	null	None	Default Password	Enabled	Swapped In

Fig. 119 Database View

Step 7. Click **Yes.**

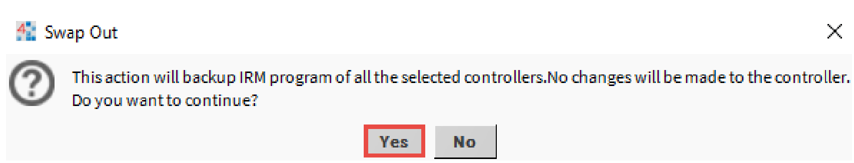


Fig. 120 Swap Out Dialog Box

Step 8. Save the station.

Important: *It is recommended to keep a station backup after making any change in the controller or station.*

Step 9. Go to the **Platform** and run **Station Copier.** This opens the station copier window.

Step 10. Select the saved station from localhost section and click **Copy** to the computer. This action copies saved station from localhost of CentraLine-N4 workbench to the computer.

Transfer the station to a HAWK-8000 or EAGLEHAWK controller

Steps to transfer the station to a HAWK-8000 or EAGLEHAWK controller:

Step 1. Open the HAWK-8000 or EAGLEHAWK platform and select **Station Copier**. This opens station copier window.

Step 2. Select the saved station from the computer section and click **Copy** to the localhost. This action copies the saved station from the computer to the localhost of the HAWK-8000 or EAGLEHAWK controller.

Keep all the IRM NX controllers in the swapped-out mode in the HAWK-8000 and EAGLEHAWK controller station to ensure seamless performance.

IP Settings

IP setting comprises IP Configuration on page 117 and Network Time Server on page 120.

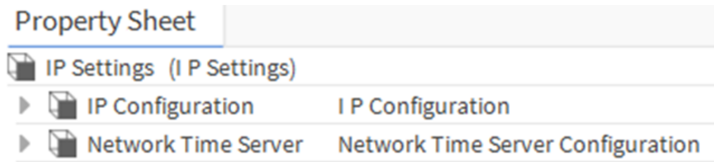


Fig. 121 IP Settings

IP Setting feature is supported by following controllers:

- VA75I24NM
- VA00IB24NM
- VA75IBWA24NM
- VA75IBWB24NM
- VA75I24NS
- VA75IB24NS
- VA75IBWA24NS
- VA75IBWB24NS
- UN-RS0844ES24NM
- UN-RS0844ESB24NM
- UN-RS0844TS24NM
- UN-RS0844TSB24NM
- UN-RL1644ES24NM
- UN-RL1644ESB24NM
- UN-RL1644TS24NM
- UN-RL1644TSB24NM

When you add IRM device into Bacnet Network, the IP Setting option is hidden by default.

Steps to activate the IP Setting:

Step 1. Navigate to the **IRM Program >** double-click **Control Manger**. This open Control manager property sheet.

Step 2. In **Device Model Name**, select the **IP Setting** supported model from the drop-down list.

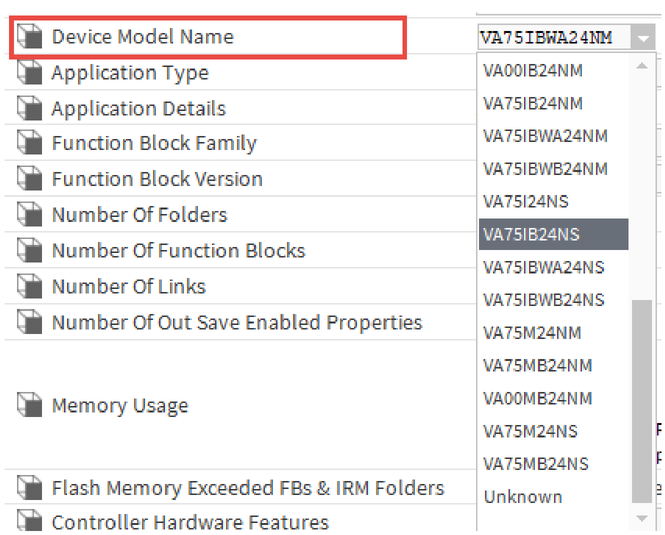


Fig. 122 Device Model Name

Step 3. Click **Save.**

Step 4. Right-click **IRM device** and select **Refresh Tree Node**. This activates the IP Setting feature.

IP Configuration

IP Config operation is provided to ease IP configuration for multiple IP VAVs from a single window. This feature allows users to perform many productivity operations like a batch update of IP configuration, auto-increment of IP addresses, visual indication of modifications to IP addresses, user errors in IP configuration, offline and online IP configuration.

Whenever a factory default or new controller is discovered on a station, it searches for the available IP address on the DCHP server or local Ethernet IP address.

For the factory out controller, the DHCP mode is enabled.

- On power-up, for the first 15 seconds, the controller will search for a DHCP server to acquire an IP address.
- If a DHCP server (switch) is not found, the controller will switch to Auto IP mode, in which it follows linklocal addressing for address resolution.
- It will acquire an IP address in the range 169.254.1.0 - 169.254.254.254. The controller will use the last two characters of its serial number as the last octet for starting address search. For example, if the serial number ends with 36 (Conversion HexToDec = 54), the IP address is set to 169.254.1.54).
- If the controller has link-local addressing, the controller will periodically (every 1 minute) search for the DHCP server. If a server is found, the controller will acquire a new IP address from the server and start using it immediately.

Note: *If a controller has the Link-Local Addressing, it will periodically search for the DHCP server (every 1 minute). If the server is found, the controller acquires the new IP address from the server and starts using it immediately.*

Steps to check IP Settings details:

Step 1. Navigate to the **BacnetNetwork > IRM device (IP controller) > IP Settings**.

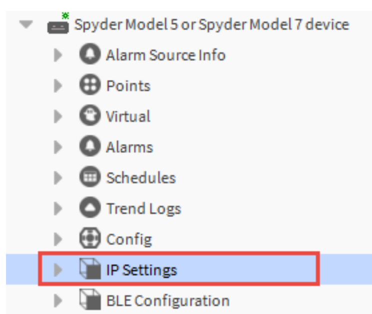


Fig. 123 IP Controller

Step 2. Double-click **IP Settings**. This action opens the IP Settings property sheet view.

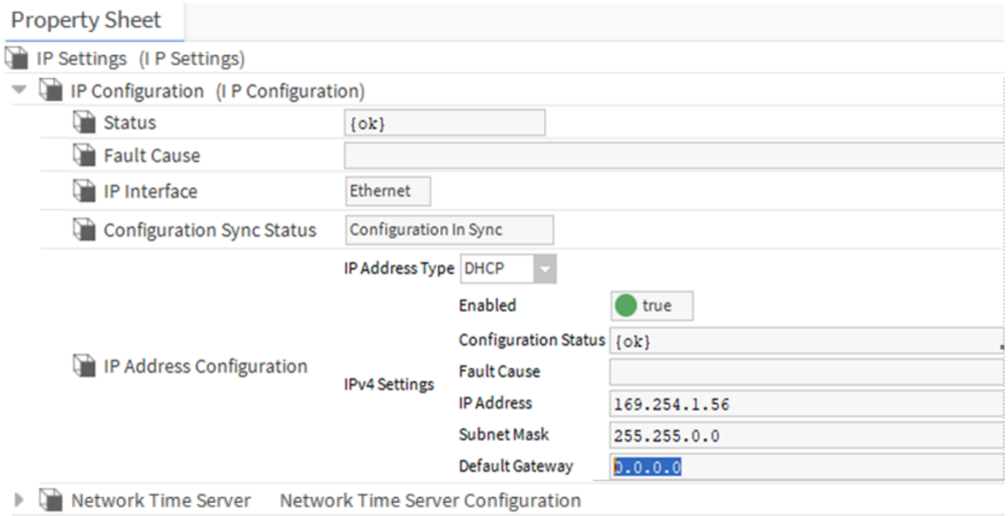


Fig. 124 IP Settings property sheet

Table 24 IP Settings Property Description

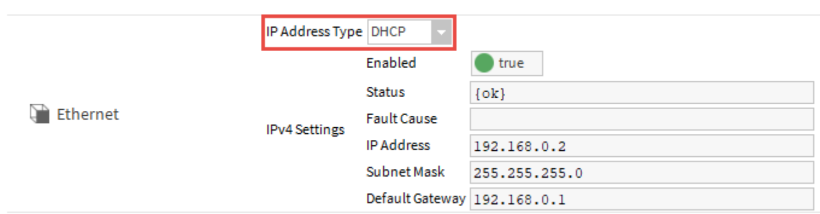
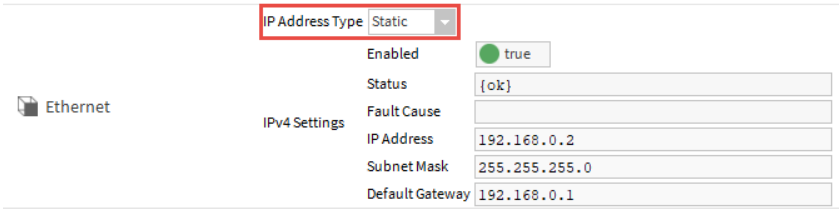
Properties	Description
Status	Read-only. Display the status of the IP Configuration.
Fault Cause	Read-only. When the IP configuration enters a fault state, this function displays the fault cause information.
IP Interface	Read-only. Displays the supported interface. The current engineering tool version supports Ethernet only.
Configuration Sync Status	Read-only. Displays the following configuration sync status. • Configuration Insync • Configuration modified • Configuration OutOfSync
Ethernet	
IP Address Type	Allows you to set the IP Address type as DHCP or Static. **DHCP IP Address Type (Default):** Displays available IP address for the controller from the DHCP server.  **Fig. 125 DHP IP Address Type**

Table 24 IP Settings Property Description (Continued)

Properties	Description
	Static IP Address Type: Displays IP address for the controller when connected to the local ethernet port.  **Fig. 126 Static IP Address Type**
IPv4 Settings	Allows you to configure the following settings: • Enter IP Address • Enter Subnet Mask address • Enter Default Gateway When configuring an IP address, the engineering tool checks the following validation conditions: • For IP address, subnet mask, and default gateway, the Octet cannot be zero. • For IP address, subnet mask, and default gateway, the first Octet cannot begin with 0. • The address should be properly formatted, and the Octet value for IP address, subnet Mask, and default gateway should be between 1 and 255. • The IP address and default gateway must not be the same. • All of the bits in the IP address's host address cannot be 0. • All of the bits in the IP address's host address cannot be 1. • The default gateway does not belong to the same network segment as the IP address and subnet mask. • Invalid subnet mask, the subnet mask has to be contiguous. • All of the bits in the IP address's network address cannot be 0. • IP addresses are not unique (IP Address validation within the network). • The first octet of IP addresses should be between 1 and 223 characters (Class D IP address is not accepted).

If the controller is connected via ethernet cable, you can change the IP address of the controller.

Step 3. Navigate to **BacnetNetwork > IRM device** (IP controller) > double-click **IP Settings.** This action opens the IP Settings property sheet view.

Step 4. Click **Save**.

Write and Read IP configuration

Write IP Configuration to Controller

This feature sends modified IP configuration details to controller.

Steps to Write IP Configuration to Controller:

Step 1. Right-click on **IP Configuration**, select **Action** and click **Write IP Configuration to Controller**.

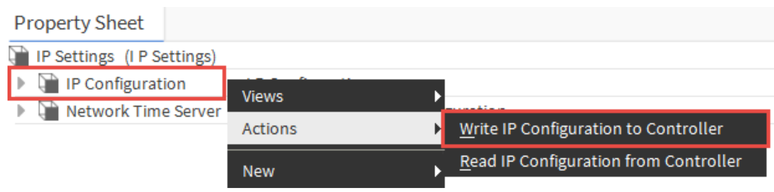


Fig. 127 Write IP Configuration To Controller

Read IP Configuration from Controller

If the user wants to read the IP Configuration from the controller platform, use Read IP Settings from Controller.

This feature retrieves IP configuration information from the controller platform and updates the information in the engineering tool's IP configuration.

Steps to Read IP Configuration from Controller:

Step 1. Right-click on **IP Configuration**, select **Action** and click **Read IP Settings from Controller.**

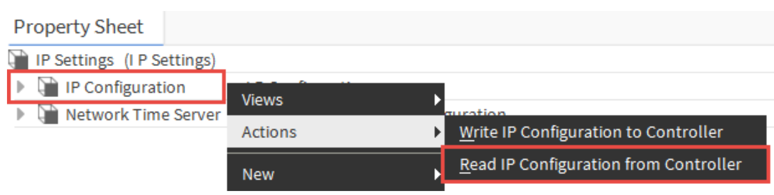


Fig. 128 Read IP Settings from Controller

Network Time Server

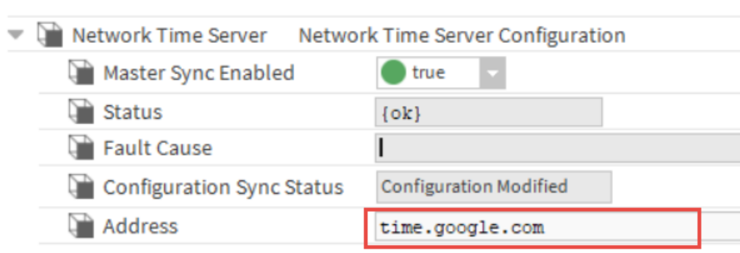


Fig. 129 Network Time Server

Allows you to add the Network Time Server address. You can enter the supported IP address (example: 129.6.15.28) or server URL link (time.googel.com).

Write NTS Configuration to Controller

This feature sends modified Network Time Server (NTS) details to controller.

Steps to Write NTS Configuration to Controller:

Step 1. Right-click on **Network Time Server**, select **Action** and click **Write NTS Configuration to Controller.**

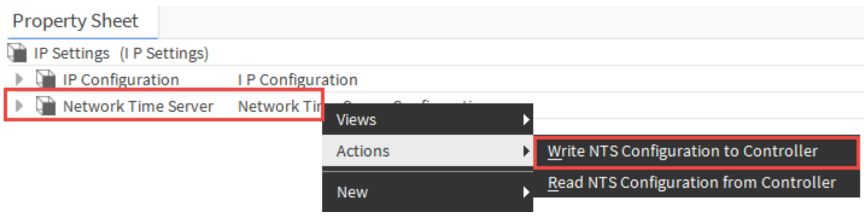


Fig. 130 Write NTS Configuration to Controller

Read NTS Configuration from Controller

This feature retrieves Network Time Server (NTS) information from the controller platform and updates the information in the engineering tool's Network Time Server configuration.

Steps to Read NTS Configuration from Controller:

Step 1. Right-click on **Network Time Server**, select **Action** and click **Read NTS Configuration from Controller.**

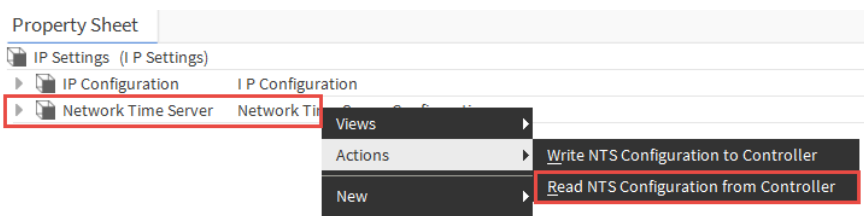


Fig. 131 Read NTS Configuration from Controller.

Write and Read IP Setting to Controller

Write IP Settings to Controller

After you've configured the IP Settings, use Write IP Setting to Controller to save the changes to the controller. This action sends the IP configuration and Network Time Server changes from the station to the controller platform.

Steps to Write IP Settings to Controller:

Step 1. Right-click on **IP Settings,** select **Action** and click **Write IP Settings To Controller.**

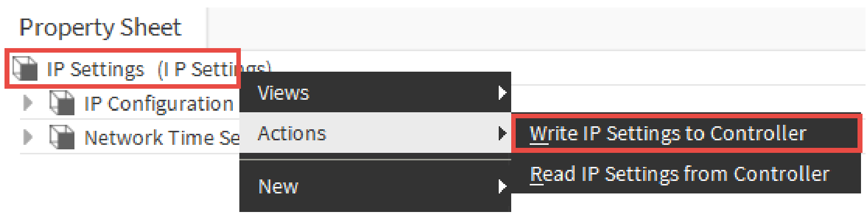


Fig. 132 Write IP settings to Controller

Read IP Settings from Controller

This feature collects the IP configuration details of the controller as well as the controller's Network Time Server (NTS) details from the controller platform and updates the IP Setting in the engineering tool.

Steps to Read IP Settings from Controller:

Step 1. Right-click on I**P Settings**, select **Action** and click **Read IP Settings from Controller.**

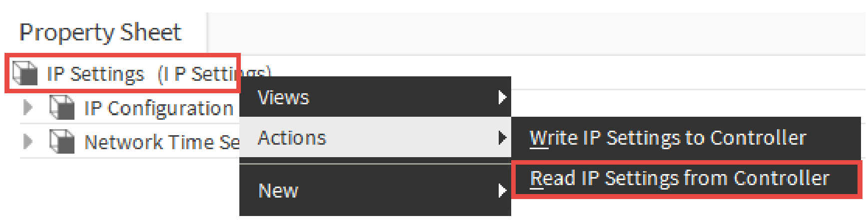


Fig. 133 Read IP Settings from Controller.

Configuring IP Settings for Multiple Controllers

The engineering tool allows you to configure IP settings on multiple controllers in a batch process.

Steps to configuring IP Settings for Multiple Controller:

Step 1. Right-click on **BacnetNetwork > Views > Irm Bacnet Device Manager** view.

Step 2. Select all the IP controllers from the device list.

Note: *Selecting the Bacnet IRM device from the device list will inactive the IP Config option.*

Step 3. Click **IP Config**.

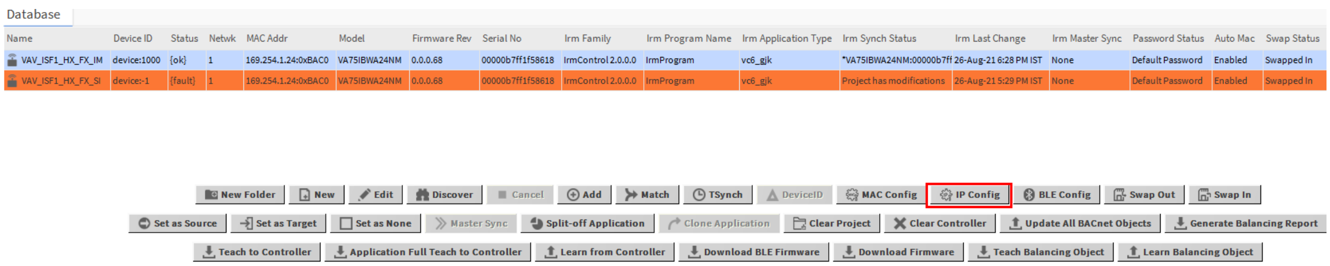


Fig. 134 Database

Step 4. This displays the IP Config batch window, which consists of Ethernet and Network Time Server settings.

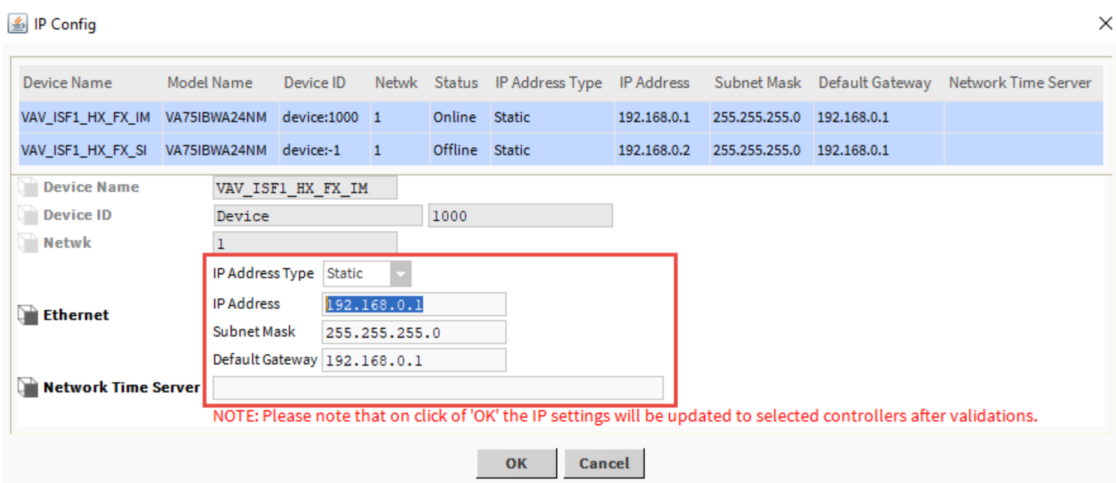


Fig. 135 IP Configuration

Note: *All the listed devices belong to one network in the IP Config window, which is determined while selecting the first device from the Irm Device Manager view.*

Step 5. Set the IP Address type as DHCP or Static (default IP address type) for all the listed IP VAV controllers from the IP Config batch window.

- **For Static IP address type**: Any change in the ethernet or network time server setting will update the respective column in the device list.
- **For DHCP address type**: If the DHCP IP address type is selected, the IP address, subnet mask, and default gateway will be auto-updated.

Note: *After changing the IP Address type to DHCP, the static IP Address configuration data for all IP VAV controllers will not be deleted. Change the IP Address type to Static if you want to go back to using static IP addresses.*

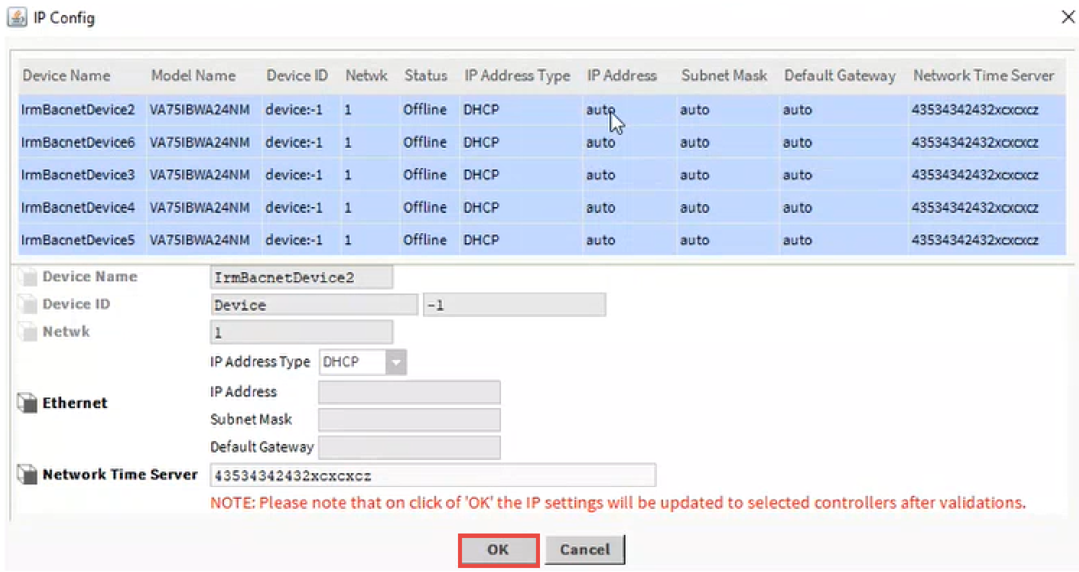


Fig. 136 IP Configuration

Step 6. Click **OK**.

Now, the engineering tool performs two operations:

- Starts validating details of all the listed IRM NX controllers to determine if they are correct.
- Starts updating the device level component for selected controllers.

Note: *The engineering tool generates an error report if any invalid configuration is discovered.*

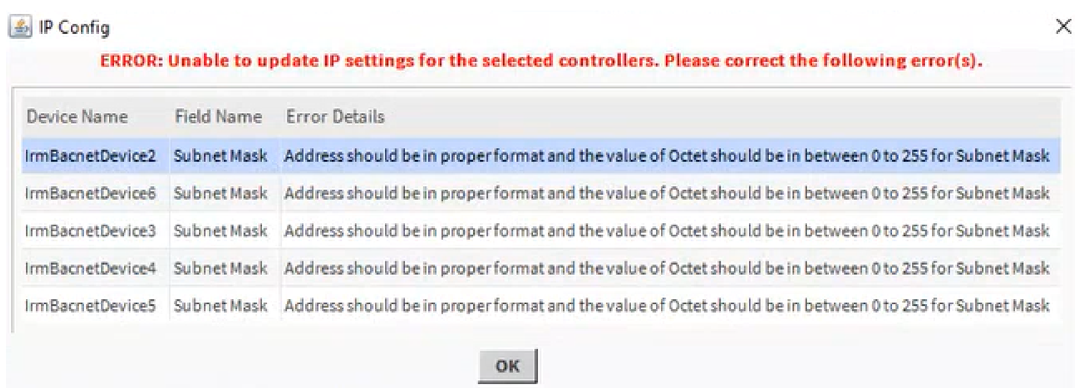


Fig. 137 Error Report

If the devices are online, perform the write IP configuration to controller. If the devices are offline, perform a write to device level component.

Important:

Configure MSTP VAV Controllers

Using the engineering tool, you can discover and configure the MSTP VAV controllers on the CentraLine-N4 workbench.

Note: *It is recommended that you use the EAGLEHAWK or HAWK-8000 controller as an MSTP router to host and run a station while commissioning the MSTP VAV controller.*

Note: *When commissioning the IRM NX controller via a third-party router (non-CentraLine branded HAWK), the user must ensure that the HAWK is licensed with the DR-SPYDERTOOL option.*

BACnet MSTP Baud Rate

The following are the supported baud rates for the IRM NX MSTP controllers.

- 9600
- **19200 (default)**
- 38400
- 57600
- 76800

After the IRM MSTP controller are powered up and connected to the BACnet MSTP bus, the baud rate of each IRM MSTP controller is automatically set by the defined baud rate of the BACnet MSTP EAGLEHAWK.

Note: *Setting or changing the baud rate of a single IRM NX controller is not possible.*

When changing the Baud Rate of the BACnet MSTP bus of a running station, any connected IRM must be power-cycled to apply the modified baud rate.

Important: *Application teach fails for baud rate 115200.*

MSTP VAV Controller System Architecture

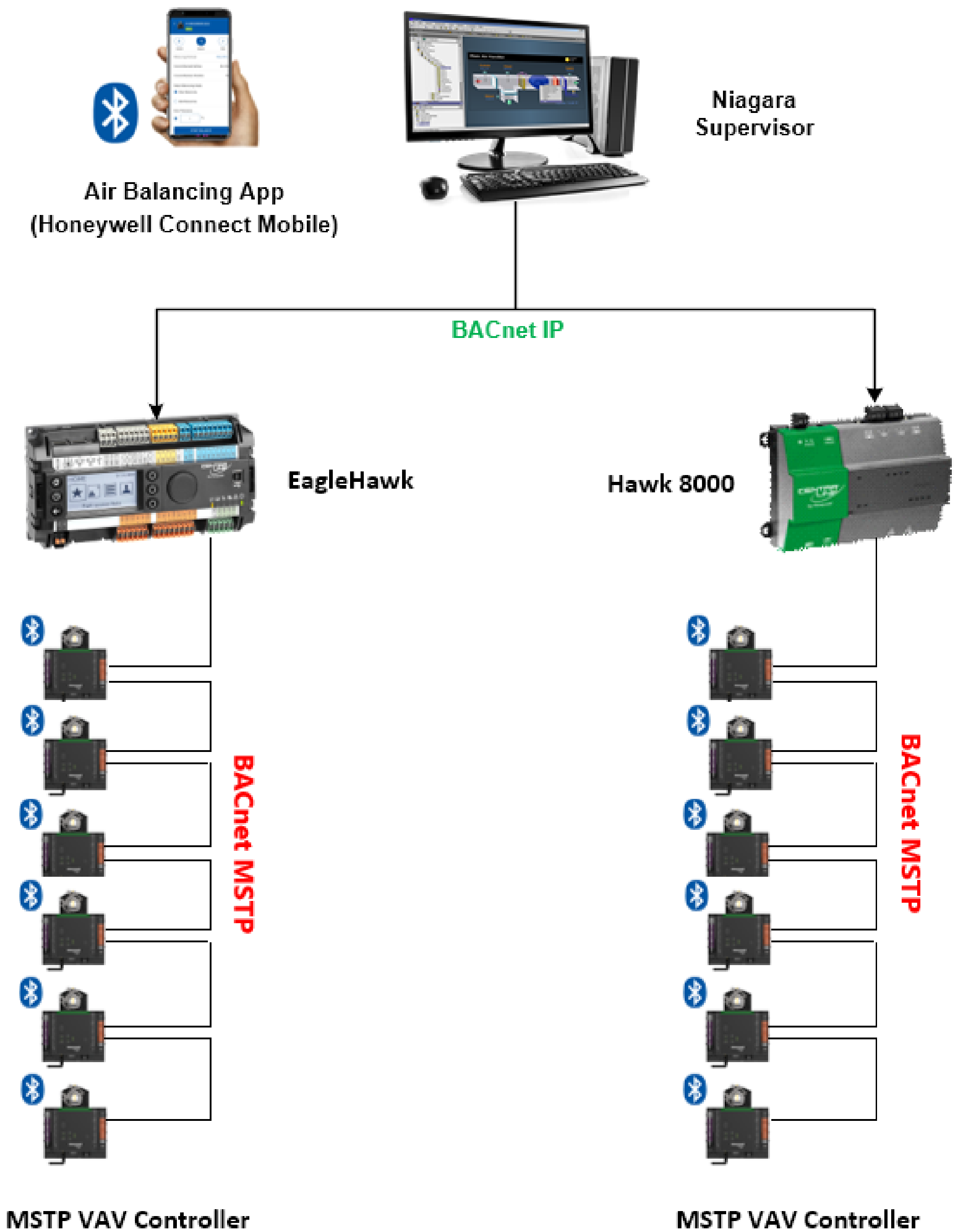


Fig. 138 MSTP VAV Controller System Architecture

Prerequisites

Step 1. Connect the HAWK-8000 or EAGLEHAWK controller with the CentraLine-N4 Supervisor via ethernet cable.

Step 2. Connect the MSTP VAV controllers to the HAWK-8000 or EAGLEHAWK controller in BACnet the MSTP network connection.

Steps to Configure MSTP VAV Controller

Follow the below steps to configure the MSTP VAV controller.

1. Configure the BACnet Network
2. Configure the MstpPort in CentraLine-N4 Workbench
3. Commission the station
4. Transfer the station to HAWK-8000 or EAGLEHAWK controller

Configure the BACnet Network

Steps to configure the BACnet Network:

Step 1. Open the CentraLine-N4 workbench and connect the platform to the localhost.

Step 2. Create a station using the **New Station Wizard**.

Step 3. Select the **CIPer50.ntpl** as station template.

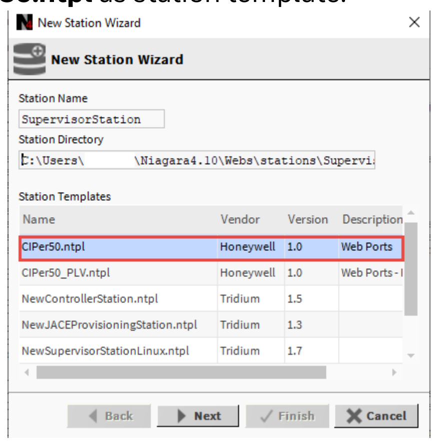


Fig. 139 New Station Wizard

Step 4. Enter the desired station name.

Step 5. Start and connect to the station.

Step 6. Expand the **Station** > **Config,** and double-click on **Drivers**.

Step 7. Click **New,** select **BacnetNetwork** from the drop-down, and click **OK**. This adds the Bacnet Network.

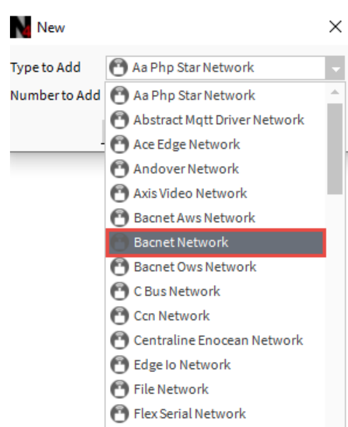


Fig. 140 BacnetNetwork Selection

Step 8. Expand **BacnetNetwork.**

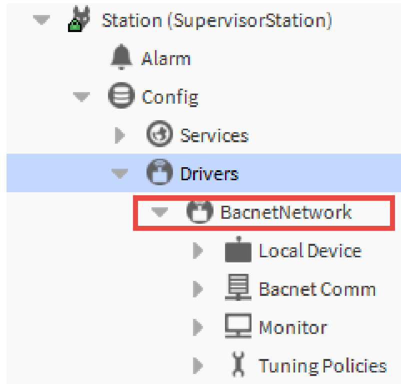


Fig. 141 Expand BacnetNetwork

Configure the MstpPort in CentraLine-N4 Workbench

Configure the MstpPort in the CentraLine-N4 workbench to access the MSTP VAV controllers via a HAWK-8000 or a EAGLEHAWK controller.

Steps to configure the MstpPort on CentraLine-N4 Workbench:

Step 1. Navigate to **Palette**, click on open palette, and type “BACnet” in the filter.

Step 2. Select the bacnet module from the search result and click **OK**.
This adds a bacnet module to the Palette.

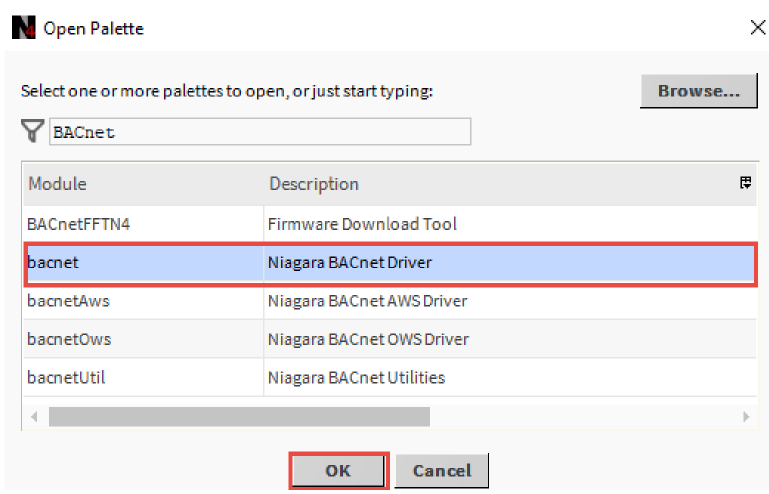


Fig. 142 Open Palette window

Step 3. Expand the **NetworkPorts** folder, select **MstpPort**, and drag it under **Drivers > BacnetNetwork > Bacnet Comm > Network**.
This adds a MstpPort under Network property.

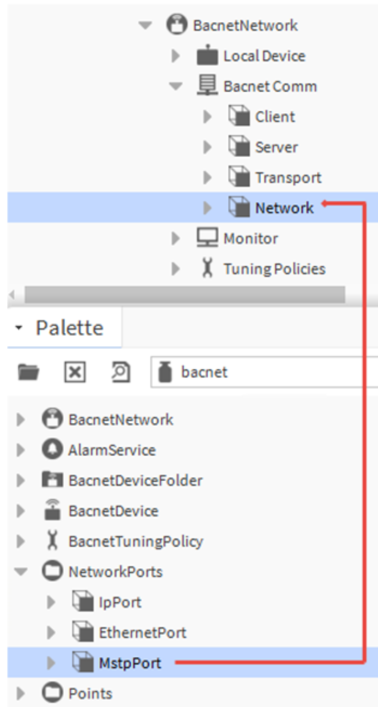


Fig. 143 Add MstpPort

Step 4. Navigate to **Drivers > BacnetNetwork > Bacnet Comm >** double-click **Network** and expand property sheet on the Mstp Port.

Step 5. Expand **Link** and enter the following details:

- **Network Number:** Any number less then or equal to 65535 (for example, 56).
- **Port Name:** RS485_1 (RS485_1 is only supported on the EAGLEHAWK, COM_1 is supported on the HAWK-8000).
- **Baud Rate:** Baud_38400 (see also Tuning Policies on page 231).
- **Enabled:** true.

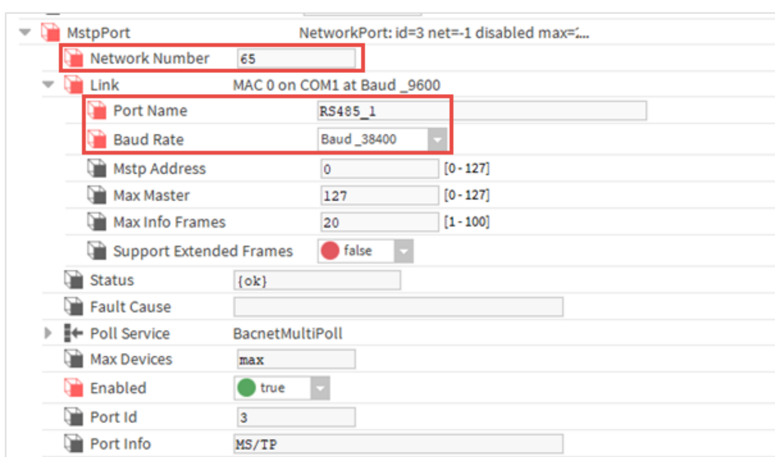


Fig. 144 MstpPort Properties

Step 6. Click **Save.**

Step 7. Go to the **Local Device** property and check the **Character Set**. Make sure the character set of the BACnet Network is Iso10646_UTF8.

Fig. 145 Local Device Property

Important: *The IRM NX controllers support the UTF-8 format. When configuring the device name with the device object, the tool should write the data in UTF-8 format. Before changing the controller name, ensure that the BACnet network is configured for character set UTF-8, or else the VAV balancing app or tool will not display the controller on the discovery page.*

Step 8. Click **Save**. This saves the MstpPort configuration on the station.

Note: *If any configuration settings change during operation, you must restart the MSTP router.*

Commission the station

Steps to commission the station:

Step 1. Right-click on **BacnetNetwork > Views > Irm Bacnet Device Manager** view.

Step 2. Click the **Discover** option in the **Irm Bacnet Device Manager** view. This action will discover all of the IP VAV controllers communicating online.

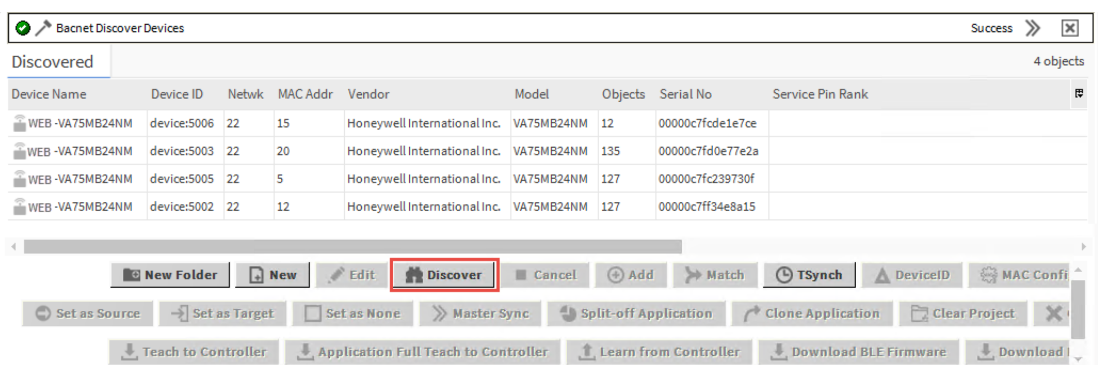


Fig. 146 Irm Bacnet Device Manager view

Step 3. Select all the controllers and click **Add**.
This opens the Add property.

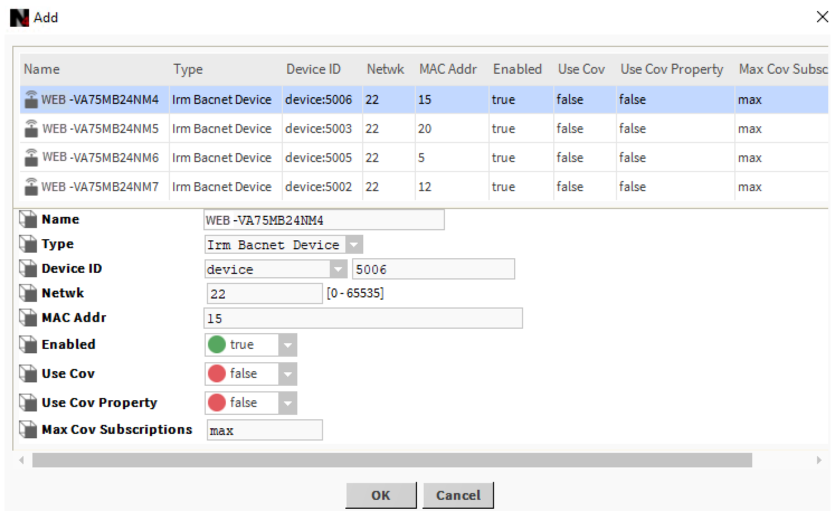


Fig. 147 Add property

Step 4. Enter the following details:

- **Name:** Rename the device name.
- **Type:** Select the device type from the drop-down list.
- **Device ID**: Enter the device ID.
- **Network addres**: Enter the network address.
- **MAC Address**: Enter the MAC address.
- **Enabled**: Select true or false from the drop-down.
- **Use Cov**: Select true or false from the drop-down. Refer to the Tuning Policies on page 231.
- **Use Cov property**: Select true or false from the drop-down.
- Keep Max Cov Subscriptions as max.

Step 5. Perform the desired engineering operations in the controller.

Note: *Perform a Swap Out operation on all the controllers before transferring the local database to a HAWK-8000 or EAGLEHAWK station. Swap Out saves RAM space and reduces processor load and bus traffic. The state of a swapped-out device is frozen and saved to a project repository on the PC disk. The swapped-out device is indicated by a proxy that inherits and shows the minimum information about the device.*

Important: *For seamless performance, it is strongly recommended to Swap Out the IRM NX controllers in HAWK-8000 or EAGLEHAWK controller after finishing the engineering in online or offline mode in the station.*

Step 6. Go to the **IrmBacnetDeviceManager** view, select the controllers from the database, and click **Swap Out.** This action displays the Swap Out dialog box. For more details, refer to the Swap on page 187.

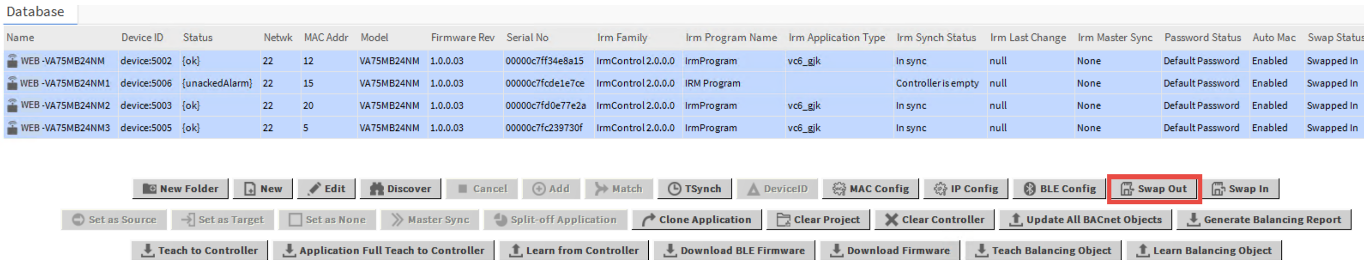


Fig. 148 Database View

Step 7. Click **Yes.**

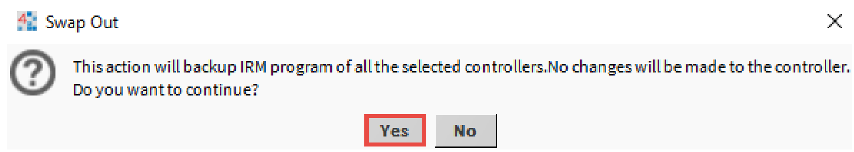


Fig. 149 Swap Out Dialog Box

Step 8. Save the station.

Important: *It is recommended to keep a station backup after making any changes.*

Step 9. Go to the **Platform** and click on **Station Copier**. This opens the station copier window.

Step 10. Select the station from the localhost section and click **Copy** to the computer. This action copies the saved station from the localhost of the CentraLine-N4 workbench to the computer.

Transfer the station to HAWK-8000 or EAGLEHAWK controller

Steps to transfer the station to a HAWK-8000 or EAGLEHAWK controller:

Step 1. Open the HAWK-8000 or EAGLEHAWK platform and select the **Station Copier**. This opens the station copier window.

Step 2. Select the saved station from the “station on this computer” section and click **Copy**. This action copies the station from the “station on this computer” section to the “station on local host” section of the HAWK-8000 or EAGLEHAWK controller.

Important: *Keep all the IRM NX controllers in the swapped-out mode in the HAWK-8000 and EAGLEHAWK controller station to ensure seamless performance.*

Controller MAC Address Configuration

Automatic MAC Address Configuration

When new devices are connected to the network, the Auto MAC functionality allows the controller to automatically assign the MAC address. On factory default controllers, the Auto MAC function is enabled by default.

Important: *Auto MAC feature is only supported for MSTP controllers and not applicable for IP controllers.*

The Device ID for factory default controllers is 4194302. On every power cycle, these controllers will activate the Auto MAC feature and may obtain a new MAC address. The Auto MAC option can be enabled or disabled to eliminate network connectivity issues caused by MAC address conflicts on an existing bus.

Disabling the Auto MAC option allows you to do the following:

- The controller's MAC address will be locked and can only be changed manually.
- It is the responsibility of the user to avoid any possible an address conflict.
- If the Auto MAC feature is disabled, assign that controller a unique MAC address.

Note: *If the controller is restored to its factory default, the Auto MAC capability is activated for that controller.*

Update MAC Address Configuration from Station

You can enable or disable the Auto MAC feature for all the controllers in the station with the Update MAC Address Configuration option.

Steps to Update MAC Address Configuration:

Step 1. Navigate to the **BacnetNetwork > IrmConfig>Actions> Update MAC Address Configuration**.

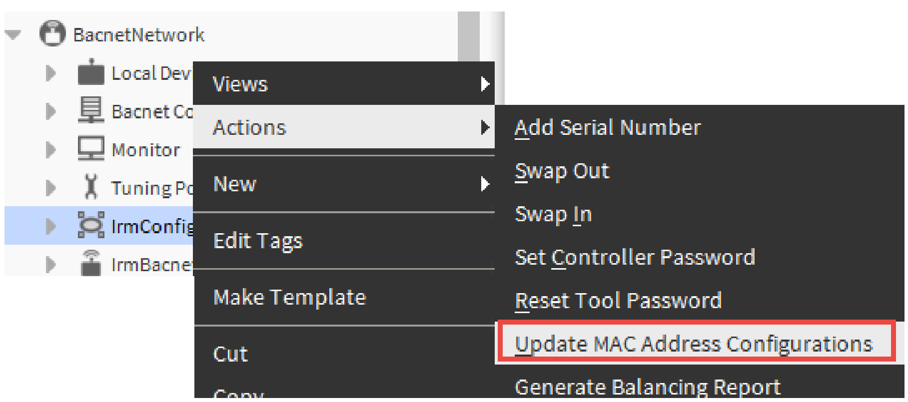


Fig. 150 Update MAC Address Configuration

Step 2. This opens the confirmation message box.

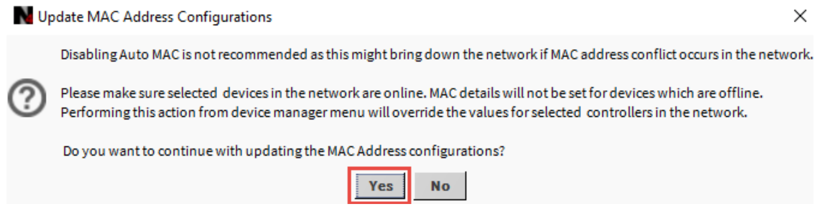


Fig. 151 Message box

Step 3. Click **Yes.** This opens Update MAC Address Configuration option.

Step 4. Enter the **Max Master** value.

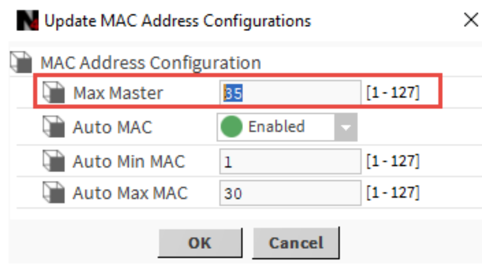


Fig. 152 Max Master value

Step 5. Enable or disable the **Auto MAC** option.

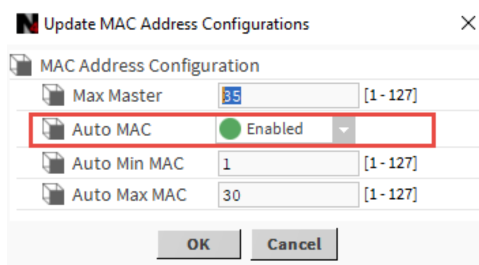


Fig. 153 To enable or disable Auto MAC option.

Click **OK.**

Auto MAC Configuration for multiple Controllers

You can enable or disable the Auto MAC feature for single or multiple controllers from the IrmBacnet Device Manager view.

Steps to Auto MAC Configuration for multiple Controllers:

Step 1. Navigate to the Irm Bacnet Device Manager view and click on MAC Config. This opens the confirmation message box.

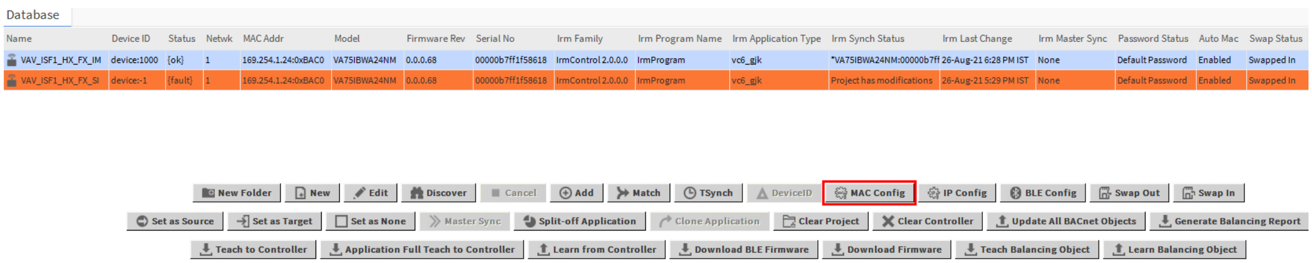


Fig. 154 Database pane

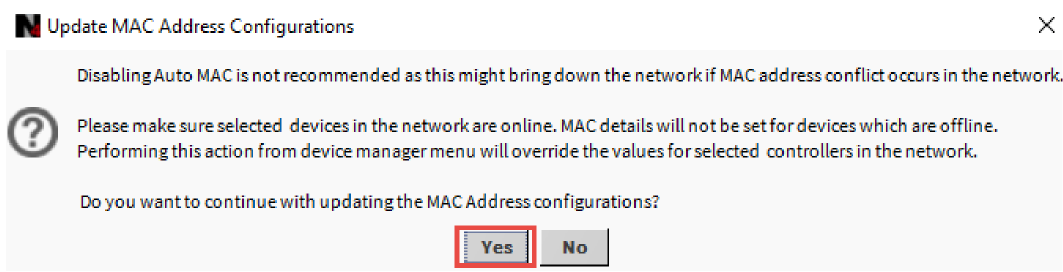


Fig. 155 Confirmation message box

Step 2. Click **Yes**. This opens Update MAC Address Configuration window.

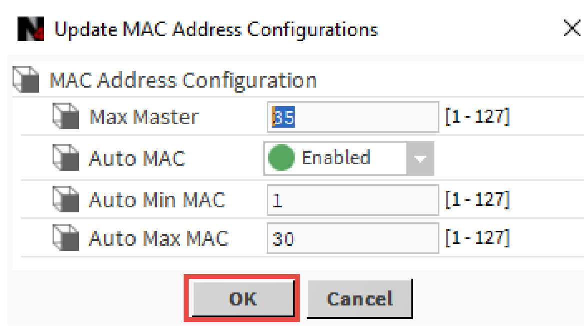


Fig. 156 To update MAC Address Configurations

Step 3. Enter the **Max Master** value.

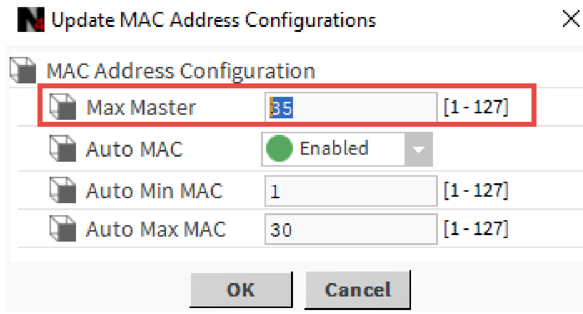


Fig. 157 Max Master value

Step 4. Enable or disable the **Auto MAC** option.

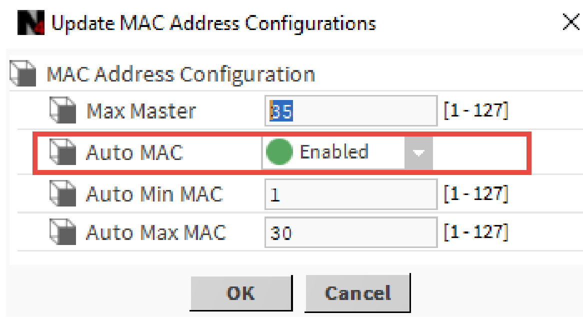


Fig. 158 To enable or disable Auto MAC option

Click **OK.**

Automatic MAC Address

In contrast to other controllers, the IRM MSTP controllers feature automatic MAC addressing.

The following properties are writable and can be changed:

- Max Master
- Min MAC
- Max MAC
- MAC address.

Table 25 Default Values

Default Max Master	Default MinMAC	Default MaxMAC	Default Baudrate
64	1	60	38400

The property Max Master specifies the highest allowable address for client nodes. Max Master is set to 64 by default, which means that it can support up to 62 BACnet MSTP VAV controllers, one supervisor, and one BACnet client (tool) per BACnet MSTP network.

Note: *When the dip switches are set to all-ON or all-OFF, the controller will run in Auto MAC mode. Do not attempt to program a MAC address outside of Min MAC and Max MAC (0 to 60).*

If any of the following events occur, the permanent MAC address changes automatically:

- If the controller's MAC address is set to 0xFF (255), it will attempt to find a new address. Auto MAC will be automatically triggered after controller powered on.
- When devices with the same MAC address cause a network conflict.
- A reset to factory delivery is performed if the service pin is pressed and the controller is switched on (while the service pin is still pressed). Auto MAC is triggered, and the controller tries to find a new address.

Note: *The particular MAC addresses 0 and 64 are designated for Auto MAC addressing. Depending on the real performance needs and connection speed, connecting fewer BACnet MSTP devices per network is recommended.*

It is recommended to connect 40 BACnet MSTP VAV controllers, with one supervisor, and one BACnet client (tool) per BACnet MSTP network with a Max Master of 64.

Setting the MSTP MAC Address

On an MSTP network segment, each device's MSTP MAC address must be set to a unique value in the range of 1 to 64. The MAC address of the MSTP VAV BACnet controller is set using seven DIP switches.

Note: *DIP settings of all-ON or all-OFF (*MAC *address = 0) activate the Auto MAC mode in the controller and prevent the dip switches from being utilized for MAC addressing.*

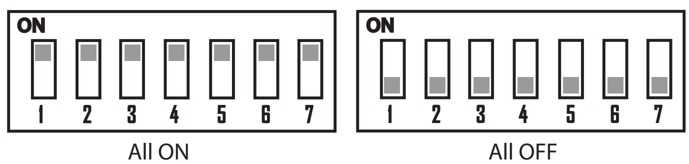


Fig. 159 MSTP MAC Address Details

Steps to set the MAC address:

Step 1. Identify an available MAC address on the BACnet MSTP network to assign the MSTP VAV controller.

Step 2. Locate the DIP switch bank on the MSTP VAV for addressing.

Step 3. Power off the BACnet MSTP and set the DIP switches for the desired MAC address.

Step 4. Determine the MAC address using the table below. For example, if DIP switches 1, 3, 5, and 7 are on, the MAC address would be 85 (1 + 4 + 16 + 64 = 85).

Table 26 DIP switches

DIP	1	2	3	4	5	6	7
VALUE	1	2	4	8	16	32	64

Fig. 160 Calculating the MAC address

Manually Changing MAC Addresses

You might want to change the MAC addresses in some cases. Assume a network is connected to a small number of controllers. In this case, the controller's Auto MAC feature may cause significant gaps in the assigned MAC addresses.

Example: The bandwidth will not be optimized if addresses 2, 7, 23, and 31 are used. This type of MSTP network is not optimal for bandwidth utilization. To improve the network, manually adjust the MAC addresses of the controllers in workbench. Make sure that each controller should have a unique MAC address. For more details refer to MAC Address Configuration on page 139.

Important: *After you've changed all of the controllers' desired MAC addresses, it's an advisable to set the controllers' Max Master to the highest MAC address (Max MAC) among all of them. As a result, the MSTP bus works properly.*
MSTP functionality will be unaffected if the Max Master option is not set to the Maximum MAC value, however MSTP performance may suffer.

Swapping MAC Addresses

The user can swap the MAC address of a controller (A) with controller (B).

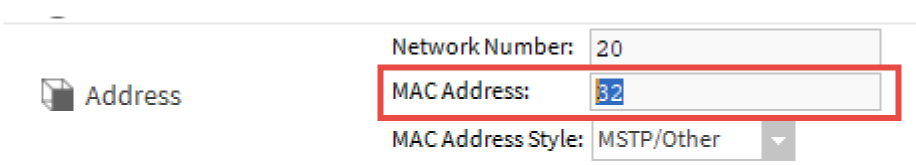


Fig. 161 Assign MAC address

Steps to swap the MAC address:

Step 1. Reassign an available MAC address in the range of 1 to 126 to controller B, thereby blocking the required MAC address.

Step 2. Assign the reserved MAC address (old address of controller B) to controller A.

Step 3. Assign the next desired MAC address to controller B (optional step).

Step 4. The previous procedures can be repeated to assign required MAC addresses to other controllers.

Step 5. Change the Max Master setting to the controller with the highest MAC address (Max MAC).

MAC Address Configuration

The MAC address and Max Master setting of the IRM NX controller can be changed using the engineering tool.

Steps to configure MAC address:

Step 1. Open the property sheet of the IRM NX controller.

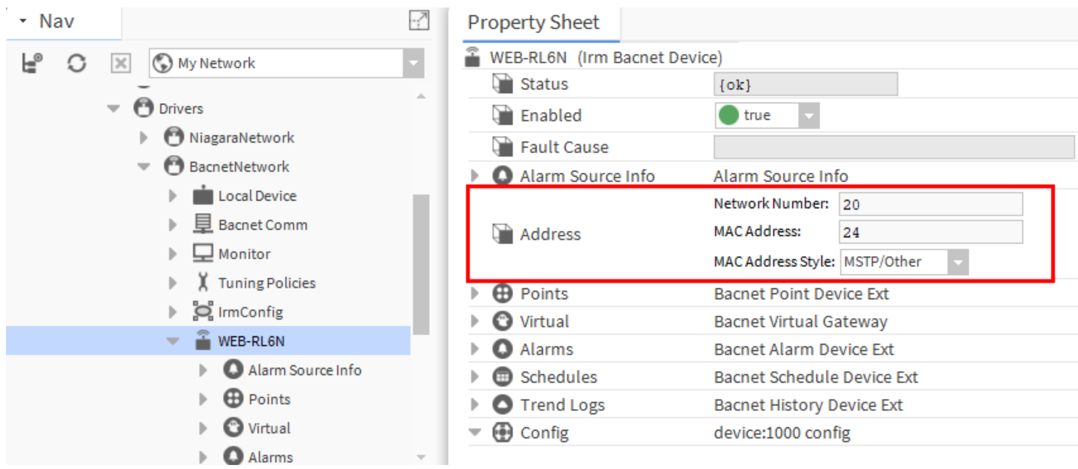


Fig. 162 Controller property sheet

Step 2. In Address property, change the **MAC Address**.

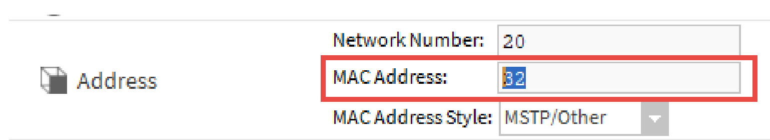


Fig. 163 Assign MAC address

Note: *In the BACnet MSTP network, the MAC addresses for the individual IRM NX controllers are not assigned in sequential order.*

Note: *The assigned MAC address for the individual IRM NX controllers in the BACnet MSTP network are not assigned in sequential order.*
The min MAC to max MAC is available as the proprietary properties id 1028 (min MAC) and 1029 (maxMAC) under the device object. The MAC Address "0" is reserved for the router/plant controller by default.

Step 3. Click **Save**.

If the new address is the highest address on the MSTP network, make the following changes to the maxMaster setting:

Step 4. Expand the **Config** or **Device Object** view.

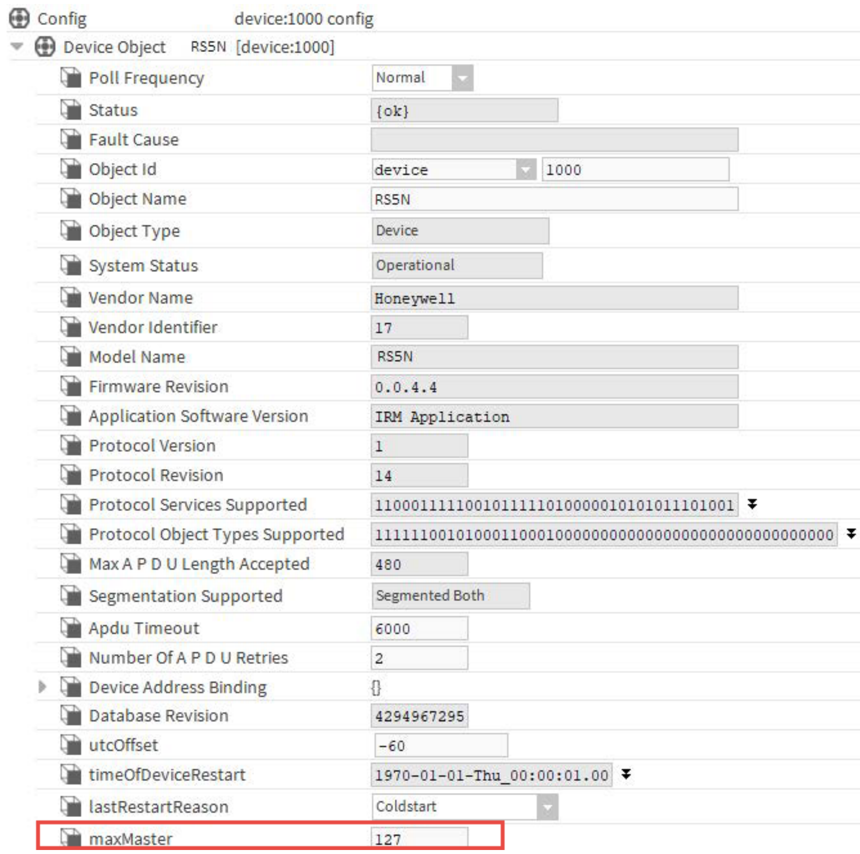


Fig. 164 Device Object area

Step 5. Enter the highest MAC address of all network controllers in the maxMaster field.

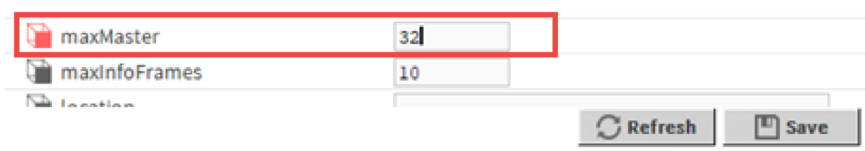


Fig. 165 maxMaster address

Step 6. Click **Save.**

Step 7. In all network controllers, enter the same **maxMaster** value.

Note: *If the Max Master Setting on the controller is not working. Before attempting to establish the maxMaster configuration, the user must first clear the alarm and ensure that the device is operational.*

Onboard IO Package

Onboard IO Links from hardware to BACnet

When discovering data points on the Bacnet network via the Irm Bacnet device manager, the I/O hardware points of the IRM NX controllers are not detected and visible by default.

To expose hardware, I/O points on the Bacnet network must be prepared individually to make them discoverable. This is performed by adding a Bacnet function block, for example, a Bacnet numeric input, to the periodic or event-driven program and link it to the hardware I/O point function block you want to expose on the Bacnet network.

Steps to link controller hardware points:

Step 1. Navigate to the **BacnetNetwork** > **IRM Bacnet Device** > **IRM Program** > double-click on the **On board IO** in the tree.

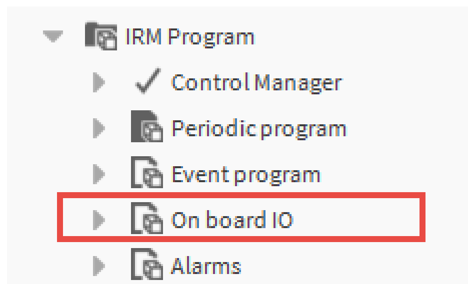


Fig. 166 On board IO

Step 2. On the wire sheet, identify the I/O hardware point you want to expose to the Bacnet network and note its type and name, for example, an analog output with the name “AO4 – HwAoFanSpeedCtl”.

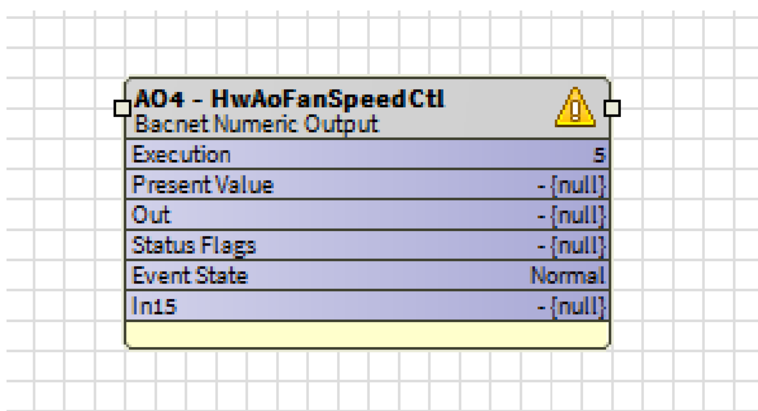


Fig. 167 Wire sheet

Step 3. Right-click the I/O hardware datapoint on the **On board IO** wire sheet, then click **Link Mark** in the context menu.

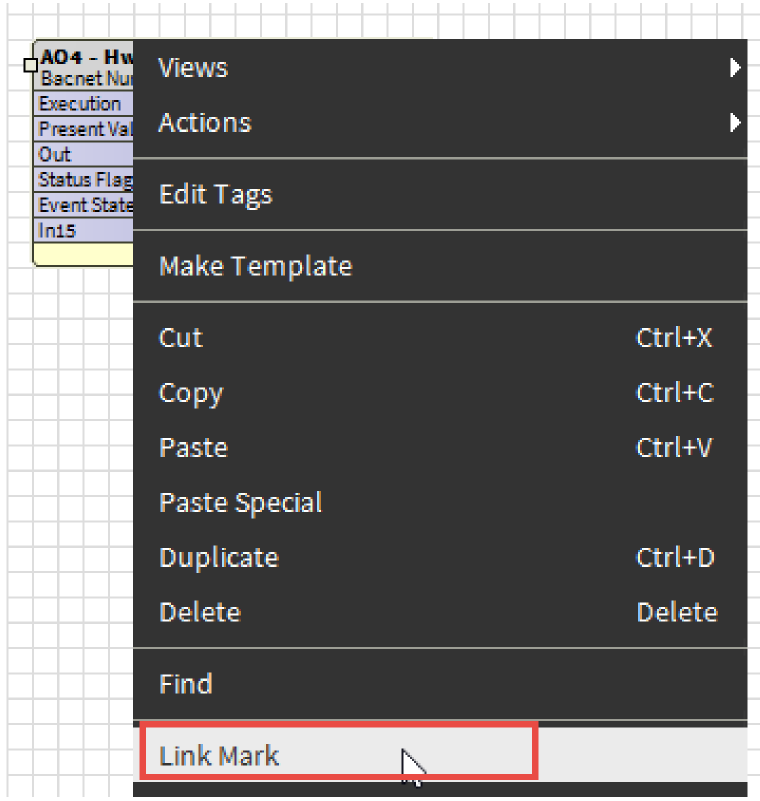


Fig. 168 On board IO Wire sheet

Step 4. Double-click **Periodic Program** in the nav tree and select the wire sheet view.

Step 5. Add a '**Bacnet Numeric Input**' Bacnet function block from the honIrmControl palette to the wire sheet.

Step 6. Change the default name to the name of the hardware I/O point you want to expose, for example, 'AO4 – HwAoFanSpeedCtl'.

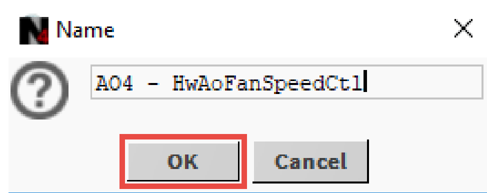


Fig. 169 Change the Default Name

Step 7. Click **OK**. The Bacnet Numeric Input is added to the wire sheet.

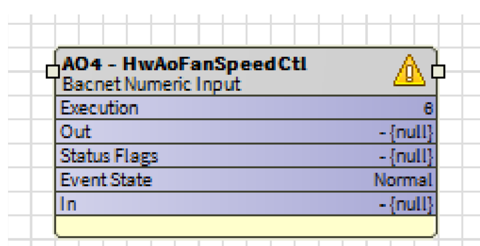


Fig. 170 Wire sheet

Step 8. Right-click the **Bacnet Numeric** Input, and click **Link Mark From <numeric input>** or **Link Mark To <numeric input>** in the context menu.

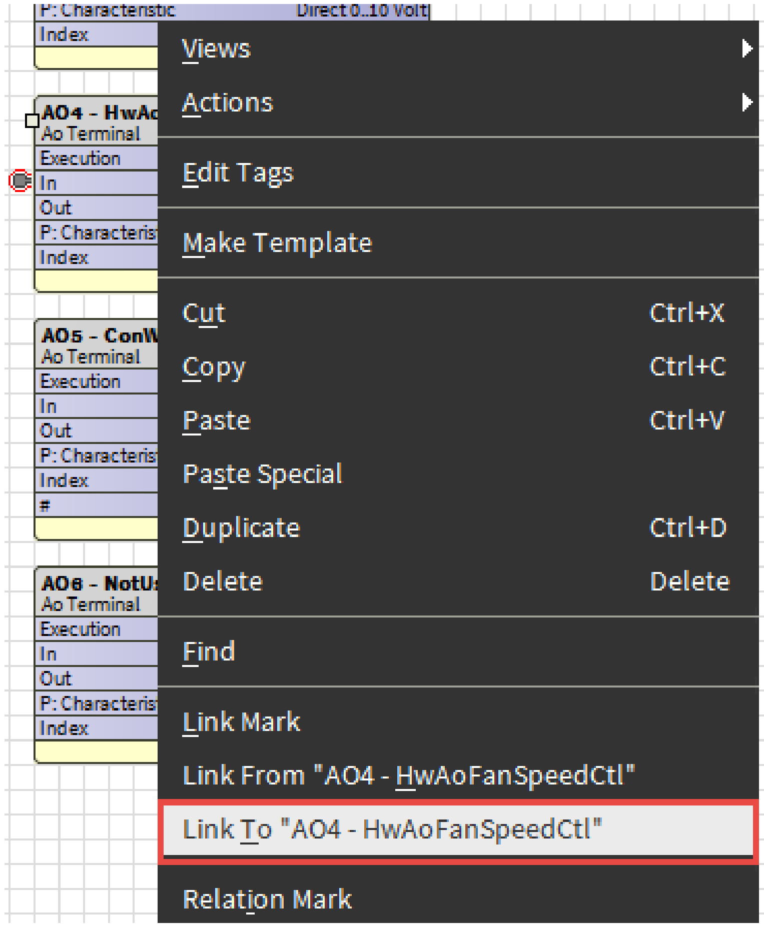


Fig. 171 Link Mark

Composite View

The composite view is an interface that allows you to virtually link control points, function blocks, and folders that contain control logic. When you create a composite, you create slots of child components in the parent component that link the configuration and run the control logic.

This interface allows you to group the application using the IrmFolder and IrmSubfolder. That contains control logic that is virtually configured with control points, function blocks, and folders present in different folders.

Important: *Whenever configuring more than 32 Irm folders, it is recommended to divide your application and add logic in their folders statically. Use IrmSubFolders to configure items or folders for major applications and minor grouping. It will help to better memory management for the unitary controller.*

Steps to perform Composite operation:

Step 1. Add **Irmfolder** from palette to the **Periodic program** or **Event program** wire sheet.

Step 2. Double-click the **Irmfolder** and drag the function block to Irmfolders wire sheet.

Step 3. Right-click on the function block and select **Composite.**

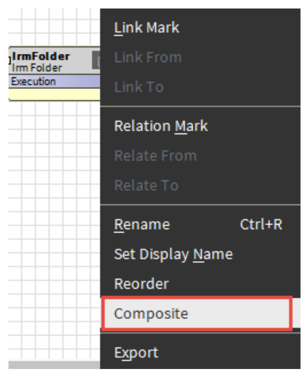


Fig. 172 Function block

Step 4. Add the input and output slots in the composite editor and click **OK**.

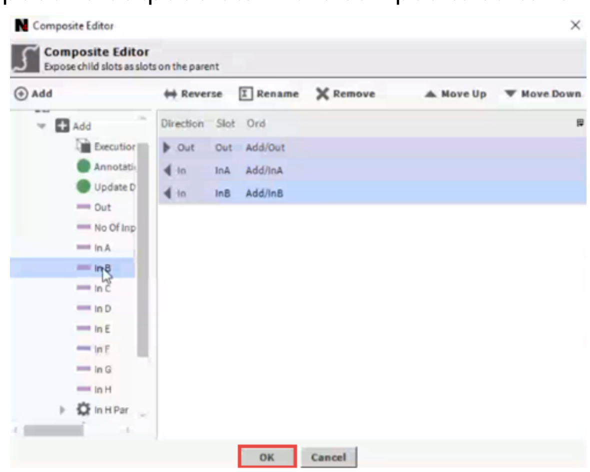


Fig. 173 Composite Editor

Step 5. Drag and drop the **Const1 Numeric** function block to **Irmfolder** wire sheet, add value to the **Const1 Numeric**, and click **Save**.

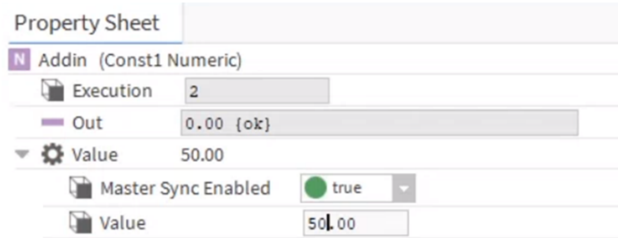


Fig. 174 Property sheet

Step 6. Connect the output slot of **Const1 Numeric** to the input slots of **IrmFolder**.

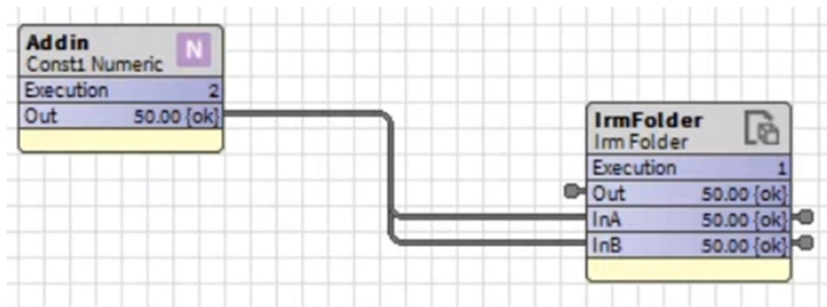


Fig. 175 Irm Folder wire sheet

If the maximum number of IrmFolders is used in the wire sheet, you can add IrmSubFolders.

Note: *IrmSubFolder cannot be added directly into the Periodic program or Event program. IrmSubFolder can only be added inside IrmFolder.*

Step 7. Double-click on configured **IrmFolder** and drag and drop the **IrmSubFolders** function block to wire sheet. After adding the IrmSubFolders function block, configure the Const1Numeric function block.

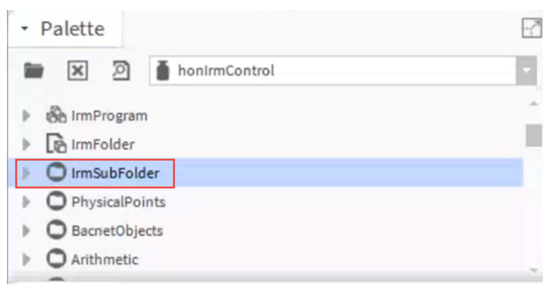


Fig. 176 honIrmControl Palette

Step 8. Connect the output slot of **Const1Numeric** to input slots of **IrmSubFolders**.

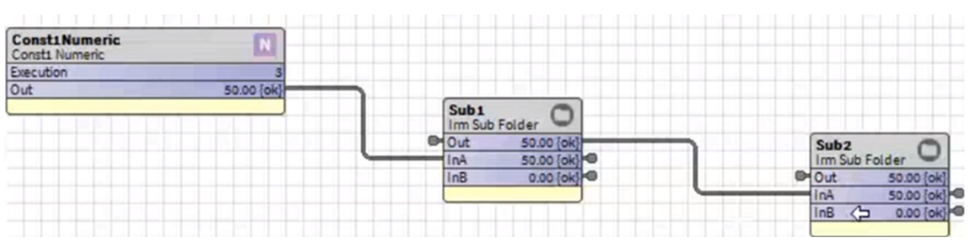


Fig. 177 IrmSubFolders

Note: *Character renaming of IrmFolder and IrmSubFolder is restricted to up to 20 characters.*

Terminal Assignment View

The Terminal Assignment View allows users to assign or swap IO terminals without opening the On board IO configuration. It also allows changing the IO terminal assignment even if the device is swapped.

Note: *Any changes to the online controller terminal assignment view led to a change in sync status of the IP/MSTP, Compact VAV, or Unitary to project has modifications in both swap-out and swap-in mode.*

Note: *When the controller is in the swap-in state and the teach mode is set to Immediate any changes to the terminal assignment view are instantly taught to the controller and the project status is in-sync.*

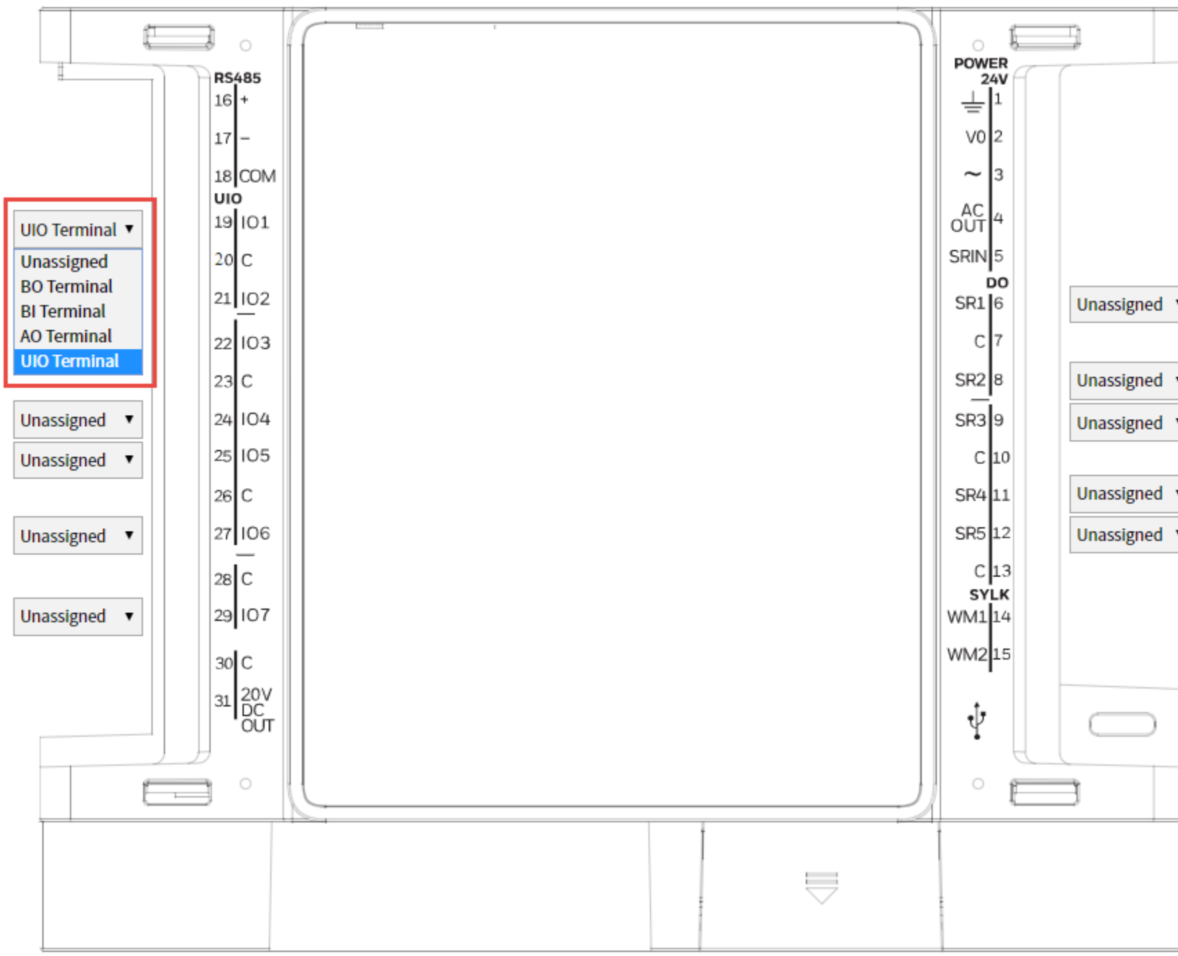


Fig 178. IP/MSTP Controller Terminal Assignment View

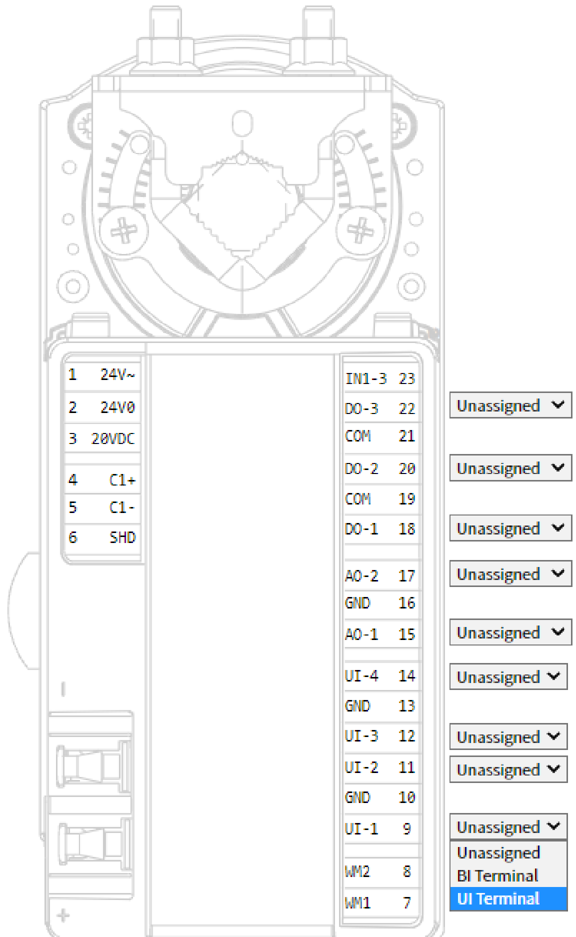


Fig. 179 Compact VAV Controller Terminal Assignment View

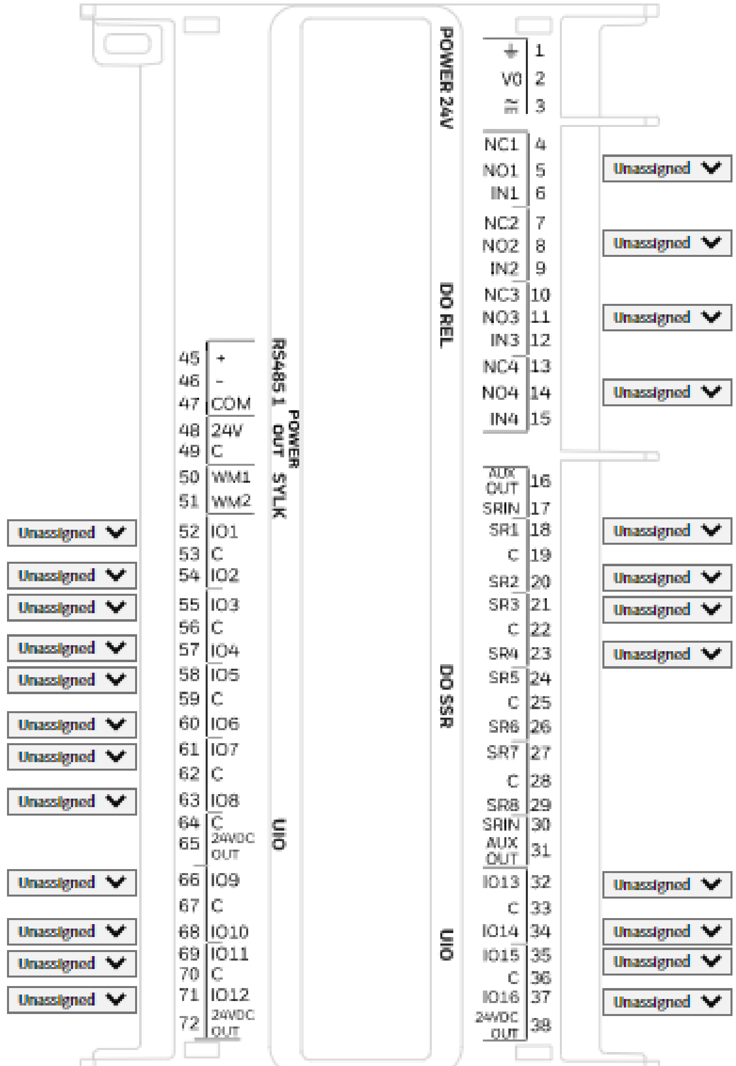


Fig. 180 Unitary Controller Terminal Assignment View

Configure Terminal Assignment View

Steps to assign the physical points in terminal assignment view:

Step 1. Navigate to the **honIrmControl** palette and copy the physical point from the palette to the **Onboard IO** wiresheet. Refer to the Onboard IO on page 83 section for more details.

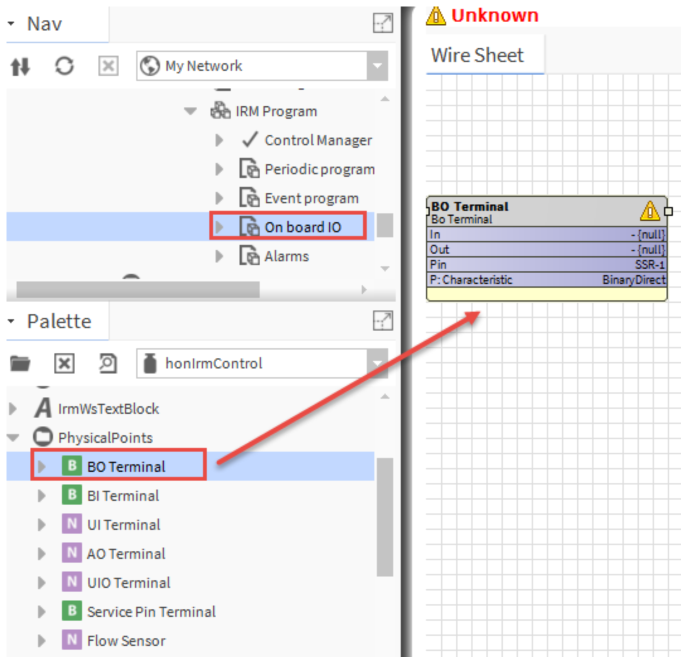


Fig. 181 Adding Physical point to Onboard IO wire sheet.

Step 2. Navigate to the **Station** > **Config** > **Drivers** > **BACnetNetwork** > **IRM device**.

Step 3. Right-click on the **IRM device** > **Views** > select **Terminal Assignment View**.

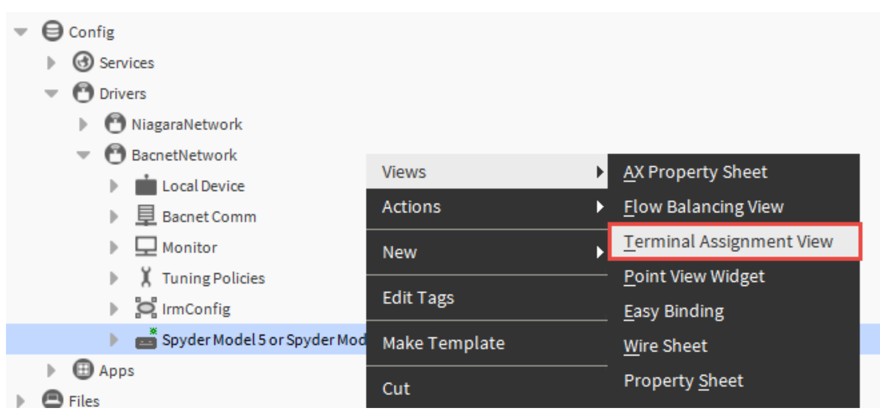


Fig. 182 Terminal Assignment View Option

This action displays the Terminal Assignment view of a selected controller.

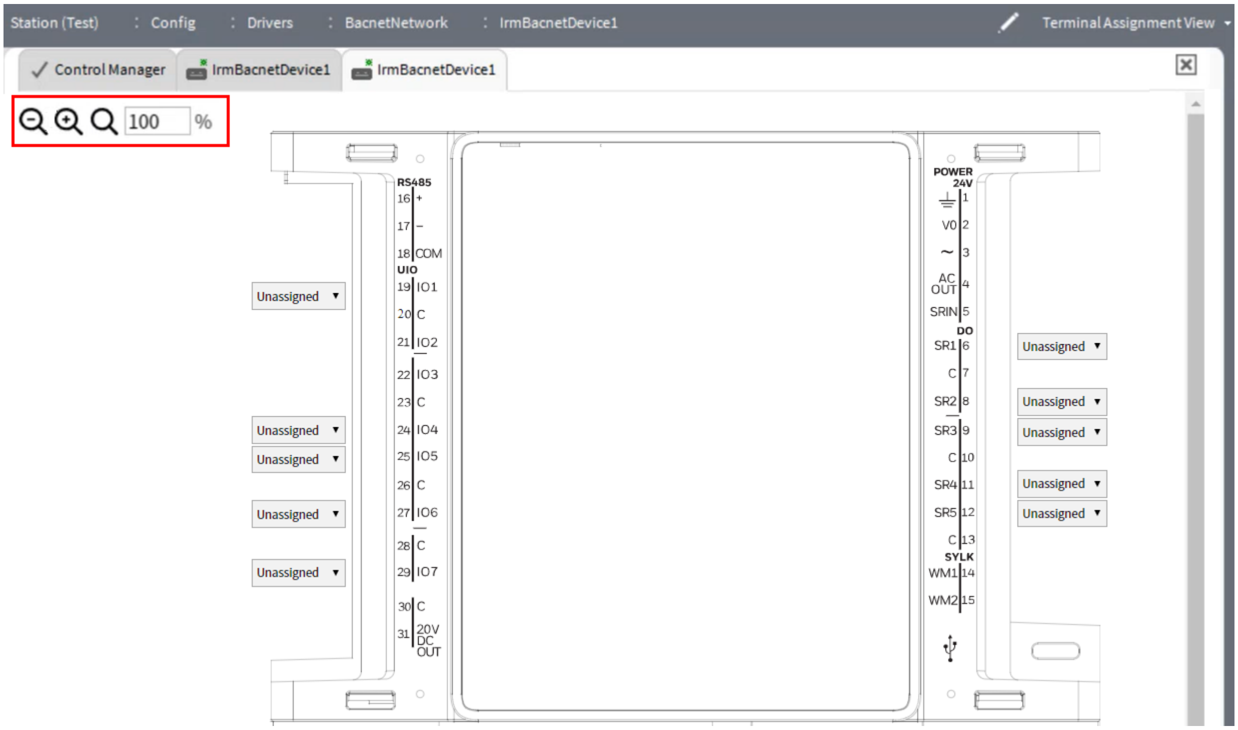


Fig. 183 Terminal assignment view zoom options

Step 4. You can perform the zoom operations as explained below:

- **Zoom-in**: Click on the Zoom-in ( ) icon (the view size will increase by 10 % each time you click the Zoom-in icon).
- **Zoom-out**: Click on the Zoom-out ( ) icon (the view size will decrease by 10 % each time you click the Zoom-out icon).
- **Reset Zoom**: Click on the Reset Zoom ( ) icon to set the view to the default size (100 %).
- **Custom Zoom**: Enter a value in the Custom Zoom field (100 %) to view the controller (by default, the view size will be 100 %, you can customize the size by entering the value in the Custom Zoom field).

Step 5. Assign the pins to the required terminal pins.

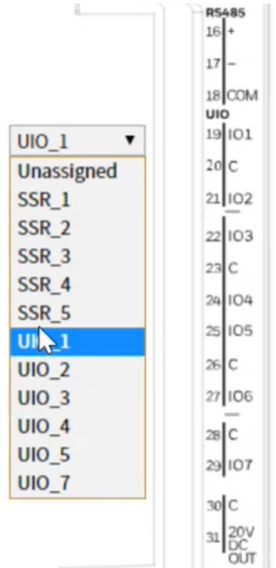


Fig. 184 Assigning UIO or BO Points

The physical points configured in the On board IO wire sheet are displayed in the terminal pin drop-down in the Terminal Assignment view.

Step 6. Click **Save**. The terminal pins are configured with the respective physical points.

Step 7. Check the On board IO wire sheet to verify the changes.

Fig. 185 Onboard IO wire sheet

Change Terminal Assignments

Example: In the image below, the user has changed the SSR 2 physical point in the terminal to the UIO 2 physical point and clicked save. After clicking save, the UIO 2 and SSR 2 physical points will switch the terminal position between UIO and BO. The change is successful because both UIO 2 and SSR 2 physical points have the same In-Type characteristic (physical point function block property).

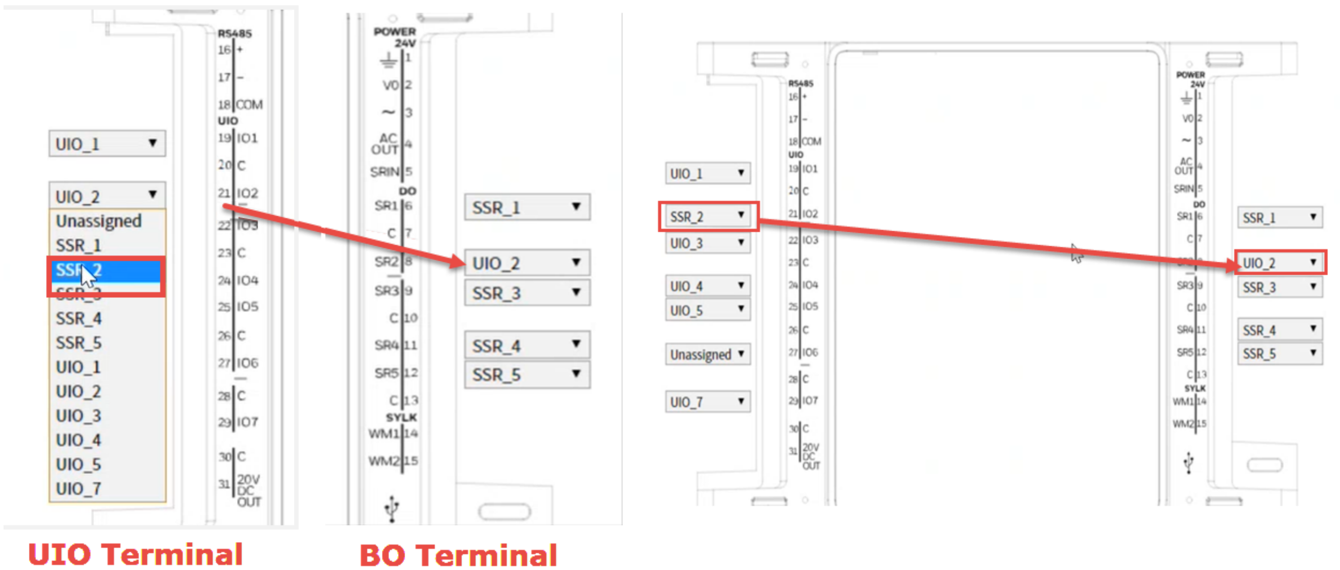


Fig. 186 Swap between UIO and BO terminal

Steps to change the terminal in Terminal Assignment View:

Step 1. Open **Terminal Assignment View**.

Step 2. Select any previously configured terminal and modify the physical point from the drop-down list.

Step 3. Click **Save.**

After performing the change, check the physical point properties in the Onboard IO wire sheet. The pin and pin characteristics of the changed physical point are updated.

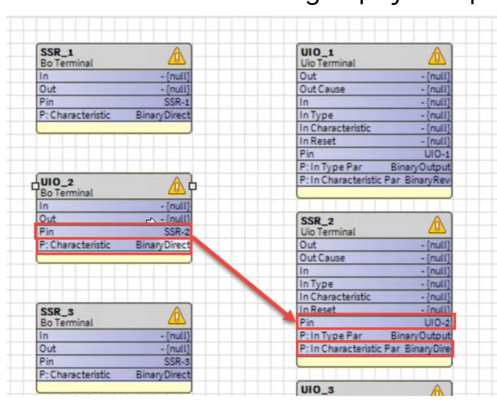


Fig. 187 Onboard IO wire sheet

Note: *If you perform a swap between unsupported In-Type characteristics UIO or BO terminal, the configured UIO or BO terminal changes to unassigned.*

Example: In the below image, if you swap between UIO_1 terminal with SSR_1 terminal and click save.

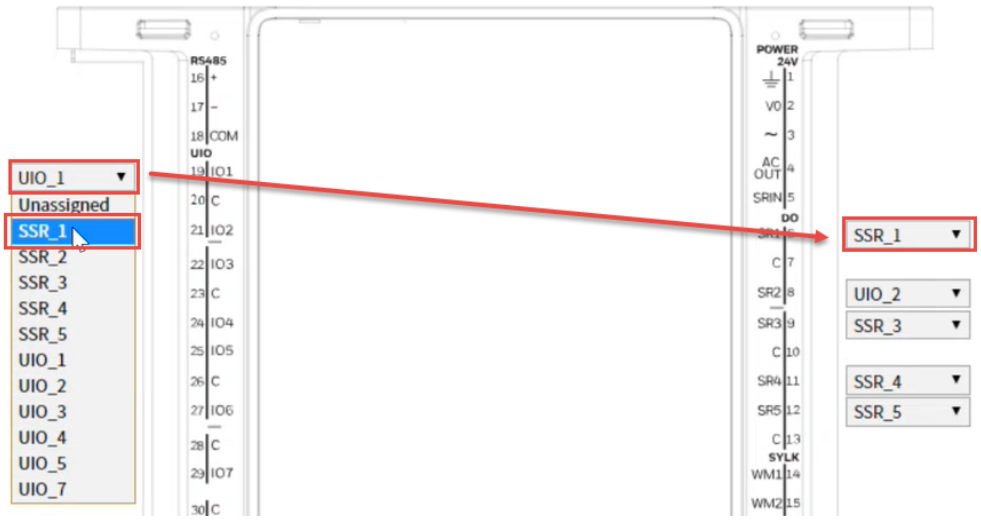


Fig. 188 Change between UIO_1 terminal with SSR_1 terminal

A message will pop up for confirmation of swapping for unsupported characteristics.

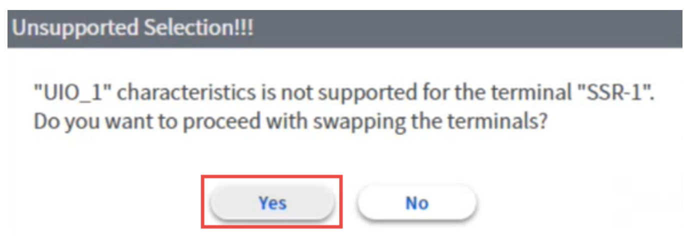


Fig. 189 Confirmation of swapping

Click yes, the UIO_1 terminal changes to the SSR_1 terminal, and the SSR_1 terminal will be changed to unassigned.

Fig. 190 Unassigned Terminal

After performing the change, check the physical point properties in the onboard IO wire sheet. The pin and pin characteristics of the changed physical point are updated.

Note: *The physical points with the fault cause will not appear in the terminal assignment view drop-down list.*

For example, UIO_6 has a fault cause in the AO terminal and it will not be shown in the UIO terminal drop-down list.

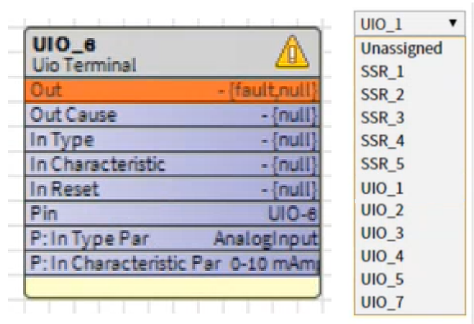


Fig. 191 Fault state in the UIO terminal

Note: *If the In-Type, In Characteristic, or both properties of UIO physical points are linked to any function block, the UIO physical points will not appear in the Terminal Assignment View drop-down list.*

For example, UIO_7 has a link to In-type, and it will not be shown in the BO terminal drop-down list.

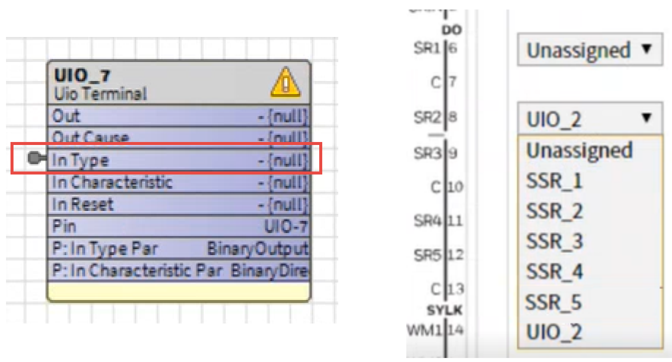


Fig. 192 In-Type property of UIO terminal

Modify the Terminals in Swap-Out Condition

You can modify the assigned terminal in the terminal assignment view when the controller is in the swapped-out state. After making changes in the terminal assignment view, save the changes. When the controller is swapped-in, you can verify the changes in the onboard IO wire sheet.

Important: *Only the physical points with the same In-Type characteristic can switch between UIO and BO terminals or vice versa.*

Steps to modify the terminals in the swapped out condition:

Step 1. Open **Terminal Assignment View** and modify the required terminals. Refer to the Change Terminal Assignments on page 152.

Step 2. Click **Save.**

When the controller is swapped-in, you can see the changes in the Onboard IO wire sheet.

Note: *The unassigned terminals will not appear in the terminal assignment view.*

CHAPTER
5
ENGINEER THE CONTROLLERS (ENGINEERING MODES)

Add Controller Setup with Service Pin

Use this procedure when you do not have the controller's serial number.

Steps to setup controller without using serial number:

Step 1. Double-click the **BacnetNetwork** folder in the Nav tree, select the **Irm Bacnet Device Manager** view, and click **New**.

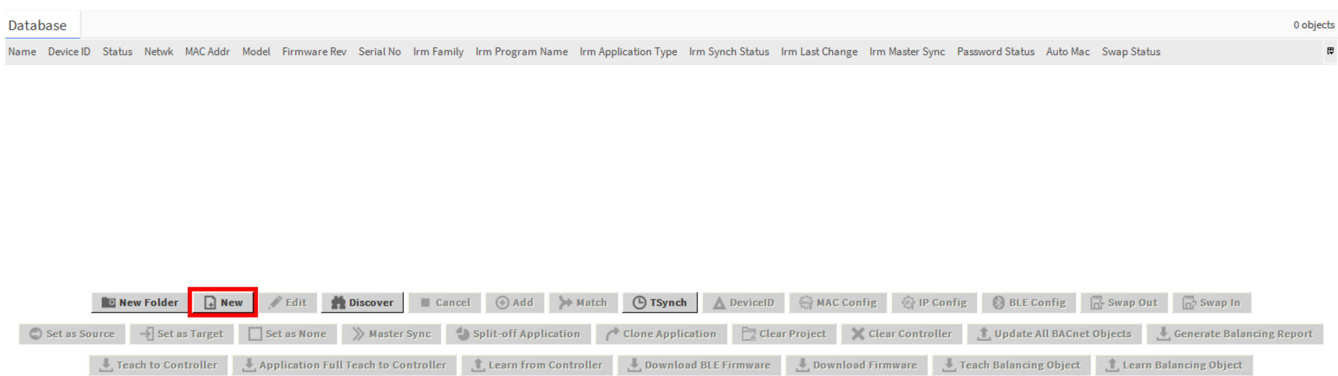


Fig. 193 Irm Bacnet Device Manager View

Step 2. In the New dialog box, select **Irm Bacnet Device** from the drop-down list and click **OK.**

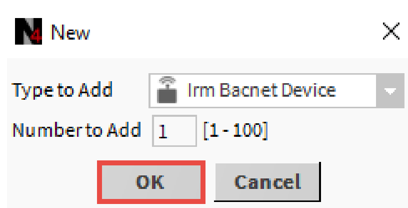


Fig. 194 New Window

Step 3. This opens the device property sheet.

If require you make the following changes:

- **Name**: Rename the device.
- **Type**: Change the device type.
- **Network address**: Enter the network address.
- **MAC Address**: Enter the MAC address.

- **Enabled**: Select the required option from the drop-down, true (default) or false.
- **Use Cov**: Select the required option from the drop-down, true or false (default).
- **Use Cov Property**: Select the required option from the drop-down, true or false (default).
- Keep Max Cov Subscriptions as max.

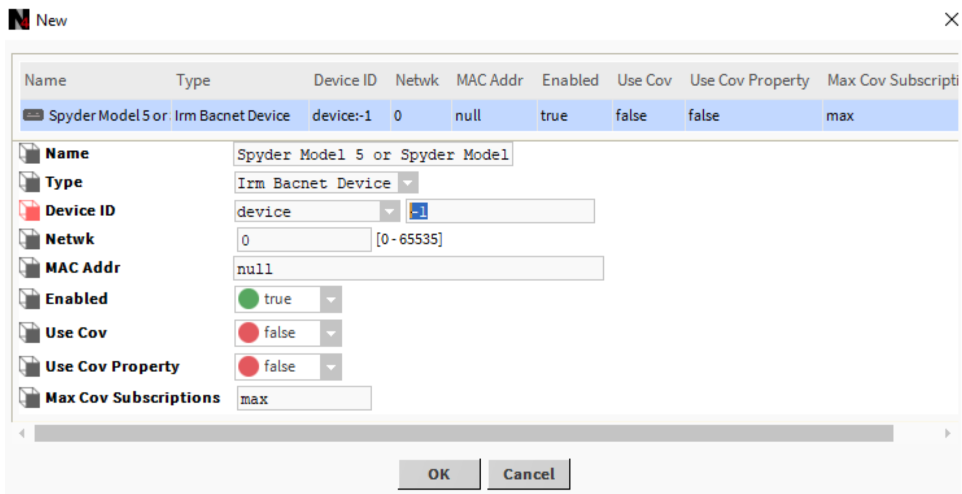


Fig. 195 Irm Bacnet Device Property Sheet

Step 4. Click **OK**.

The IRM is created and added to the database.

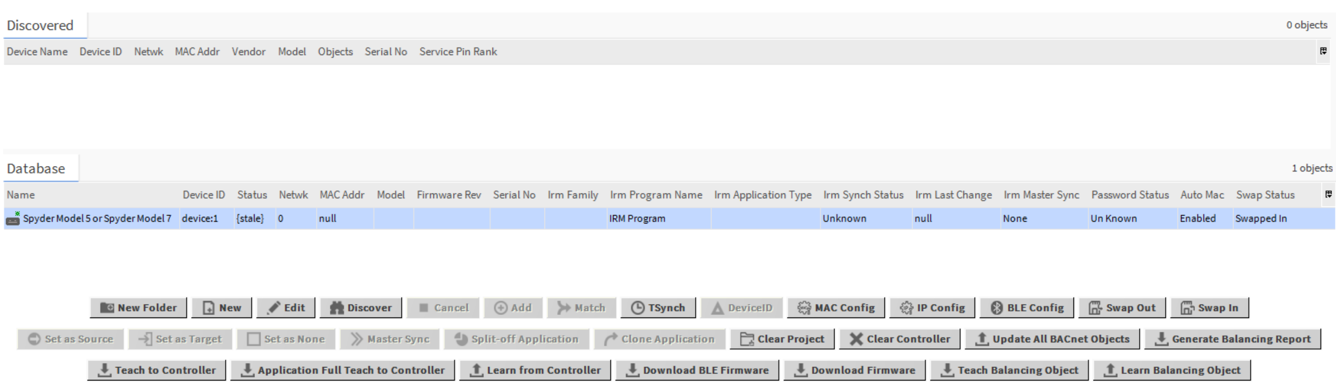


Fig. 196 Database Pane

Step 5. Expand the IRM and configure the **IRM Program**.

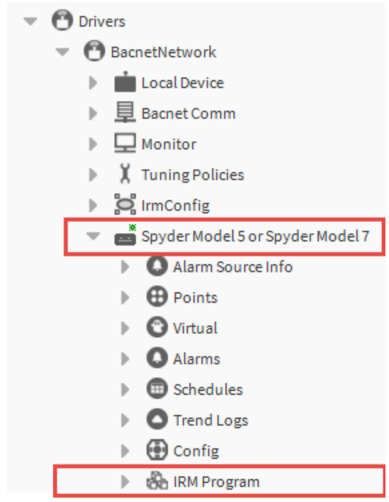


Fig. 197 IRM Program

Step 6. Visit the site and connect to the Bacnet network to get online.

Step 7. Go to the **Irm Bacnet Device Manager** view and click **Discover**. All the devices communicating will be discovered.

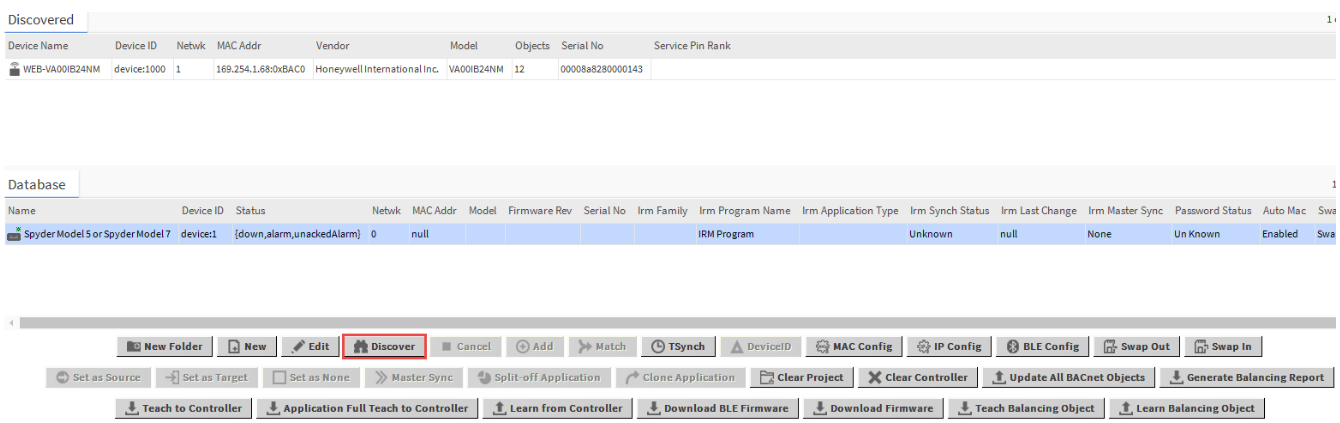
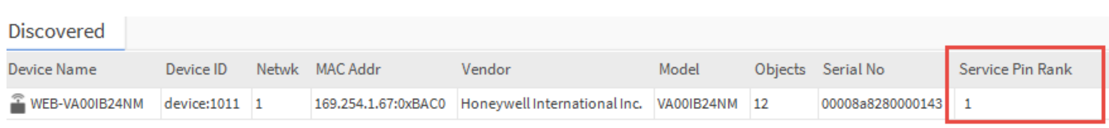


Fig. 198 Database Pane

Step 8. Press the service pin to match an offline IRM NX controllers with a online IRM NX controller. Perform the same procedure for all devices that need to be matched. This action will discover and list the devices in the discovered section as per service pin rank.

Note: *In the service pin rank column, the service pin action is indicated by consecutive numbers depending on when the service pin was pressed on the device.*


Discovered

Device Name	Device ID	Netwk	MAC Addr	Vendor	Model	Objects	Serial No	Service Pin Rank
WEB-VA00IB24NM	device:1011	1	169.254.1.67:0xBAC0	Honeywell International Inc.	VA00IB24NM	12	00008a8280000143	1

Fig. 199 Service Pin Rank

Step 9. In the **Discovered** view, select the online device, and in the **Database** view, select the offline device.

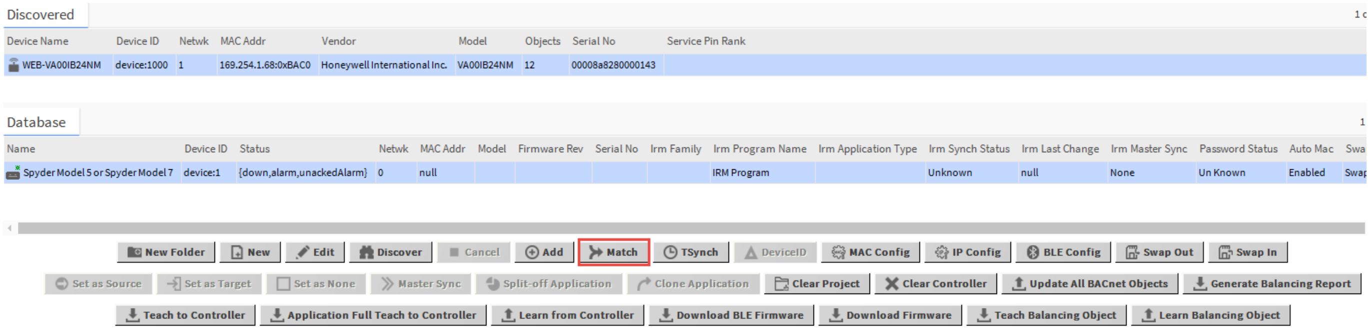


Fig. 200 Discovered Pane

Step 10. Click **Match**.

The properties of the online BACnet device are matched to the offline BACnet device in the database pane. The properties of the following devices are updated:

- Name
- Type
- Device ID
- Status
- Model
- Firmware Revision
- Serial Number
- Irm Family
- Irm Program Name
- Irm Application Type
- Irm Sync Status
- Irm Last Change
- Irm Master Sync

Step 11. If desired, you can change the name, device id, network number, and MAC address, and enable Use Cov by selecting "true" from the drop-down list.

Step 12. Click **OK**.

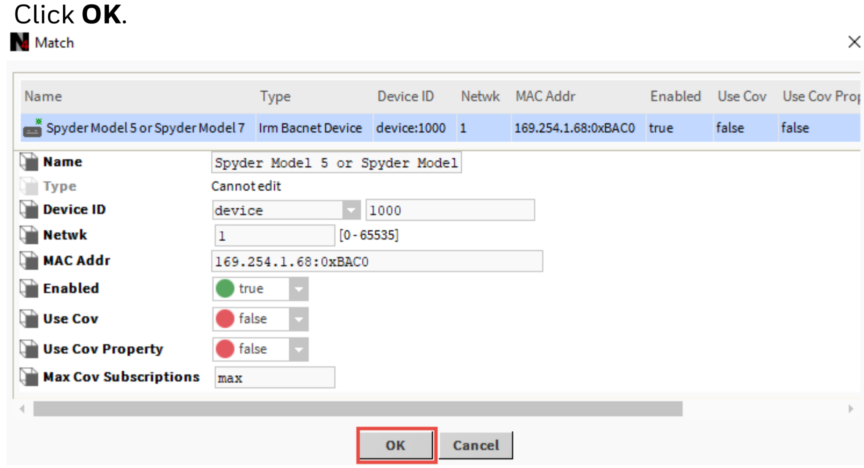


Fig. 201 Irm Bacnet device Property

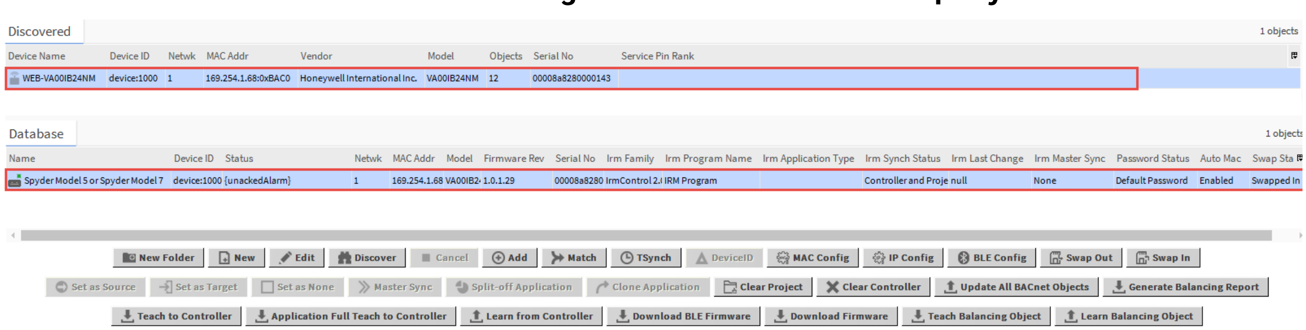


Fig. 202 Database View

Step 13. Perform the hardware compatibility check to ensure that the application is appropriately designed to run seamlessly in the created device. To perform hardware compatibility, refer to Check Hw Compatibility on page 179.

Step 14. Click **Teach Full Application to Controller**.
If you want to match a BACnet device to a new IRM controller, or if you want to clear all previous configurations from the IRM controller and download the new configuration.

Or

Click **Teach to Controller.**
If you want to modify an existing program in the IRM controller.

Note: *If a large application is created in the controller, it is recommended to perform Teach Full Application To Controller.*

A notification message will appear. If there are any application inconsistencies between the offline and online devices, the control manager will indicate the relevant synchronization status.

To resolve any inconsistencies, synchronize the applications by performing any of the following actions:

- Clear Project
- Clear Controller
- Teach To Controller
- Learn from Controller
- Check Application Compatibility

Controller Setup using Serial Number

Before working on this procedure, make sure you have the device name, serial number, and device id of the controller, which needs to be matched.

Steps to setup controller using serial number:

Step 1. Expand the **BacnetNetwork** in the Nav tree.

Step 2. Right-click the **IrmConfig** > **Action** > click **Add Serial Number**.

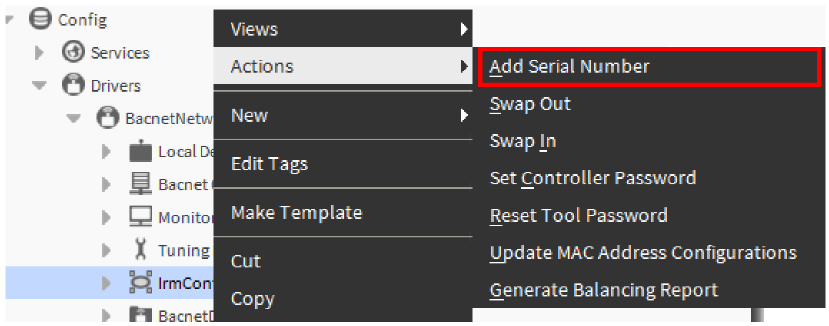


Fig. 203 Add Serial Number

Step 3. Enter the **Device Name, Serial No** and **Device Id**. If a barcode scanner is available, use a barcode scanner to get the barcode data, copy and paste the data in the respective field.

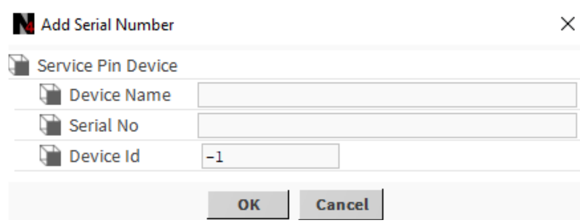


Fig. 204 To Add Device Name and Serial Number

Or

Enter the data manually:

- Enter 0000 in the **serial number** field. The serial number is case-sensitive and should match the serial number printed on the product label.
- Enter the correct **device name** and **device id** as per the online IRM NX controller you wish to configure. For example,

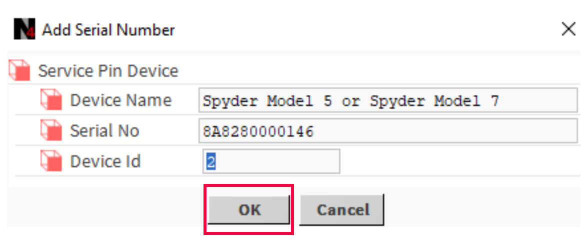


Fig. 205 Service Pin Device

Step 4. Click **OK.** The device gets added to the **IrmConfig** property sheet.

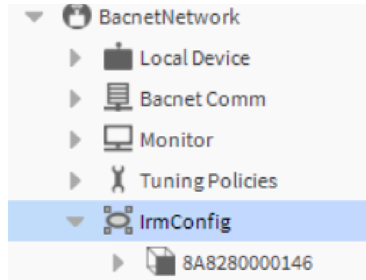


Fig. 206 IrmConfig Property Sheet

Repeat the steps 2 to setp 4 to add all the controllers to the IrmConfig property sheet.

Step 5. Go to the **Irm Bacnet Device Manager** view and click **Discover**. All of the offline devices will display in discovery view.

Fig. 207 Discover Pane

Step 6. Select the device from the discovered view and click **Add**.

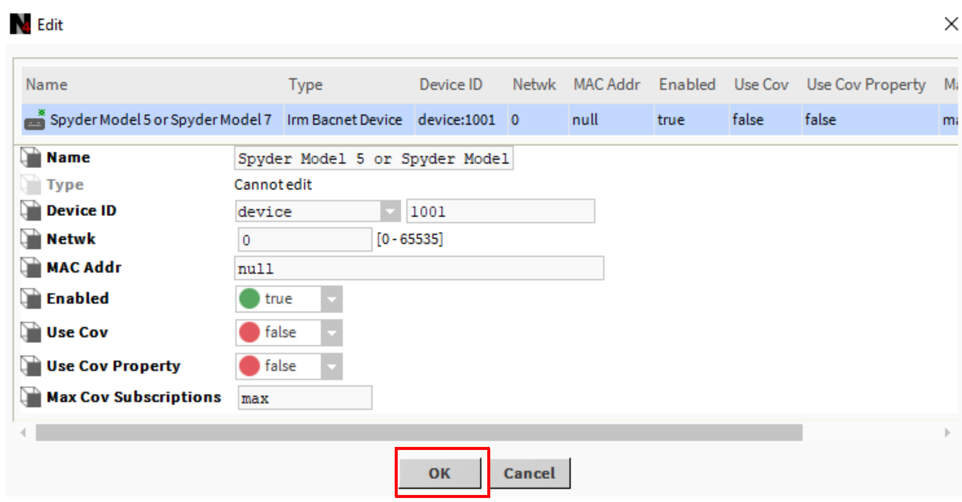


Fig. 208 Device Property Sheet

If desired, you can change the **Name, Device ID, Network number,** and **MAC Address**, and enable **Use Cov** by selecting “true” from the drop-down list.

Step 7. Click **OK.** This adds an offline controller to the **Database**.

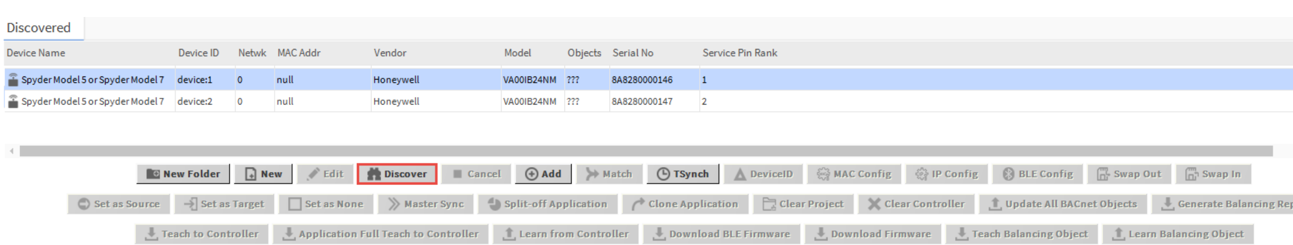


Fig. 209 Discover Pane and Database Pane

Step 8. Expand the device and create the **IRM Program** by adding control strategy, hardware layout, and alarm settings (optional).

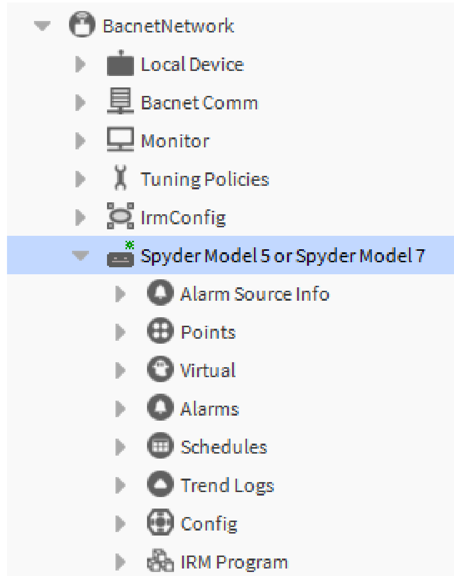


Fig. 210 Offline Device Add under Bacnet Network

Visit the site, go online by connecting to the Bacnet network.

Step 9. Go to the **Irm Bacnet Device Manager** view and click **Discover**. In the discovered view, all the offline devices will be displayed.

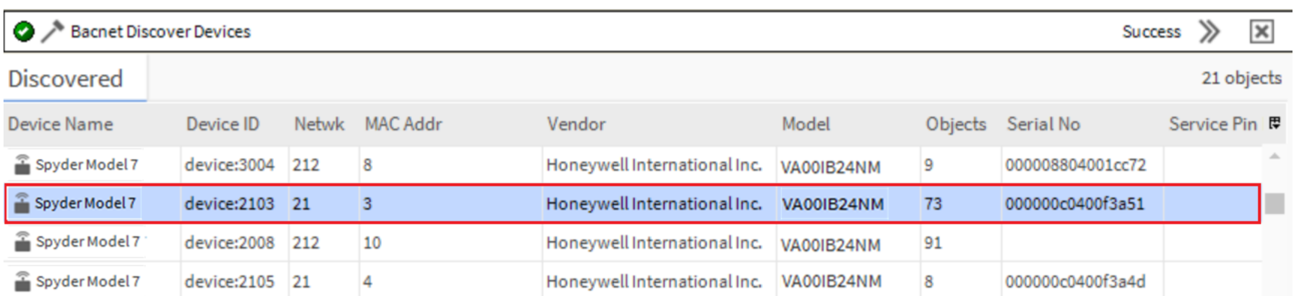


Fig. 211 To Discover the Controllers

The engineering tool discovers the controllers having the same serial numbers issued offline.

Or

Press the service pin to match an offline IRM NX controller with a online IRM NX controller. Perform the same procedure for all devices that need to be matched. This action will discover and list the devices in the discovered section as per service pin rank.

Note: *In the service pin rank column, the service pin action is indicated by consecutive numbers depending on when the service pin was pressed on the device.*

Step 10. Select the online device in the **Discovered** section and the offline device in the **Database** section.

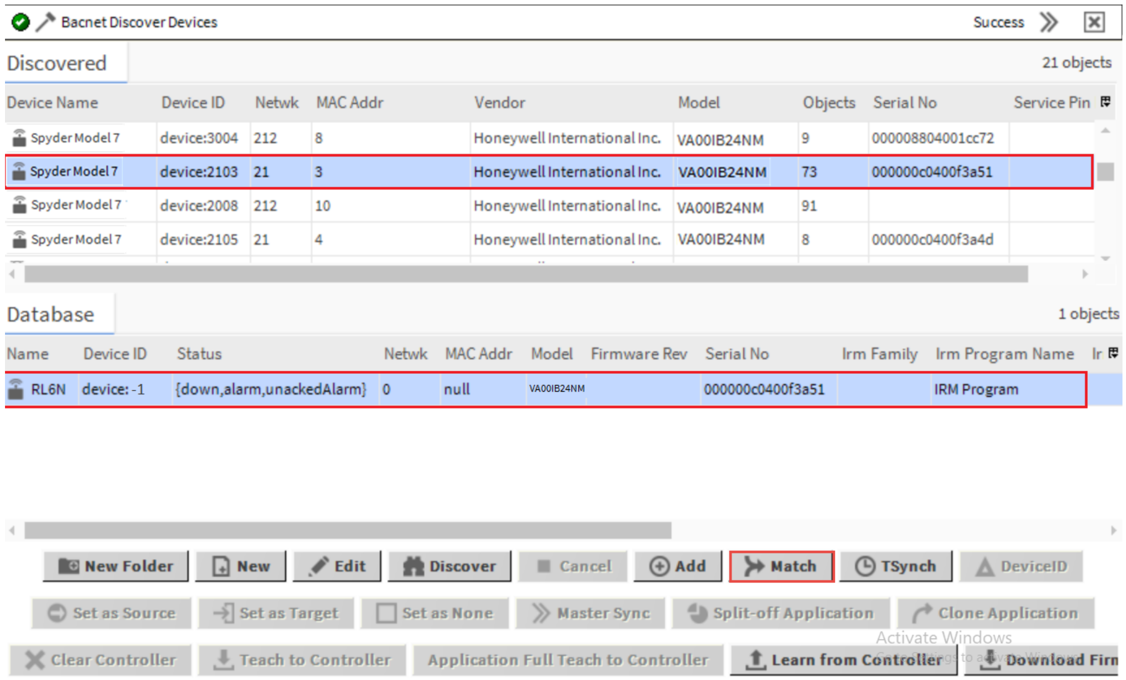


Fig. 212 Irm Bacnet Device Manager View

Step 11. Click **Match**.

The online device properties are matched to the offline Bacnet device indicated in the Database section. Following device properties are updated:

- Name
- Type
- Device ID
- Status
- Model
- Firmware Revision
- Serial Number
- Irm Family
- Irm Program Name
- Irm Application Type
- Irm Sync Status
- Irm Last Change
- Irm Master Sync

Step 12. If desired, you can change the name, device id, network number, and MAC address, and enable Use Cov by selecting “true” from the drop-down list.

Step 13. Click **OK.**

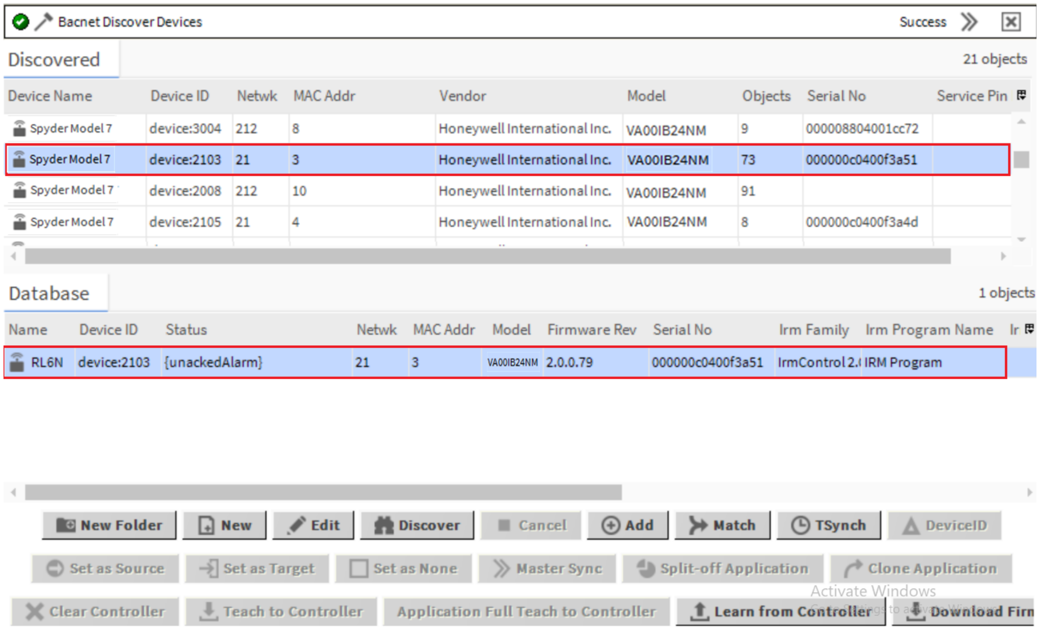


Fig. 213 Discover and Database view

Step 14. Perform the hardware compatibility check to ensure that the application is appropriately designed to run seamlessly in the created device. To perform hardware compatibility, refer to Check Hw Compatibility on page 179.

Step 15. Click **Teach Full Application to Controller**.
If you want to match a BACnet device to a new IRM controller, or if you want to clear all previous configurations from the controller and download the new configuration.

Or

Click **Teach to Controller.**
If you want to modify an existing program in the controller.

Note: *If a large application is created in the controller, it is recommended to perform Teach Full Application To Controller.*

A notification message will appear. If there are any application inconsistencies between the offline and online devices, the control manager will indicate the relevant synchronization status.

To resolve any inconsistencies, synchronize the applications by performing any of the following actions:

- Clear Project
- Clear Controller
- Teach To Controller
- Learn from Controller
- Check Application Compatibility

Discover Online Controller

Use this method when the controller is online.

Steps to discover online controller:

Step 1. Connect to the **Bacnet Network**.

Step 2. Navigate to the **Irm Bacnet Device Manager** view and click **Discover**. All the available controllers in the Bacnet Network are discovered.

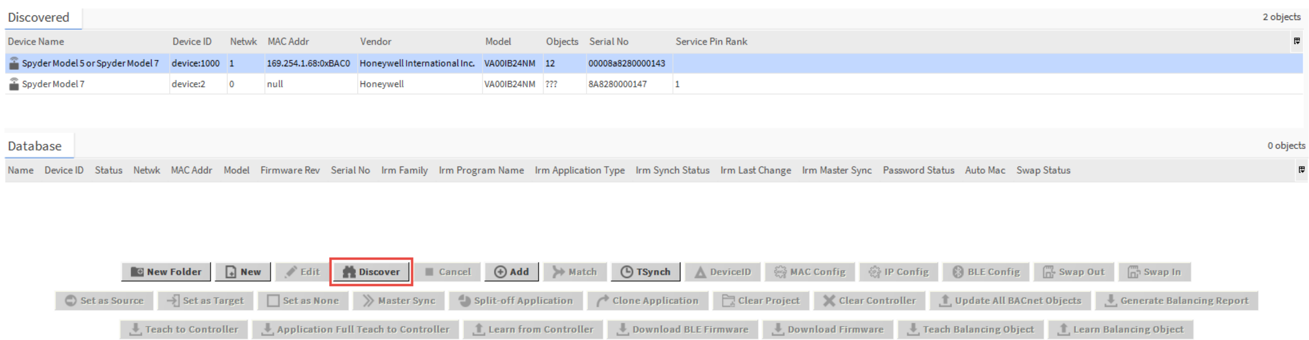


Fig. 214 Discovered Controller

Note: *In the Service Pin Rank column, the rank of the service pin is indicated by consecutive numbers depending on the sequence when the service pin was pressed on the controller. The service pin rank will not be available until the user presses the service button on the controller.*

Step 3. Select the controller you want to add to the database and click **Add.**

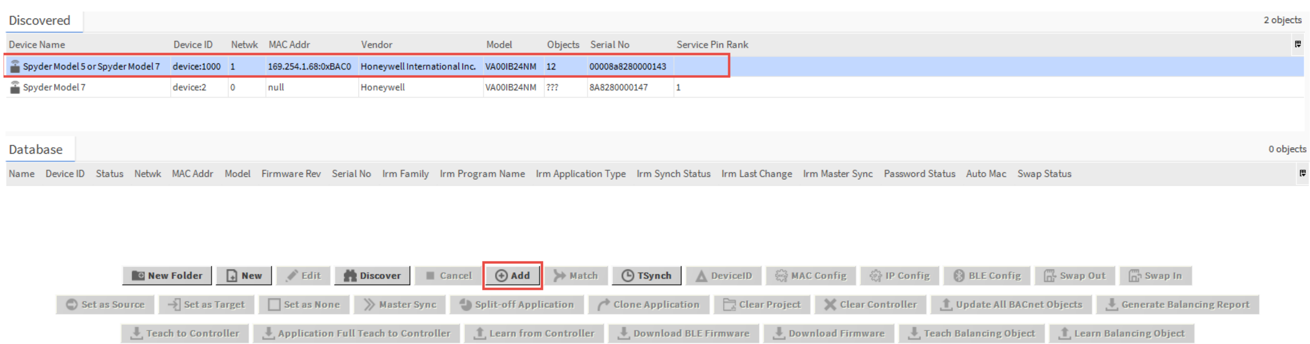


Fig. 215 Adding Controller to Database

Step 4. If desired, you can change the name, device id, network number, and MAC address, and enable Use Cov by selecting “true” from the drop-down list.

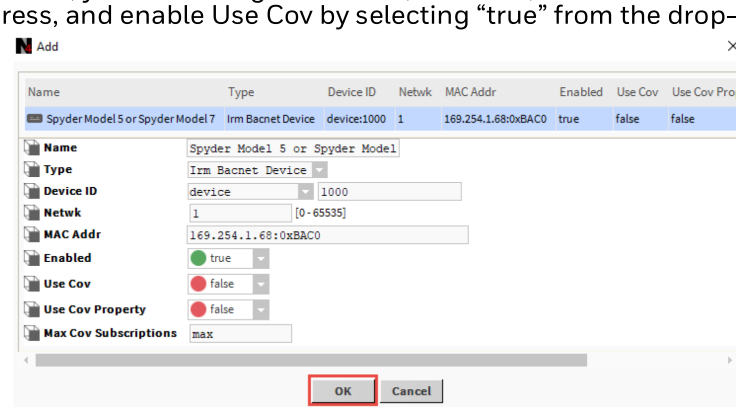


Fig. 216 Device Property Sheet

Step 5. Click **OK**. This action adds the controller to the database, and the controller properties are updated.

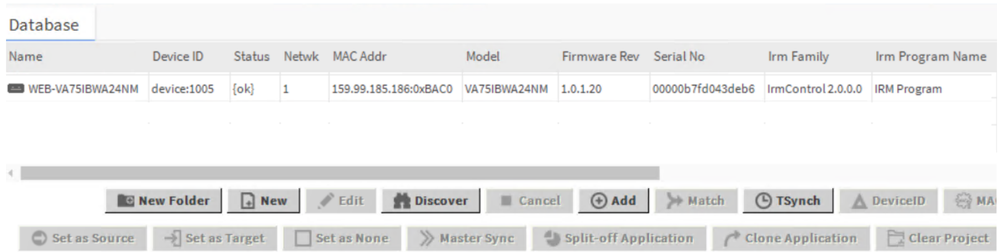


Fig. 217 Database view

Step 6. Verify the following properties of the added controller.

- Name
- Type
- Device ID
- Status
- Model
- Firmware Revision
- Serial Number
- Irm Family
- Irm Program Name
- Irm Application Type
- Irm Sync Status
- Irm Last Change
- Irm Master Sync

Step 7. Add the logic or application to the controller such as adding function block to wiresheet and creating logic or application.

Step 8. Perform the hardware compatibility check to ensure that the application is appropriately designed to run seamlessly in the created device. To perform hardware compatibility, refer to Check Hw Compatibility on page 179 and Check Application Compatibility on page 180.

Step 9. Click **Teach Full Application to Controller**.
If you want to match a BACnet device to a new IRM controller, or if you want to clear all previous configurations from the controller and download the new configuration.

Or

Click **Teach to Controller.**
If you want to modify an existing program in the controller.

Note: *If a large application is created in the controller, it is recommended to perform Teach Full Application To Controller.*

A notification message will appear. If there are any application inconsistencies between the offline and online devices, the control manager will indicate the relevant synchronization status.

To resolve any inconsistencies, synchronize the applications by performing any of the following actions:

- Clear Project
- Clear Controller
- Teach To Controller
- Learn from Controller
- Check Application Compatibility

Common Operations of IRM Program

This section explains the common operations you can perform during application engineering on IRM NX controller.

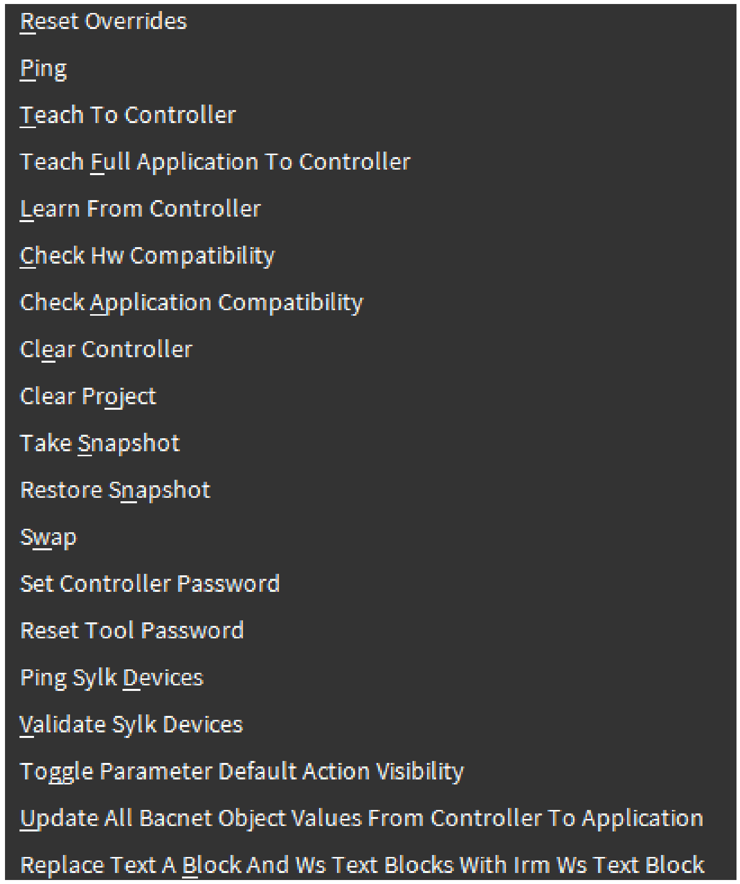


Fig. 218 Common operation of IRM Program

Following are the operation you can perform in IRM Program.

Table 27 Common operation of IRM Program

Operations	Descriptions
Reset Overrides	To fix override issues in the function block.
Ping	To check the connectivity between engineering tool and controller.
Teach To Controller	Downloads changes in the application of the project to the controller.
Teach Full Application To Controller	Downloads full application of the project to the controller.
Learn from Controller	Uploads current application from the controller to project.

Table 27 Common operation of IRM Program (Continued)

Operations	Descriptions
Check Hw Compatibility	Checks hardware compatibility Verifies the hardware configuration defined for the controller in the application is compatible with the physical controller.
Check Application Compatibility	Validates and compiles Sylk devices and checks application compatibility.
Clear Controller	Deletes the application from the controller.
Clear Project	Deletes the application from the project.
Take Snapshot	Backup the application.
Restore Snapshot	Restore the backup application to the project
Swap	Swap In- Restores saved application to RAM Swap Out- Makes app backup and swaps application out of RAM.
Set Controller Password	Set controller Password.
Reset Tool Password	Reset the password for a controller.
Ping Sylk Devices	Sylk ping verifies and displays status based on the connected Sylk device connected to the network.
Validate Sylk Device	It is used for validating the Sylk configuration in the application.
Toggle Parameter Default Action Visibility	To hide or show parameter default action.
Update All Bacnet Object Values from Controller to Application	Synchronize the controller values with the application values.
Replace Text A Block and Ws Text Blocks with Irm Ws Text Block	Convert any TextA Function Block to the IRMWsTextBlock Function Block.

Reset Overrides

Reset overrides fix the override issue in the function blocks. Any function block that have multiple links to the same slot can fall into override state, this is a Niagara behavior. Reset Overrides removes the multiple links from the same slot of the function blocks.

Steps to perform the Reset Overrides:

Step 1. Expand the **Station** > **Config** > **Drivers** > **Irm Bacnet device** > **IRM Program**.

Step 2. Right-click on the **IRM Program** > **Actions** > select **Reset Overrides**.
This action will remove the override state of the function block.

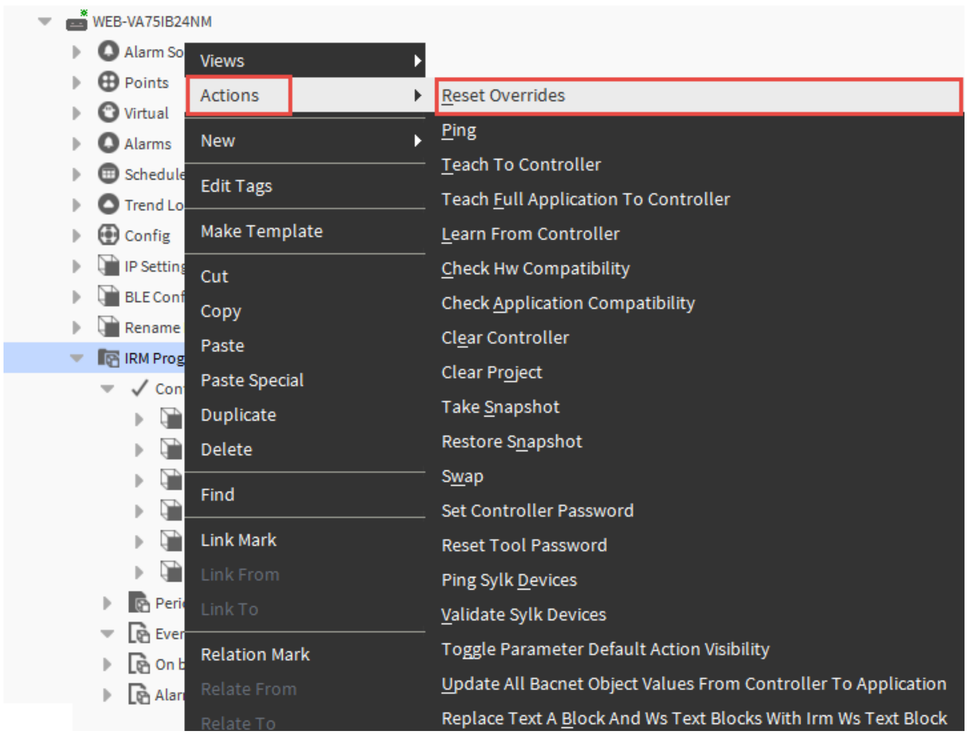


Fig. 219 Reset Overrides

Note: *In the latest tool, when adding a new link to the function block through the composite method, you will be notified by a popup message suggesting to delete either of the links if a link already exists in the slot.*

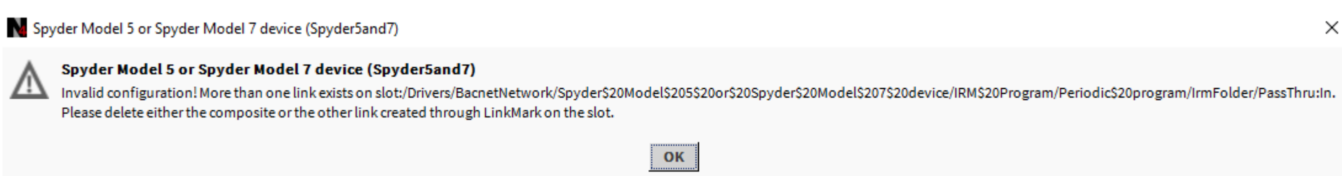


Fig. 220 Confirmation Dialog Box

Note: *Perform reset overrides before performing the full teach operation to avoid override issues in the function block.*

Remove the Links for a Single Function Block

This procedure allows you to remove the links for a single function block by performing the reset override operation.

Steps to perform the Reset Overrides for a single function block:

Step 1. Open the function block in the wire sheet view.

Step 2. Right-click on the function block > **Actions** > select **Reset Overrides**.

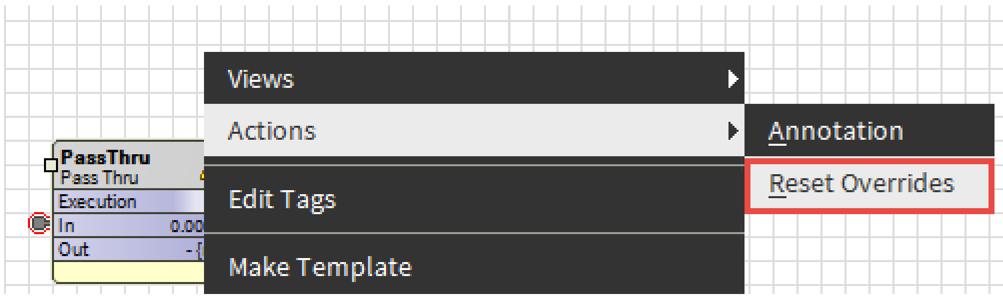


Fig. 221 Reset overrides for single function block

Remove the Links Manually

Steps to remove the link manually in the relation sheet:

Step 1. Open the function block in the wire sheet view.

Step 2. Right-click on the function block > **Views** > select **Relation Sheet**.

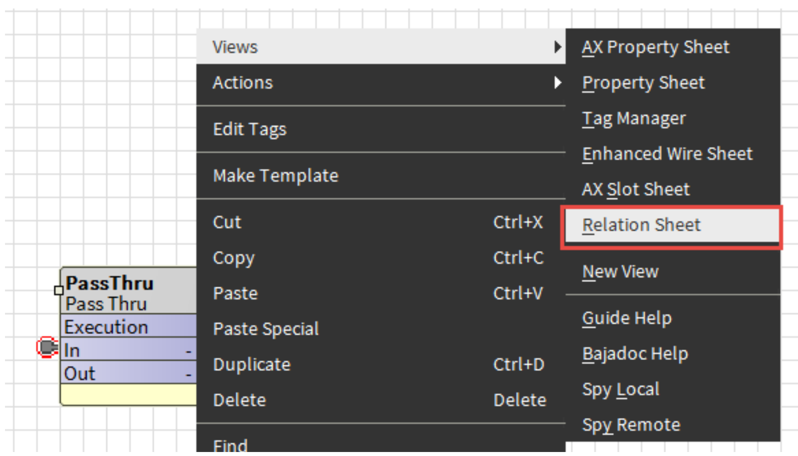


Fig. 222 Open the Relation sheet

Step 3. Find the repeated link, right-click on one of the links and click **Delete**.

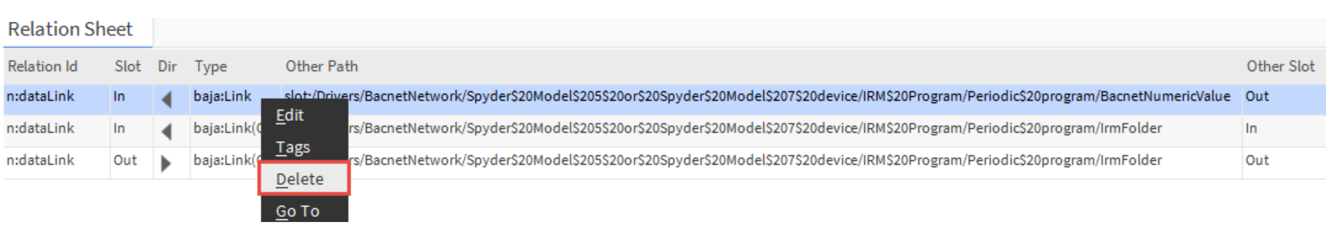


Fig. 223 Relation sheet

Ping

To check the connectivity between engineering tool and controller.

Steps to perform Ping:

Step 1. Right-click on **IRM Program**, click **Actions > Ping**.

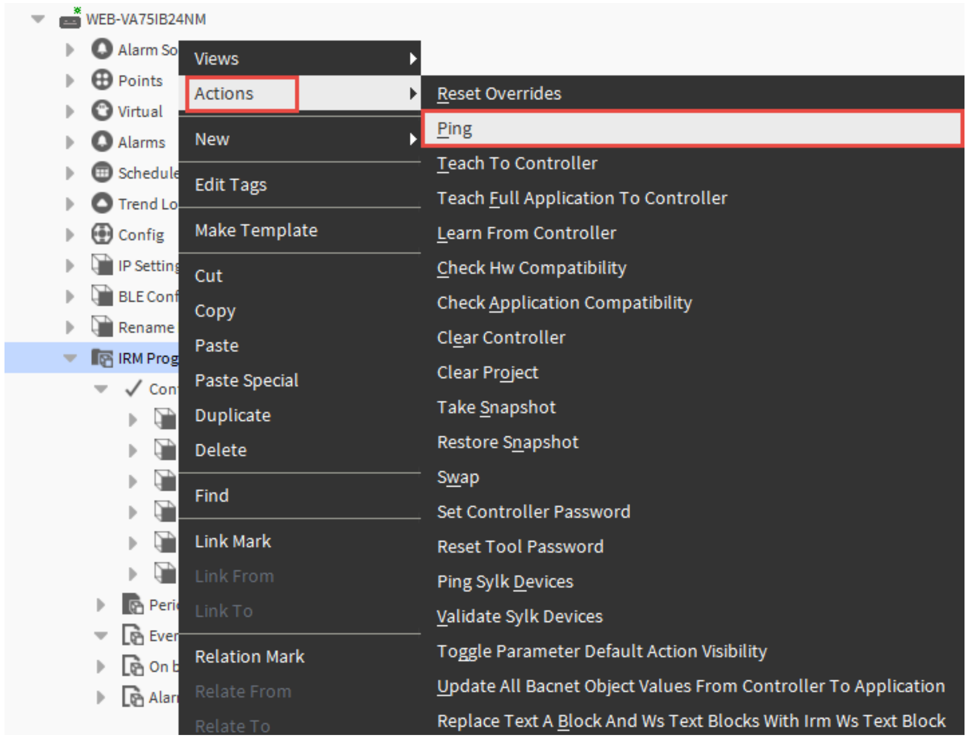


Fig. 224 Ping

Step 2. Click **OK**.

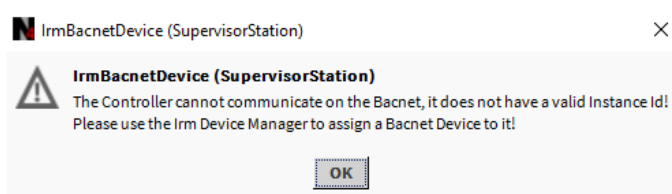


Fig. 225 Warning Message

Teach To Controller

Teach to controller downloads the changed application of the project to the controller. This can happen in two ways:

- **Immediate**: Changes are written to the controller automatically and are effective immediately.

Note: *When working in "Immediate" teach mode, no messages are displayed, and no changes are graphically indicated while changing applications.*

- **On demand**: Changes are written to the controller manually and are effective after "Teach to Controller" action.

Steps to perform Teach To Controller:

Step 1. Right-click on **IRM Program** > **Actions** > and then click **Teach to Controller**.

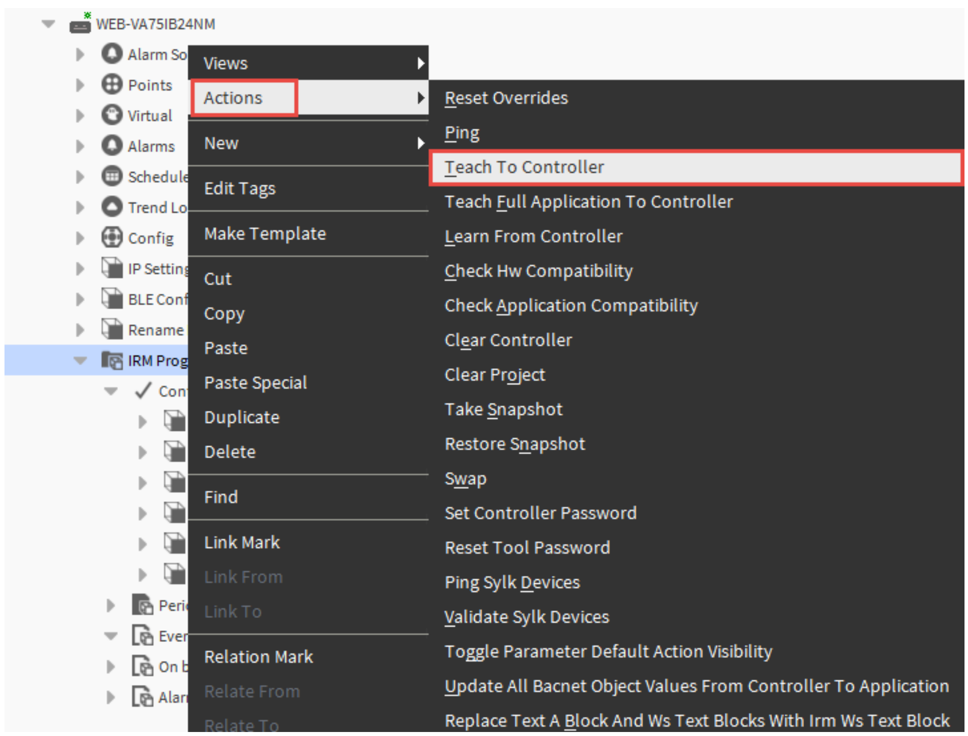


Fig. 226 Teach to Controller

Step 2. Select **Overwrite BACnet objects values in Device** or **Overwrite BACnet object values in Application.**

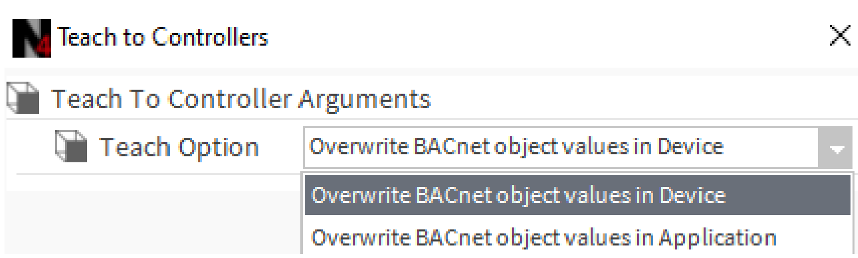


Fig. 227 Teach To Controllers Dialog Box

- **Overwrite BACnet objects values in Device**: This option overwrites Bacnet object values in the controller and teaches application to the controller.
- **Overwrite BACnet object values in Application:** This option update all Bacnet object values and default values from controller to application and, then it teaches the application to the controller.

Step 3. Click **OK.**
The changes are written to the controller, and the applications are synchronized. The successful action displays in the workbench job service**.**

Note: *Teaching full application to the controller may be required if the maximum APDU size and segmentation supported under device object properties are not updating in the controller, resulting in commissioning failures.*

Teach to Multiple Controllers

Perform “Teach to Controller” operation from “Irm Bacnet Device Manager” view to teach to changes of application to the multiple controller.

Steps to perform Teach on multiple controllers:

Step 1. Right-click on **BacnetNetwork** > **Views** > **Irm Bacnet Device Manager** view.

Step 2. Select all the controllers from the device list.

Step 3. Click **Teach to Controller.** This action opens teach to controller dialog box.

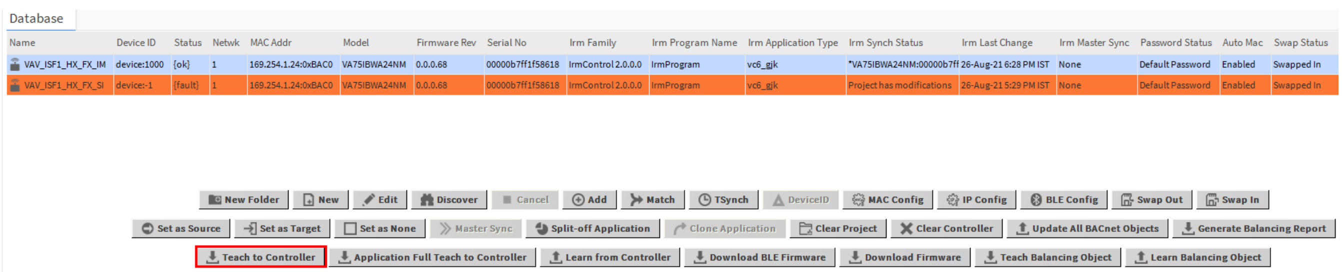


Fig. 228 Teach to Controller Dialog Box

Step 4. Select **Overwrite BACnet objects values in Device** or **Overwrite BACnet object values in Application.**

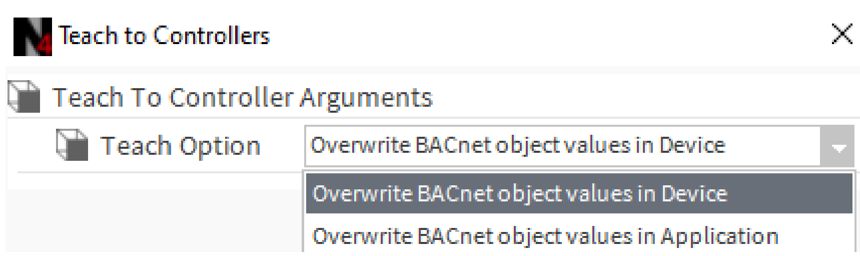


Fig. 229 Teach to Controllers dialog box

Step 5. Click **OK.**
The changes are written to the controller, and the applications are synchronized. The successful action displays in the workbench job service**.**

Teach Full Application To Controller

Teach Full Application To Controller deletes all existing configurations from the controller and downloads the new configuration to controller.

Note: *While performing teach full application to controller, it is recommended to keep a backup of the previous configuration.*

Steps to perform Teach Full Application To Controller:

Step 1. Right-click on **IRM Program** > **Actions** > click **Teach Full Application to Controller** in the context menu.

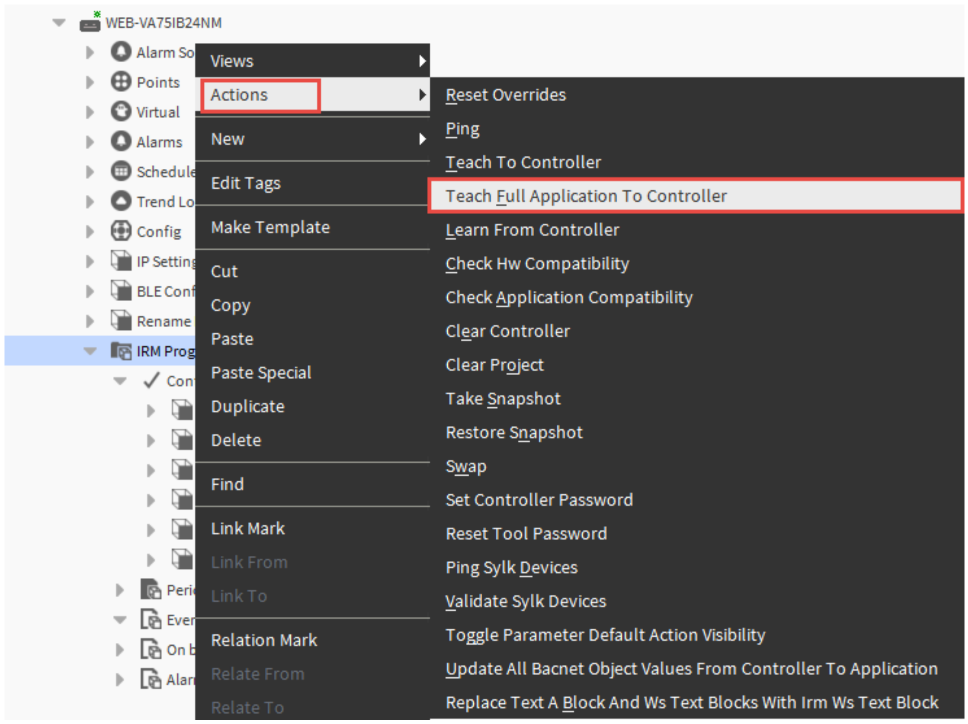


Fig. 230 Teach Full Application To Controller

Step 2. Select **Overwrite BACnet objects values in Device** or **Overwrite BACnet values in Application**.

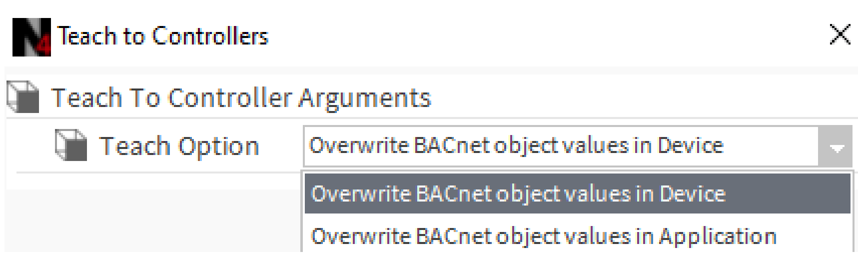


Fig. 231 Teach to Controllers dialog box

Step 3. Click **OK.**
The changes are written to the controller, and the applications are synchronized. The successful action displays in the workbench job service**.**

Application Full Teach to Multiple Controllers

Perform "Application Full Teach to Controller" operation from "Irm Bacnet Device Manager" view to downloads the new configuration to the multiple controller.

Steps to perform Application Full Teach on multiple controllers:

Step 1. Right-click on **BacnetNetwork > Views > Irm Bacnet Device Manager** view.

Step 2. Select all the controller from the device list.

Step 3. Click **Application Full Teach to Controller**. This action opens **Teach To Controller** dialog box.

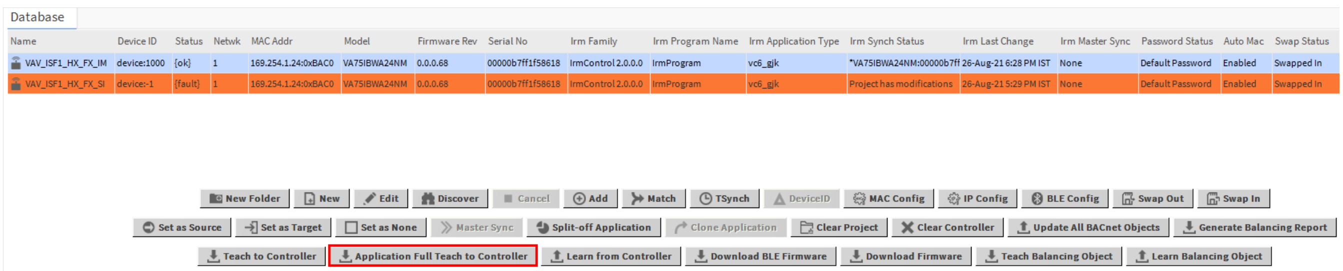


Fig. 232 Application Full Teach to Controller

Step 4. Select **Overwrite BACnet objects values in Device** or **Overwrite BACnet object values in Application.**

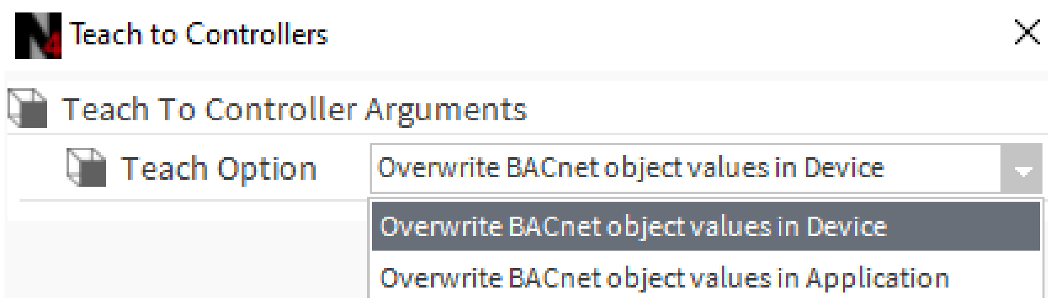


Fig. 233 Teach to Controllers dialog box

Step 5. Click **OK.**
The changes are written to the controller, and the applications are synchronized. The successful action displays in the workbench job service**.**

Overwrite Application Teach

Overwriting an application is permitted for all the controllers on Bacnet network.

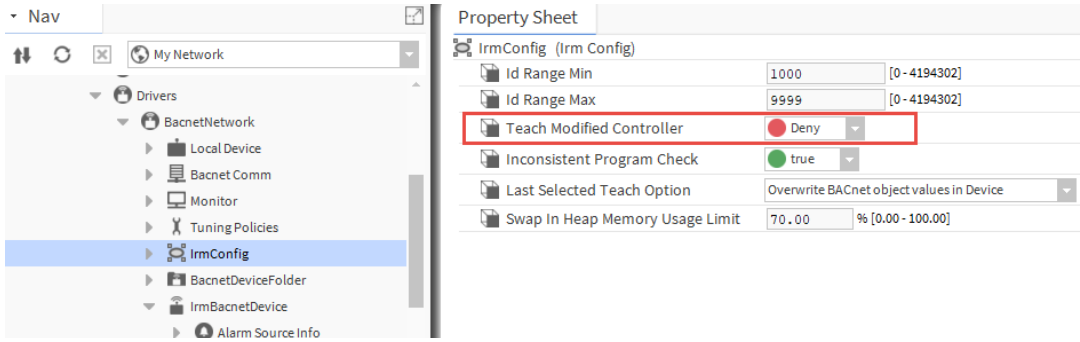


Fig. 234 Teach Modified Controller

- **Deny (Default value)**: Do not allow overwriting of an existing application in the controller. While trying to teach a different application to a controller, an error message is generated, requiring clearing the controller.
- **Allow**: Allows to overwrite an existing application.

Learn from Controller

Learn from Controller uploads the current application from the controller in the project.

Steps to perform Learn from Controller:

Step 1. Right-click on **IRM Program > Actions >** and then click L**earn From Controller** in the context menu.

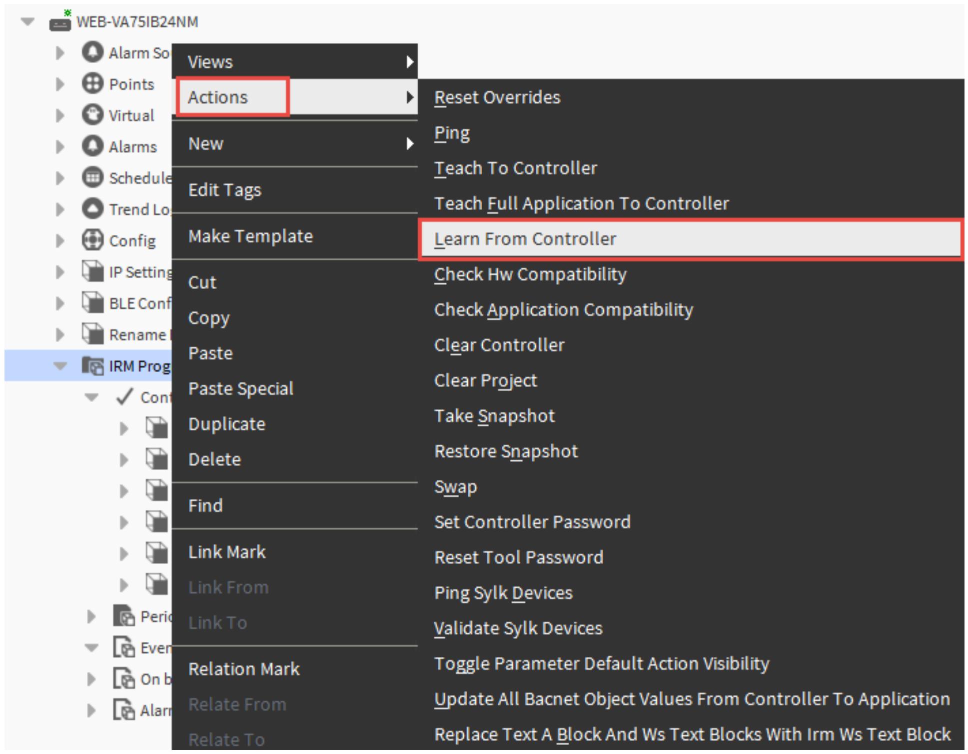


Fig. 235 Learn from Controller

The applications are uploaded to the controller, and the applications are synchronized. The successful action displays in the workbench job service**.**

Note: *When **Learning From Controller** is completed, the project's application is deleted.*

If the synchronization status is different, a message recommends either clearing the project (discard modifications) or teaching the controller (discard modifications in the controller).

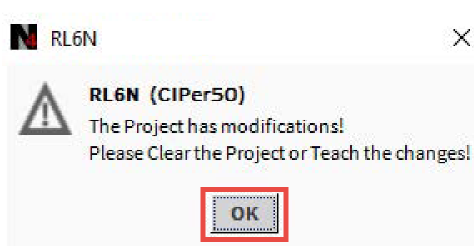


Fig. 236 Warning Message

Learn from Multiple Controllers

Perform “Learn from Controller” operation from “Irm Bacnet Device Manager” view to uploads all the changes of application from multiple controller to the project.

Steps to perform Learn from multiple controllers:

Step 1. Right-click on **BacnetNetwork > Views > Irm Bacnet Device Manager** view.

Step 2. Select all the controller from the device list.

Step 3. Click **Learn from Controller.** This action opens the learn from the controller dialog box.

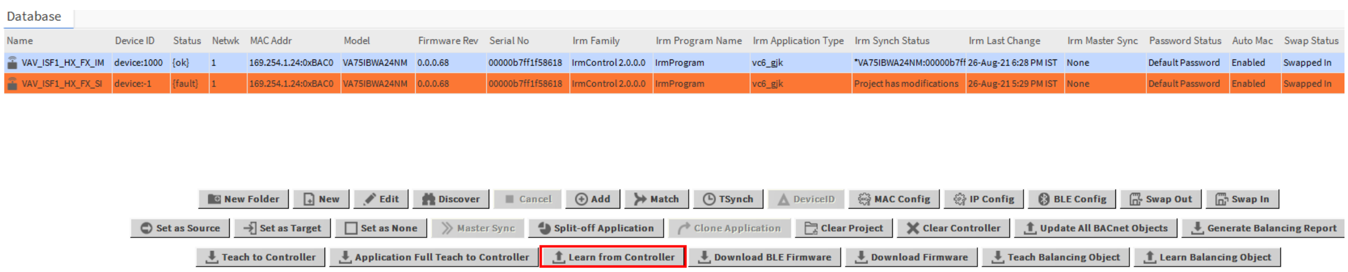


Fig. 237 Database Pane

Step 4. Click **Yes.**

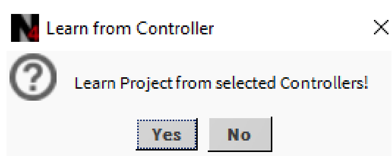


Fig. 238 Learn from Controller Dialog Box

The applications are uploaded to the controller, and the applications are synchronized. The successful action displays in the workbench job service**.**

Check Hw Compatibility

Using this option, you can check the hardware configurations and the hardware defined for the controller in the application. Any differences are indicated on the Hw compatibility job log.

Steps to perform Check Hw Compatibility:

Step 1. Right-click on **IRM Program** > **Actions** > and click **Check Hw Compatibility.**

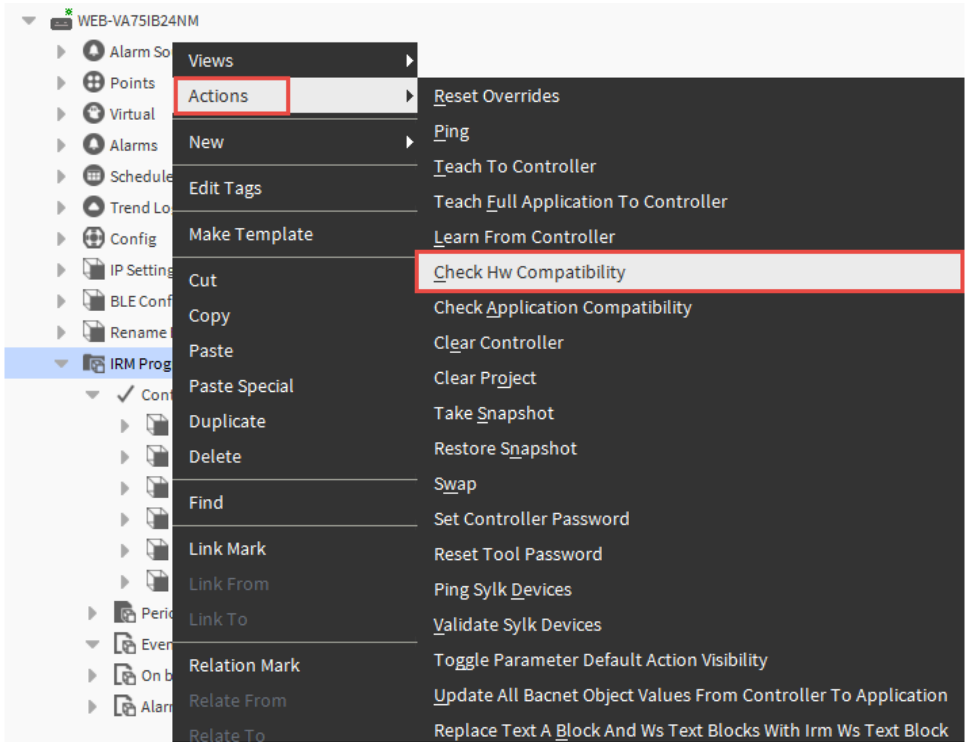


Fig. 239 Check Hw Compatibility

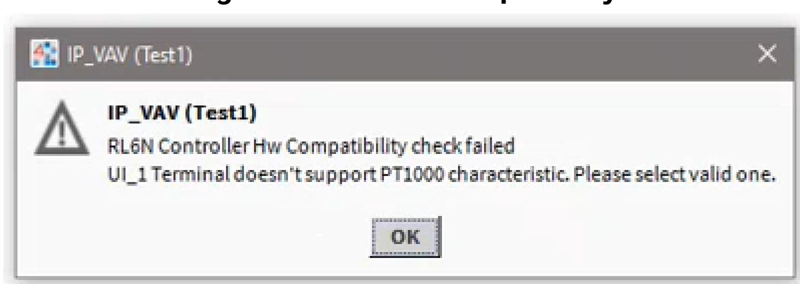


Fig. 240 Error message

Step 2. Click **OK**, then remove the incorrect or unused terminals.

Step 3. Perform **Teach the controller**.

The successful action displays in the workbench job service.

Note: *The user can view the error details by double-clicking on the job log.*

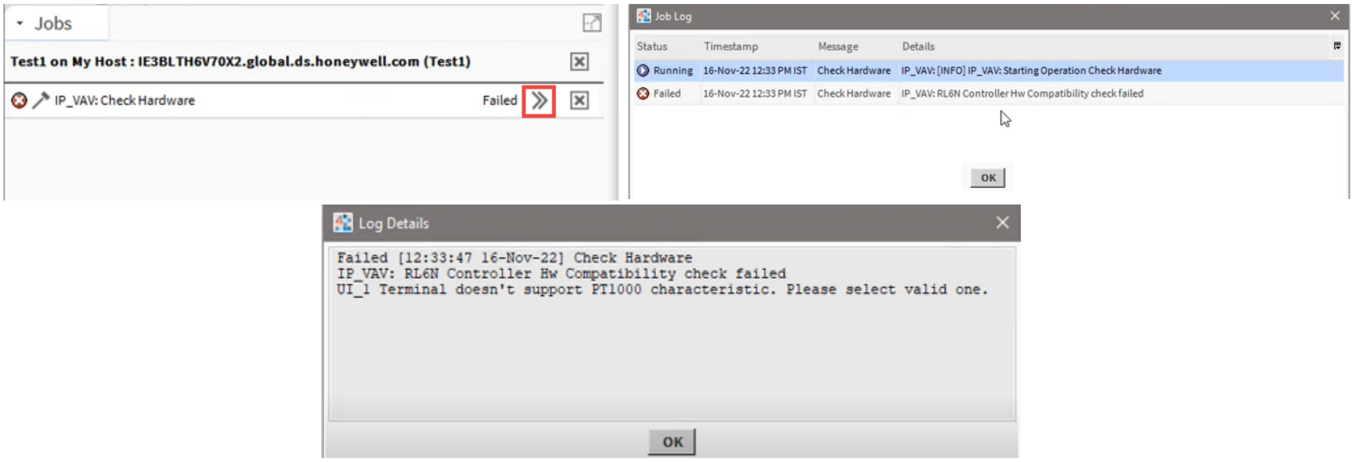


Fig. 241 Job Log and Log Details

Check Application Compatibility

Check the application's compatibility for the IRM NX controller.

Steps to perform Check Application Compatibility:

Step 1. Right-click on **IRM Program** > **Actions** > and click **Check Application Compatibility**.

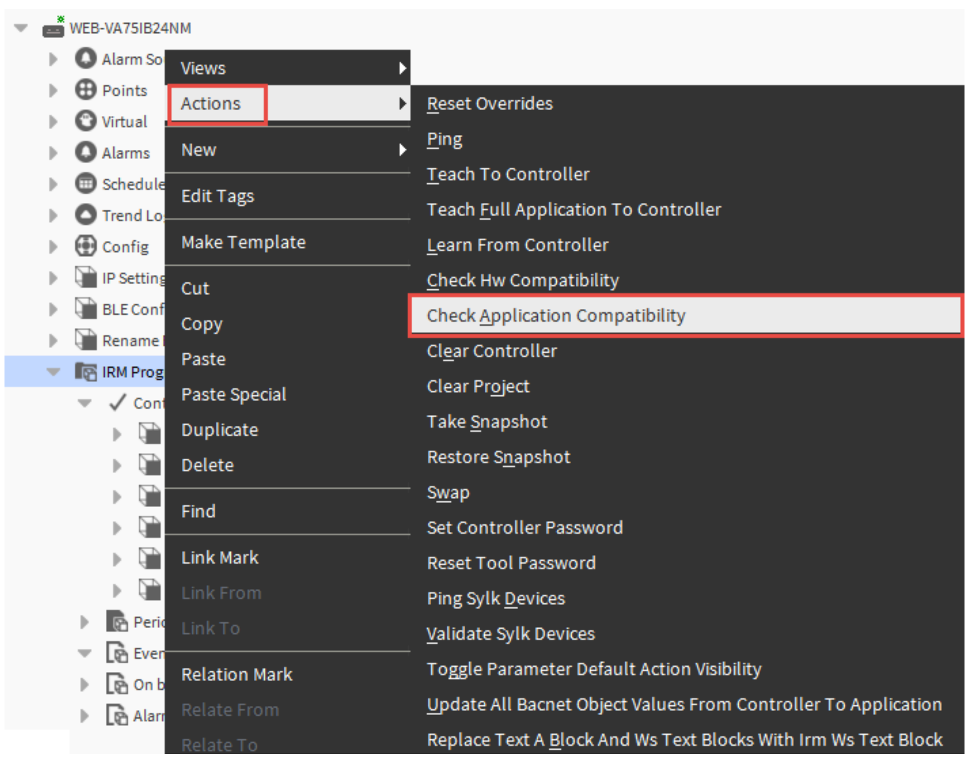


Fig. 242 Check Application Compatibility

Clear Controller

The clearing controller deletes the entire project from the controller.

Note: *While clearing the controller and loading the Sylk configuration to the controller (proxy file to the controller), 20 VDC output will turn off for 30 seconds. All I/O terminals will be down for 30 seconds. It will only happen when CentraLine-N4 changes the Sylk application or deletes the application from the controller. It will not happen once the application teach completes and the controller is running.*

Steps to perform Clear Controller:

Step 1. Right-click on **IRM Program** > **Actions** > and then click **Clear Controller** in the context menu.

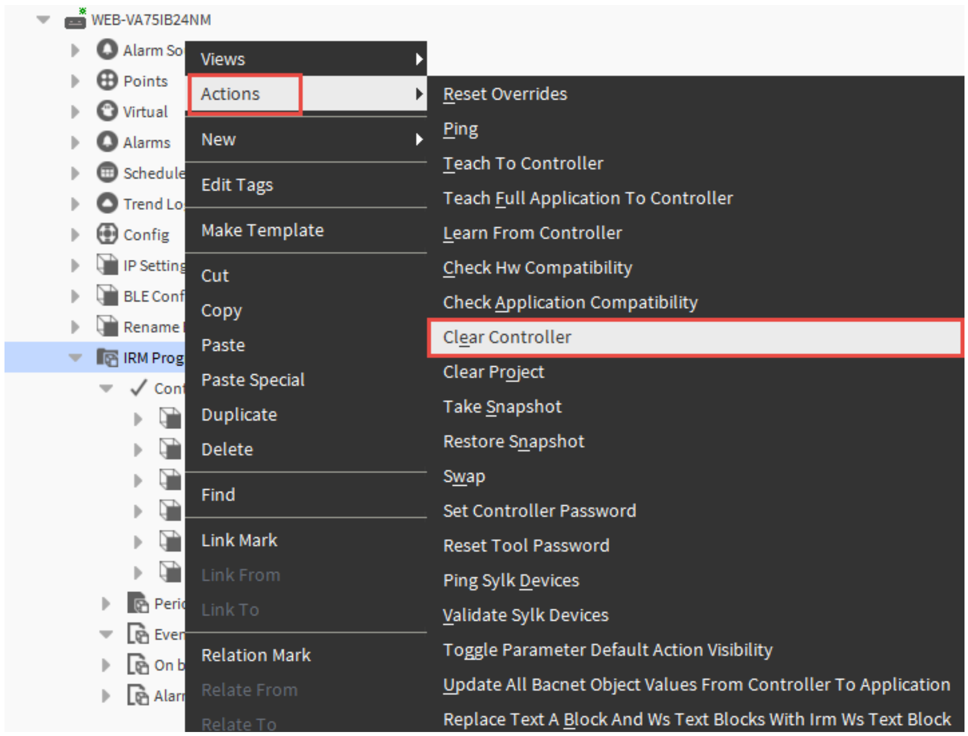


Fig. 243 Clear Controller

Step 2. Click **Yes** to delete the project from the controller.

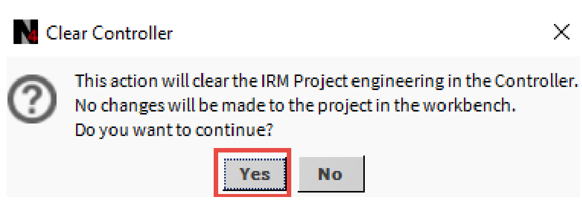


Fig. 244 Clear Controller confirmation

Clear Multiple Controllers

Use the "Clear Controller" operation from the "Irm Bacnet Device Manager" view to delete the entire project from the multiple controllers.

Steps to perform Clear multiple controllers:

Step 1. Right-click on **BacnetNetwork > Views > Irm Bacnet Device Manager** view.

Step 2. Select all the controllers from the device list.

Step 3. Click **Clear Controller.** This action opens the clear controller dialog box.

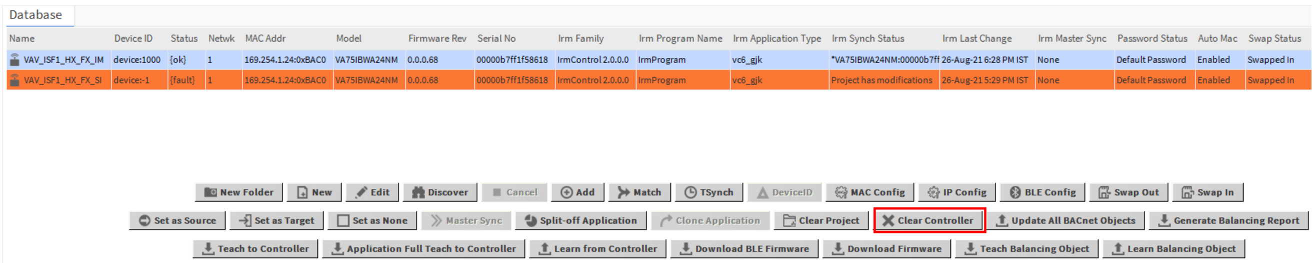


Fig. 245 Database Pane

Step 4. Click **Yes.**
The application is removed from all the selected controllers. Workbench job service displays the successful action.

Clear Project

The clear project operation removes all engineering programs from the project of the controller.

Steps to perform the Clear Project:

Step 1. Right-click on **IRM Program > Actions >** and then click **Clear Project** in the context menu.

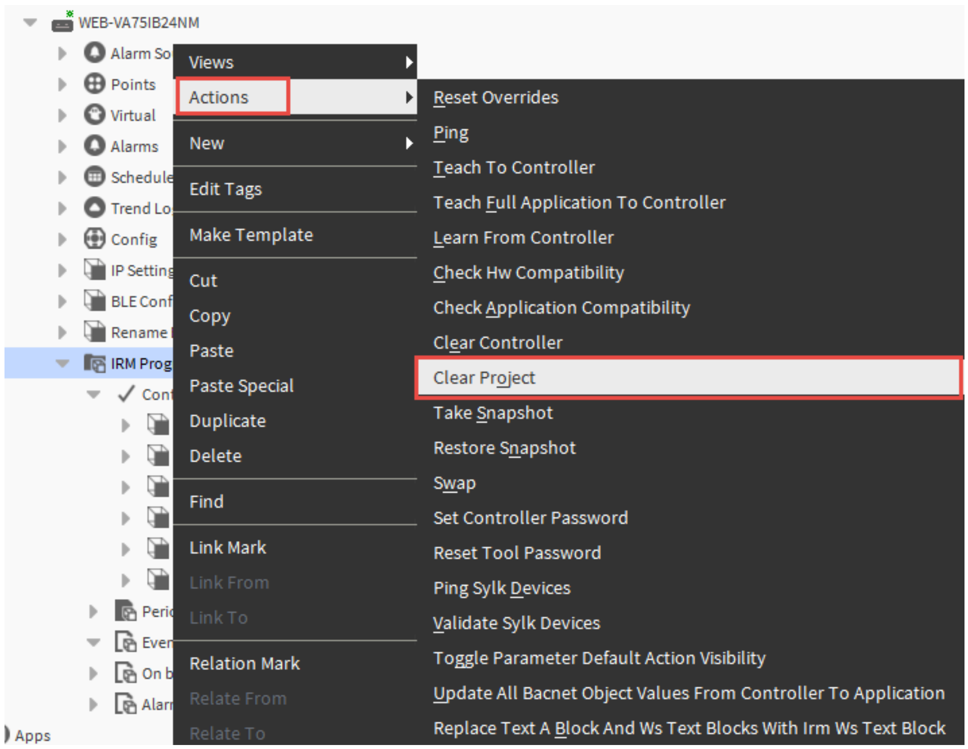


Fig. 246 Clear Project

Step 2. Click **Yes** to clear the engineering project from the controller.

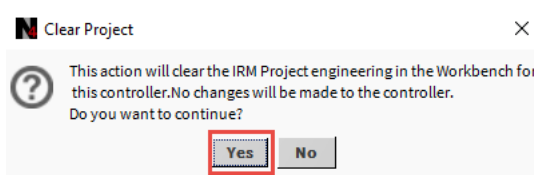


Fig. 247 Clear Project confirmation

Clear Project from Multiple Controller

Use the "Clear Project" operation from the "Irm Bacnet Device Manager" view to clear the engineering project from the multiple controllers.

Steps to perform Clear Project on multiple controllers:

Step 1. Right-click on **BacnetNetwork > Views > Irm Bacnet Device Manager** view.

Step 2. Select all the controllers from the device list.

Step 3. Click **Clear Project**. This action opens the clear controller dialog box.

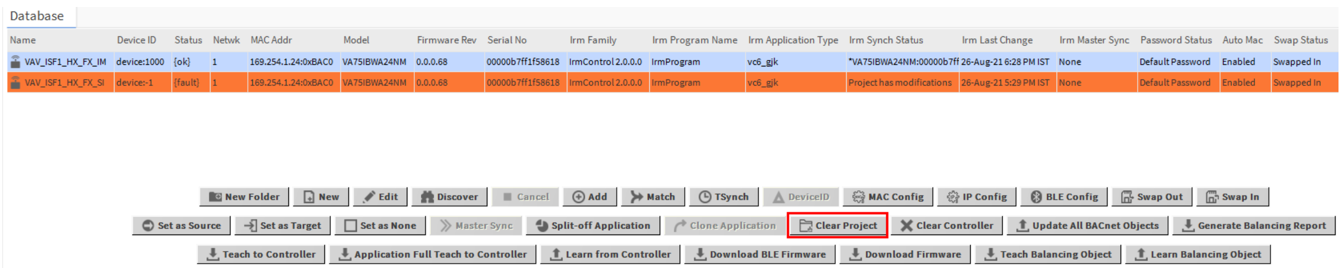


Fig. 248 Database Pane

Step 4. Click **Yes.**

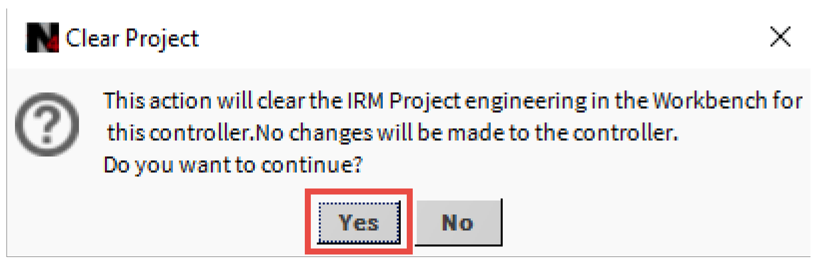


Fig. 249 Clear Controller Dialog Box

The application is removed from all the selected controllers. Workbench job service displays the successful action.

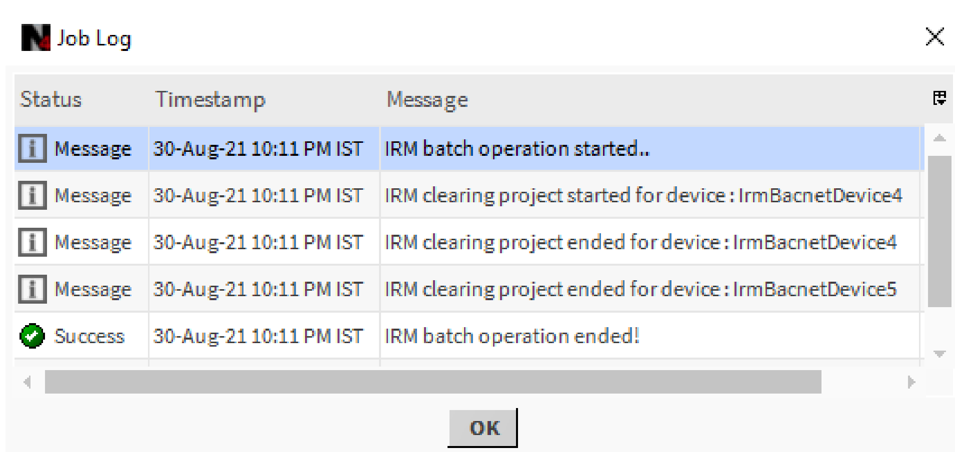


Fig. 250 Job Log

Take Snapshot

The Take Snapshot feature allows back up the current application's state and can be restored later.

Steps to perform Take Snapshot:

Step 1. Right-click on **IRM Program** > **Actions** > click **Take Snapshot** in the context menu.

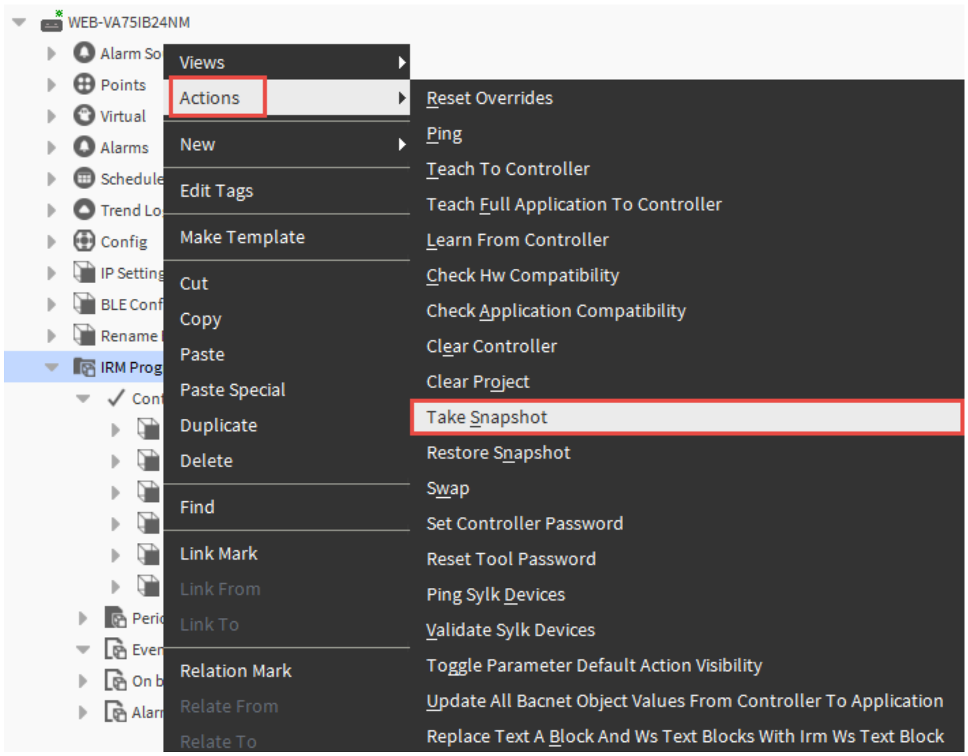


Fig. 251 Take Snapshot

The application is backed up. Workbench job service displays the successful action.

Restore Snapshot

The Restore Snapshot feature allows you to restore the backup. It allows you to restore an application if you want to discard changes.

Steps to perform Restore Snapshot:

Step 1. Right-click on **IRM Program > Actions >** and click **Restore Snapshot**.

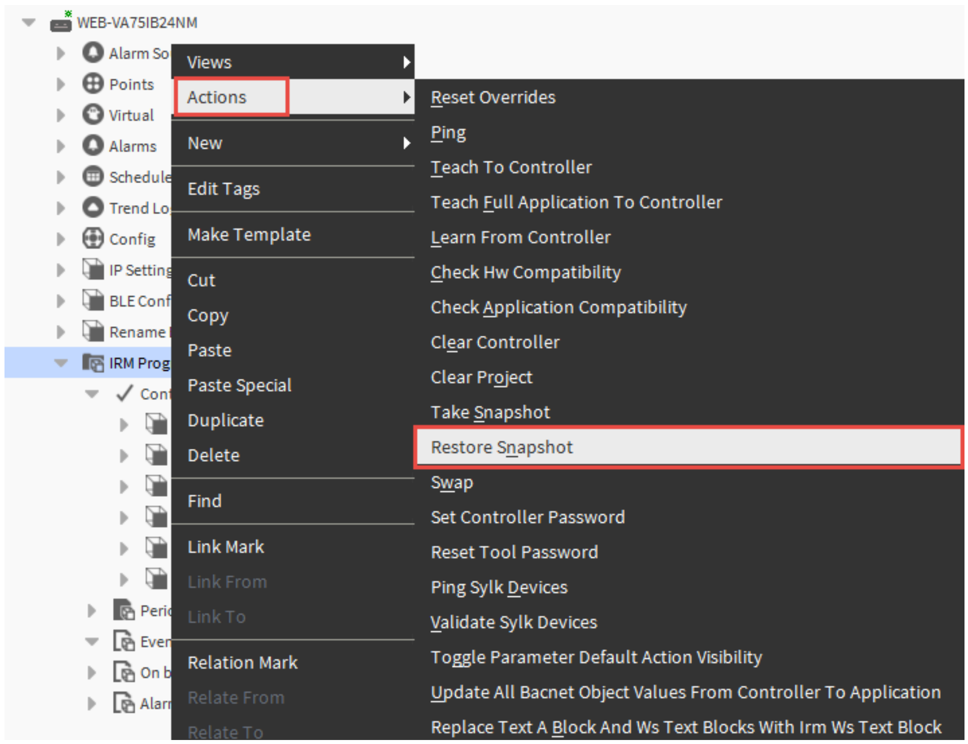


Fig. 252 Restore Snapshot

Step 2. Select the required backup file (*.bog file)* and click **OK.**

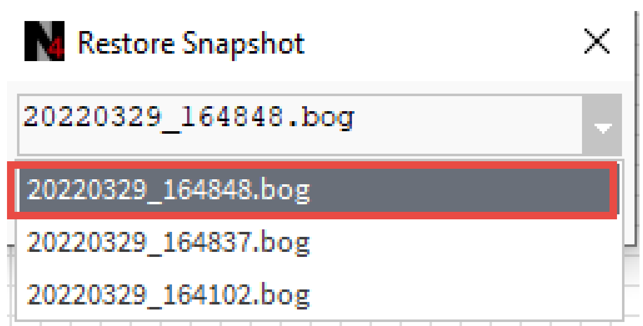


Fig. 253 Selecting backup file

The application is restored. Workbench job service displays the successful action.

Swap

The Swap features allows to reduce the processing load of the station.

Important: *It is strongly recommended to swap-out the application after finishing the engineering in online or offline mode.*

Note: *Synchronization does not work for swap-out devices. The devices must be swapped-in again to synchronize. You can swap single devices or multiple devices at once.*:

Steps to perform Swap on a controller:

Step 1. Right-click on **IRM Program** > **Actions** > and click **Swap**.

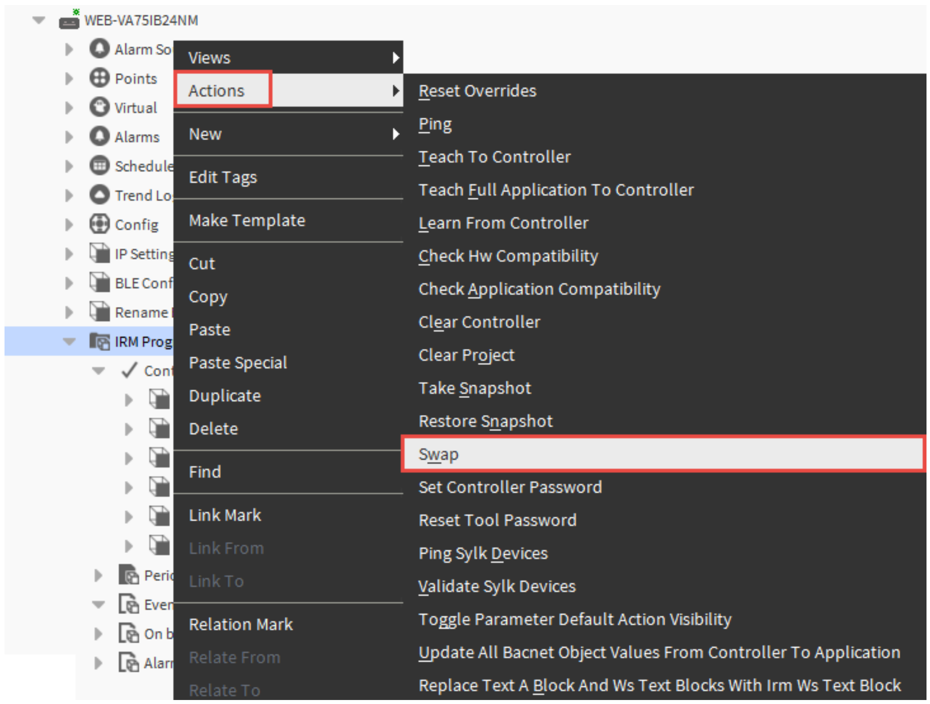


Fig. 254 Swap

The device displays the minimum information when an online or offline device is swapped out. In swap-out state, the controller data is saved on the PC disk.

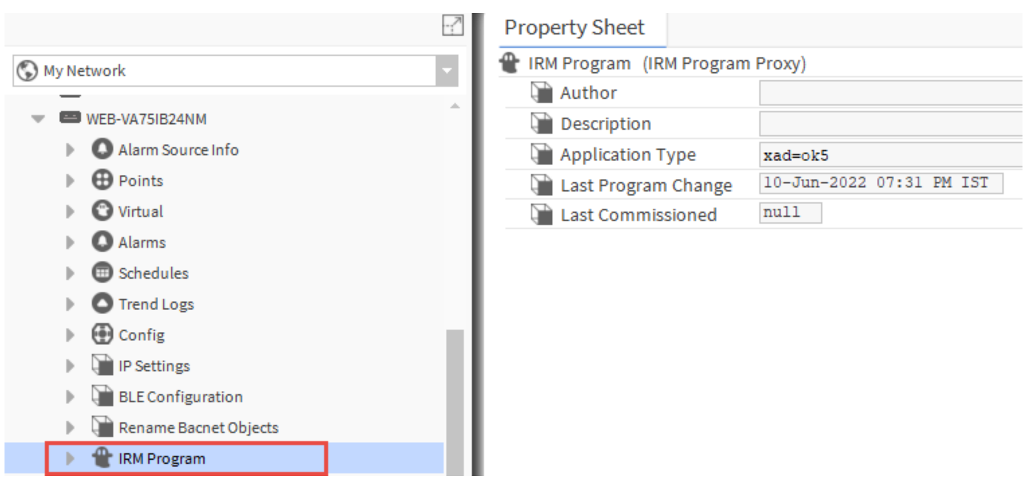


Fig. 255 Swap-out State

To swap-in the device, right-click on **IRM Program** > **Actions** > and click **Swap** in the context menu.

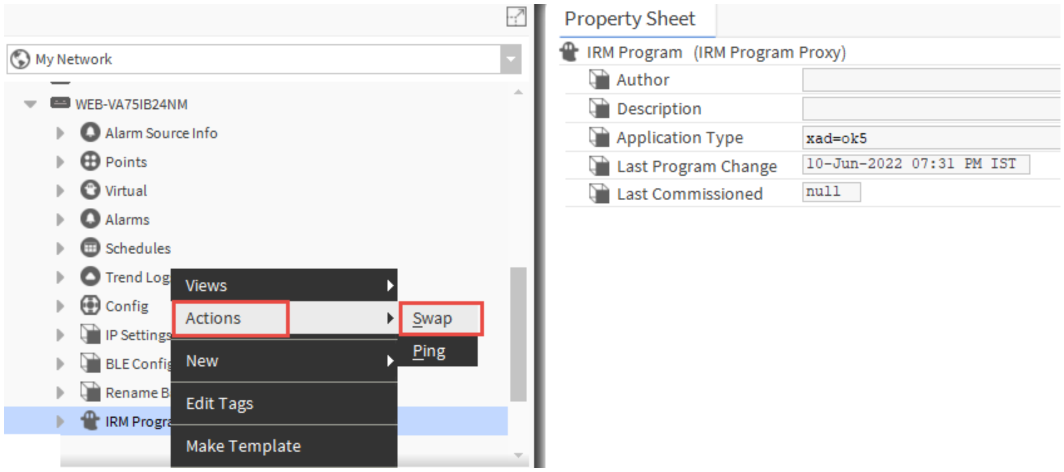


Fig. 256 Swap-In State

After performing the swap-in on the device, all of the device's properties are displayed in the IRM Program.

Swap Out Multiple Controllers

If you want to “Swap Out” multiple controllers under Bacnet network, follow the below steps.

Steps to perform Swap Out on multiple controllers:

Step 1. Right-click on **BacnetNetwork** > **Views** > **Irm Bacnet Device Manager** view.

Step 2. Select desired controllers from the device list.

Step 3. Click **Swap Out**.This action displays Swap Out dialog box.

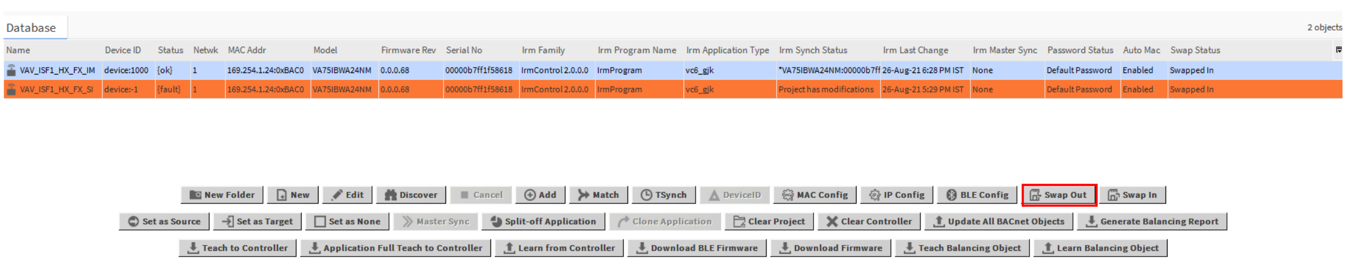


Fig. 257 Database pane

Step 4. Click **Yes.**

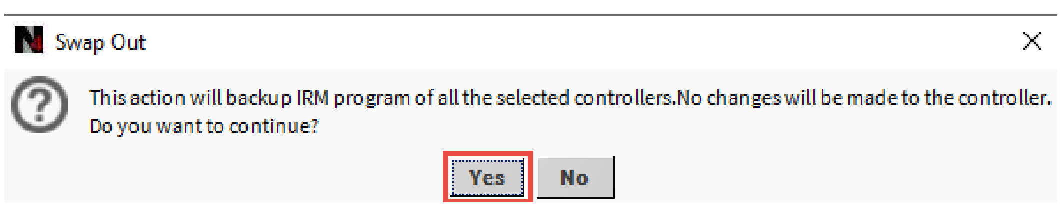


Fig. 258 Swap Out Dialog Box

The successful swap-out is displayed in the workbench job service.

To “Swap In” multiple controllers under Bacnet network, follow the below steps.

Steps to perform Swap In on multiple controllers:

Step 1. Right-click on **BacnetNetwork** > **Views** > **Irm Bacnet Device Manager** view.

Step 2. Select the desired controllers from the device list.

Step 3. Click **Swap In**. This action displays Swap In dialog box.

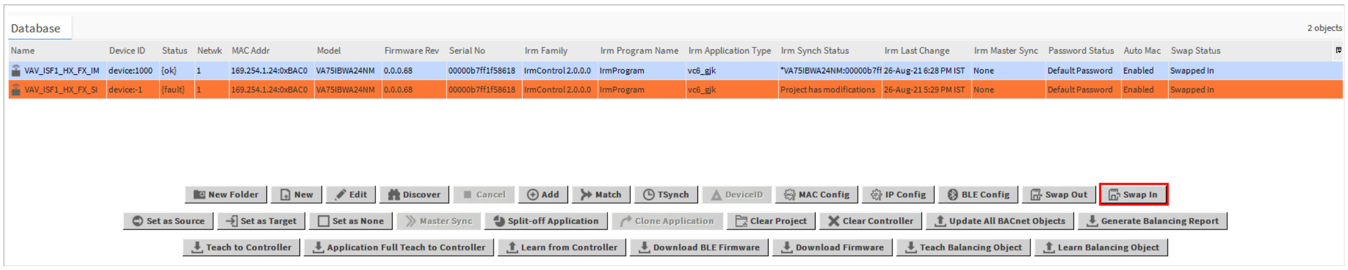


Fig. 259 Database pane

Step 4. Click **Yes.**

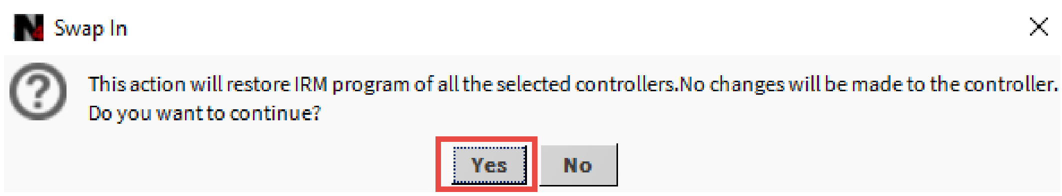


Fig. 260 Swap In dialog box

The devices are swapped in. The successful swap-in is displayed in workbench job service.

Swap Out All Controllers

If you want to “Swap Out” all the controllers under Bacnet network, follow the below steps.

Steps to perform Swap Out on all controllers:

Step 1. Expand the Bacnet network.

Step 2. Right-click on **IRM Program** > **Actions** > click **Swap Out.**

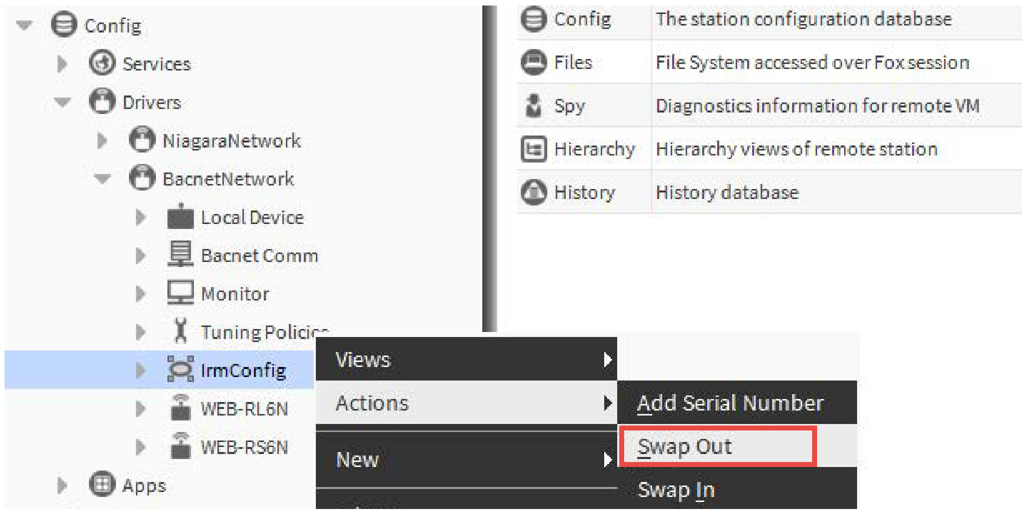


Fig. 261 Swap Out

To “Swap In” all the controllers under Bacnet network, follow the below steps.

Steps to perform Swap In on all controllers:

Step 1. Right-click on the **IrmConfig folder** > **Actions** > click **Swap In**.

Fig. 262 Swap In

Set Controller Password

The Set Controller Password allows you to set tool and controller passwords for secure commissioning communication.

Secure commissioning communication is introduced for IRM NX controller commissioning, beginning with controller firmware version 1.0.1.9 and engineering tool version 1.0.1.7. The controller and engineering tool version 1.0.1.7 use an invisible default password in the initial state (default factory setup).

Note: *Resetting the controller password means conducting a manual factory reset for every controller. The engineering tool and the IRM NX controller must share the same password to communicate.*

Note: *When switching projects or discovering IRM controllers, the passwords may need to be re-entered on one or both sides. Passwords may be set using the engineering tool's set password for function. The password can be set just for the “Tool” or the “Tool And Controller”.*

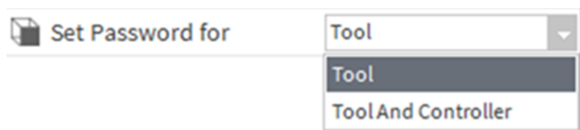


Fig. 263 Set Password Option

Steps to Set Password for single controller:

To set the password, right-click on **BacnetNetwork** > **Views** > **Set Controller Password**.

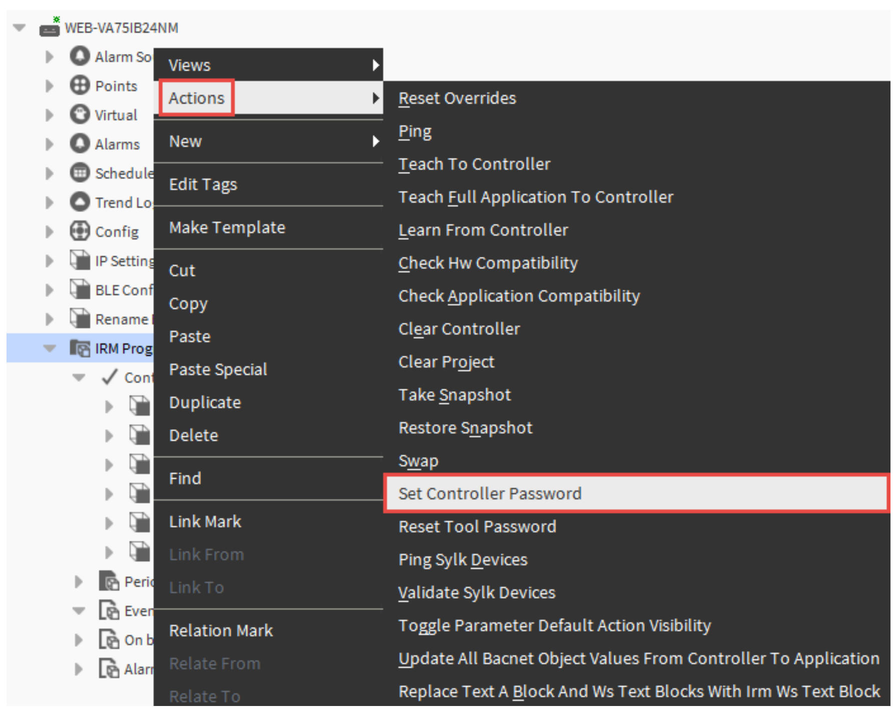


Fig. 264 Set Controller Password

Step 2. In the Set Controller Password window, enter the **New Password, Repeat New Password**, and select the **Tool** or **Tool And Controller** option.
While creating password follow the password requirement mentioned in the Hint.

Click **OK**

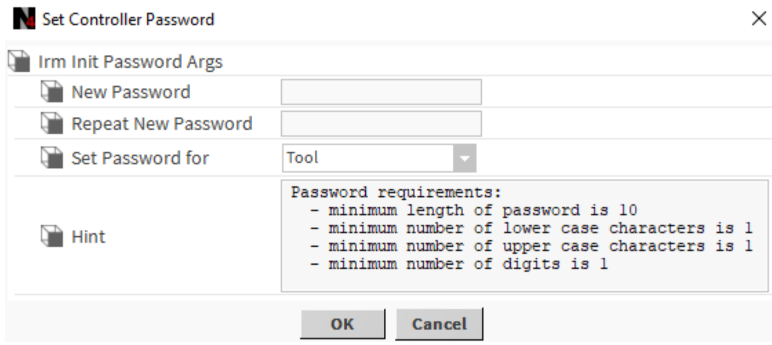


Fig. 265 Set Controller Password

Setting Password for all Controllers

If you want to set the password for all of the controllers, follow the steps below.

Steps to Set Password for all controllers:

Step 1. Expand the **BacnetNetwork.**

Step 2. Right-click on **IrmConfig** > **Actions** > click **Set Controller Password.**

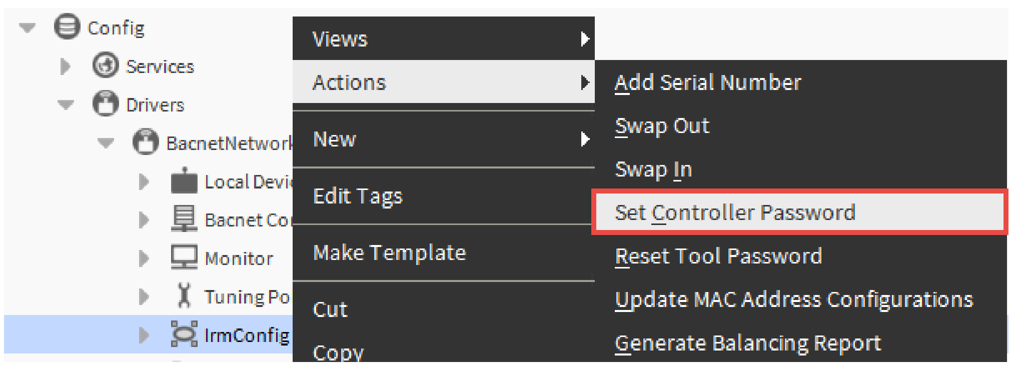


Fig. 266 Set Controller Password

Step 3. Click **Yes**.

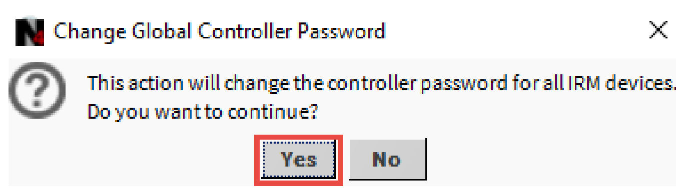


Fig. 267 Change Global Controller Password dialog box

Step 4. Enter the **Old Password, New Password, Repeat New Password,** and **Set Password for** the tool or tool and controller.

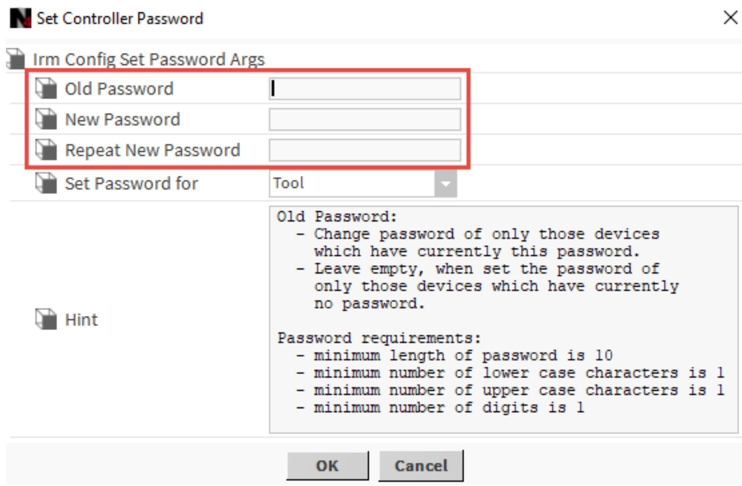


Fig. 268 Set Controller Password

Step 5. Click **OK.**

To ensure that the password in the controller and the engineering tool is same, use **Set Password for** function to select where the password should be changed.

Note: *If you are creating a password for the first time, the old password field should be empty.*

Reset Tool Password

The Reset Tool Password feature allows to reset the controller password.

Steps to reset controller password:

Step 1. Navigate to the **Station** > **BacnetNetwork** > **IrmBacnetDevice** > select I**RM Program.**

Step 2. Right-click on **IRM Program** > **Actions** > **Reset Tool Password**.

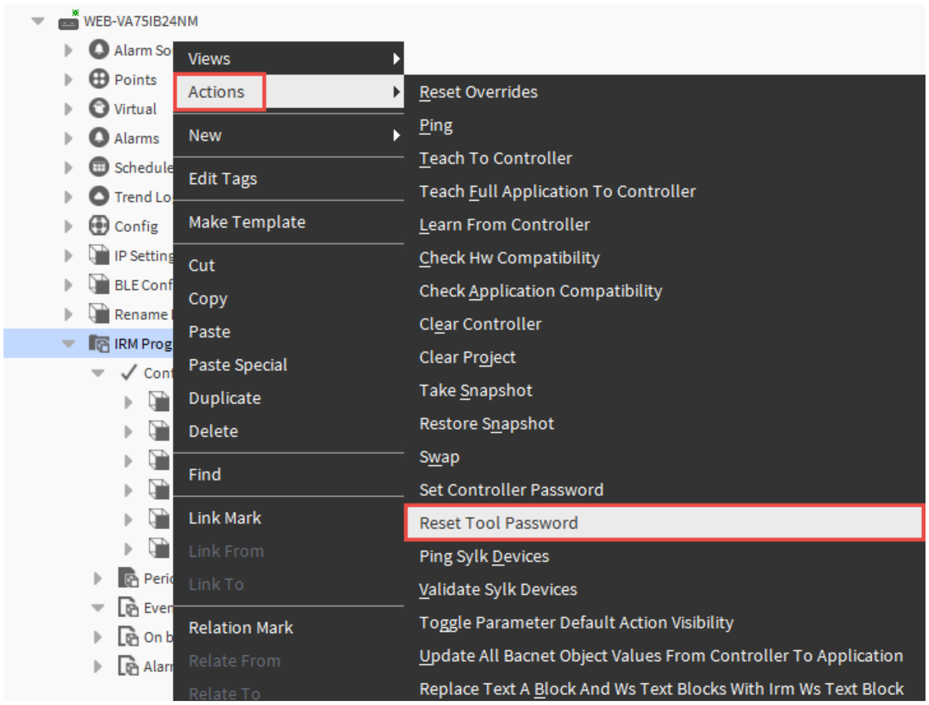


Fig. 269 Reset Tool Password

Step 3. Enter the **Old Password** and click **OK.**

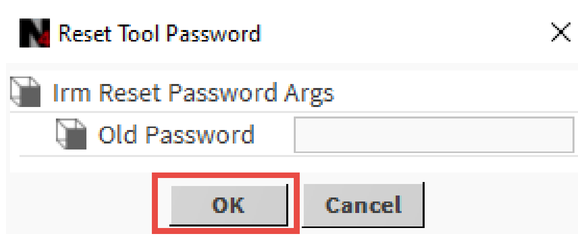


Fig. 270 Reset Tool Password

Note: *A controller password can only be reset by performing a factory reset. Refer to* Reset to Factory Default on page 352.

Reset Password for all Controllers

If you want to reset the password for all of the controllers, follow the steps below.

Steps to reset password for all controllers:

Step 1. Navigate to **BacNetwork** and right-click on **IRMConfig** > **Actions** > **Reset Tool Password**.

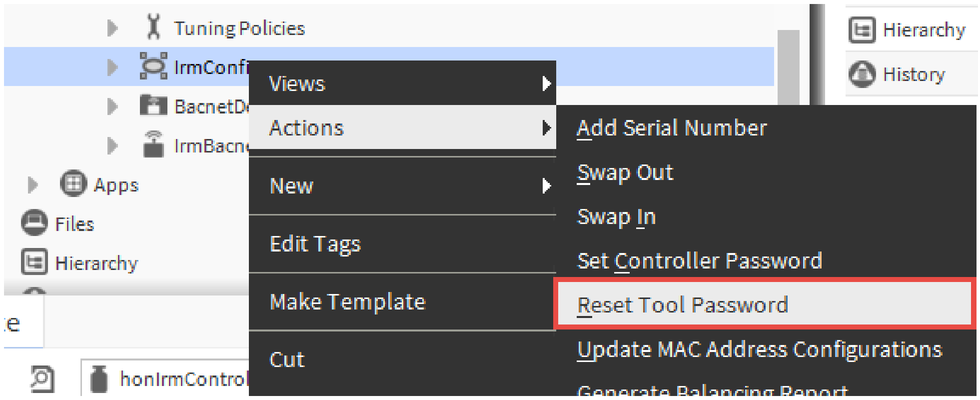


Fig. 271 Reset Tool Password

Step 2. Enter the **Old Password** and click **OK.**

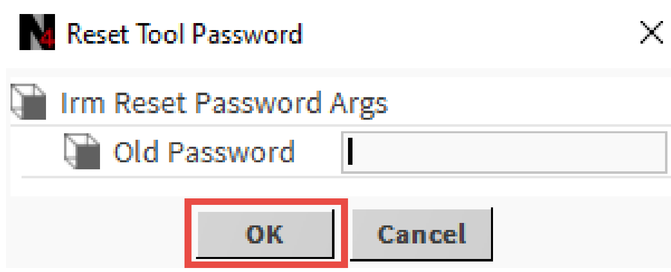


Fig. 272 Reset Tool Password

Note: *A controller password can only be reset by performing a factory reset. Refer to* Reset to Factory Default on page 352.

Password reset use cases

The table below depicts many use cases for changing setting the controller's password.

Table 28 Use Cases for Password Reset

Use Case	Firmware version ≥ 1.0.1.9	Engineering Tool ≥ 1.0.1.7	Description
User commissioning the controller for first time	New controller connected to Bacnet network. The device is discovered and added to the Irm device manager view for the first time.	The device is discovered and added to the Irm device manager view for the first time. The default password is used	The default password is used for teach / learn / ping / clear controller. For commissioning, use the default password and then input the user-defined password. Keep the user-defined password secure for future use. Without a user-defined password, it is impossible to read / learn the application logic from the controller. Set a user-defined password in the Bacnet program actions menu by selecting set controller password. Reset the user-defined password to the default password using the set controller password option in the Bacnet program actions menu.
Set common user defined password for all controller	New controller connected to Bacnet network. Default Password is set from the factory.	The device is discovered and added to the Irm device manager view for the first time. In the engineering tool and all controllers, the default password is automatically assigned.	The default password is used for teach / learn / ping / clear controller. The user can set the user-defined password in the engineering tool and all controllers. Users should use the set controller password actions menu of IrmConfig in Bacnet network. When a user-defined password is created for the first time, the Old Password field remains empty.
Change common user defined password for all controllers	Existing controllers. The user previously specified the password during commissioning.	The engineering tool has the same user-defined password as all controllers. The users want to change the user-defined password in all controllers.	The existing user-defined password is used for teach /learn / ping / clear controller. Users can change the user-defined passwords in all controllers. Users should use the set controller password actions menu of IrmConfig in Bacnet network. The old and new passwords must be entered.

Table 28 Use Cases for Password Reset (Continued)

Use Case	Firmware version ≥ 1.0.1.9	Engineering Tool ≥ 1.0.1.7	Description
Application modification in the controller by another user	Existing controllers. The user previously specified the password during commissioning. All the controllers have a user-defined password.	User 2 discovers the devices and add them devices into the Irm device manager.	• The user-defined password is set by User 1. • User 2 uses the different user-defined passwords and gets the error message (There is an error in controller communication. It could be a password mismatch in the controller and station). User 2 can not teach / learn / ping /clear the controller until the user-defined password from user 1 is set in the engineering tool. All engineering operations can be performed after entering User 1 defined password. ***Important:*** *If the user-defined password is forgotten, the controller must be factory reset and re-commissioned.*
Modify application in existing controller with the same station	Existing controllers. The user-defined password is already set	Existing station. The user-defined password is already set.	All engineering operations can be performed.
Modify application in existing controller with other station	Existing controllers. User-defined password is already set	Another station. The user-defined password is already set. The user-defined password does not match with the password set in the controller.	The user gets an error in the job log and dialog box while performing teach / ping / learn. There is a problem with controller communication. There may be a password mismatch between the controller and the station. **Solution:** In the engineering tool, reset the user-defined password. Set the user-defined password that will be used in the controller and the engineering tool.

Table 28 Use Cases for Password Reset (Continued)

Use Case	Firmware version ≥ 1.0.1.9	Engineering Tool ≥ 1.0.1.7	Description
Modify application with the new station	Existing controllers. The user-defined password is already set.	New station devices are discovered and added into station database. Default user password is set in the engineering tool.	The user gets an error in the job log and dialog box while performing teach / ping / learn. There is a problem with controller communication. There may be a password mismatch between the controller and the station. **Solution:** Reset user-defined password in the engineering tool. Default user passwords will be used in the engineering tool.
Replace the damaged controller with the new controller from the factory.	New controller Default user password is set from the factory.	Users use the same station to configure the controller again. In station, the user-defined password is set.	User cannot perform teach /learn / ping / clear controller. **Solution 1:** Reset the user-defined password in the engineering tool. Default user passwords will be used in the engineering tool. Then do the match between the controller in the engineering tool and the new controller added in the network. Set user-defined password again. **Solution 2:** Backup of the application logic using engineering tool. Delete the controller from the database within the engineering tool. Add the newly discovered device into the station database and restore the backup. ***Note:*** *After replacing a damaged controller with the new controller, you can either commission the application already present in the station or replace the database device with backed-up device data.* When restoring the application using the device already present in the station, please ensure you put the device in the database into the "Swapped In" mode. After swapping logic backed up in the controller, the repository will be made available in the station database. The user can commission the newly replaced device. To learn more about device swapping, refer to Swap on page 187.

Table 28 Use Cases for Password Reset (Continued)

Use Case	Firmware version ≥ 1.0.1.9	Engineering Tool ≥ 1.0.1.7	Description
User want to reset controller to factory-default	Existing controllers. User-Defined Password is set.	Existing station. A user-defined password is set.	Perform a factory reset at the controller. Reset the user-defined password in the engineering Tool. Discover and match with the controller in the engineering tool. Set the user-defined password and do the commissioning.
Copy device on the new controller in the network	New Controller added to the network. Default user password is set from the factory	Copy from the controller in the station having a user-defined password set. User matching the cloned device with a new controller added to the network.	The copy function will copy the password from the existing device. **Solution:** Reset the user-defined password in the engineering tool. The default user password will be used. Set the user-defined password used in the old controller.
Clone application from one controller to another controller		Clone application logic from one controller to multiple controllers or single controller in Irm device manager view	The clone operation in the Irm device manager view does not alter the password in the target controllers. Furthermore, the password will not be copied from the source controller to the target controller.

Password Status

The Irm Bacnet Device manager now includes a Password Status column, which allows users to quickly monitor the status and detect issues when creating a password for the IRM NX controller.

The following status will be shown in the password status column:

- **Not supported**: If the firmware version is below 1.0.2.2.
- **Default password**: If no password is entered.
- **User password:** When the password is be set or changed.
- **Password mismatch**: If the tool password does not match with the controller password.

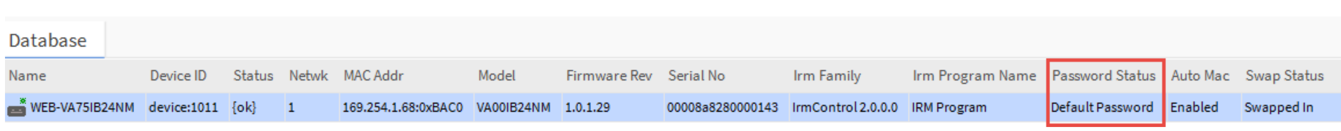


Fig. 273 Password Status

Ping Sylk Devices

Perform the “Ping Sylk Devices” operation to verify and displays the status of the connected Sylk device to the network.

Note: *The duration of the Sylk Device ping is two minutes.*

Steps to Ping the Sylk Devices:

Step 1. Navigate to the **Station** > **BacnetNetwork** > **IrmBacnetDevice** > **IRM Program.**

Step 2. Right-click on **IRM Program** > **Actions** > **Ping Sylk Devices.**

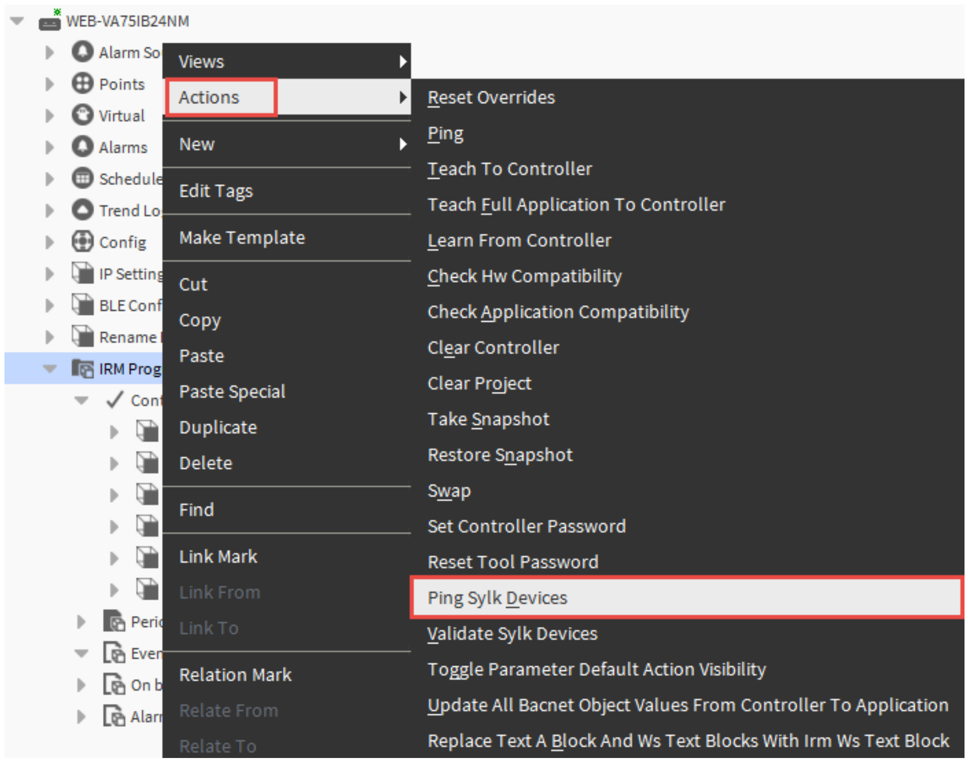


Fig. 274 Sylk Device Ping

- If no device is connected at the set address, the “Status” displays Down; in this case, the “Fault Cause” displays No device identified, and Sylk device suspends read-write operations.
  All Sylk parameters associated with the Sylk device will also be updated with the same status and fault cause.

- If the user has configured TR75 and connected TR42 at the configured address, the “Status” displays down. In this case, “Fault Cause” shows 'Incompatible device found and Sylk device stops read-write operation.

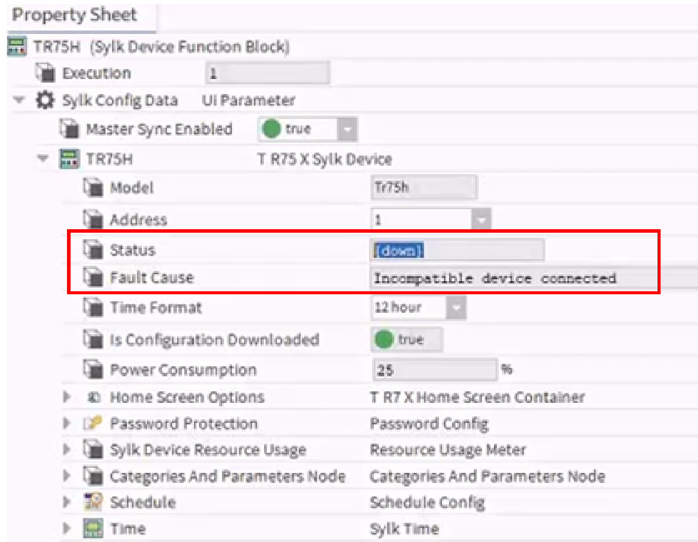


Fig. 275 Sylk Device Function Block property sheet

- If the device configured matches the device connected to the network, the “Status displays (ok), and the Sylk device resumes read-write operation.

Note: *The user should open the property sheet for each Sylk device and verify the Sylk device fault cause if they ping multiple Sylk devices at the same time.*

Validate Sylk Device

The “Validate Sylk Device” is used for validating the Sylk configuration in the application. Also, the validation action confirms any incorrect value entered in parameters or limitations for the configured Sylk device. For more details, refer to Validate Sylk Device on page 286.

Steps to perform Validate Sylk Device:

Right-click on **IRM Program** > **Actions** > click **Validate Sylk Device**

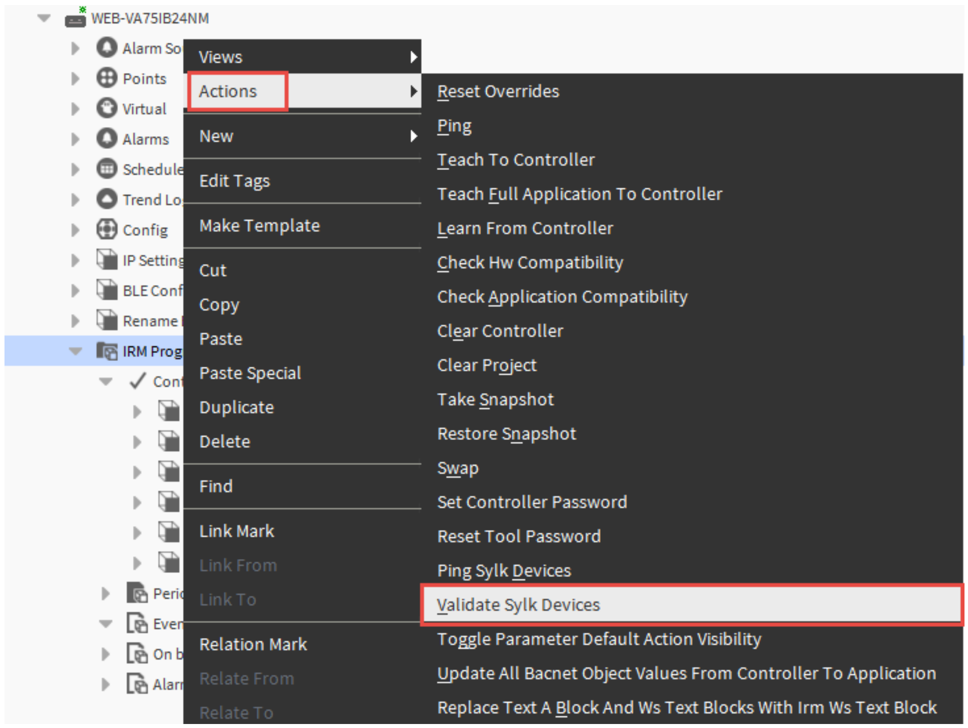


Fig. 276 Validate Sylk Device

Toggle Parameter Default Action Visibility

The Toggle Parameter Default Action Visibility is used to hide or show parameter default action.

Steps to perform Toggle Parameter Default Action Visibility:

Step 1. Navigate to the **Station > BacnetNetwork > IrmBacnetDevice > IRM Program.**

Step 2. Right-click on **IRM Program > Actions >** click **Toggle Parameter Default Action Visibility.**

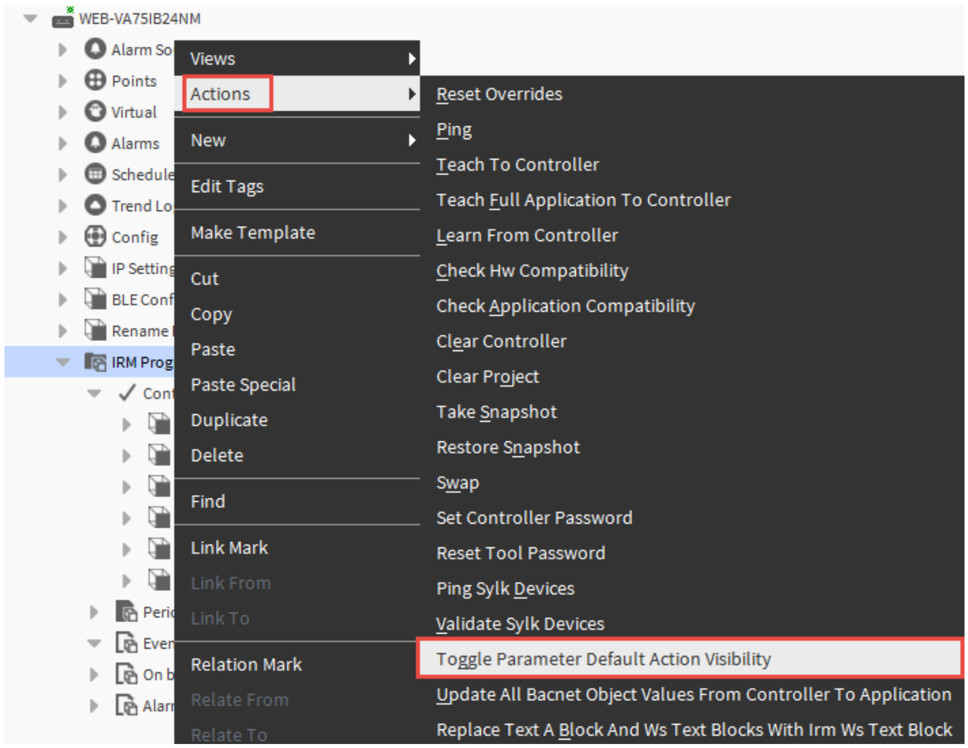


Fig. 277 Toggle Parameter Default Action Visibility

This action open Toggle Parameter Default Action Visibility option.

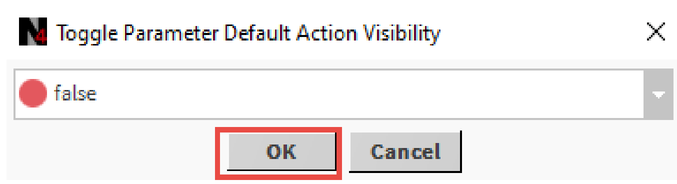


Fig. 278 Toggle Parameter Default Action Visibility options

Step 3. Set it to “false”, if you want to hide the parameter default action.

Or

Set it “true”, if you want to show default parameter action to the user.

Update All Bacnet Object Values from Controller to Application

The “Update All Bacnet Object Values From Controller To Application” option allows the user to synchronize the values of the controller and the application. When you perform a full teach to the controller, you ensure that the controller values are not overwritten by wire sheet values that are out of sync. It will keep the controller's object values.

Steps to perform Update all Bacnet object Values From Controller To Application:

Step 1. Navigate to the **Station** > **BacnetNetwork** > **IrmBacnetDevice** > select **IRM Program.**

Step 2. Right-click on **IRM Program** > **Actions** > **Update All Bacnet Object Values From Controller To Application.**
This action opens the Update All Bacnet Objects dialog box.

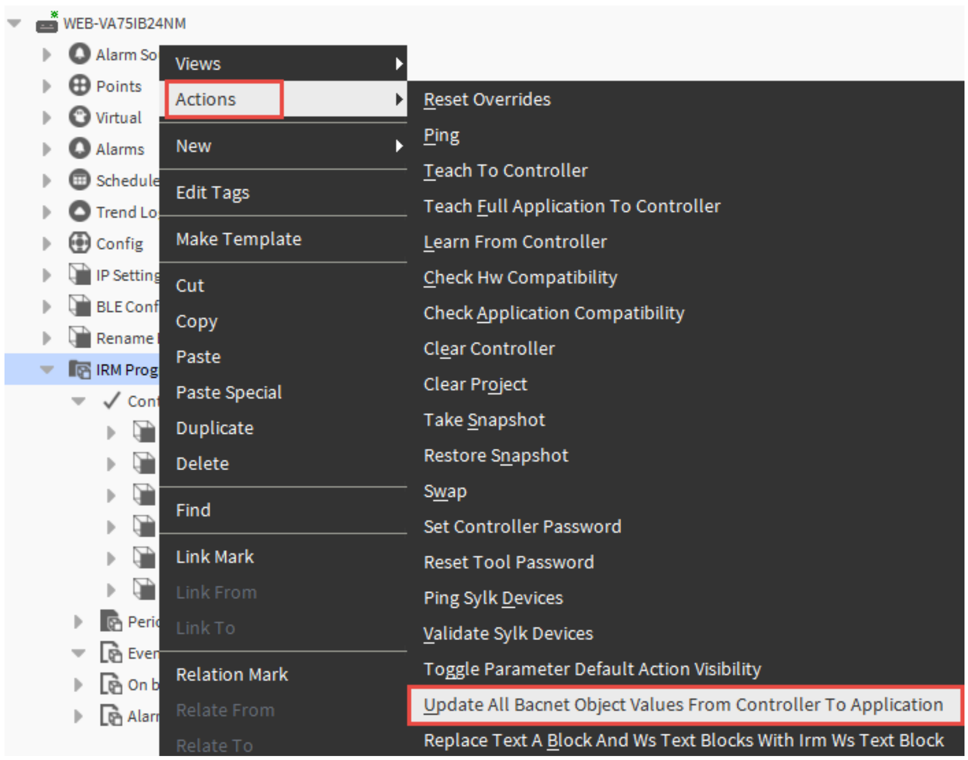


Fig. 279 Update All Bacnet Object values from Controller to Application

Step 3. Click **Yes** to update the default values for all the connected Bacnet objects.

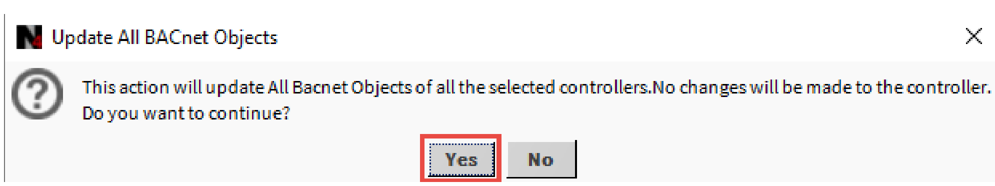


Fig. 280 Update All Bacnet Objects

Update BACnet object values for multiple controllers

If you want to update Bacnet object Values for multiple controllers, follow the below procedure.

Steps to perform Update Bacnet object values for multiple controllers:

Step 1. Right-click on **BacnetNetwork > Views > Irm Bacnet Device Manager** view.

Step 2. Select all the controllers from the device list.

Click **Update All Bacnet Objects**. This action displays Update All Bacnet Objects dialog box.
This action opens the Update All Bacnet Objects dialog box.

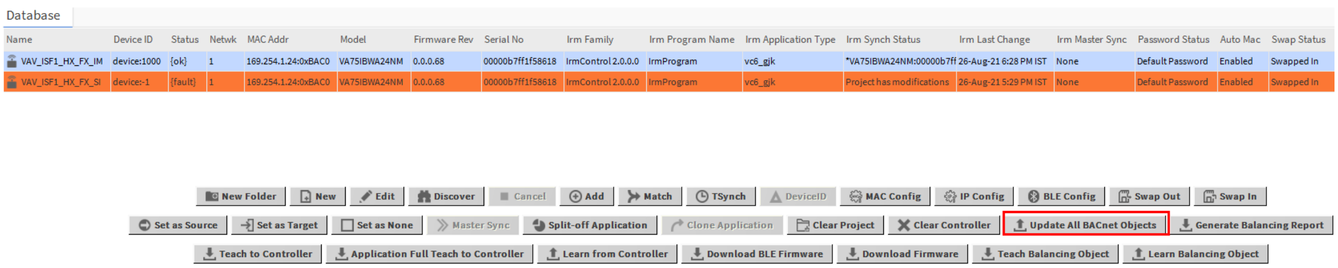


Fig. 281 Database Pane

Step 3. Click **Yes** to update the default values for all the connected Bacnet objects.

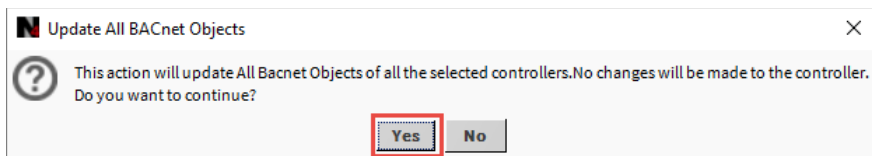


Fig. 282 Update All Bacnet Objeccts dialog box

Note: *Update All Bacnet Object Values From Controller To Application only works if both the controller and the application are in Sync mode.*

Replace Text A Block and Ws Text Blocks with Irm Ws Text Block

The “Replace Text A Block and Ws Text Blocks with Irm Ws Text Block” allows you convert any Text A function block to the IRMWsTextBlock function block that supports better graphics for application comments.

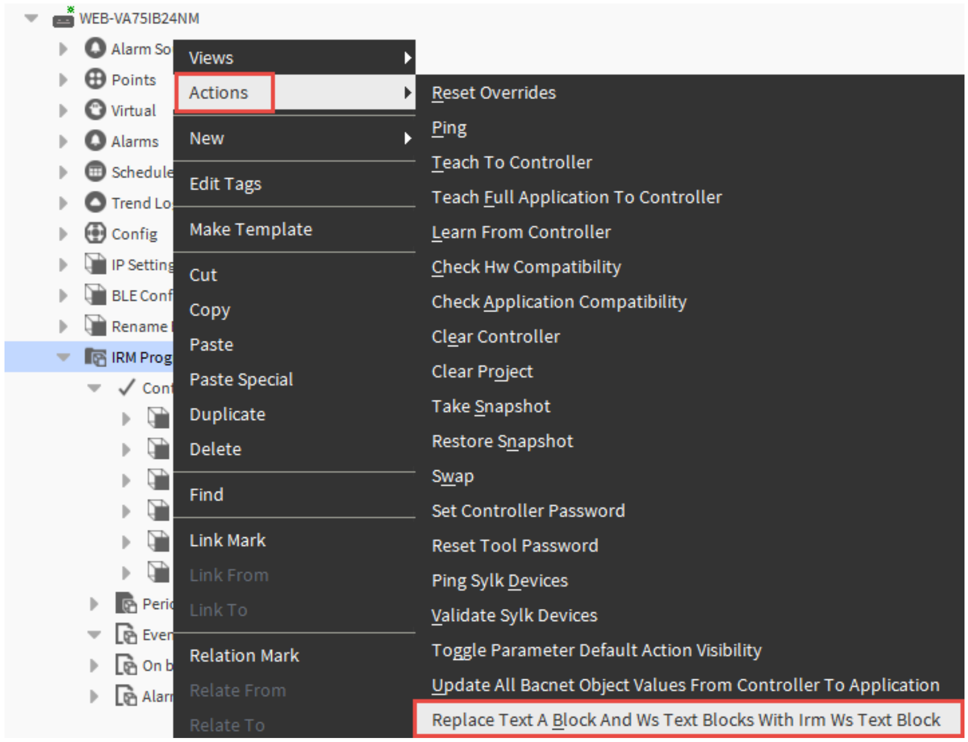


Fig. 283 Replace Text A Block and Ws Text Blocks with Irm Ws Text Block

The IRM engineering tools supports Niagara's WsTextBlock with the object named IRMWsTextBlock.

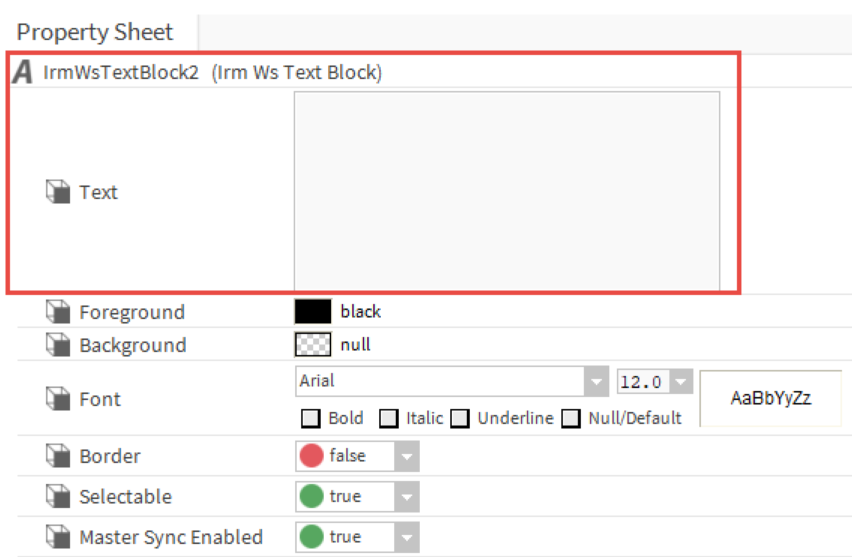


Fig. 284 IrmWsTextBlock Property sheet

Table 29 Inputs of IRMWsTextBlock

Input Name	Description
Text	Enter the text for the label.
Foreground	Allows to set foreground color. Null indicates no foreground fill.
Background	Allows to set background color. Null indicates no background fill.
Font	Allows to change font style.
Border	Allows to enable the border for the label.
Selectable	When set to true, the label on the wire sheet view can be selected. When set to false, the label cannot be selected on the wire sheet view.
Master Sync Enabled	When set to true, all properties sync from master to target. When set to false, all properties from the master to the target will not sync.

Master Sync

The Master Sync function is based on a large number of devices, all of which must be running the same application. This is referred to as a master sync group. The master sync group is created by copying the application of a single device (template) to multiple devices using the Clone Application feature.

One device designated as source, while the others serve as targets. The master sync command then allows the master device's current application (changes) to be rolled out to all target devices in a single step.

The changes are only made in the project on the target devices regardless of the teaching mode set (On Demand or Immediate). They are not automatically loaded into the target controllers, meaning that a "Teach to Controller" or a "Teach Full Application to Controller" is necessary.

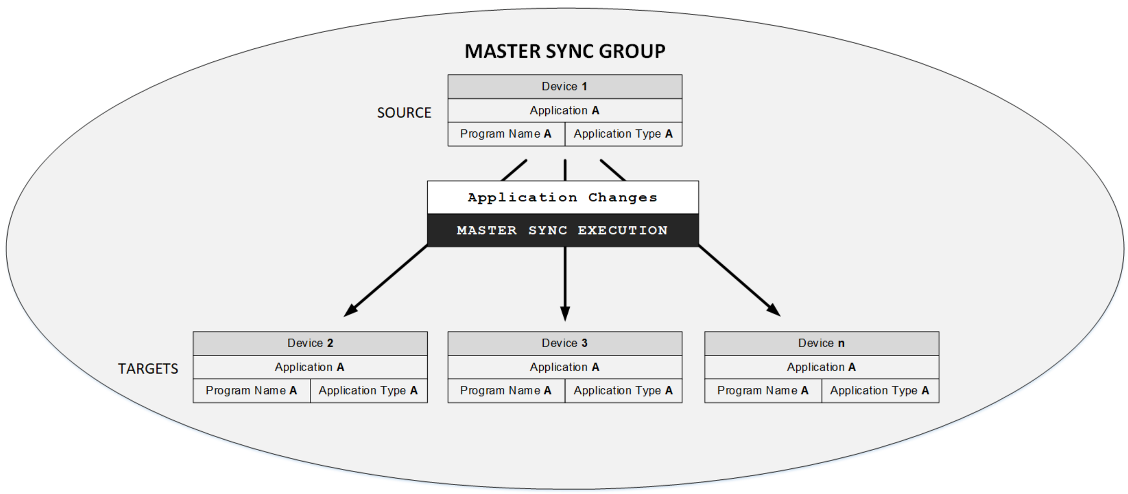


Fig. 285 Master Sync Group including Source and Target Devices

Note: *Before selecting "Set as Source" or "Set as Target," the Irm Application Type for the Source and Target devices must be identical and unique over all other controllers. Please refer to the description of "Clone Application."*

Important: *It is recommended to use “Clone application” or “Master Sync” instead of Template service.*

Applying Master Sync

This function allows rolling out the source device's application (changes) to all target devices per one step. The differences in all target device applications are synchronized with the application of the source device.

At least one device must include an application to establish a master sync group via cloning. If you haven't previously, clone the application as explained in the Clone Application on page 210.

The following procedure shows an offline engineering example with four manually-created controllers using the standard workbench new command.

Steps to apply master sync:

Step 1. Double-click on the Bacnet Network to display the devices from the database. The Irm Application Type column must show the same name for all the master and target devices receiving the same application. Otherwise, perform a Clone Application to get unique and identical names. All other devices should have a different IRM Application Type.

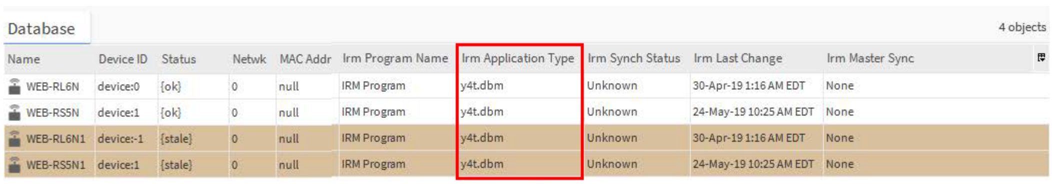


Fig. 286 Database Pane

Step 2. Select the device you want to define as the source, and then click **Set as Source**.

Step 3. Select the devices you want to define as the targets, and then click **Set as Target.**

Step 4. Select the source device, and then click **Master Sync.**

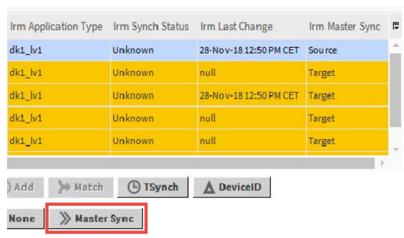


Fig. 287 Master Sync

The Synchronize differences dialog box displays.

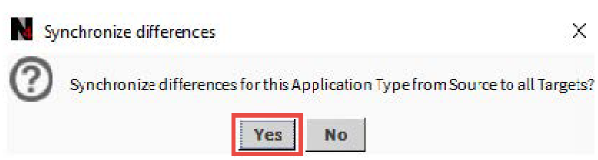


Fig. 288 Synchronize differences dialog box

Step 5. Confirm the message by clicking **Yes.**
The differences in all the target device applications are synchronized with the project's source device application.

Step 6. Perform a "Teach to Controller" or a "Teach Full Application to Controller" to load the changes for all the target controllers.

Clone Application

This function allows you to clone the device application to a specific device based on a template (device). As a result, all devices will be synced with the same application.

Note: *The master sync group is not established even if all devices have the same application type after cloning. The cloning can be performed before or after using the Master Sync option (see* Applying Master Sync on page 209*).*

For example, the following schematic shows a master sync group consisting of four devices with the same application. The application is cloned using device 1 as a template, and devices 2 through 4 are selected for receiving this application. They form a master group defined by application Type-A.

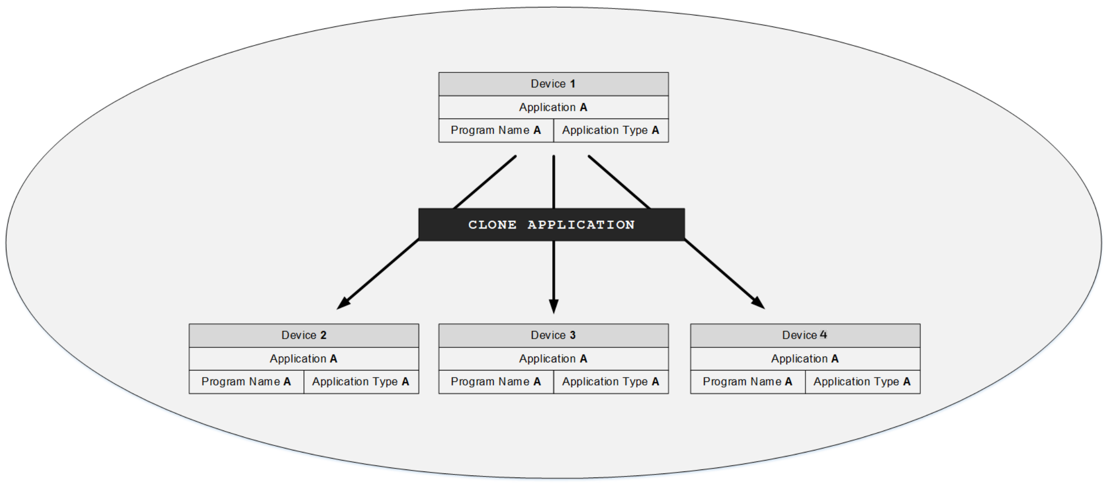


Fig. 289 Cloning Application

Steps to clone application:

Step 1. Select all devices to include in the clone in the Database window. One selected device's application will be utilized as a template. All others will be assigned the application type of the chosen template device.

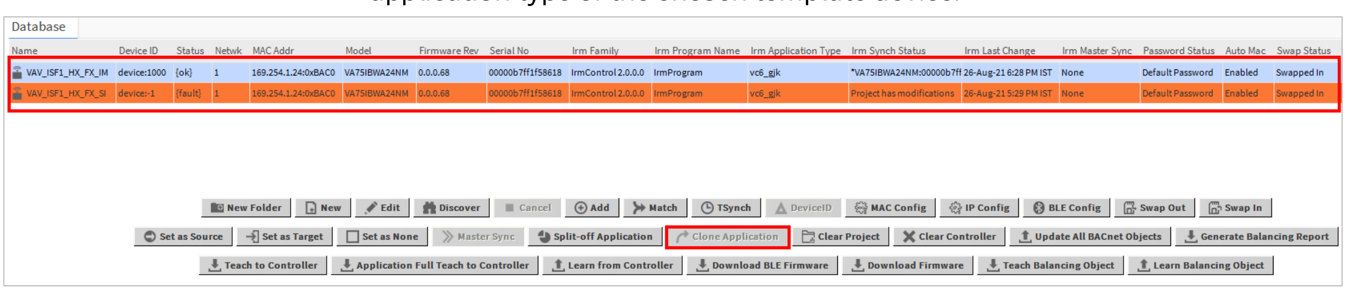


Fig. 290 Datasheet pane

The following message box displays.

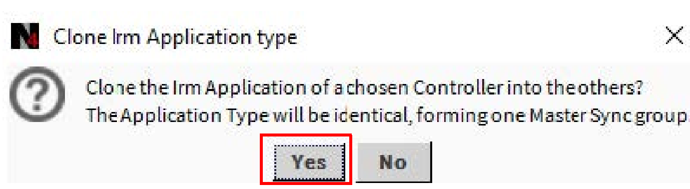


Fig. 291 Clone Irm Application Type Message Box

Step 2. Confirm the message by clicking **Yes.**
The Select Template dialog box displays.

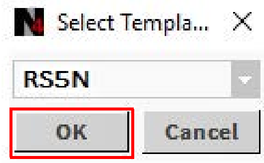
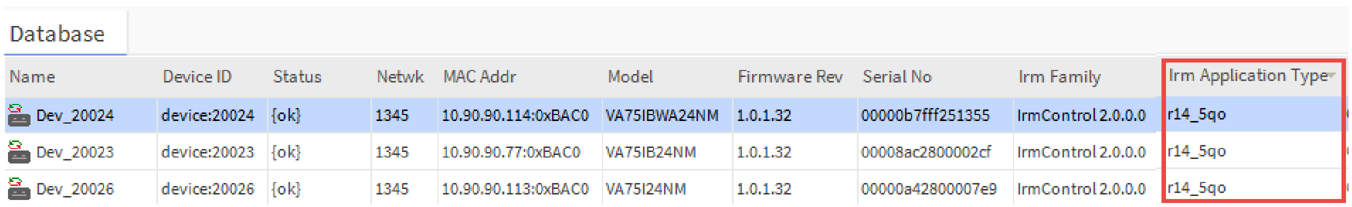


Fig. 292 Select Template dialog box

Step 3. Select the template (device) from the drop-down list box.

Step 4. Confirm the message by clicking **OK.**

The chosen template will be applied to all devices in the database pane. The Irm application type column indicates that all devices now have the same application type in the database pane. The master sync group is established.



Database

Name	Device ID	Status	Netwk	MAC Addr	Model	Firmware Rev	Serial No	Irm Family	Irm Application Type
Dev_20024	device:20024	{ok}	1345	10.90.90.114:0xBAC0	VA75IBWA24NM	1.0.1.32	00000b7fff251355	IrmControl 2.0.0.0	r14_5qo
Dev_20023	device:20023	{ok}	1345	10.90.90.77:0xBAC0	VA75IB24NM	1.0.1.32	00008ac2800002cf	IrmControl 2.0.0.0	r14_5qo
Dev_20026	device:20026	{ok}	1345	10.90.90.113:0xBAC0	VA75I24NM	1.0.1.32	00000a42800007e9	IrmControl 2.0.0.0	r14_5qo

Fig. 293 Irm Application Type column

Excluding Function Block Items from Master Sync

The function block items can be disabled in both the master and target devices. Function block items can be disabled for both periodic and event programs.

In the Master Sync function, function block values can be omitted if required. When the master sync command is executed, the omitted values of the function block will be preserved and will not be affected by the upgraded application.

- When a function block value is disabled in the master device, it is retained in all target devices.
- When a function block value is disabled in a target device, just that target device is excluded from the value update

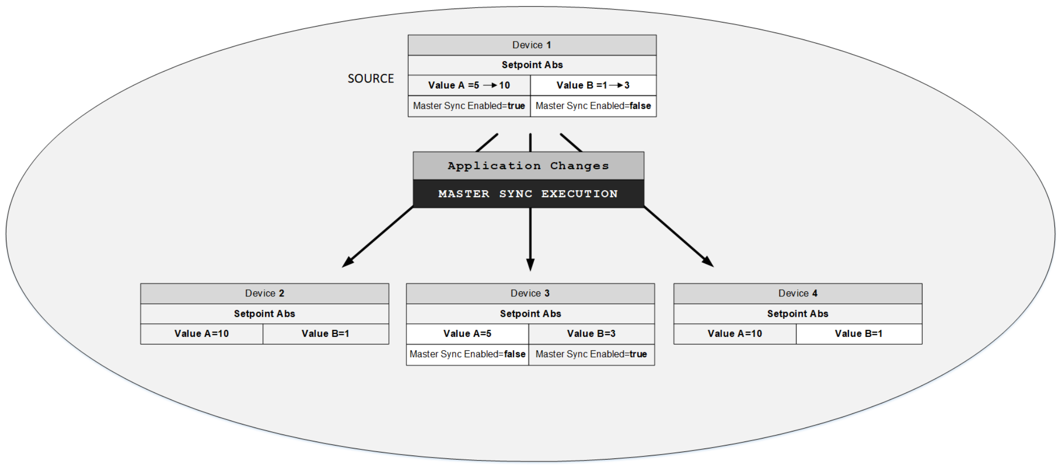


Fig. 294 Master Sync Enabled Configuration and Function Block Value Updates

Steps to disable function Block Items from Master Sync:

Step 1. Double-click the **Const2Numeric** function block.

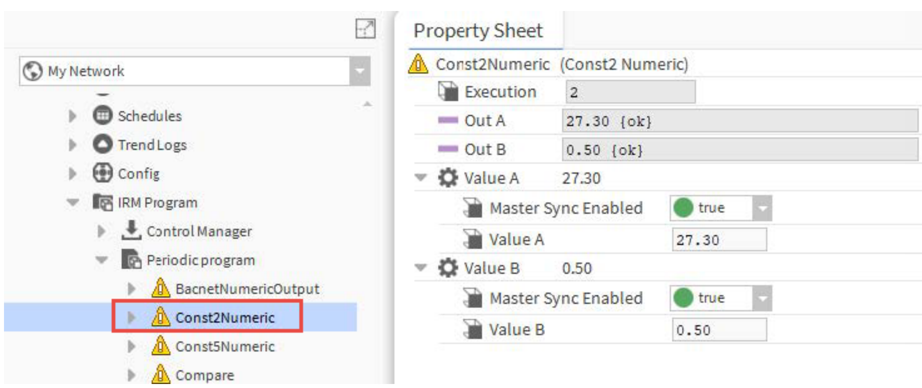


Fig. 295 Const2Numeric property sheet

Step 2. Expand the **Value A** and **Value B**.

Step 3. Set **Master Sync Enabled** property to false.

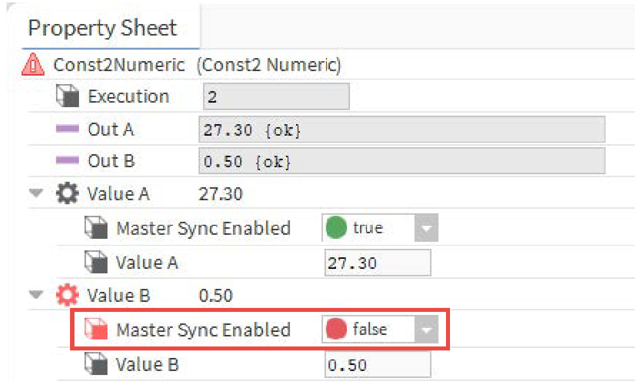


Fig. 296 Const2Numeric property sheet

Step 4. Click **Save**.

Split Application

You can split the unique application of the master sync group into a new application while retaining the current application. For the new application, you can give it a different program name. The software automatically creates a new application type. The new application can then be cloned to from the new master sync group.

This method may be used to add new features to an existing application for use in a similar context. For example, a small-sized office application can be used to create an application for a mid-sized workplace.

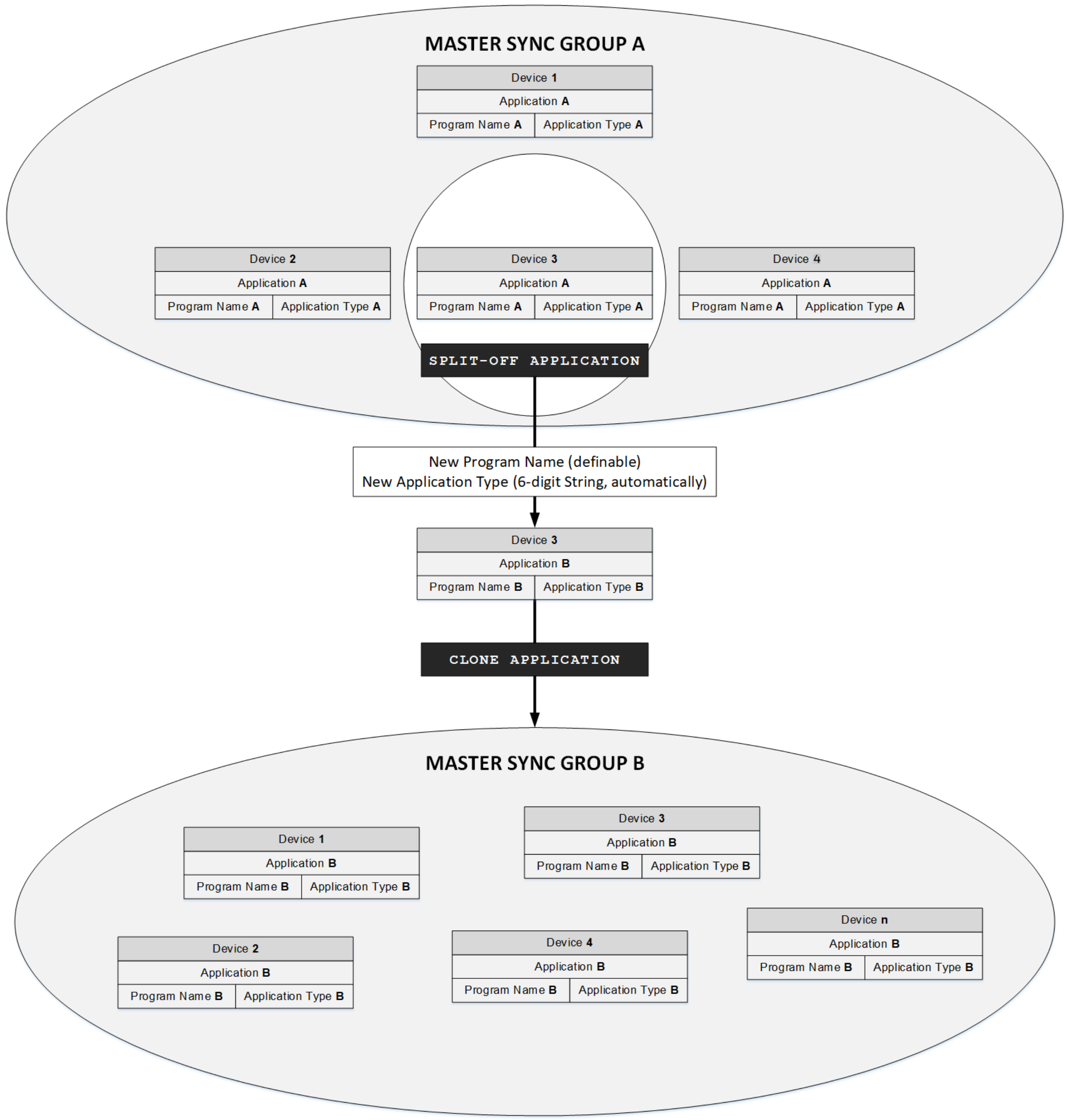


Fig. 297 Splitting-Off and Cloning Application

Steps to split the application from the master sync group:

Step 1. In the database pane, select the device you want to split, and then click **Split-Off Application**.

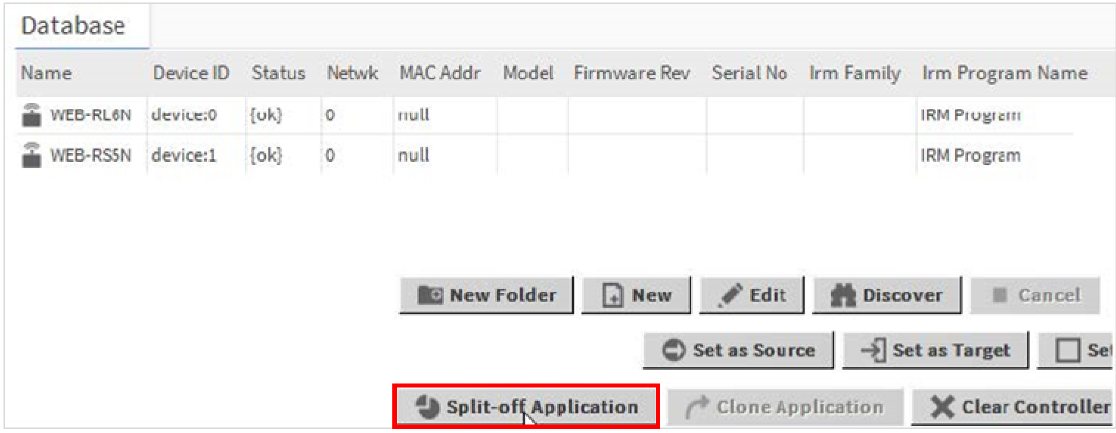


Fig. 298 Database Pane

The following message box displays.

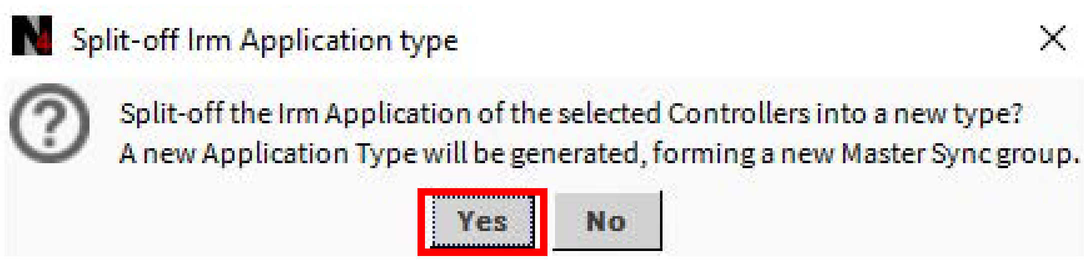


Fig. 299 Split-off Irm Application Type Message Box

Step 2. Click **Yes** to confirm. The following dialog box displays.

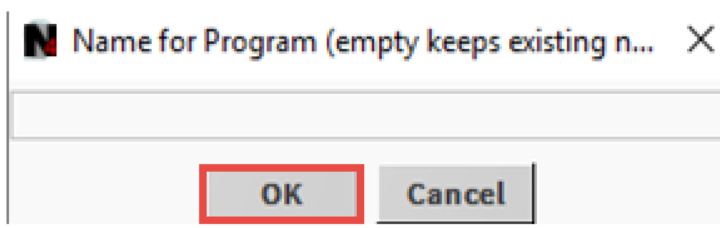


Fig. 300 Name for program dialog box

Step 3. Enter a new name for the BACnet program.

Step 4. Confirm by clicking **OK**.

The specified program name displays in the “IRM Program Name” column in the database pane, and the new application type is displayed in the IRM application type column. You may now create a new master sync group with the device based on this split-off application type by cloning the application and setting the source and targets.

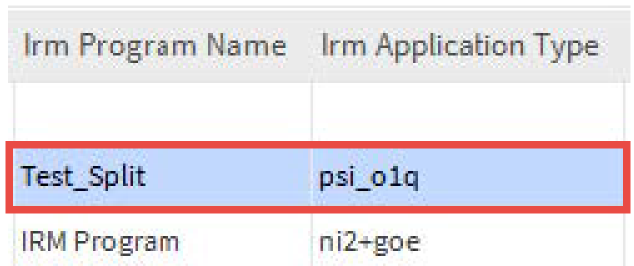


Fig. 301 Irm Application Type column

Batch Commissioning

Steps to perform batch commission:

Step 1. Create a station.

Note: *Keep the offline controllers in Swap Out mode.*

Step 2. Commission all the controllers (by default, the online controllers added in the database will be in swap-in mode).

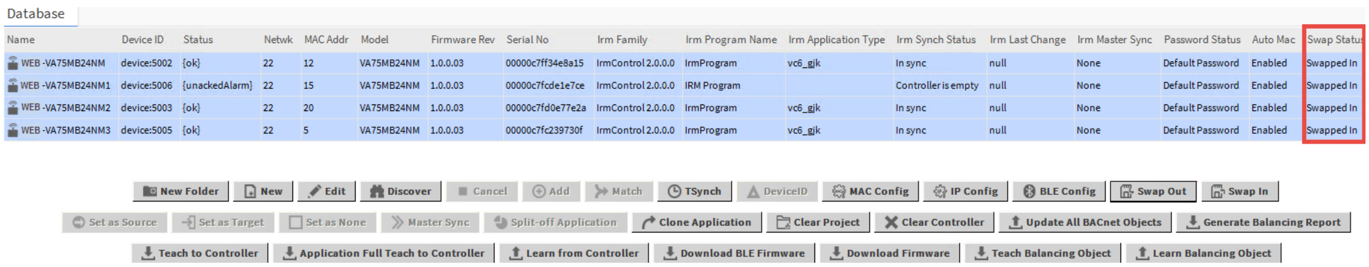


Fig. 302 Swapped In controllers

Step 3. Navigate to the **Irm Bacnet Device Manager** view.

Step 4. Select the first lot of online controllers from the database section. Based on the available memory the number of controllers in each lot decided.

Step 5. Perform the **Full Teach to the Controller** or **Teach to Controller** operation on the swapped in controllers. Wait until the operation is completed.

Note: *It is recommended to perform the Full Teach to the Controller on new controllers.*

Note: *In batch operation you can perform Full Teach to the Controller on maximum 10 controllers when the applications are in Swap In.*

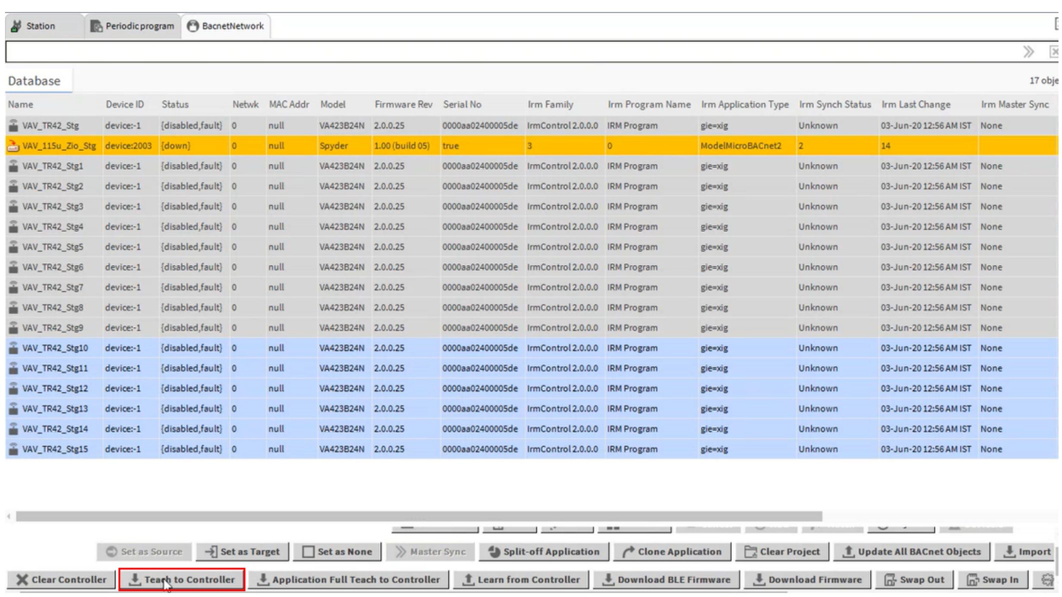


Fig. 303 Database view

Step 6. Click **Swap Out.**

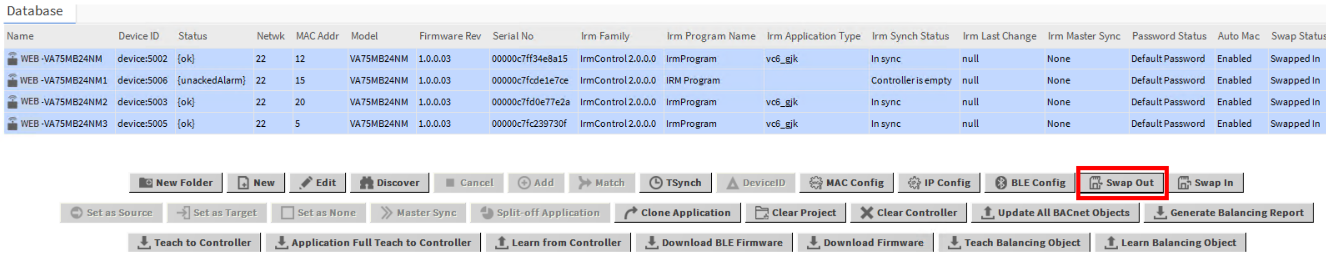


Fig. 304 Swapping out

Recommendation for batch commission

Select the controllers based on the available memory. It is not recommended to load more than 50 % of the available memory space. If you load more than 50% of the memory space, the controllers, then perform the batch operation in slots.

Example: Select 10 devices or (determine the number of devices based on the load). Perform the batch teach to the controller, then Swap Out. Similarly, select the next 10 devices and perform the same steps.

Rename Bacnet Objects

The Rename Bacnet Objects feature is used to customize the BACnet points by adding prefixes and suffixes. Adding prefixes or suffixes will only update the BACnet point name stored in the controller, but not the BACnet point name displayed in the application.

Note: *By default Rename Bacnet Objects feature is disabled.*

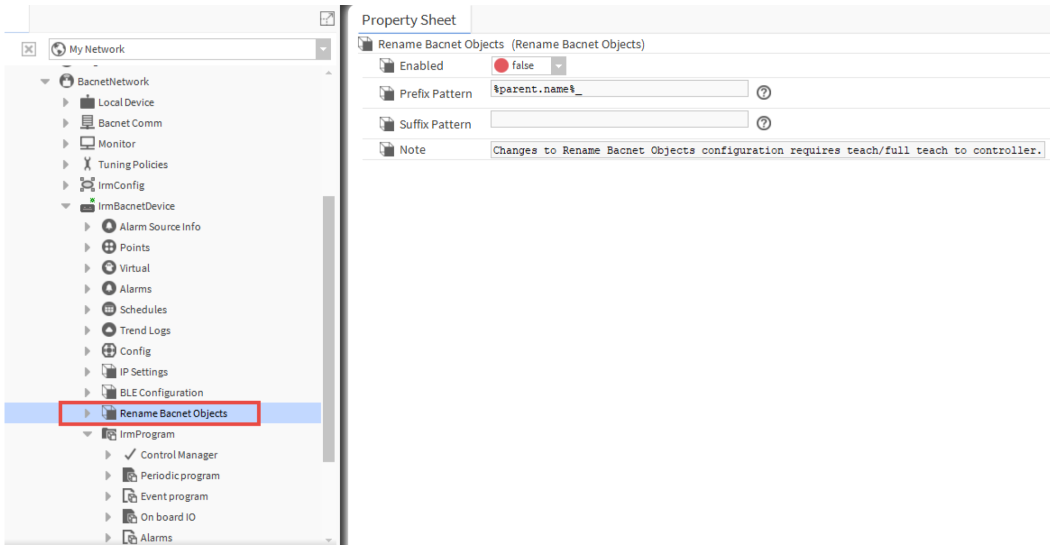


Fig. 305 Rename Bacnet Objects Feature

Steps to rename Bacnet objects:

Step 1. Set **Enabled** option to true.

Step 2. In the **Prefix Pattern** field, enter the prefix name.

Step 3. In the **Suffix Pattern** field, enter the suffix name.
The prefix and suffix pattern are both in BFormat strings. To know more details on BFormat click on icon seen in the Rename Bacnet Objects view below.

Step 4. Click **Save**.

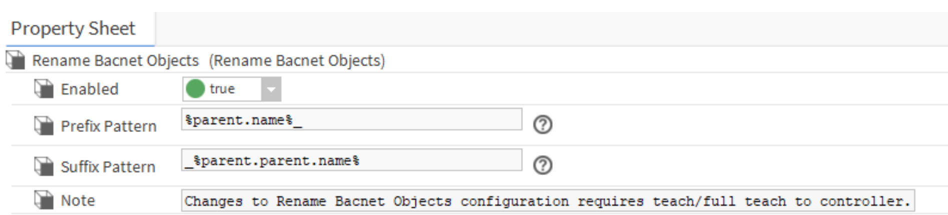


Fig. 306 Rename Bacnet Objects

You can verify the updated bacnet point name in Irm Bacnet Point Manager view.

Step 5. Expand **BacnetNetwork > Controller**, right-click on **Points > Views> Irm Bacnet Point Manager** and select **Offline** discovery.

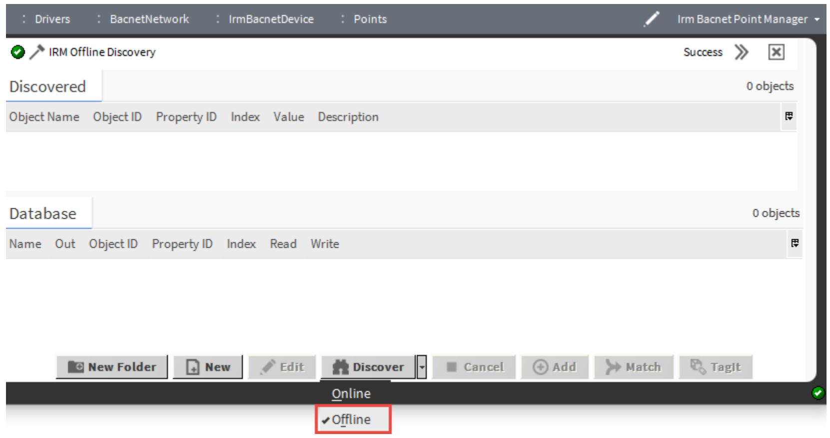


Fig. 307 Offline Point Discovery

Step 6. Click **Discover**.

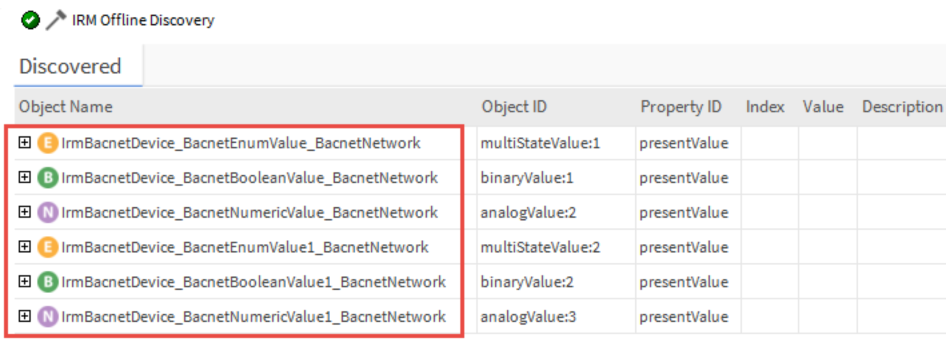


Fig. 308 Renamed Bacnet Points

Step 7. Run **Teach To Controller** or **Teach Full Application To Controller** to apply the changes to the controller.

Also, you can rename BACnet points for multiple controllers from the Irm Bacnet Device Manager view.

Steps to Rename BACnet points of multiple controllers:

Step 1. Right click on **BacnetNetwork > Views > Irm Bacnet Device Manager**.

Step 2. Select the controllers and click **Rename Bacnet Objects**.

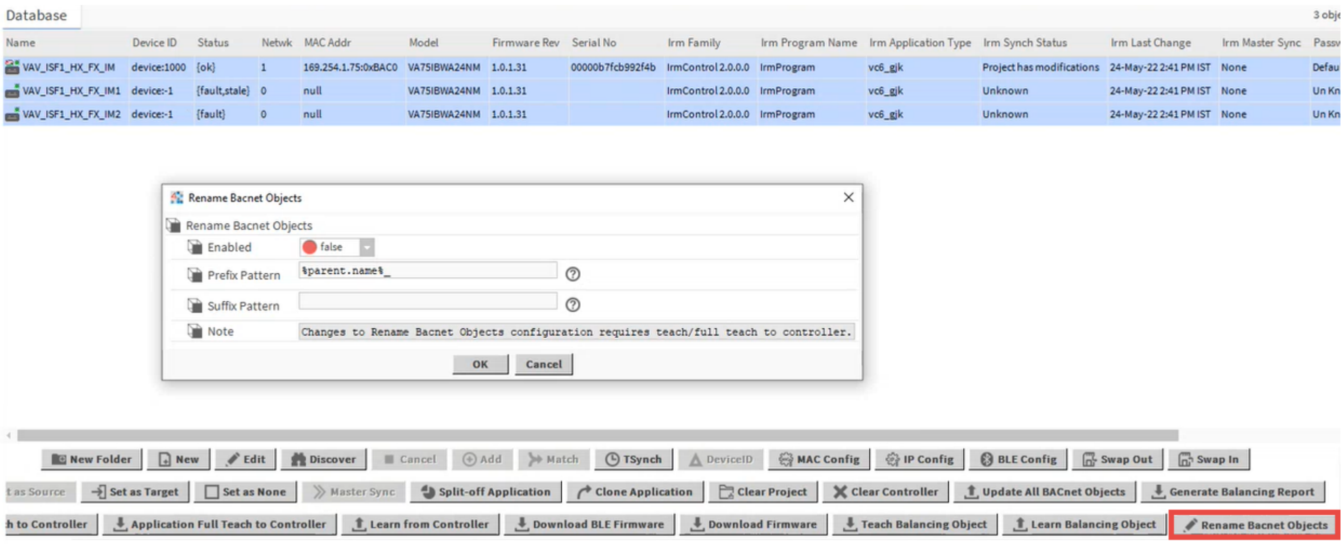


Fig. 309 Rename BACnet points from Irm Bacnet Device Manager View

Note: *The Rename Bacnet Objects feature displays default settings if you select multiple controllers. When you select a single controller, the Rename Bacnet Objects feature will display the settings that existed in the controller.*

Step 3. Set **Enabled** option to True.

Step 4. In the **Prefix Pattern** field, enter the prefix name.

Step 5. In the **Suffix Pattern** field, enter the suffix name.

That prefix pattern and suffix pattern are both in BFormat strings. To know more details on BFormat click on icon.

Step 6. Click **Save.**

Step 7. Run **Teach To Controller** or **Teach Full Application To Controller** to apply the changes to the controller.

Bluetooth Configuration

Bluetooth configuration is provided to configure Bluetooth configuration for IP and MSTP controller. This feature allows you to perform operations like enabling or disabling the bluetooth function, setting Bluetooth password, Bluetooth enabling start and end time to enable mobile balancing applications to connect to the devices over Bluetooth.

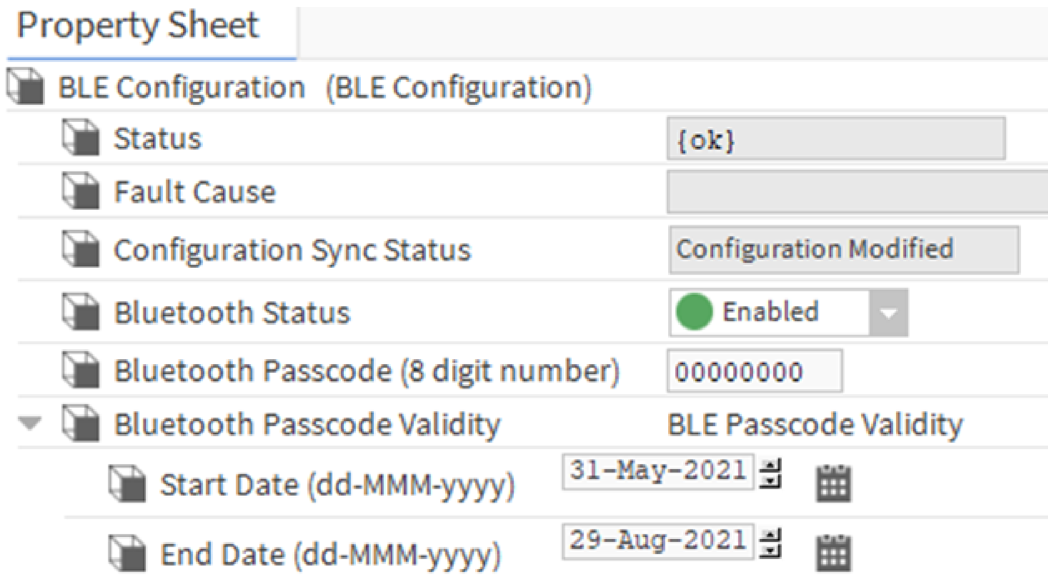


Fig. 310 BLE Configuration

The Bluetooth configuration feature is supported by the following controllers.

- VA423B24N
- VA00IB24NM
- VA75IBWB24NM
- VA75IB24NS
- VA75IBWA24NS
- VA75MB24NM
- VA00MB24NM
- VA75MB24NS

When you add IrmBacnetDevice into Bacnet network, the Bluetooth setting option is hidden for non-Bluetooth enabled devices.

Steps to select the Bluetooth supported controller:

Step 1. Navigate to the **IRM Program >** double-click **Control Manger**. This opens the Control manager property sheet.

Step 2. In **Device Model Name**, select the Bluetooth supported model from the drop-down list.

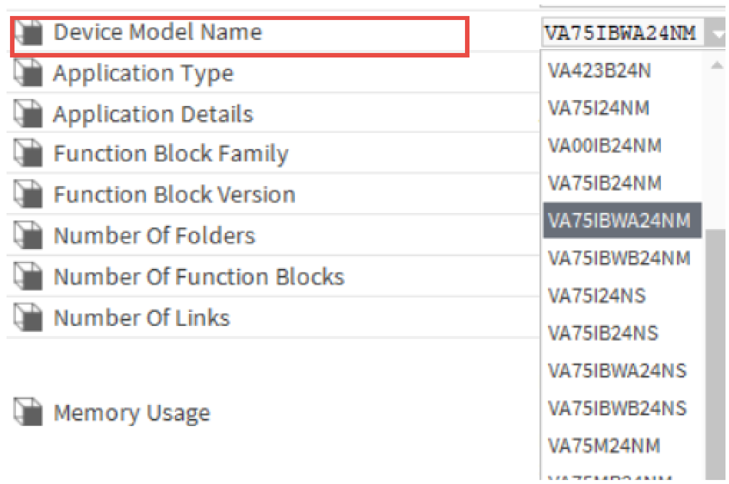


Fig. 311 Device Model Name

Step 3. Click **Save**.

Step 4. Right-click **IrmBacnetDevice** and select **Refresh Tree Node**. This activates the Bluetooth Configuration feature.

Enable Bluetooth Settings

Steps to enable Bluetooth Configuration:

Step 1. Navigate to the **BacnetNetwork** > **IrmBacnetDevice** > double-click on **Bluetooth Configuration.**

Step 2. Set **Bluetooth Status** to **Enabled**.

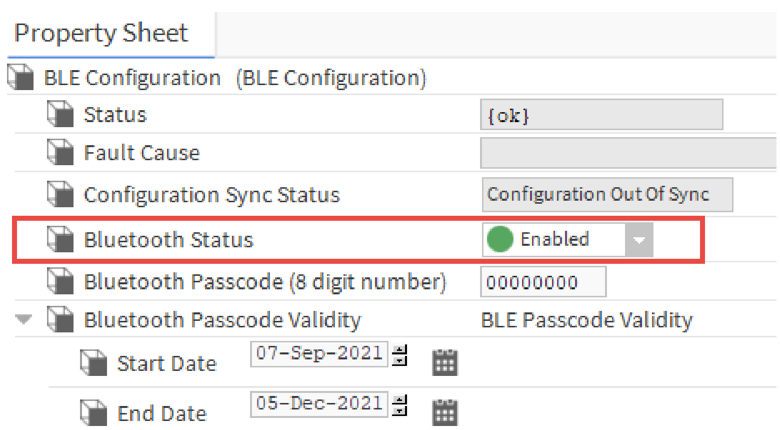


Fig. 312 Bluetooth Status

Setting Bluetooth devices Passcode

The Bluetooth configuration allows you to set a passcode for the connected Bluetooth devices, which helps you to authenticate the correct device. The passcode is an eight-digit number. The default passcode is 00000000. You can set your passcode or generate a random passcode. Also, you can set the validity of the passcode.

Steps to set Bluetooth device passcode:

Step 1. Right-click **BLE Configuration > Actions > Generate Passcode.**

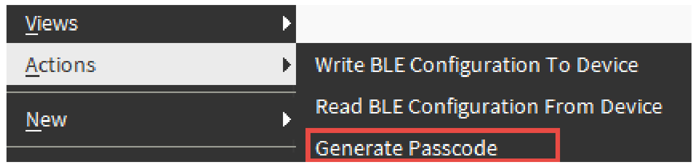


Fig. 313 To generate passcode

Steps to set Bluetooth device passcode validity:

Step 1. Navigate to the **BLE Configuration**, double-click **Bluetooth Configuration** to open the property sheet.

Step 2. Under **Bluetooth Passcode Validity**, select the **Start Date** and **End Date**.

Fig. 314 Bluetooth Passcode Validity

Note: *The Bluetooth passcode End Date cannot be more than 90 days than the Start Date.*

Step 3. Click **Save.**

Read and Write BLE Setting

Write BLE Configuration to Device

This feature sends all the Bluetooth configuration modifications from engineering tool to the controller.

Steps to perform Write BLE Configuration to Device:

Step 1. Right-click on **BLE Configuration**, select **Action,** and **Write BLE Configuration to Device**.

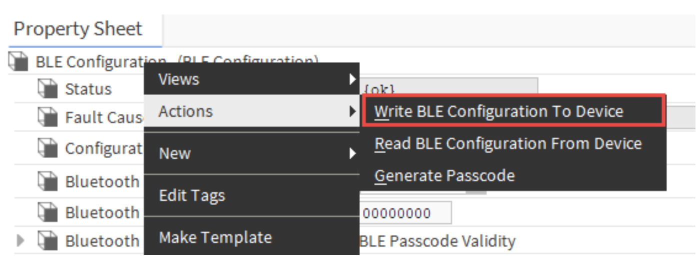


Fig. 315 Write BLE Configuration to Device

Read BLE Configuration from Device

If the user wants to read the Bluetooth configuration from the device, use read BLE configuration from device.

Steps to perform Read BLE Configuration from Device:

Step 1. Right-click on **BLE Configuration**, select **Action,** and click **Read BLE Configuration from Device**.

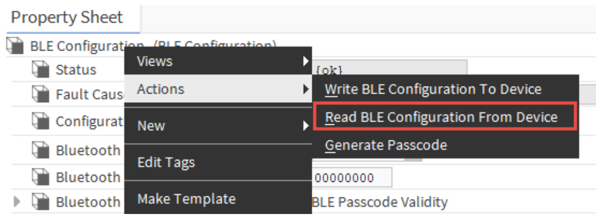


Fig. 316 Read BLE Configuration from Device

Configuring Bluetooth for Multiple Devices

The engineering tool allows the user to perform Bluetooth configurations on multiple controllers in a batch process.

Steps to perform Bluetooth configuration on multiple controllers:

Step 1. Right-click on **BacnetNetwork** > **Views** > **Irm Bacnet Device Manager** view.

Step 2. Select all the IP or MSTP devices from the device list.

Note: *The BLE Config option will be inactive if any unsupported device is selected from the device list.*

Step 3. Click on **BLE Config** and set **Generate New Passcode** to True or False.

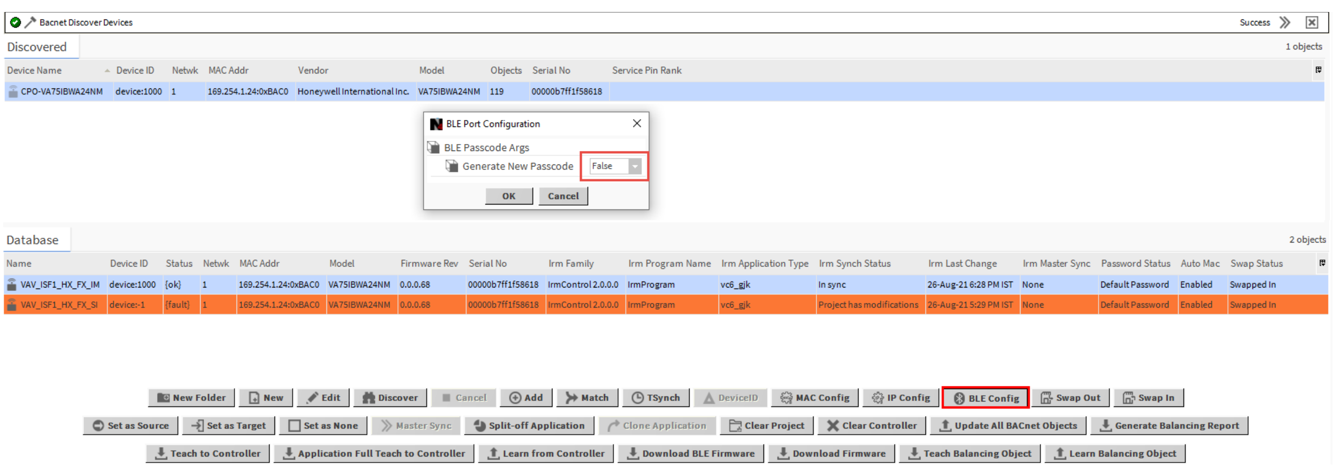


Fig. 317 BLE Configuration

Step 4. Set **Bluetooth Status** to **Enabled**. This enables Bluetooth features for all the selected IP or MSTP devices.

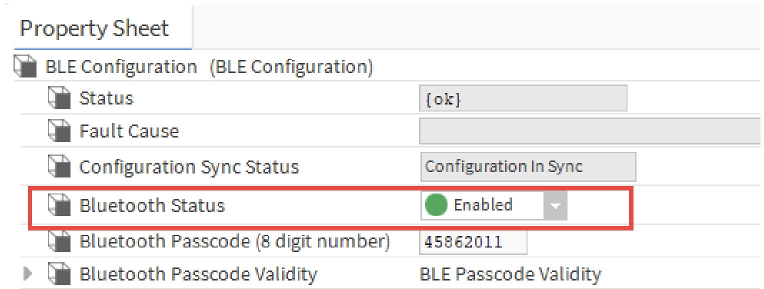


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Fig. 318 Bluetooth Status

Step 5. Set **Bluetooth Passcode** and **Bluetooth Passcode Validity**.

Fig. 319 Bluetooth Passcode Validity

Step 6. Click **Save**.

Onboard IO Migration

Onboard IO migration allows the user to migrate the pre-configured terminals from a selected source model to the target model. The Onboard IO migration is possible with the terminals having the same characteristics. Onboard IO Migration is a feature that the tool performs in the background when the user changes the model. The user explicitly cannot perform this action.

Note: *When the user changes the device model in control manager, the engineering tool automatically reconfigures the IO configuration to best suit the target model.*

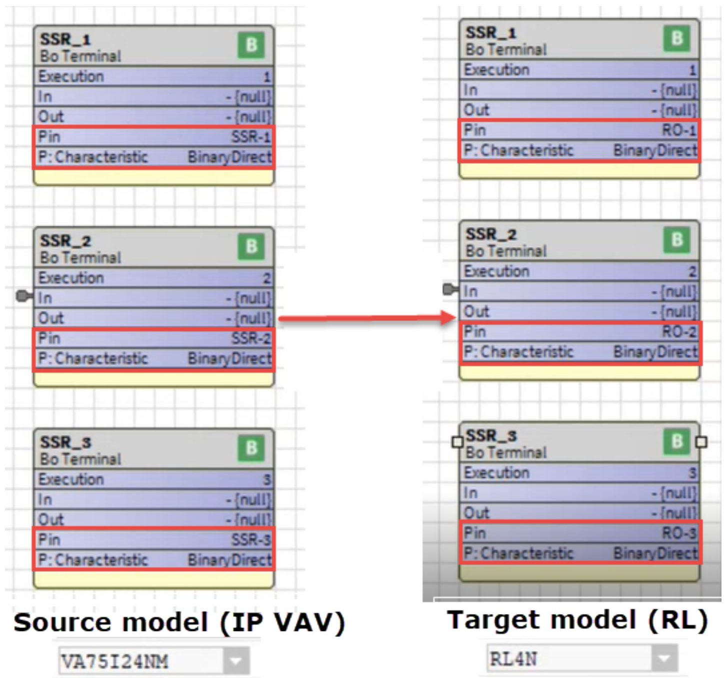

Fig. 320 Onboard IO migration

As part of IO Migration, the tool first finds the same IO terminal type. If the target model does not support the same terminal type as the source or there are no free terminal on target with the same pin type, the tool tries to find its supertype. For example, a BI in the source is converted to a type in the order BI, UI, or UIO.

Steps to perform the Onboard IO migration:

Step 1. Open the Onboard IO wire sheet for a preconfigured device model (source model).

For example: Open the On board IO wire sheet for the IRM NX controller model VA75124NM that has three SSR terminals and two UIO terminals.

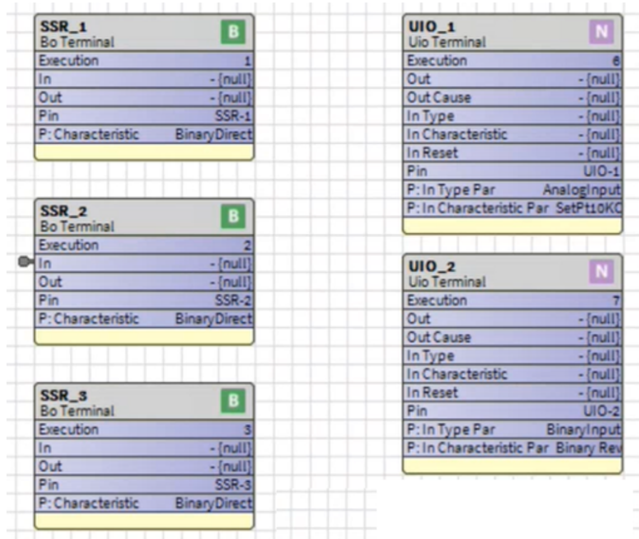

Fig. 321 Onboard IO wire sheet

Step 2. Open the **Control Manager**, select the **Device Model Name**, and select the target model from the drop-down list.

Step 3. Click **Save**.
For example, select RL4N as your target model.

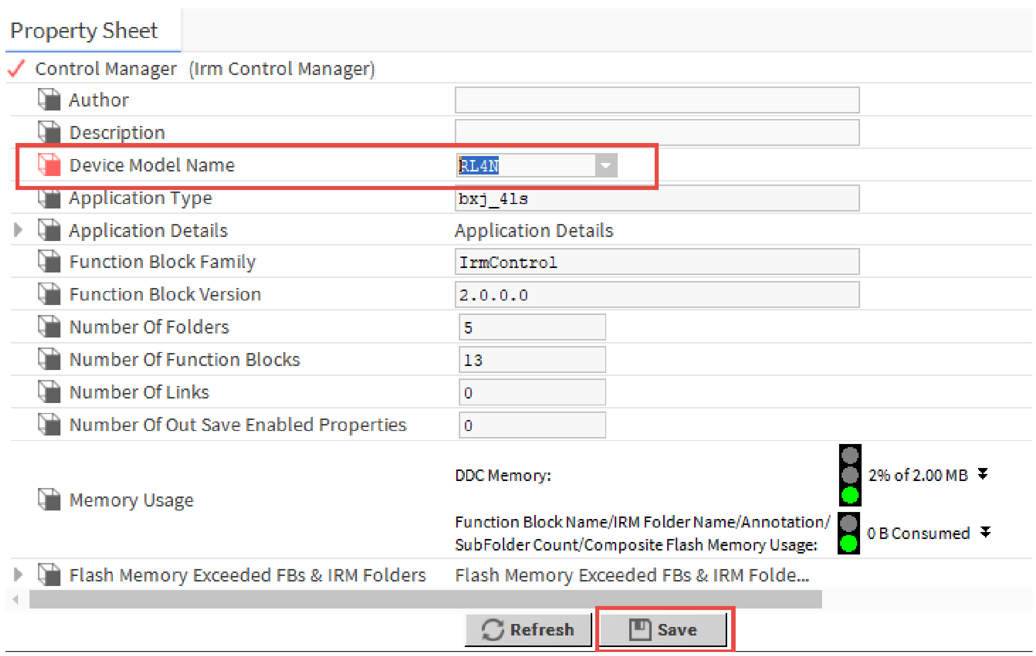

Fig. 322 Control Manager

This action migrates the UIO or BO terminal with the same In-Type characteristics from the source model to the target model.

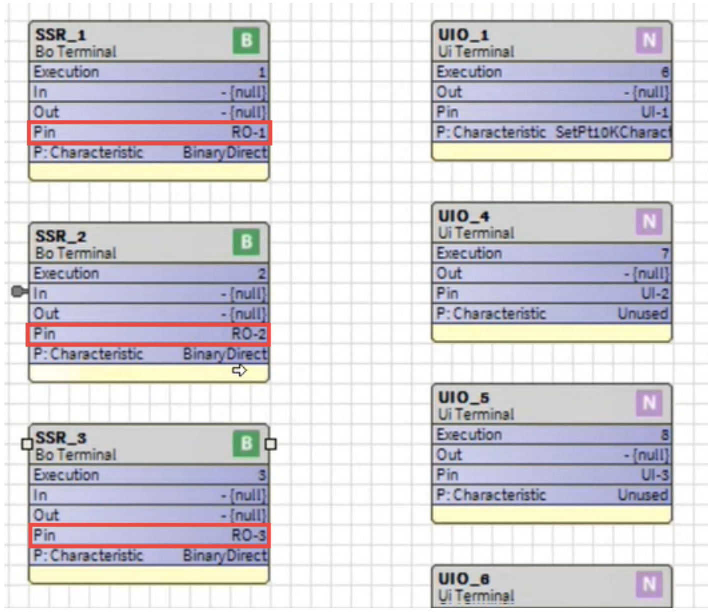

Fig. 323 Onboard IO wire sheet

Note: *Review the IO conversions that the engineering tool performed during device model migration.*

On Board IO Migration Examples

Migrating a BO terminal in VA75I24NM to RL4N model:

Scenario 1: Target has BO terminal available:

To assign BO and UIO terminals of the IRM NX controller (VA75I24NM) to the BO and UIO terminals of the RL4N controller, both the source and the target model terminals must have the same In-type characteristics. The below figure shows the migration of SSR_1 (Bo terminal) of VA75I24NM model to SSR_1 (Bo terminal) RL4N model, which have the same Binary direct characteristics for both the terminals.

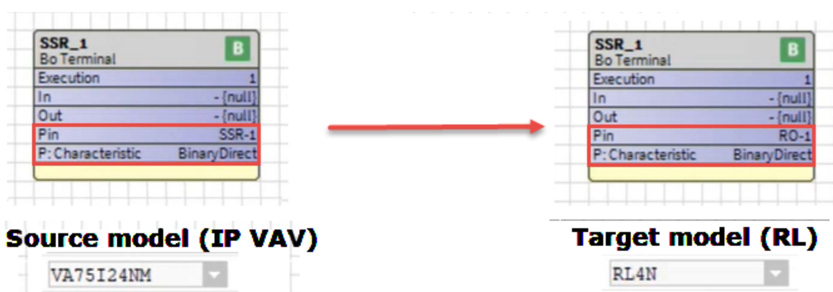

Fig. 324 Onboard IO migration for same characteristics

Scenario 2: Target has BO terminal unavailable, So tool migrates the BO to a UIO with inType as BinaryOutput.

Example: The source model has the BO terminals, and the target model doesn't. In this case of migration, the source model configures with the next model, which has the same In-type characteristics. The below figure shows the migration of the UIO_2 (Bo terminal) to the SSR_2 (Uio Terminal) having the same In-type characteristics as BinaryOutput.

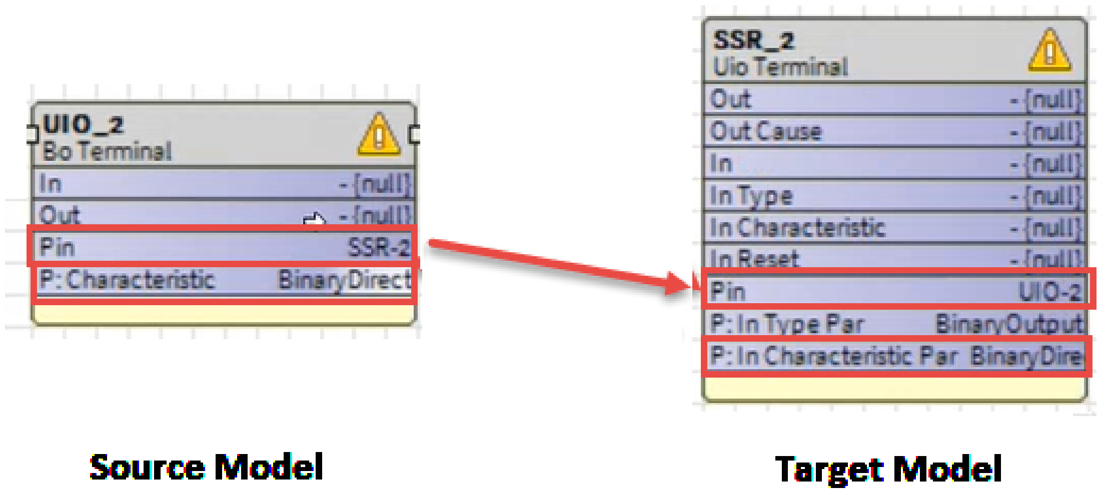

Fig. 325 Assign the terminals between different physical points

Migrating terminals between different physical blocks with different In-type characteristics is not recommended if you try to migrate the target model set to unassigned.

Tuning Policies

The tuning policies configure rules for evaluating both write requests, for example, requests to write to proxy points and the acceptable freshness of reading requests resulting from polling. Tuning policies are important because they can affect the status of the driver's proxy points.

Tuning policies include standard tuning policy properties and additional properties related to client-side usage of the BACnet Subscribe Change Of Value (COV) service.

Note: *The IRM NX controllers support 20 points for COV. Since there is a limitation in the CentraLine-N4 framework on the COV feature, it is recommended to configure only 20 points and the rest of the points for polling.*

The IRM NX controllers have a default tuning policy that enables the COV feature. Whenever you perform a BACnet Network discovery, the IRM NX controller automatically creates the IrmTuningPolicy.

Important: *You can assign the policy points to poll the important points more frequently than less important points based on the importance level. This configuration helps to optimize the bandwidth.*

Default IrmTuning Policy

The IRM controllers have a default tuning policy that enables the COV feature. Whenever you perform a BACnet Network discovery, the IRM controller automatically creates the IrmTuningPolicy.

To access default IrmTuningPolicy:

Step 1. Expand **BacnetNetwork > Tuning Policies** or double-click **IrmTuningPolicy.**

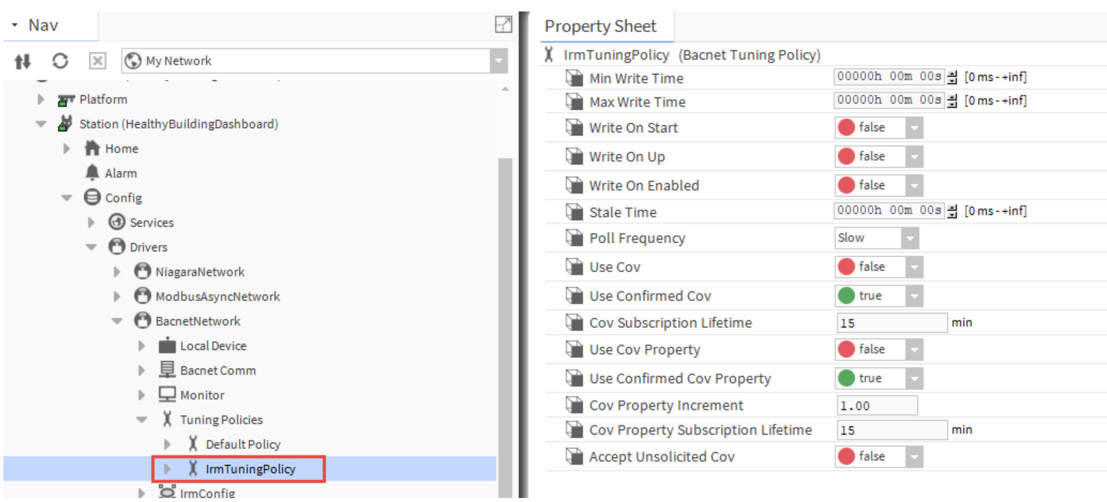

Fig. 326 IrmTuning Policy

Assign Policy

Steps to assign a policy is a follows:

Step 1. Navigate to **BacnetNetwork** > **IrmBacnetDevice** > double-click on **Points.**

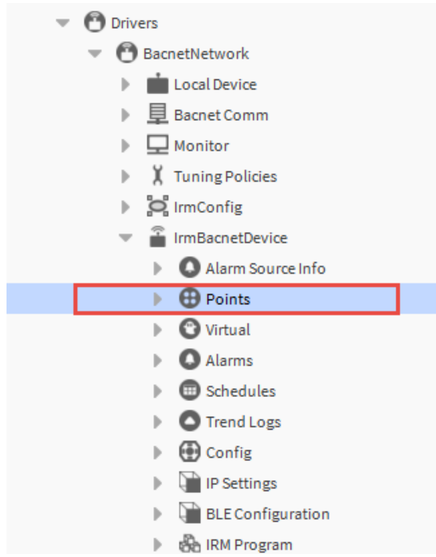

Fig. 327 Points Directory

Step 2. Click **New**, select the point type from the drop-down and then click **OK.**

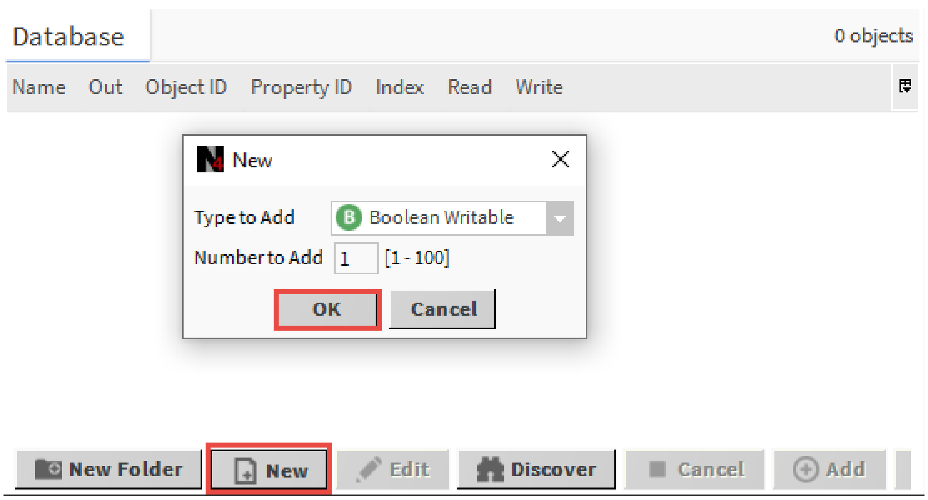

Fig. 328 Adding New Point

Step 3. Configure the point and assign the tuning policy from the tuning policy name drop-down.

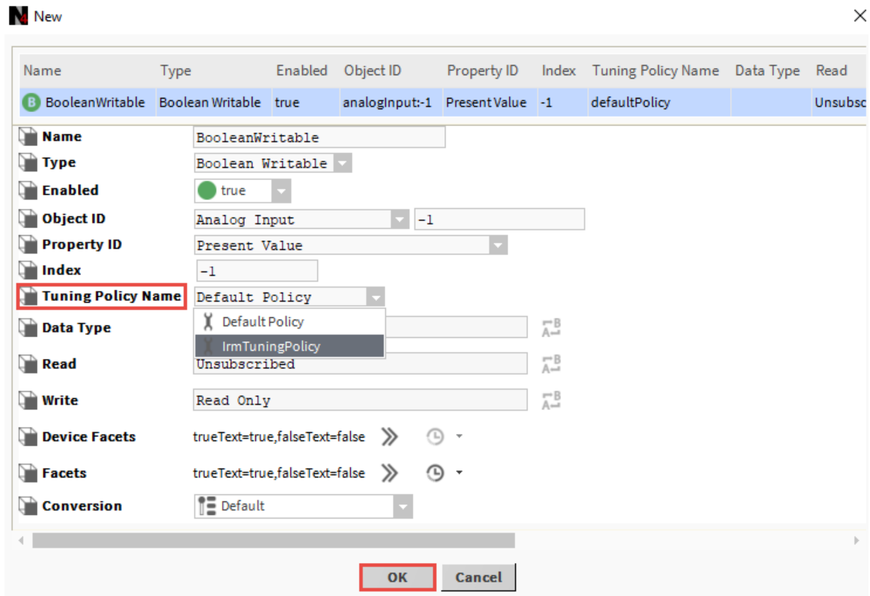

Fig. 329 Tuning Policy Name

Step 4. Click **OK**. This action adds a point to the database.

To access these properties is expand **BacnetNetwork > Tuning Policies** or double-click **Default Policy**.

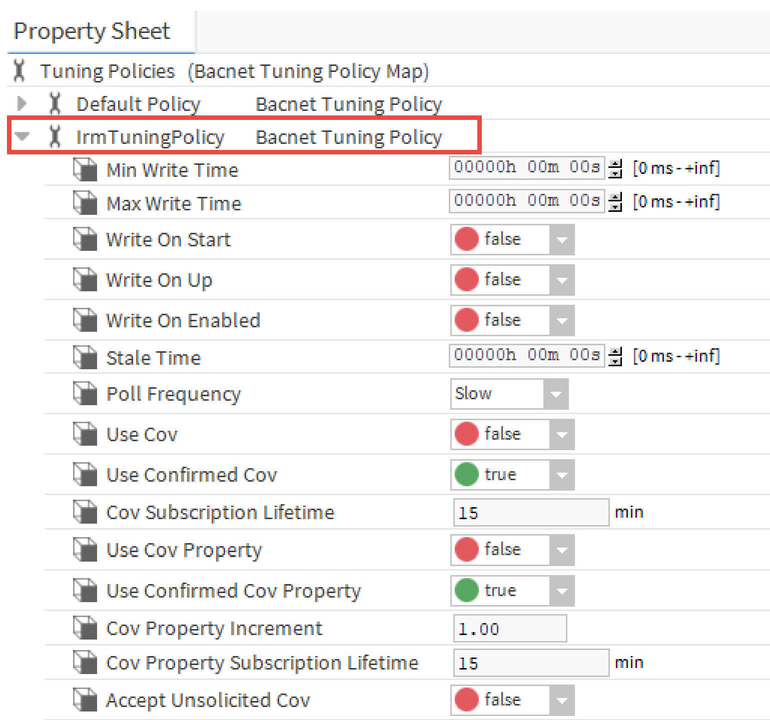

Fig. 330 Bacnet Tuning Policy Property Sheet

Table 30 Tuning Policy Property Sheet Description

Property	Value	Description
Min Write Time	hours, minutes, seconds (defaults is zero)	Specifies the minimum amount of time allowed between writes to writeable points. This causes the system to write only the last value during this minimum time period, which serves to throttle rapidly changing values, improving system performance. A value of 0 disables this feature causing the system to attempt to write all values.
Max Write Time	hours, minutes, seconds (defaults is zero)	Specifies the maximum amount of time to wait before rewriting the same value to a writable point if nothing else triggers a write. Any write action resets this timer. A value of 0 disables this feature resulting in no timed rewrites.
Write On Start	true false (default)	Determines writable proxy point behavior when a station starts. ***Note:*** *For critical proxy points false is recommended. Otherwise, large networks may experience write-queue overflow exceptions.*
Write On Up	true false (default)	Determines writable proxy point and parent device behavior . • If true, a write occurs when the parent device transitions from down to up. • If false, no write occurs.
Write On Enabled	true false (default)	Determines writable proxy point behavior. • If true, a write occurs when the point transitions from disabled to enabled. • If false, no write occurs.
Stale Time	hours, minutes, seconds (defaults is zero)	Defines the amount of time after which the data for a point in the station is considered too old to be meaningful {stale}. • A non-zero value causes the point to become stale. The status will show as {stale}. If the configured time elapses without a successful read, read status {ok} is indicated. • The default value of 0 disables the stale timer. Points become stale immediately when unsubscribed. • Do not set a timer that is shorter than the poll cycle time. In the normal course polling, points will become stale. Instead, set this time longer than the largest poll cycle expected.
Poll Frequency	Fast Normal Slow (default)	Provides a method to associate the tuning policy with one of 3 poll rates available in the network's poll service: fast, normal, or slow rate. Applies to all proxy points.
Use Cov	true false (default)	• If set to true, the driver attempts (proxy subscriptions) using BACnet Cov subscriptions to the device. If the subscription attempt succeeds, the read status property of the point's BACnet proxy extension displays the Cov. If the subscription attempt failed, the driver uses normal polling and the read status property shows polled. • If set to false, the driver ignores all the proxy subscriptions.

Table 30 Tuning Policy Property Sheet Description (Continued)

Property	Value	Description
Use Confirmed Cov	true (default) false	• If set to true, the driver attempts for proxy subscriptions using BACnet confirmed Cov subscriptions to the device. • If disabled, the driver ignores this property.
Cov Subscription Lifetime	time in minutes (default is 15 min)	Indicates the lifetime, in minutes, for which the database subscribes for Cov notifications, then periodically subscribes again. A value of zero means an indefinite lifetime, although this is not guaranteed to persist across resets of the server device.
Use Cov Property	true false (default)	If Use Cov Property set to true, and assigned proxy points are under a BacnetDevice that supports the Subscribe COV service, any necessary updates (proxy subscriptions) are attempted using BACnet COV subscriptions to the device. • If the subscription attempt succeeds, the “Read Status” property of the point’s BacnetProxyExt displays “COV”. • If the subscription attempt for a proxy point fails, normal polling is used and the “Read Status” property shows “Polled”.
Use Confirmed Cov Property	true (default) false	• If Use Confirmed Cov Property is set to true and assigned proxy points are under a BacnetDevice that supports Confirmed COV notifications, any necessary updates (proxy subscriptions) are attempted using BACnet Confirmed COV subscriptions to the device. • If Use Confirmed Cov Property set to false, it makes no difference what this property value is.
Cov Property Increment	number to two decimal places (default is 1.00)	Defines an increment for a COV property to apply to the sending of COV notifications. This property applies to numeric COV values only.
Cov Property Subscription Lifetime	15 min (default)	Configures the lifetime, in minutes, for which the software subscribes to the COV property for COV notifications. A value of 0 means an indefinite lifetime, although this is not guaranteed to persist across resets of the server device.
Accept Unsolicited Cov	true false (default)	Allows (true) or prohibits (false) Cov notifications to update a point that is being polled. False prevents the unsolicited updates.

Alarms

Each BACnet Device has an Alarms device extension. This extension applies to BACnet event notifications (alarms) sent to the station by that device.

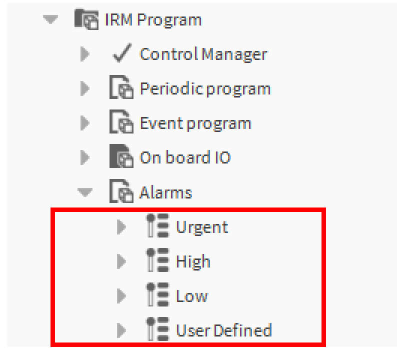

Fig. 331 Types of Alarms

Steps to perform the alarm configuration and to use the notification class objects in BACnet points:

Step 1. Navigate to the **BacnetNetwork >IrmBacnetDevice>** double-click **Config.**

Step 2. Click **Discover** and select all the discovered notification classes 1,2,3 & 4.

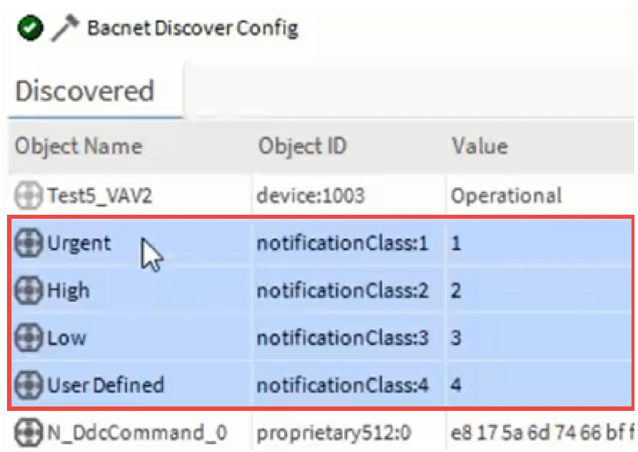

Fig. 332 Discovered Notification Classes

Step 3. Click **OK** to add the notification to the database.

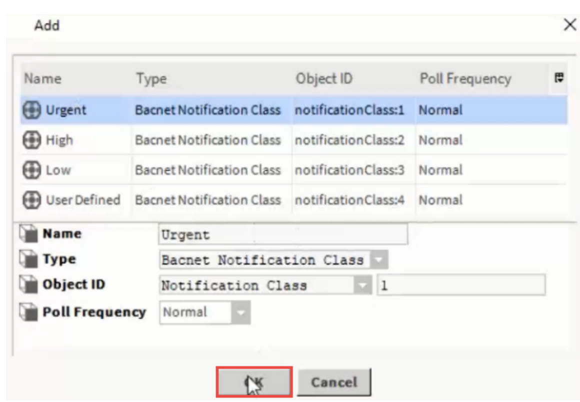

Fig. 333 Adding Alarm

You can change the properties of any notification class listed in the database.

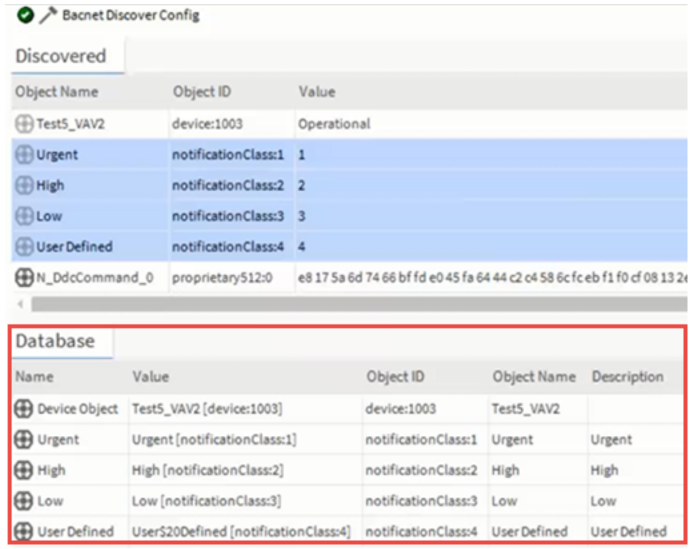

Fig. 334 Discover and Database pane

Step 4. Right-click on any of the notifications by going to **Views > property sheet**.

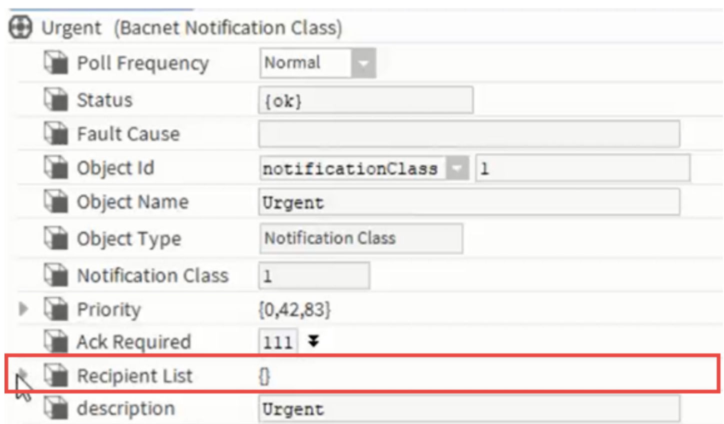

Fig. 335 Property sheet

Step 5. Right-click on **Recipient List > Action >** select add **Elements**.

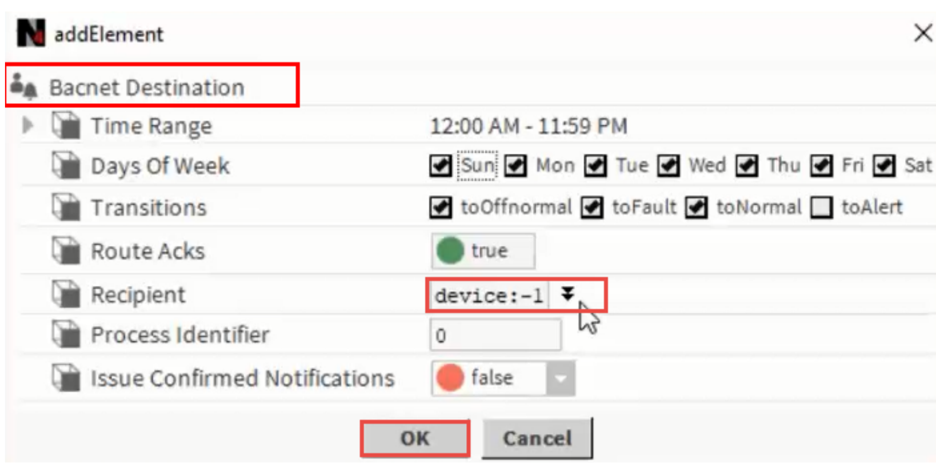

Fig. 336 Add Elements

Step 6. Select the **Recipient** option, configure the **device ID** and click **OK**.

Fig. 337 Add device ID

This action will configure the device Id for the alarm notification.

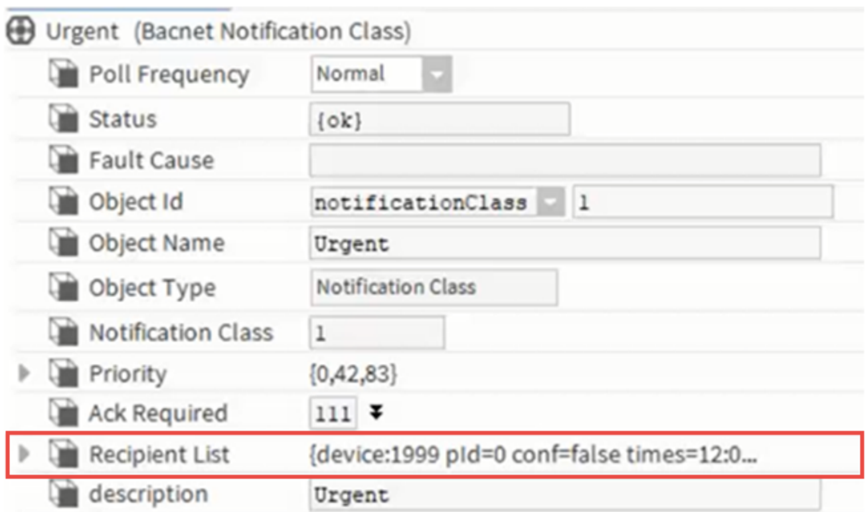

Fig. 338 Property sheet

BACnet alarms support the data types BacnetInput, BacnetOutput, Binaryinput, and Binaryoutput.

BACnet alarms do not support the enumoutput, numericvalue, booleanvalue, enumvalue, refin, and refout data types.

Alarm Synchronization Check

Modifications such as adding, deleting, copying, and pasting items on the alarms wire sheet are not allowed. You can only change the properties of the pre-defined notification class objects on the property sheet after double-clicking the notification class icon.

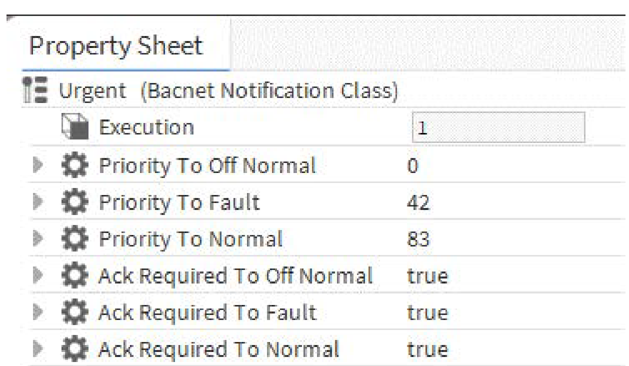

Fig. 339 Bacnet Notification Class

CHAPTER

6 SYLK DEVICE PROGRAMMING

Sylk Devices

The Sylk devices are part of the IRM family. These devices are designed to seamlessly integrate with IRM NX controllers using the Sylk bus for communication. These devices increase the controller's ability to expand the operation, which is configured with applications that require a large amount of physical I/O. The Sylk devices are used in HVAC applications that require a programmable controller. All the devices provide flexible, universal inputs for external sensors.

The Sylk devices are programmable using IRM engineering tool wire sheets through the CentraLine-N4 workbench.

The “honIrmControl” palette supports the following Sylk devices listed below.

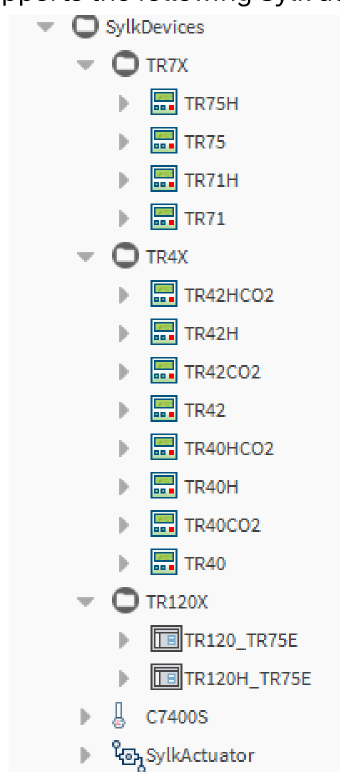

Fig. 340 Sylk Devices

Note: *While clearing the controller and loading the Sylk configuration to the controller (Proxy file to the controller), 20 VDC output will turn off for 30 seconds. All I/O terminals will be down for 30 seconds. It will only happen when CentraLine-N4 changes the Sylk application or deletes the application from the controller. It will not happen once the application teach completes and the controller is running.*

Following is the list of supported Sylk devices:

Table 31 Sylk Devices

Module-TR7x	
TR75H	TR75
TR71H	TR71
Module-TR4x	
TR42	TR42H
TR42CO2	TR42HCO2
TR40	TR40H
TR40CO2	TR40HCO2
Module-TR120x	
TR120	TR120H
Sensor	
Sylk sensor	C7400S Sylk Sensor (Zeleny)
Sylk Actuator	
Sylk Actuator	MS3103, MS3105, MS4103, MS4105, MS7403, MS7405, MS7503, MS7505, MS8103, MS8105 spring return. Direct Coupled Actuators (DCA) are used within Heating, Ventilating, and Air-Conditioning (HVAC) systems. They can drive a variety of quarter-turn; final control elements requiring spring return fail-safe operation.

Sylk Parameters

The “honIrmControl” palette supports following the Sylk parameters listed below.

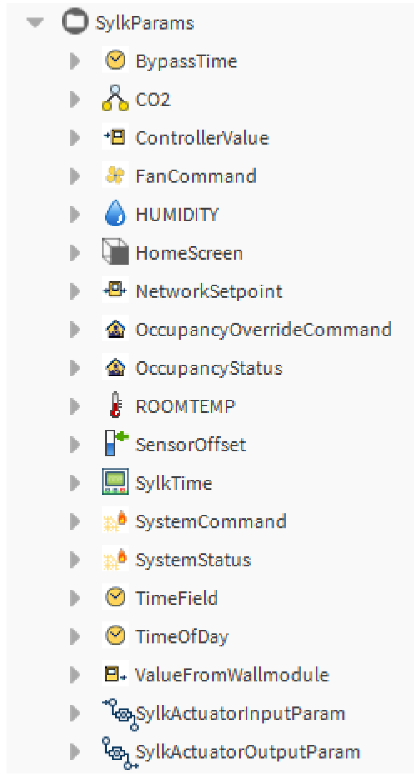

Fig. 341 Sylk Parameters

Table 32 Sylk Parameters

Parameter	Description
BypassTime	To provide the bypass time to a wall module.
CO2	CO2 concentration in the space.
ControllerValue	Sylk device value sent to the controller and they are reflected in the wall module.
FanCommand	To provide commands to the fan from the wall module.
HUMIDITY	Percent humidity of the space.
HomeScreen	To configure the LED display of the wall module.
NetworkSetpoint	To provide the setpoints to a wall module.
OccupancyOverrideCommand	To override the unoccupancy mode to occupied mode.
OccupancyStatus	Occupancy status in the wall module.
ROOMTEMP	Temperature of the space.
SensorOffset	To provide the sensor offset to a wall module.
SylkTime	To configure and change the value of the Sylk module and platform time.
SystemCommand	To override the system command from the wall module.

Table 32 Sylk Parameters (Continued)

Parameter	Description
SystemStatus	System status in the wall module.
TimeField	To configure the time format of the wall module.
TimeOfDay	Time of the day to display on the Sylk device.
ValueFromWallModule	To provide the value from the wall module to the controller.

For more information regarding Sylk parameters, refer to the IRM Function Blocks User Guide - EN2B-0415-GE51.

Sylk Parameters Supported by the Sylk Devices

This section describes the Sylk parameters that are supported by Sylk devices.

Sylk Parameters Supported by TR120x

Table 33 TR120x

Parameter	TR120x SBus wall modules	
	TR120	TR120H
ROOMTEMP	Y	Y
HUMIDITY	N	Y
OccupancyOverrideCommand	Y	Y
ValueFromWallModule	Y	Y
TimeOfDay	Y	Y
SystemStatus	Y	Y
OccupancyStatus	Y	Y
ValueFromController	Y	Y
SystemCommand	Y	Y
TimeField	Y	Y
BypassTime	Y	Y
SensorOffset	Y	Y
HomeScreen	Y	Y
NetworkSetpoint	Y	Y
SylkTime	Y	Y
FanCommand	Y	Y
EnumSchedule	Y	Y

Sylk Parameters Supported by TR7x

Table 34 TR7x

Parameter	TR7x SBus wall modules			
	TR75H	TR75	TR71H	TR71
ROOMTEMP	Y	Y	Y	Y
HUMIDITY	Y	N	Y	N
OccupancyOverrideCommand	Y	Y	Y	Y
ValueFromWallModule	Y	Y	Y	Y
TimeOfDay	Y	Y	Y	Y
SystemStatus	Y	Y	Y	Y
OccupancyStatus	Y	Y	Y	Y
ValueFromController	Y	Y	Y	Y
SystemCommand	Y	Y	Y	Y
TimeField	Y	Y	Y	Y
BypassTime	Y	Y	Y	Y
SensorOffset	Y	Y	Y	Y
HomeScreen	Y	Y	Y	Y
NetworkSetpoint	Y	Y	Y	Y
SylkTime	Y	Y	Y	Y
FanCommand	Y	Y	Y	Y
EnumSchedule	Y	Y	N	N

Sylk Parameters Supported by TR40x

Table 35 TR40x

Parameter	TR40x SBus wall modules			
	TR40	TR40H	TR40CO2	TR40HCO2
ROOMTEMP	Y	Y	Y	Y
HUMIDITY	N	Y	N	Y
CO2	N	N	Y	Y

Sylk Parameters Supported by TR42x

Table 36 TR42x

Parameter	TR42x SBus wall modules			
	TR42	TR42H	TR42CO2	TR42HCO2
ROOMTEMP	Y	Y	Y	Y
HUMIDITY	N	Y	N	Y
CO2	N	N	Y	Y
OccupancyOverrideCommand	Y	Y	Y	Y
OccupancyStatus	Y	Y	Y	Y
BypassTime	Y	Y	Y	Y
NetworkSetpoint	Y	Y	Y	Y
FanCommand	Y	Y	Y	Y

Sylk Parameters Supported by C7400S

Table 37 C7400S (Zeleny)

Parameter	(Zeleny)
ROOMTEMP	Y
HUMIDITY	Y

Steps to Configure Sylk Application

Steps to configure and install the Sylk application in Sylk devices:

Step 1. Add Sylk Device: Add Sylk device to the periodic program or event program wiresheet view.

Step 2. Add and Map Sylk Parameters in Sylk Device: Map the required Sylk parameters with a Sylk device.

Step 3. Configure Sylk Parameters: Configure the Sylk parameters as required.

Step 4. Configure Sylk Device: Configure the Sylk device as required.

Step 5. Validate Sylk Device: Verify all the Sylk device configurations in the wiresheet view.

Step 6. Teach to Controller: Install the Sylk device application file in the Sylk device models like TR120, TR75, etc.

Add Sylk Device

Steps to add Sylk device:

Step 1. Navigate to the **Station** > **Config** > **Drivers** > **BacnetNetwork** > **IrmBacnetDevice** > **Irm Program** and open the **Wiresheet** view of the **Periodic program.**

Step 2. Navigate to the Palette section select **honlrmControl** > **SylkDevices**.

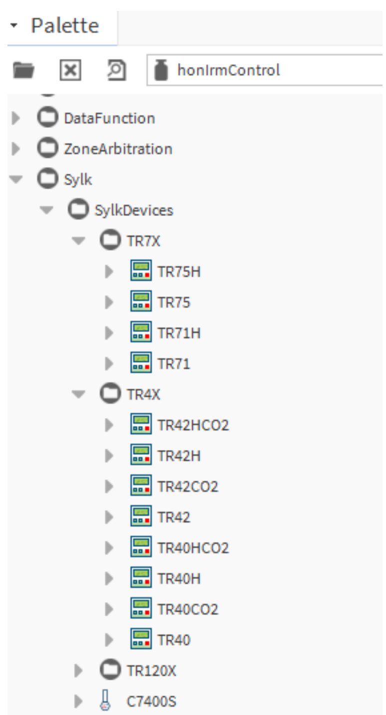

Fig. 342 honIrmControl Palette

Step 3. Select the Sylk device from the **SylkDevices** list and drag-drop it in the wiresheet view of the **Periodic program.**

You can add multiple Sylk devices by holding down Ctrl and right-clicking on them in the palette, then dragging them into the wiresheet view of **Periodic Programs**.

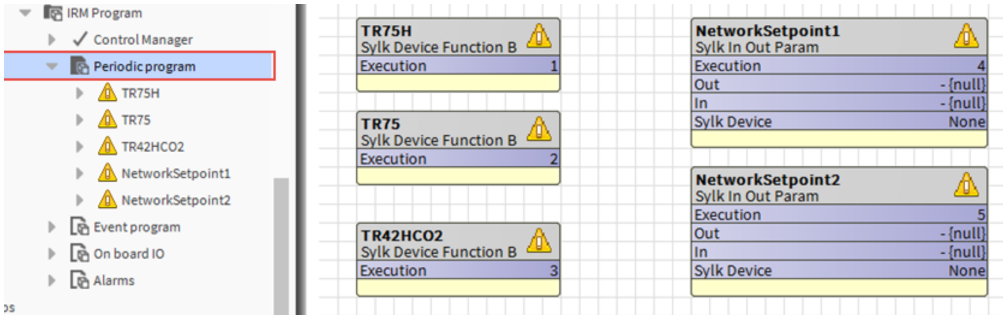

Fig. 343 Wiresheet View Of Periodic Program

To view the property sheet for the Sylk device, double-click on it. You can check the power consumption and customize the Sylk device on the property sheet. You may also see if the Is configuration downloaded status is true or false.

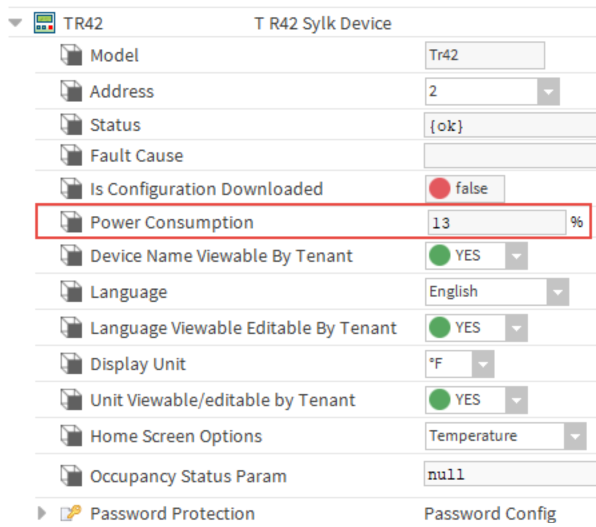

Fig. 344 Total Sylk Power Consumption Data

Add and Map Sylk Parameters in Sylk Device

Once you have copied the Sylk device under the periodic program or event program, you can configure the parameters of the Sylk devices. Refer to the Sylk Parameters on page 241 section for more details on supported Sylk parameters for all the Sylk devices.

Steps to map Sylk Parameters with Sylk Device:

Step 1. Navigate to **Station** > **Config** > **Drivers** > **BacnetNetwork** > **IrmBacnetDevice** > **Irm Program** and open the **Wiresheet view** of **Periodic program.**

Step 2. Navigate to the **honlrmControl** palette, expand **Sylk** folder and select **SylkParms**.

Step 3. Drag the Sylk parameters and drop onto the wiresheet.

Step 4. Once all the required parameters added in the wiresheet view, map all of the parameters with the Sylk device.

Step 5. Double-click on the Sylk parameters object. This action opens the property sheet.

Step 6. Select the Sylk device from the sylkdevice drop-down list.

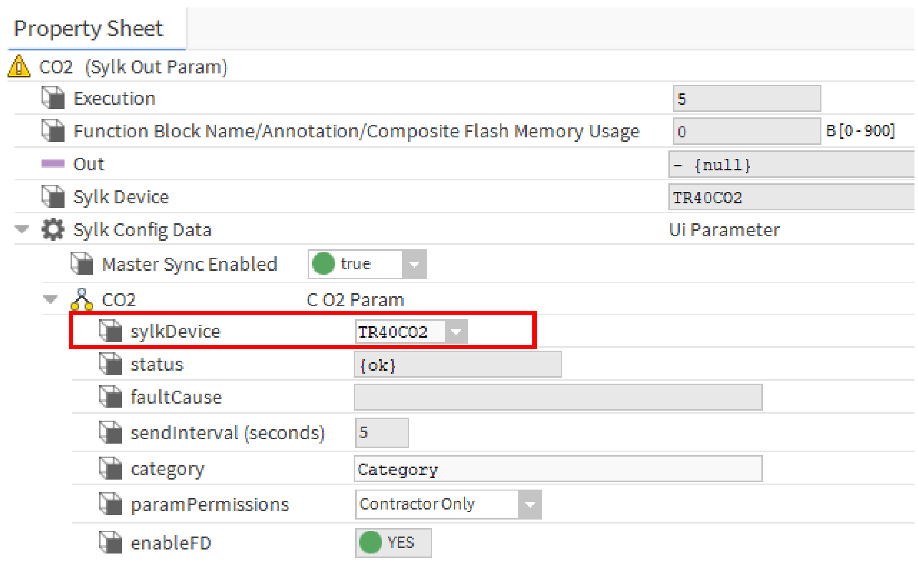

Fig. 345 List of supported Sylk devices

Also, you can create a specific group of Sylk parameters and map them with the required Sylk device using Irmfolder.

Steps to create a specific group of parameters:

Step 1. Navigate to the **honlrmControl** palette, add the **IrmFolder** in the wiresheet view.

Step 2. Double-click on the **IrmFolder.** This opens **IrmFolder** wiresheet view.

Step 3. Similarly, add the Sylk device and parameters from the palette to the **IrmFolder** wiresheet.

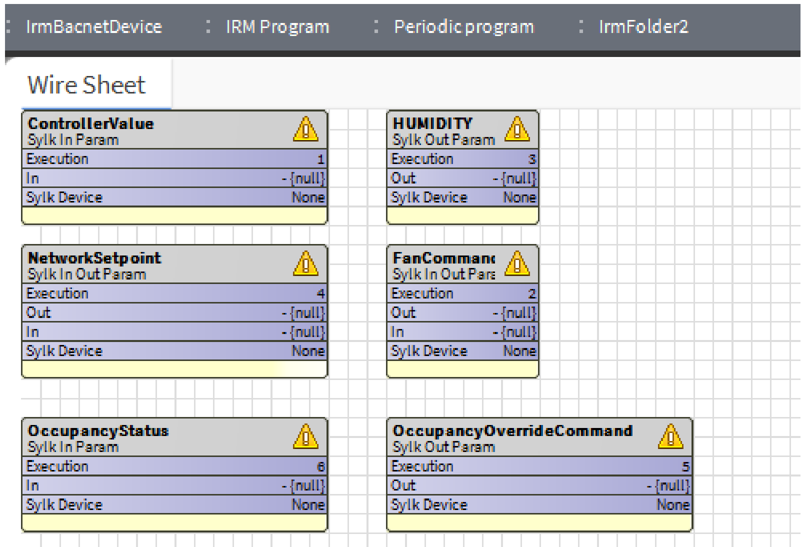

Fig. 346 Wiresheet View

Step 4. In the Wiresheet view, right-click the **Sylk Device** > **Actions** > select **Attach unassigned Params.** All the unassigned parameters of the Sylk device are assigned.

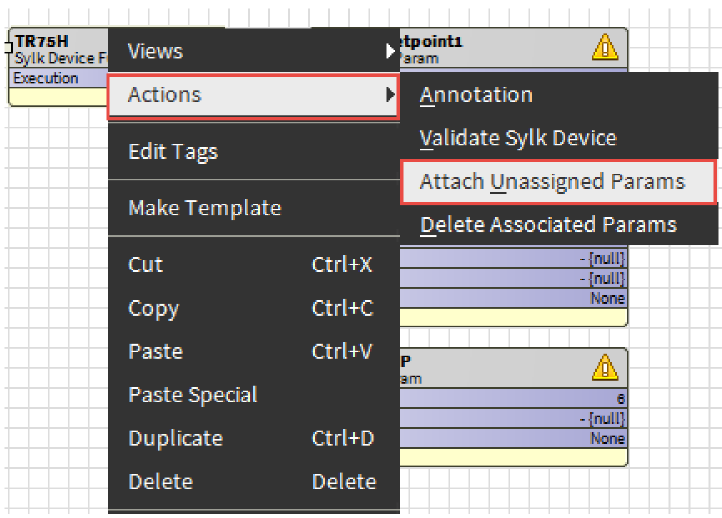

Fig. 347 Attach Unassigned Parameters

Similarly, you can also create several folders and configure them with Sylk devices. The folders can be reused by copying and pasting them into the wiresheet view.

Configure Sylk Parameters

Configure the required Sylk parameters after mapping the Sylk device with the Sylk parameters.Sylk Parameters are divided into three categories:

- **Sylk In Parameters:** These parameters act as input to the Sylk devices. For more details, refer to the Configure Sylk In Parameters on page 250.
- **Sylk Out Parameters:** These parameters capture input from various sensors and act as output for the Sylk device. For more details, refer to the Configure Sylk Out Parameters on page 255.
- **Sylk In Out Parameters:** These parameters are used as input as well as output for the Sylk device. For more details, refer to the Configure Sylk In Out Parameters on page 268.

Sylk In Parameters

Sylk In parameters are used as inputs to the Sylk devices.

Table 38 Sylk In Parameters

Properties	Description
ControllerValue	Value from the controller to the wall module.
OccupancyStatus	Occupancy status in the wall module.
SystemStatus	System status in the wall module.
TimeOfDay	Displays Time of the day on Sylk device.

Sylk Out Parameters

Sylk Out parameters capture input from various sensors and act as output for the Sylk devices.

Table 39 Sylk Out Parameters

Properties	Description
CO2	CO2 concentration in the space.
HUMIDITY	Percent humidity of the space.
OccupancyOverrideCommand	Allows you to override the occupied, unoccupied, standby mode for wall module.
ROOMTEMP	Temperature of the space.
SensorOffset	Provides the sensor offset to the wall module.
ValueFromWallModule	Provides the Sylk device value from the wall module to the controller.

Sylk In Out Parameters

Sylk In Out parameters are used as input and output for the Sylk device.

Table 40 Sylk In Out Parameters

Properties	Description
BypassTime	Provide the bypass time to a wall module.
FanCommand	Provide commands to the fan from the wall module.
NetworkSetpoint	Provide the setpoints to the wall module.
SystemCommand	Override the system command from the wall module.
TimeField	Configure the time format of the wall module.

Configure Sylk In Parameters

- Controller Value Parameter Configuration: The Controller Value parameter displays the value from the controller to the wall module.
- Occupancy Status Parameter Configuration: The Occupancy Status parameter displays occupancy status in the wall module.
- System Status Parameter Configuration: The System Status parameter displays the system status in the wall module.
- Time Of Day Parameter Configuration: The Time of Day parameter sets the time format for the wall module.

For more detail about Sylk In Parameters type, refer to IRM Function Blocks User Guide - EN2B-0415-GE51.

Controller Value Parameter Configuration

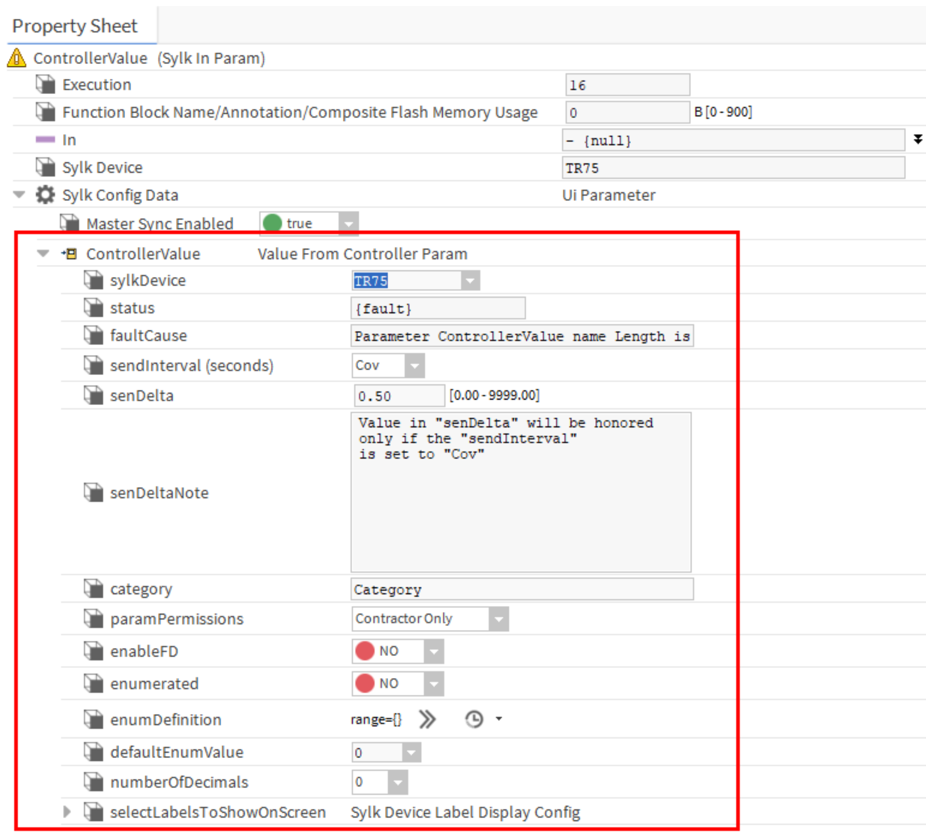

Fig. 348 Controller Value Property Sheet

Steps to configure Controller Value parameter:

Step 1. **sylkDevice:** Select the Sylk device from the drop-down list.

Step 2. **category:** Enter the category name in the field. It helps to differentiate between parameters.

Step 3. **paramPermissions:** Select the permissions from the drop-down list as per the requirement (Contractor Only, Tenant Read-only, and Tenant Read Write).

Fig. 349 Parameter Permissions

Step 4. **enableFD:** The period until the configured Sylk device is alerted of a failure at this point is defined as fail detect.

- **YES**: If the parameter has not received an update from the BACnet network source in the fail detect time, an alarm is generated, and the current value is set to invalid.
- **No**: False means the object retains the last value written to it until a BACnet network source changes.

Note: *Fail detect time depends on the configured update rate.*

Step 5. **enumerated:** This field allows user to enable multiple states of the enum setpoint.

Step 6. **enumDefinition:** If the enumerated field is "Yes," the user can set multiple states of the enum setpoints.

To set the enumDefinition of the Setpoint:

i). Click on the >> button.

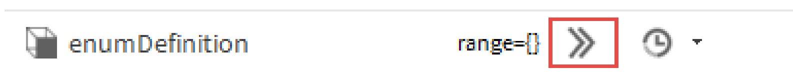

Fig. 350 Enum Setpoint

ii). Set the enum definitions **Ordinal, Tag, and Display** as per your requirement.

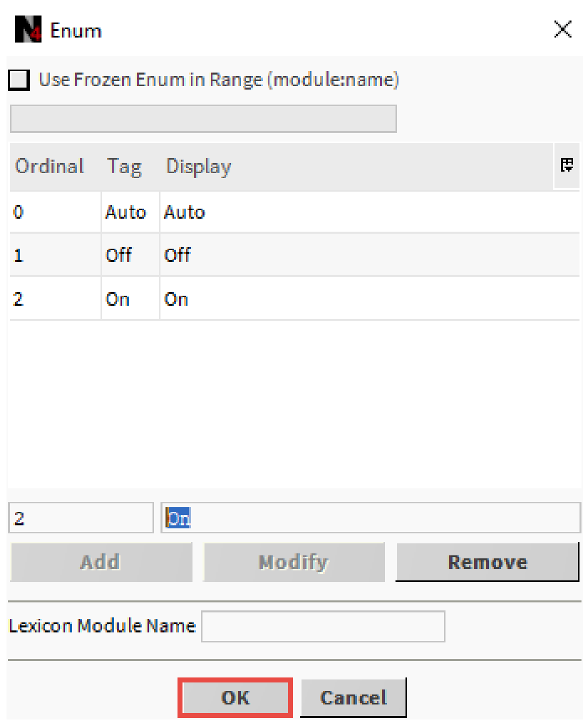

Fig. 351 Enum definitions

iii). Click **OK** to save.

Note: *TR 71 and TR 75 are the enumerated options for the Sylk module type. To enable the enumerated option, set the parameter type to controller value, wall module value, or network setpoint.*

Step 7. **defaultEnumValue :** This option displays the list of default enum values from the defined enum range.

Step 8. **selectLabelsToShowOnScreen:** This option allows the user to configure the Sylk device labels to the display in the Sylk wall module.

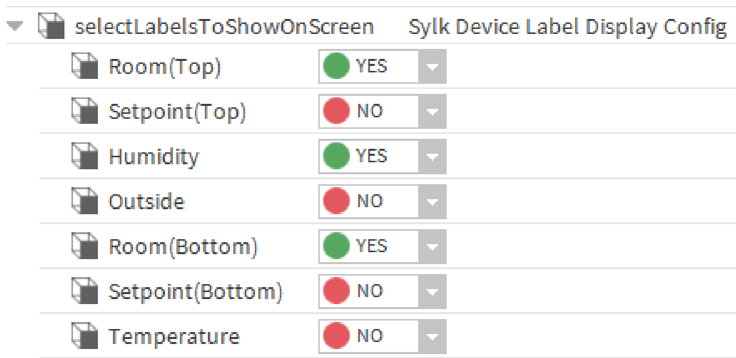

Fig. 352 Sylk Select Labels

Occupancy Status Parameter Configuration

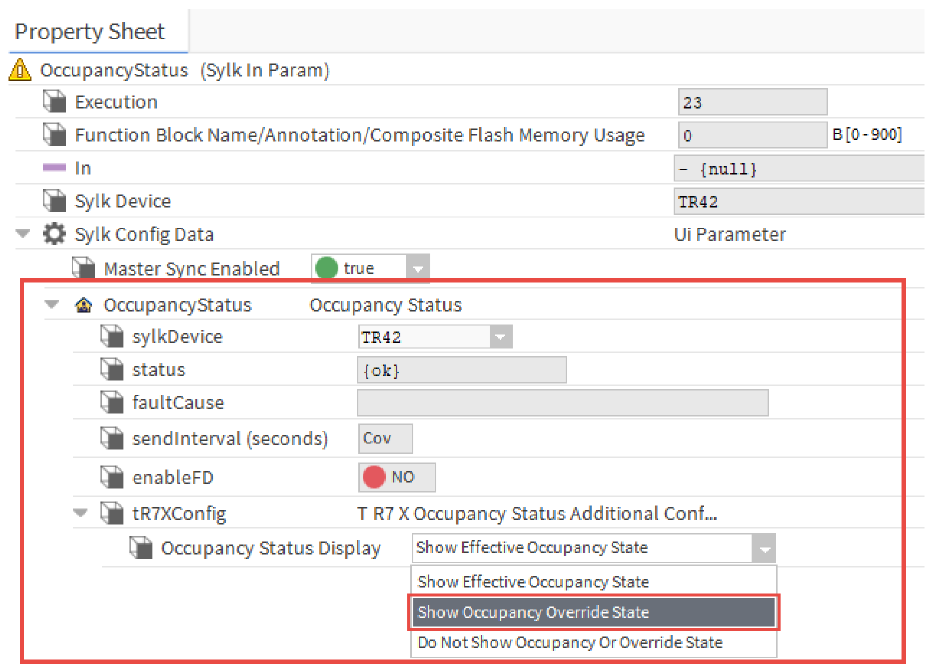

Fig. 353 Occupancy status Property Sheet

Steps to configure Occupancy Status parameter:

Step 1. **sylkDevice:** Select the Sylk device from the drop-down list.

Step 2. **tR7XConfig:** This field allows you to choose how the override status should be presented on the LCD.

- **Show effective occupancy status:** LCD displays the actual occupancy status considering the IRM application.

- **Show the occupancy override status:** LCD displays the occupancy override status initiated from the LCD, independent of the IRM application.
- **Do not show occupancy or override status:** LCD does not display occupancy or override, regardless of what the user initiates and the IRM application.

System Status Parameter Configuration

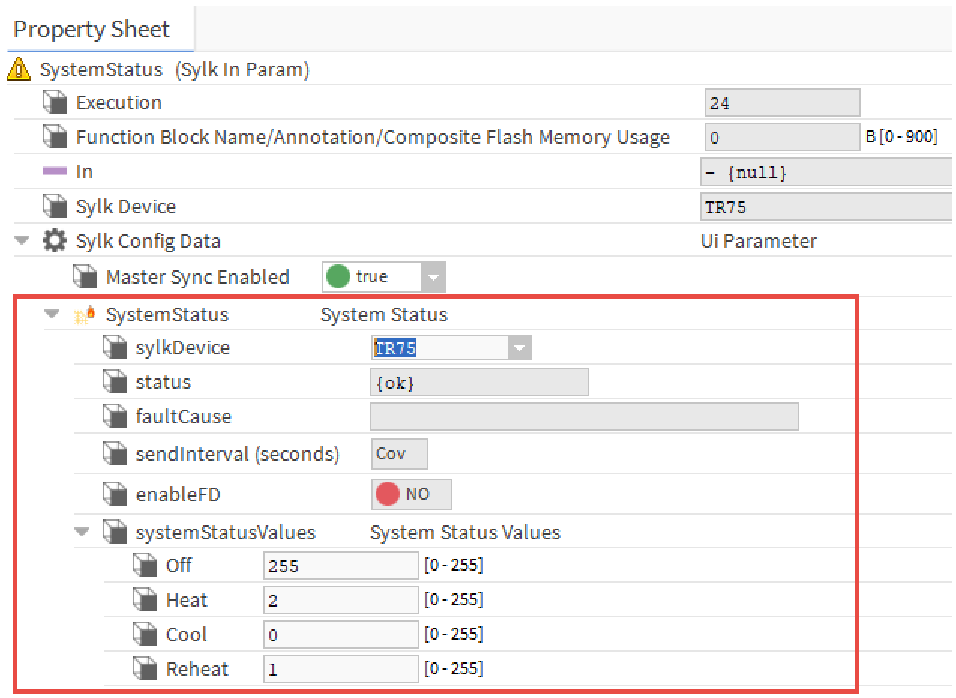

Fig. 354 System Status Property Sheet

Steps to configure System Status parameter:

Step 1. **sylkDevice:** Select the Sylk device from the drop-down list.

Step 2. **systemStatusValues:** This option allows configuring the system values as per requirement in the defined range.

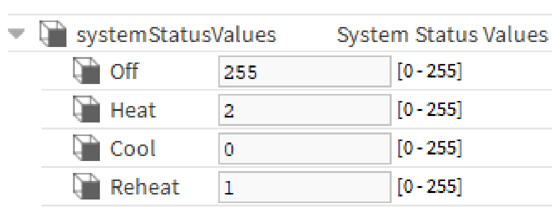

Fig. 355 System Status Values

Time Of Day Parameter Configuration

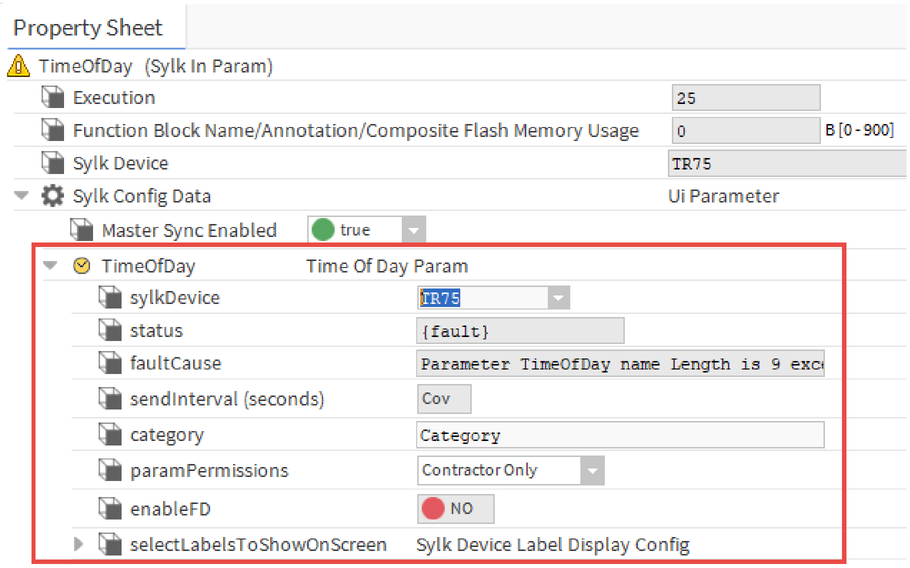

Fig. 356 Time Of Day Property Sheet

Steps to configure Time Of Day parameter:

Step 1. **sylkDevice:** Select the Sylk device from the drop-down list.

Step 2. **category:** Enter the category name in the field. It helps to differentiate between parameters.

Step 3. **paramPermissions:** Select the permissions from the drop-down list as per the requirement (Contractor Only, Tenant Read-only, and Tenant Read Write).

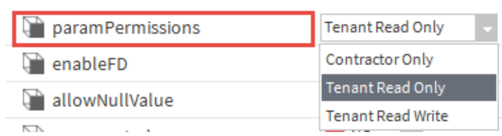

Fig. 357 paramPermissions

Step 4. **selectLabelsToShowOnScreen:** This option allows you to customize the display of the Sylk device label for Sylk parameters.

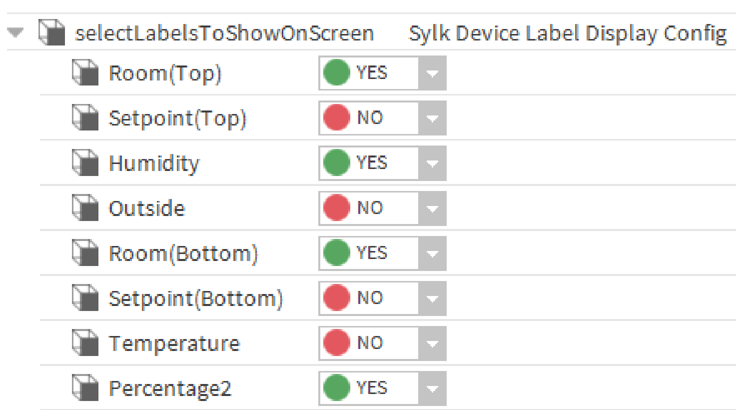

Fig. 358 Configure Sylk Device Label Display

For more detail about Sylk In Parameters type, refer IRM Function Blocks User Guide - EN2B-0415-GE51.

Configure Sylk Out Parameters

The following are the parameters that capture input from various sensors and act as output for the Sylk device:

- Humidity Parameter Configuration: The Humidity parameter shows the percentage of humidity in the room.
- CO2 Parameter Configuration: The CO2 parameter specifies the level of CO2 concentration in the room.
- Occupancy Override Command Parameter Configuration: The Occupancy Override Command parameter allows to switch between Unoccupancy Mode to Occupied Mode.
- Room Temperature Configuration: The ROOMTEMP parameter displays the room temperature.
- Sensor Offset Parameter Configuration: The Sensor offset parameter provides the sensor offset to the wall module.
- Value From Wall Module Parameter Configuration: The Value From Wall Module parameter provides the value from the wall module to the controller.

For more detail about Sylk In Parameters type, refer IRM Function Blocks User Guide - EN2B-0415-GE51.

Humidity Parameter Configuration

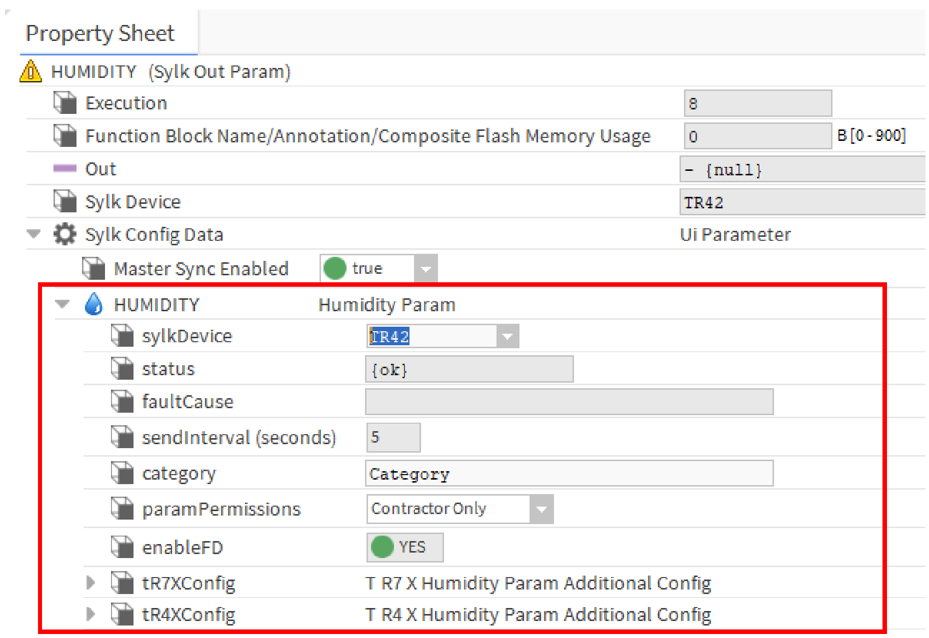

Fig. 359 Humidity Property Sheet

Steps to Configure Humidity parameter:

Step 1. **sylkDevice:** Select the Sylk device from the drop-down list.

Step 2. **categories:** Enter the category name in the field. This helps to differentiate between the parameters.

Step 3. **paramPermissions:** Select the permissions from the drop-down list as per the requirement (Contractor Only, Tenant Read-only, and Tenant Read Write).

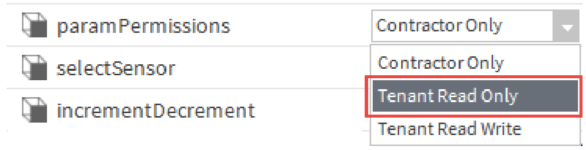

Fig. 360 Parameter Permissions

Step 4. **tR7XConfig:** This option allows configuring additional parameters.

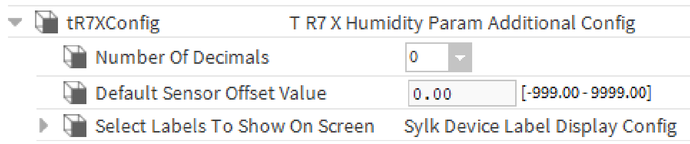

Fig. 361 T R7X Humidity Param Additional Config

- **Number of Decimals:** Enter the decimal accuracy.
- **Default Sensor Offset Value:** Enter the default value for sensor offset.
- **Select Labels To Show On Screen:** This option allows you to customize the display of the Sylk device label for Sylk parameters.

Step 5. **tR4XConfig:** This option allows configuring additional parameters.

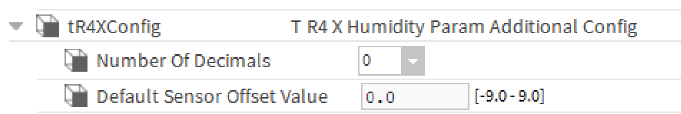

Fig. 362 T R4X Humidity Param Additional Config

- **Number of Decimals:** Enter the decimal accuracy.
- **Default Sensor Offset Value:** Enter the default value for sensor offset.

CO2 Parameter Configuration

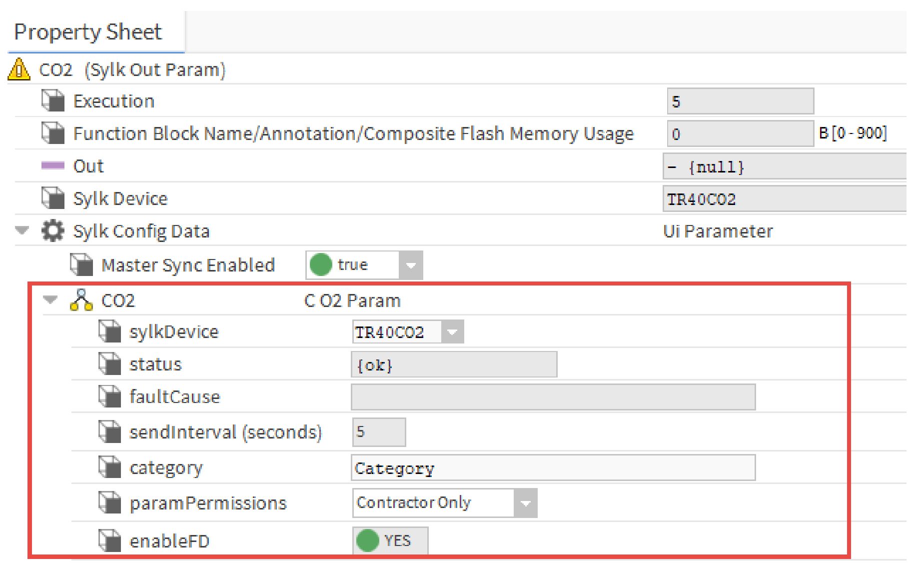

Fig. 363 CO2 Property Sheet

Steps to configure CO2 parameter:

Step 1. **sylkDevice:** Select the Sylk device from the drop-down list.

Step 2. **categories:** Enter the category name in the field. It helps to differentiate between parameters.

Step 3. **paramPermissions:** Select the permissions from the drop-down list as per the requirement (Contractor Only, Tenant Read-only, and Tenant Read Write).

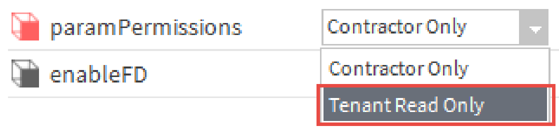

Fig. 364 Change Parameter Permissions

Occupancy Override Command Parameter Configuration

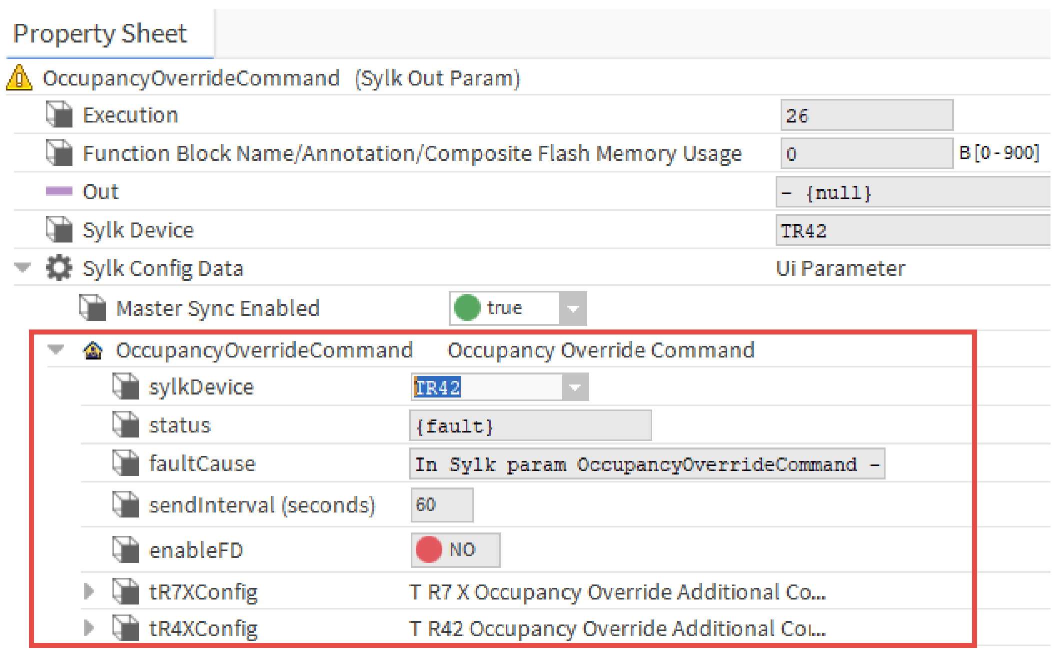

Fig. 365 Occupancy Override Command Property Sheet

Steps to configure Occupancy Override Command parameter:

Step 1. **sylkDevice:** Select the Sylk device from the drop-down list.

Step 2. **tR7XConfig:** This option allows configuring occupancy override additional settings.

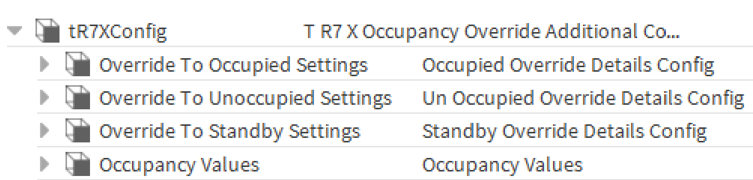

Fig. 366 T R7X Occupancy Override Additional settings

Override To Occupied Settings

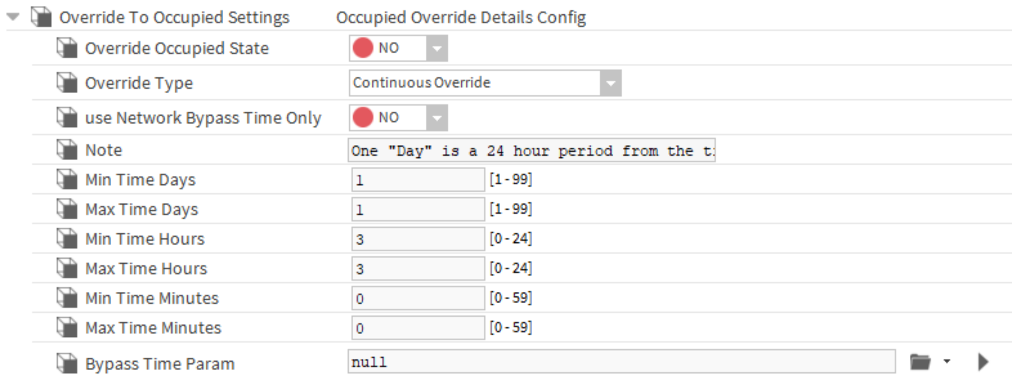

Fig. 367 Override to Occupied Settings

- **Override Type**
  - **Continuous Override:** The default setting, this setting disables the time override type options.
  - **Time Override in Hours (Bypass):** This option enables the time setting details. The minimum and maximum time can be set in hours and minutes. The default setting is min = max = 3 hours. Ensure that the maximum time is greater than the minimum time or that the minimum time is lesser than the maximum time. If either case is not true, an error message appears informing that the min value is greater than the max value. The range is from 0 to 24 hrs / 0 to 59 min.
  - **Time Override in Days (Bypass):** This option enables the time setting details, wherein the minimum and maximum time can be set in days. In this case, the hours and minutes options are disabled. The default setting is min = max = 1 day. The permissible range is 1 to 99 days.

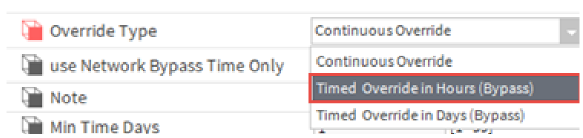

Fig. 368 Override Type

If the range exceeds, an error message displays.

- **Use Network Bypass Time Only:** If this option is selected, then all other override details are disabled. The application will determine the timed override.

Note: *The Use Network Bypass Time only option applies to occupied override type settings. This option is not available for unoccupied and standby override type settings.*

- **Override Setting**

Fig. 369 Override Settings

Override To Unoccupied Settings

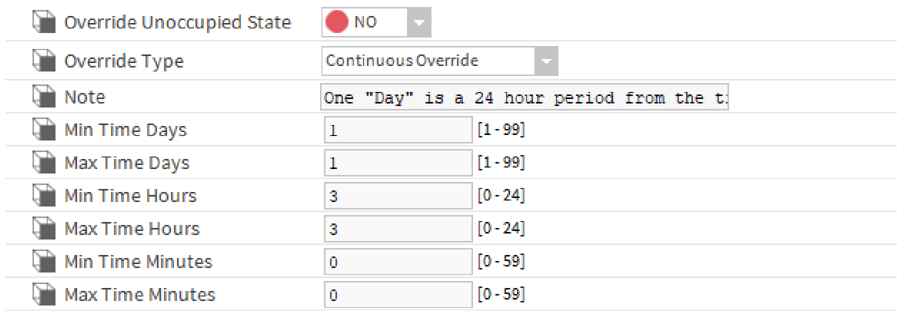

Fig. 370 Override to Unoccupied

- **Override Type**
  - **Continuous Override:** The default setting, this setting disables the time override type options.
  - **Time Override in Hours (Bypass):** This option enables the time setting details. The minimum time and maximum time can be set in hours and minutes. The default setting is min = max = 3 hours.Ensure that the maximum time is greater than the minimum time or that the minimum time is lesser than the maximum time. If either case is not true, an error message appears informing that the min value is greater than the max value. The range is from 0 to 24 hrs / 0 to 59 min.
  - **Time Override in Days (Bypass):** This option enables the time setting details, wherein the minimum and maximum time can be set in days. In this case, the hours and minutes options are disabled. The default setting is min = max = 1 day. The permissible range is 1 to 99 days.

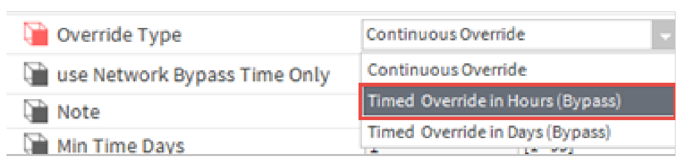

Fig. 371 Override Type

- **Override Settings**

Fig. 372 Override Settings

Override To Standby Settings

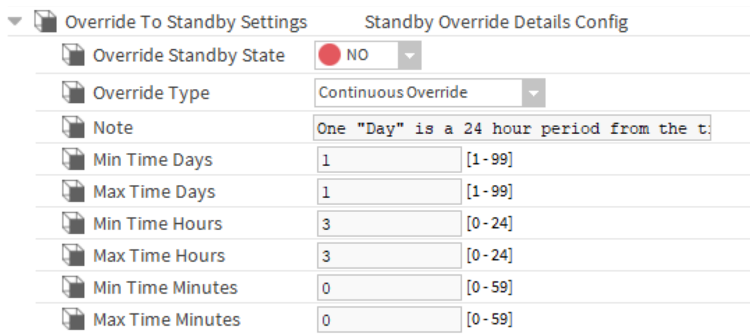

Fig. 373 Override To Standby

- **Override Type**
  - **Continuous Override:** The default setting, this setting disables the time override type options.
  - **Time Override in Hours (Bypass):** This option enables the time setting details. The minimum and maximum time can be set in hours and minutes. The default setting is min= max= 3 hours. Ensure that the maximum time is greater than the minimum time or that the minimum time is lesser than the maximum time. If either case is not true, an error message appears informing that the min value is greater than the max value. The range is from 0 to 24 hrs / 0 to 59 min.
  - **Time Override in Days (Bypass):** This option enables the time setting details, wherein the minimum and maximum time can be set in days. In this case, the hours and minutes options are disabled. The default setting is min = max = 1 day. The permissible range is 1 to 99 days.

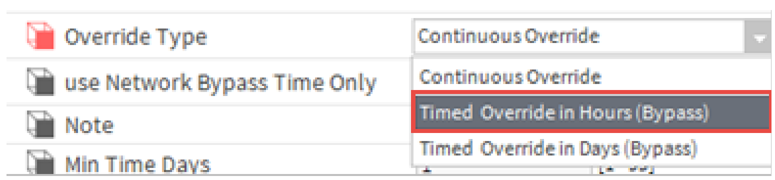

Fig. 374 Override Type

  - **Override Settings**

Fig. 375 Override Settings

Occupancy Values

Provides options to define the different values within the mentioned ranges.

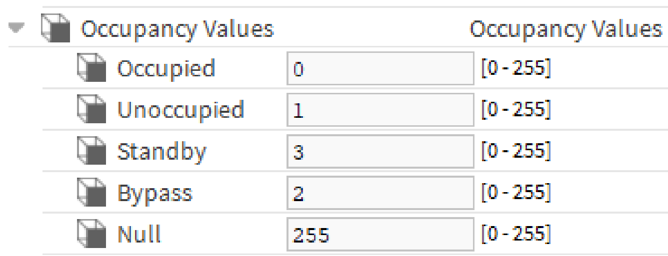

Fig. 376 Occupancy Values

- **Show effective occupancy status:** LCD displays the actual occupancy status considering the IRM application.
- **Show occupancy override status:** LCD displays the occupancy override status initiated from the LCD, independent of the IRM application.
- **Do not show occupancy or override status:** LCD does not display occupancy or override, regardless of what the user initiates and IRM application.

Step 3. **tR4XConfig:** This option allows configuring additional parameters.

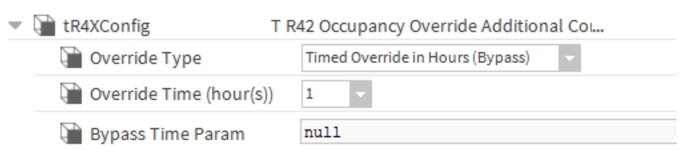

Fig. 377 tR4XConfig Additional Parameter Options

Room Temperature Configuration

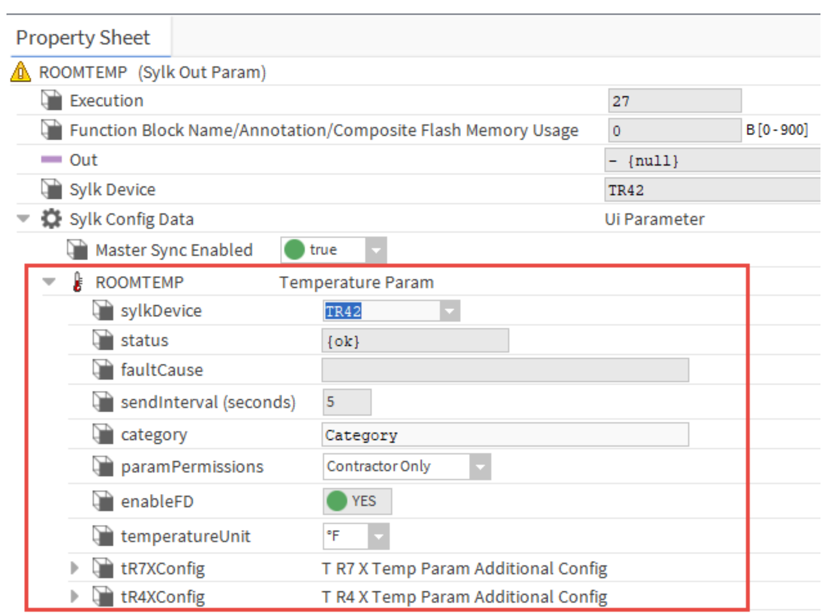

Fig. 378 RoomTemp Property Sheet

Steps to configure Room Temperature parameter:

Step 1. **sylkDevice:** Select the Sylk device from the drop-down list.

Step 2. **categories:** Enter the category name in the field. It helps to differentiate between parameters.

Step 3. **paramPermissions:** Select the permissions from the drop-down list as per the requirement (Contractor Only, Tenant Read-only, and Tenant Read Write).

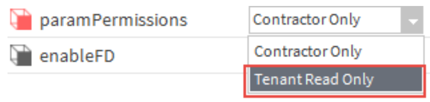

Fig. 379 Parameter Permissions

Step 4. **TemperatureUnit:** This option allows to select temperature unit (°F or °C).

Step 5. **tR7XConfig:** This option allows you configure additional parameters.

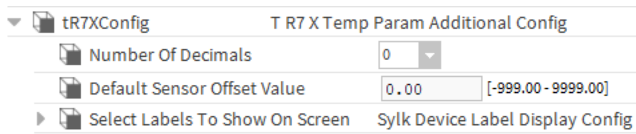

Fig. 380 tR7XConfig Additional Parameter Options

- **Number of Decimals:** Enter the decimal accuracy.
- **Default Sensor Offset Value:** Enter the default value for sensor offset.
- **Select Labels To Show On Screen:** This option allows you to customize the display of the Sylk device label for Sylk parameters.

Step 6. **tR4XConfig:** This option allows you configure additional parameters.

Fig. 381 tR4XConfig Additional Parameter Options

- **Number of Decimals:** Enter the decimal accuracy.
- **Default Sensor Offset Value:** Enter the default value for sensor offset.

Sensor Offset Parameter Configuration

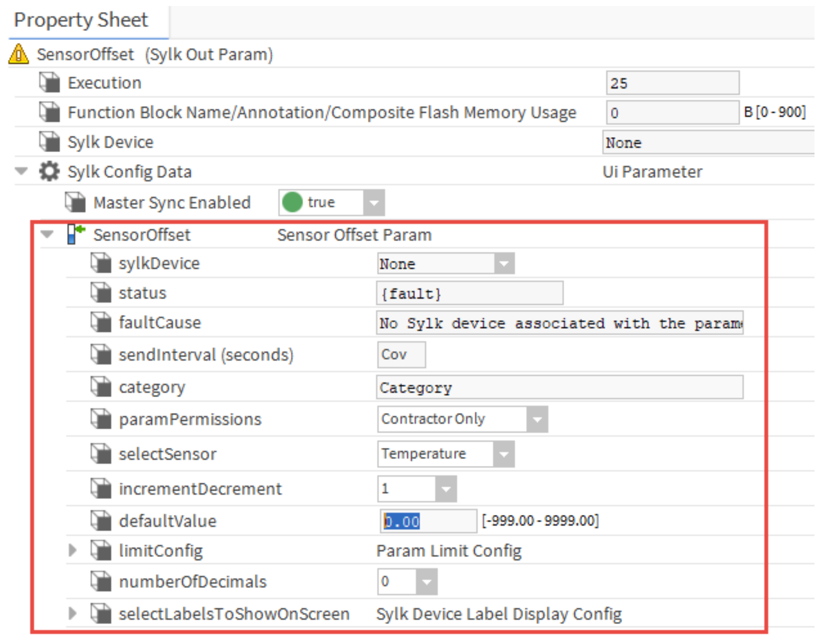

Fig. 382 SensorOffset Property Sheet

Steps to configure Sensor Offset parameter:

Step 1. **sylkDevice:** Select the Sylk device from the drop-down list.

Step 2. **categories:** Enter the category name in the field. It helps to differentiate between parameters.

Step 3. **paramPermissions:** Select the permissions from the drop-down list as per the requirement (Contractor Only, Tenant Read-only, and Tenant Read Write).

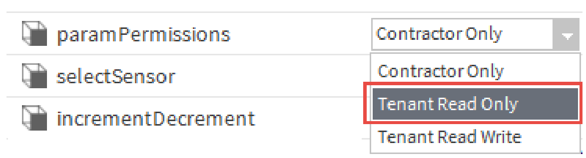

Fig. 383 Parameter Permissions

Step 4. **selectSensor:** Select sensor displays the list of sensors that needs to be configured and offset. All available sensors are listed, but the selection is based on the selected model. The default selection is **Temperature.** This field is displayed only for a parameter of the category offset.

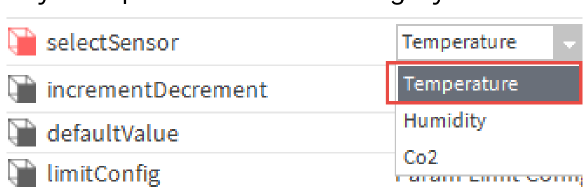

Fig. 384 Select Sensors

Following are the sensor selection available:

- Temperature
- Humidity
- CO2

Note: *If the value of the parameter types temperature, humidity, and CO2 from the wall module is edited and saved, the default sensor offset value of the corresponding sensor is also changed to the edited value.*

Step 5. **incrementDecrement:** Depends on the number of decimal places selected.

- If the number of decimal places is 0, then select 1, 5, 10, 100.
- If the number of decimal places is 1, then select 0.1, 0.5, 1, 5, 10, 100.
- If number of decimal places is 2, then select 0.01, 0.1, 0.5, 1, 5, 10, 100.

Note: *For the TR71x and TR75x wall modules, increments of 5 and 0.5 are available for the value from the wall module, network setpoint, and sensor offset value (Internal) parameters.*

Step 6. **defaultValue:** Indicates the value that initially downloads to the wall module. This value must be between the low and high limits. This field displays for the following parameter types:

- Value from the wall module.
- Sensor offset value. By default, it is set to 0.

Note: *The default value has a limit of 5 characters.*

Step 7. **limitConfig:** This option is to set the high & low limits of the parameter.

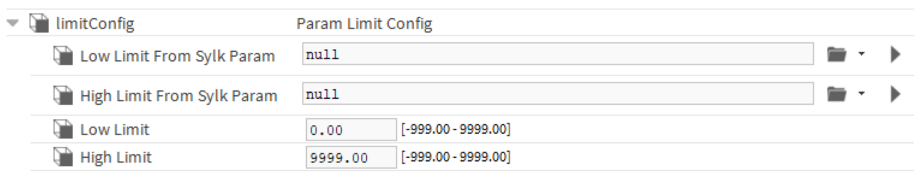

Fig. 385 Set high and Low Limits of Sylk Parameters

- **Low Limit From Sylk Param:** To select the low limit value from the other Sylk parameter of respective system device.
- **High Limit From Sylk Param:** To select the high limit value from the other Sylk parameter of respective system device.
- **Low Limit:** To set the low limit.
- **High Limit:** To set the high limit.

Step 8. **numberOfDecimals:** Apply to all parameter types except Time. This value affects the incrementDecrement options.

Step 9. **selectLabelsToShowOnScreen:** This option allows to configure the Sylk device label display for the Sylk parameter.

Value From Wall Module Parameter Configuration

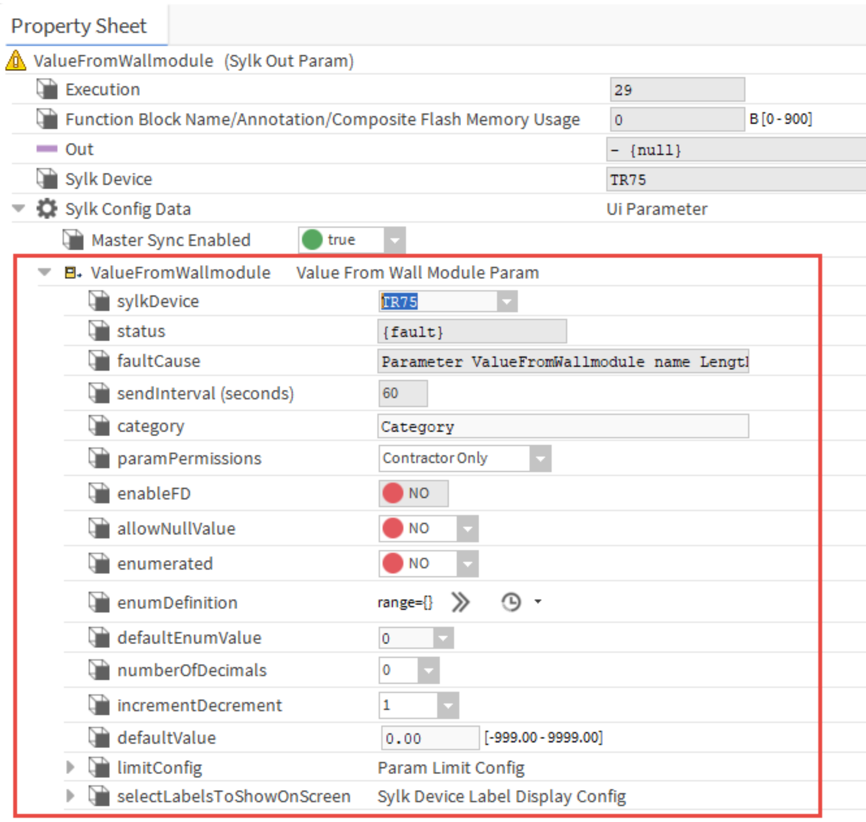

Fig. 386 ValveFromWallModule Property Sheet

Steps to configure Value From Wall Module parameter:

Step 1. **sylkDevice:** Select the Sylk device from the drop-down list.

Step 2. **categories:** Enter the category name in the field. It helps to differentiate between parameters.

Step 3. **paramPermissions:** Select the permissions from the drop-down list as per the requirement (Contractor Only, Tenant Read-only, and Tenant Read Write).

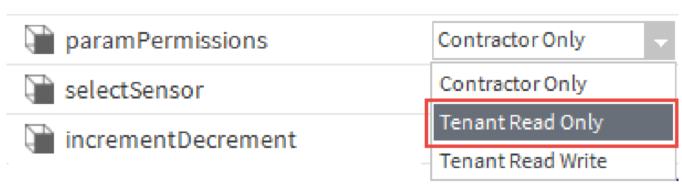

Fig. 387 Change Parameter Permissions

Step 4. **allowNullValue:** Indicate whether null values can be set for the adjustable value. If enabled, when the LCD user reaches a low or high limit, an additional button press will send the null value.

Step 5. **enumerated:** This field allows user to enable multiple states of the enum setpoint.

Step 6. **enumDefinition:** If the enumerated is “Yes,” the user can set multiple states of the enum setpoint.

To set the enumDefinition of the Setpoint:

i). Click on the >> button.

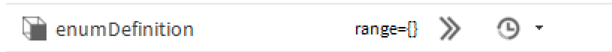

Fig. 388 Enum Setpoint

ii). Set the states **Ordinal, Tag, and Display** as per requirement.

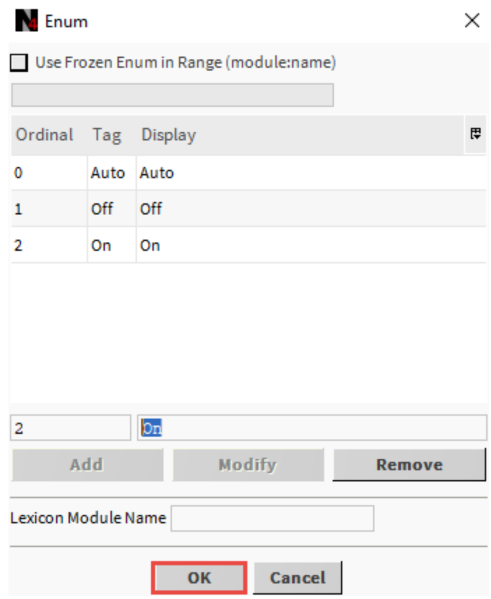

Fig. 389 Enum States

iii). Click **OK** to save.

Note: *The enumerated option applicable to the Sylk module type is TR 71 and TR 75. Select the parameter type as controller value, a value from wall module, or network setpoint to enable the enumerated option.*

Step 7. **defaultEnumValue:** This option displays the list of default enum value from the defined enum range.

Step 8. **numberOfDecimals:** Apply to all parameter types except Time. This value affects the the incrementDecrement options.

Step 9. **incrementDecrement:** Depends on the number of decimal places selected.

- If the number of decimal places is 0, then select 1, 5, 10, 100.
- If the number of decimal places is 1, then select 0.1, 0.5, 1, 5, 10, 100.
- If number of decimal places is 2, then select 0.01, 0.1, 0.5, 1, 5, 10, 100.

Note: *The increment of 5 and 0.5 is available for the value from wall module, network setpoint, and sensor offset Value (Internal) parameters for the TR71x and TR75x wall modules.*

Step 10. **defaultValue:** Indicates the value that initially downloads to the wall module. This value must be between the low and high limits. This field is displayed for the following parameter types:

- Value from wall module.
- Sensor offset value. By default, it is set to 0.

Step 11. **limitConfig:** This option is to set the high and low limits of the parameter.

- **Low Limit From Sylk Param:** To select the low limit value from the other Sylk parameter of the respective system device.

- **High Limit From Sylk Param:** To select the high limit value from the other Sylk parameter of the respective system device.
- **Low Limit:** To set the low limit.
- **High Limit:** To set the high limit.

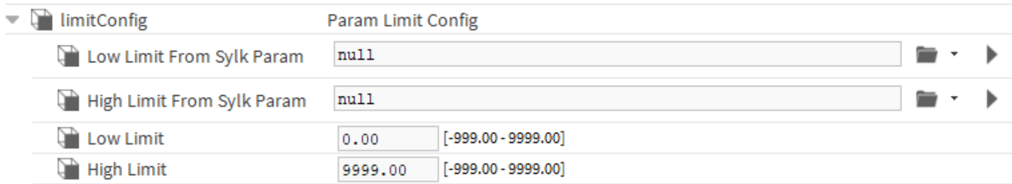

Fig. 390 Set High and Low Limits of Parameter

Step 12. **selectLabelsToshowOnScreen:** This option allows to configure Sylk device label display for Sylk parameter.

Configure Sylk In Out Parameters

The Sylk device uses the following parameters as input as well as output:

- Bypass Time Parameter Configuration: provide the bypass time to the wall module.
- Fan Command Parameter Configuration: provide commands to the fan from the wall module.
- Network Setpoint Parameter Configuration: provide the setpoints to the wall module.
- System Command Parameter Configuration: override the system command from the wall module.
- Time Field Parameter Configuration: To configure the time format of the wall module.

For more detail about Sylk In Parameters type, refer IRM Function Blocks User Guide - EN2B-0415-GE51.

Bypass Time Parameter Configuration

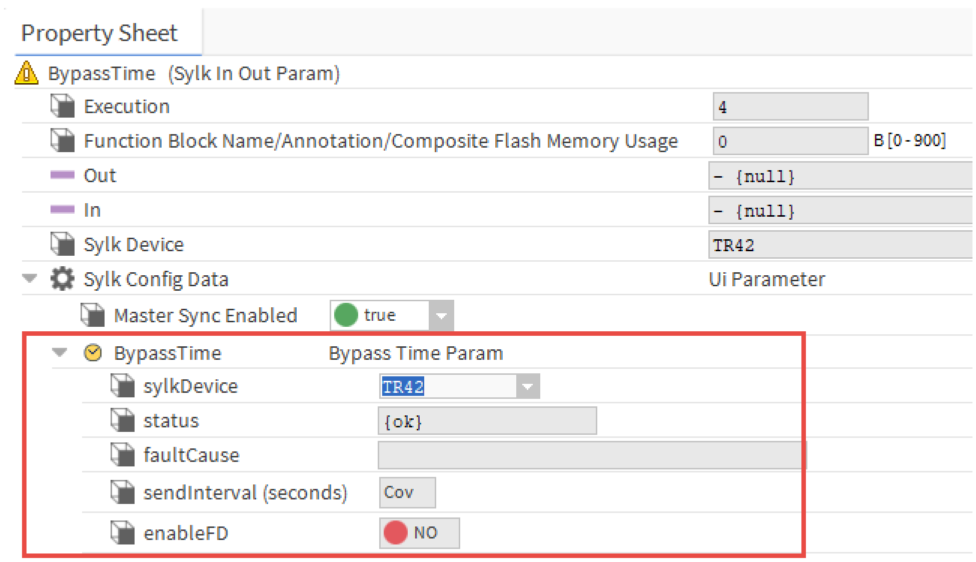

Fig. 391 BypassTime Property Sheet

Steps to configure Bypass Time parameter:

Step 1. **sylkDevice:** Select the Sylk device from the drop-down list.

Fan Command Parameter Configuration

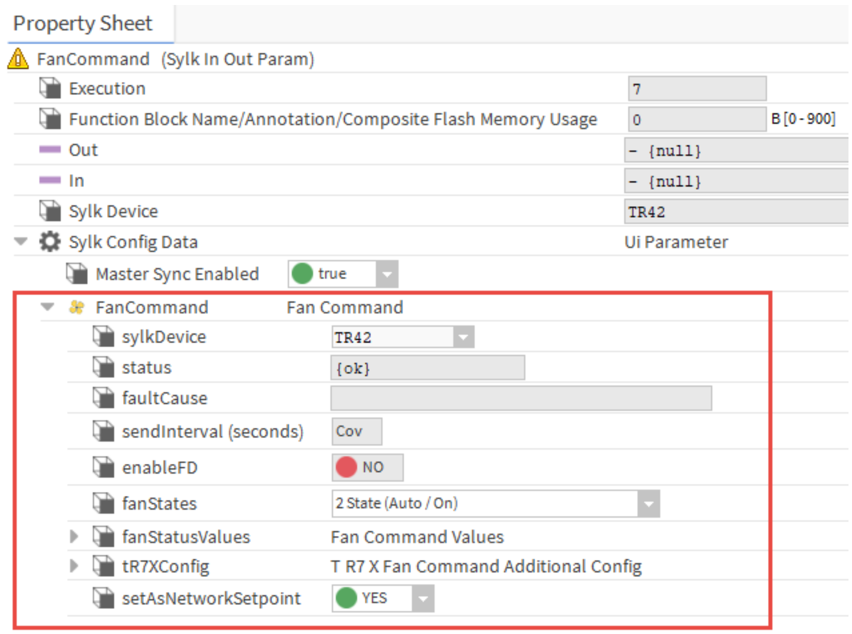

Fig. 392 FanCommand Property Sheet

Steps to configure Fan Command parameter:

Step 1. **sylkDevice:** Select the Sylk device from the drop-down list.

Step 2. **fanStates:** Enables the fan command. The valid fan States choices will be enabled if this option is checked. The three eligible fan states are 2 State, 3 State, and 5 State.

The following are the available fan state options:

- **2 State:** Auto / On. The default option is On.
- **3 State:** Auto / On / Off. The default option is On.
- **5 State:** Auto / Off / Low / Medium / High. The default option is Auto.

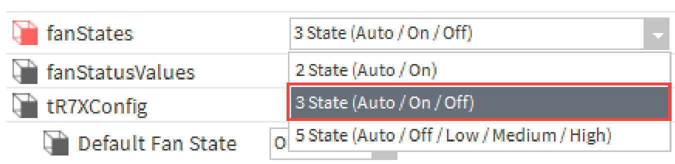

Fig. 393 Fan state Options

Step 3. **fanStateValues:** Set the fan state values for Auto / Off / On / Low / Medium / High.

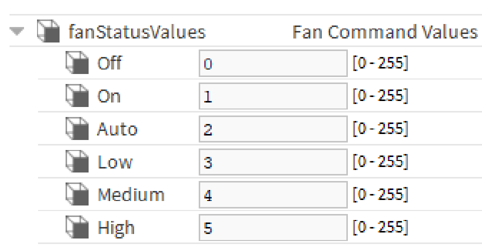

Fig. 394 Fan State Values

Step 4. **tR7XConfig:** Set the default state of the fan command.

Step 5. **setASNetworkSetpoint:** This option allows you to specify whether the parameter should be configured as a network set point or as an output only parameter.

- If you select Yes, you have access to write and read values.
- If you select No, you can only read values from the Sylk device.

Note: *• Set as Network setpoint is enabled by default. This option cannot be disabled by the user.*

• Only the TR71/TR75/TR42 model wall modules have the Set as Network Setpoint option.

Network Setpoint Parameter Configuration

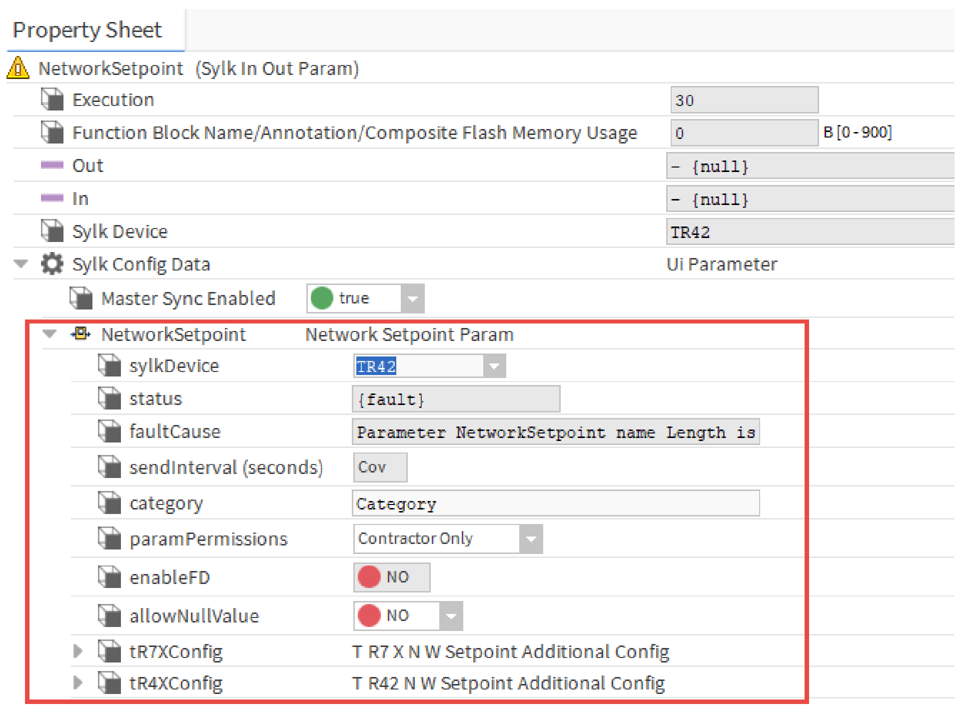

Fig. 395 Network Setpoint Property Sheet

Steps to configure Network Setpoint parameter:

Step 1. **sylkDevice:** Select the Sylk device from the drop-down list.

Step 2. **categories:** Enter the category name in the field. It helps to differentiate between parameters.

Step 3. **paramPermissions:** Select the permissions from the drop-down list as per the requirement (Contractor Only, Tenant Read-only, and Tenant Read Write).

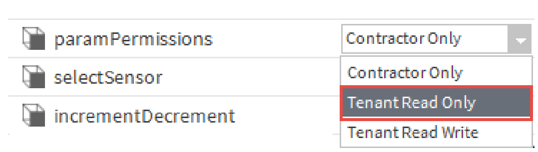

Fig. 396 Parameter Permissions

Step 4. **allowNullValue:** Indicates whether null values can be set for the adjustable value. If enabled, when the user exceeds a low or high limit, an additional button push will deliver the null value.

Step 5. **tR7XConfig:** This option allows you configure additional parameters.

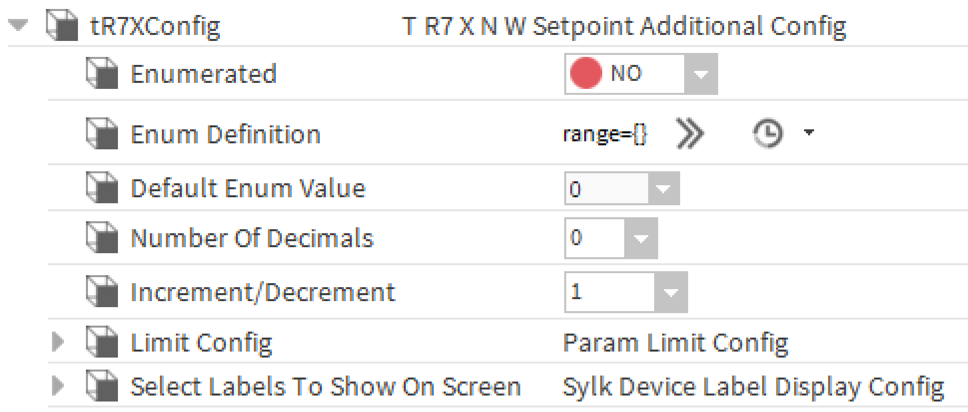

Fig. 397 tR7XConfig Additional Parameter Options

- **enumerated:** This field allows user to enable multiple states of the enum setpoint.
- **enumDefinition:** If the enumerated is "Yes," the user can set multiple states of the enum setpoint.

Note: *The enumerated option applicable to the Sylk module type is TR 71 and TR 75. Select the parameter type as controller value, a value from wall module, or network setpoint to enable the enumerated option.*

- **defaultEnumValue:** This option displays the list of default enum value from the defined enum range.
- **numberOfDecimals:** Apply to all parameter types except Time. This value affects incrementDecrement options.
- **incrementDecrement:** Depends on the number of decimal places selected.
  - If the number of decimal places is 0, then select 1, 5, 10, 100.
  - If the number of decimal places is 1, then select 0.1, 0.5, 1, 5, 10, 100.
  - If number of decimal places is 2, then select 0.01, 0.1, 0.5, 1, 5, 10, 100.

Note: *The increment of 5 and 0.5 is only available for the value from wall module, network setpoint, and sensor offset Value (Internal) parameters for the TR71x and TR75x wall modules.*

- **defaultValue:** Indicates the value that will be initially downloaded to the wall module. This value must be between the low and high limits. This field is displayed for the following parameter types:
  - Value from wall module.
  - Sensor offset value. By default, it is set to 0.
- **limitConfig:** This option allows to set the high and low limits of the parameter.
  - **Low Limit From Sylk Param:** To select the low limit value from the other Sylk parameter of the respective system device.
  - **High Limit From Sylk Param:** To select the high limit value from the other Sylk parameter of the respective system device.
  - **Low Limit:** To set the low limit.
  - **High Limit:** To set the high limit.

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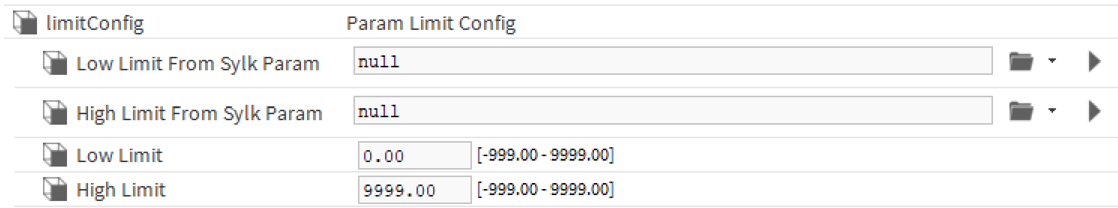


Fig. 398 To set high and low limits of parameter

- **selectLabelsToshowOnScreen:** This option allows to configure Sylk device label display for Sylk parameter.

Step 6. **tR4XConfig:** This option allows you configure additional param options.

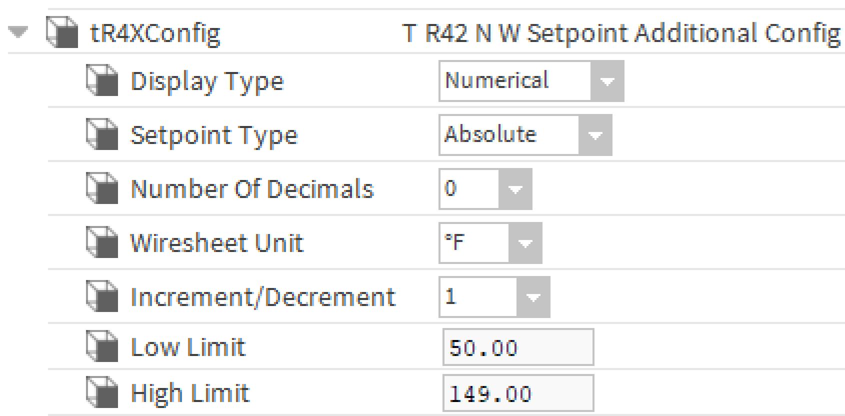


Fig. 399 tR4XConfig

System Command Parameter Configuration

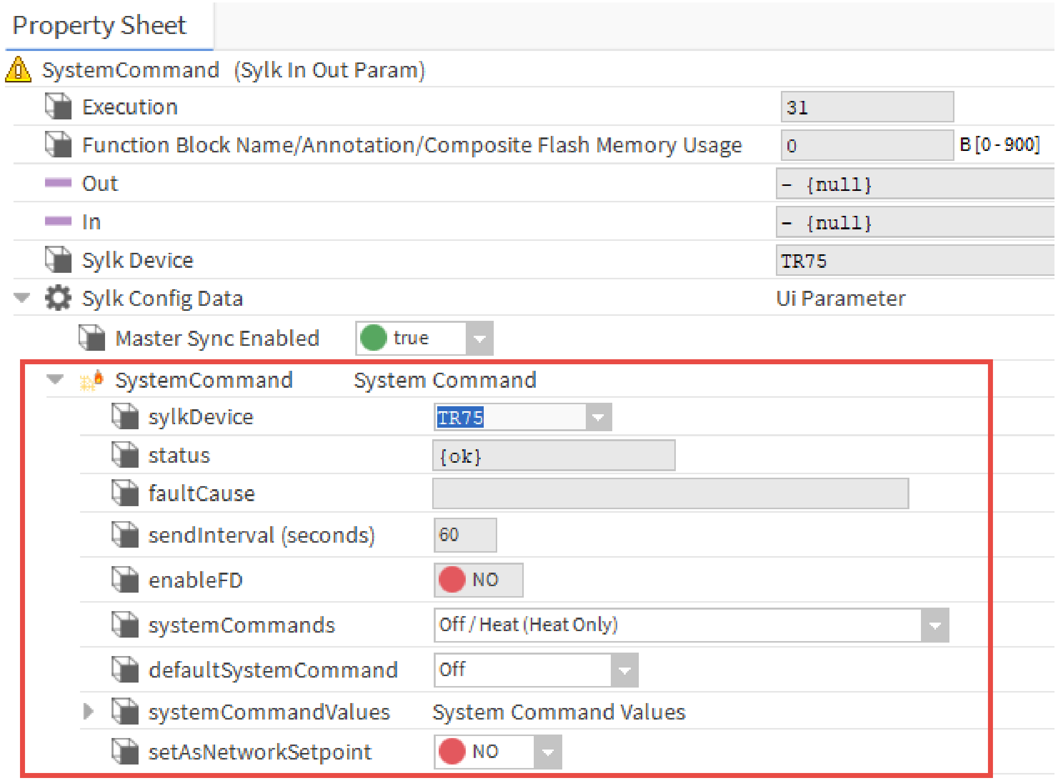


Fig. 400 System Command Property Sheet

Steps to configure Network Setpoint parameter:

Step 1. **sylkDevice:** Select the Sylk device from the drop-down list.

Step 2. **systemCommands:** Indicate an option to enable or disable the tenants commanding the system.

The following are the five valid system command options available:

- Off / Heat (Heat only)
- Off / Cool (Cool only)
- Off / Heat / Cool (No auto changeover)
- Off / Auto / Heat / Cool (Auto changeover)
- Off / Auto / Heat / Cool / Emergency Heat (Heat Pump)

Fig. 401 Command Points

Step 3. **defaultSystemCommand:** Allows to set the default value for the system command options:

- Off: Off / Heat / Cool:
- Auto: Off / Auto / Heat / Cool

- Heat: Off / Heat
- Cool: Off / Cool
- Emergency Heat: Off / Auto / Heat / Cool / Emergency Heat

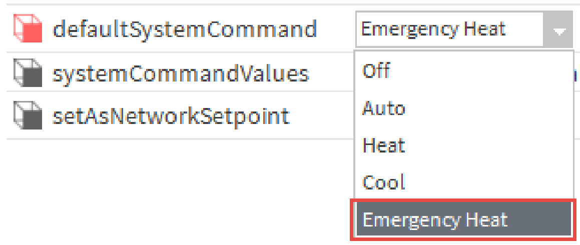


Fig. 402 Default System Command Values

Step 4. **systemCommandValues:** System command values display the various command values that are enabled based on the valid system commands that are selected. Incorrect values are disabled (depending on the system configuration options selected). You can switch between Off, Auto, Heat, Cool, and Emergency Heat modes.

- Off = 255
- Auto= 0
- Heat = 2
- Cool = 1
- Emergency Heat = 3.

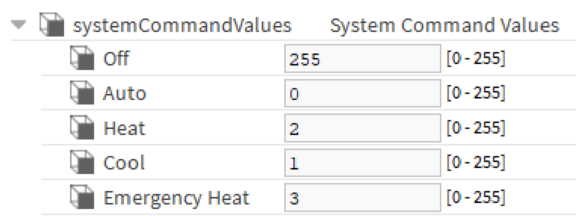


Fig. 403 System Command State Values

Step 5. **setAsNetworkSetpoint:** Connect the System command block to the Network input or setpoint and the Network output point using this option. If this option is not selected, the System command block can only refer to the Network output point and not the Network input or set point.

Note: *Set as Network Setpoint is disabled by default. The default value is No. By clicking YES or NO, you can enable or disable this option.*

Note: *Set as Network Setpoint option is available only for theTR71/TR75/TR120 model.*

Time Field Parameter Configuration

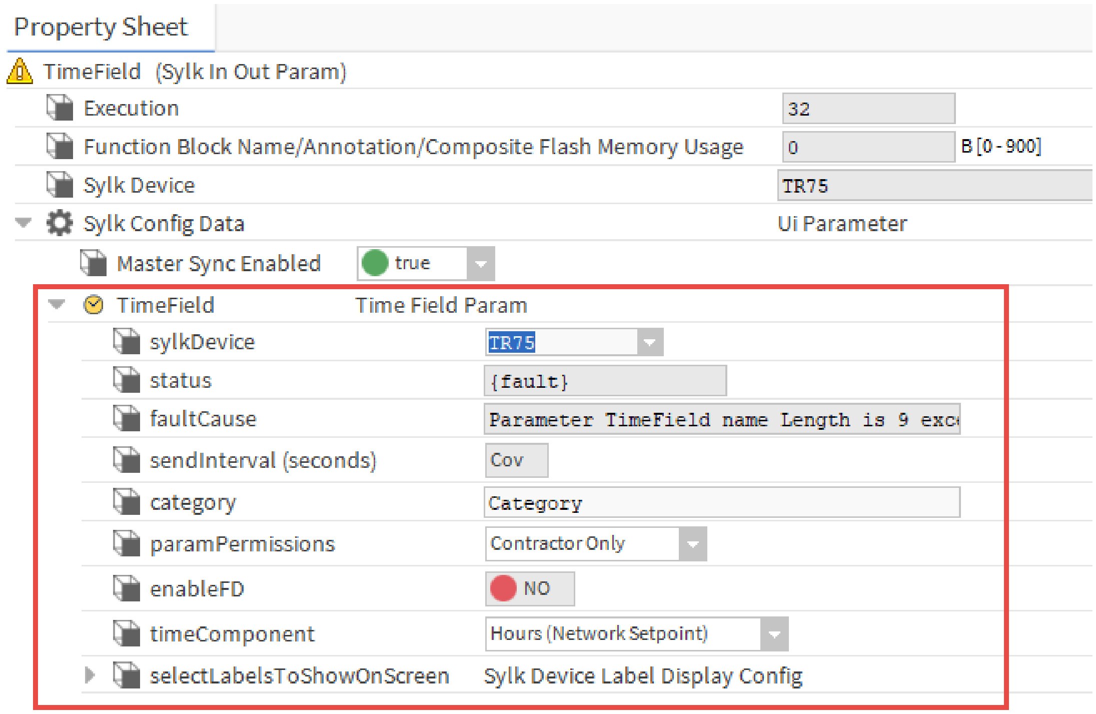


Fig. 404 Time Field Parameter

Steps to configure Time Field Parameter parameter:

Step 1. **sylkDevice:** Select the Sylk device from the drop-down list.

Step 2. **paramPermissions**: Select the permissions from the drop-down list as per the requirement (Contractor Only, Tenant Read-only, and Tenant Read Write).

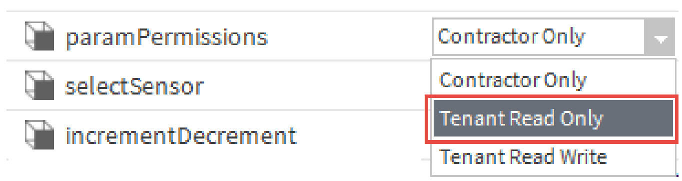


Fig. 405 Parameter Permissions

Step 3. **timeComponent**: This option allows configuring time and date format. The following are the available time components.

- Hours (Network Setpoint)
- Minutes (Network Setpoint)
- Day (Network Setpoint)
- Month (Network Setpoint)
- Year (Network Setpoint)

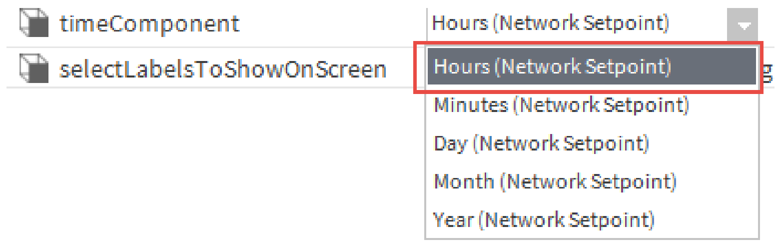


Fig. 406 To configure Time and Date Format

Step 4. **selectLabelsToShowOnScreen**: This option allows to configure the Sylk device label display for the Sylk parameter.

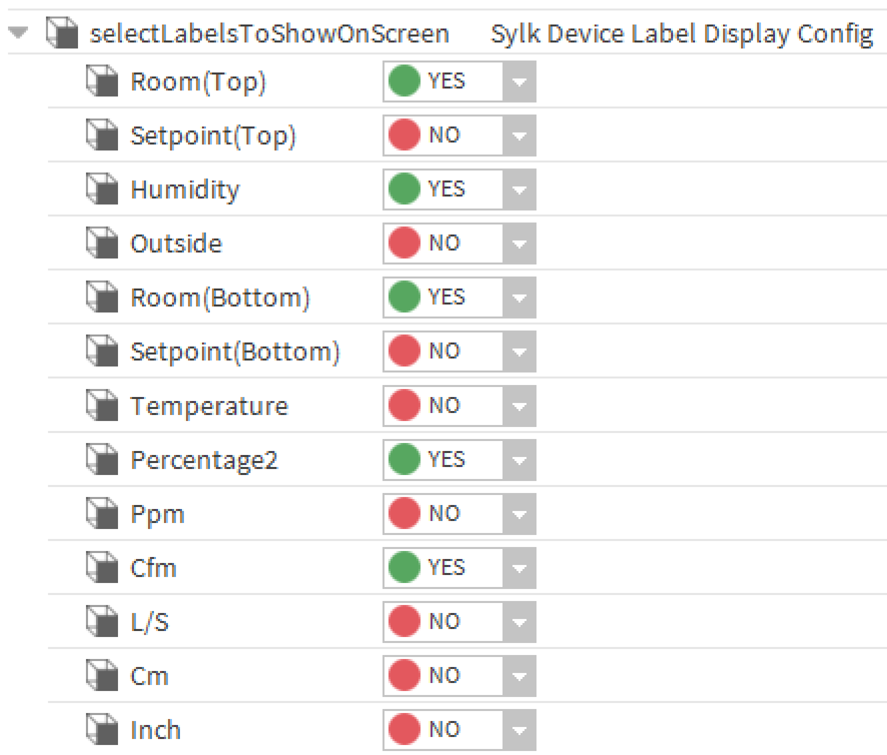


Fig. 407 Sylk Device Label Display

Map UI terminal of the controller with Sylk parameter

If you want to show any Sylk parameter data, such as temperature on the Sylk wall module display, then you need to map the controller UI terminal with the Sylk parameter.

Steps to Map UI terminal of the controller with Sylk parameter:

Step 1. Open the **Wiresheet View**, right-click on the controller's UI terminal, and select **Link Mark**.

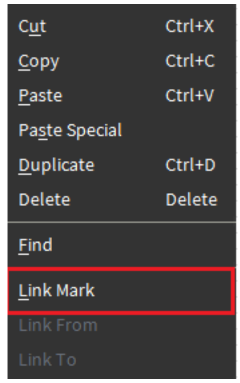


Fig. 408 UI Terminal

Step 2. Navigate to the Sylk application, right-click on the Sylk parameter, and select **Link From "UI_4".**

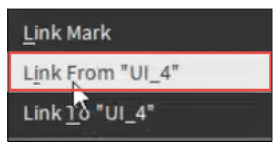


Fig. 409 Link to UI Terminal

Step 3. Select **Out** from the source and **In** from the target.

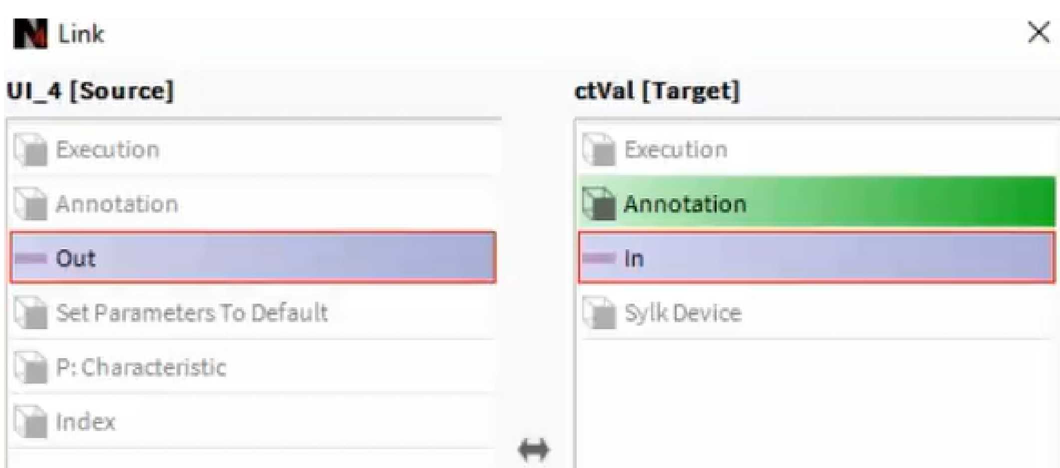


Fig. 410 Link Windows

Step 4. Click **OK.** It maps the UI controller terminal with the Sylk parameter terminal.

Configure Sylk Device

The Sylk device's details are displayed on the property sheet. The details include Network number, address, status, power consumption, and other options.

Steps to configure a Sylk Device:

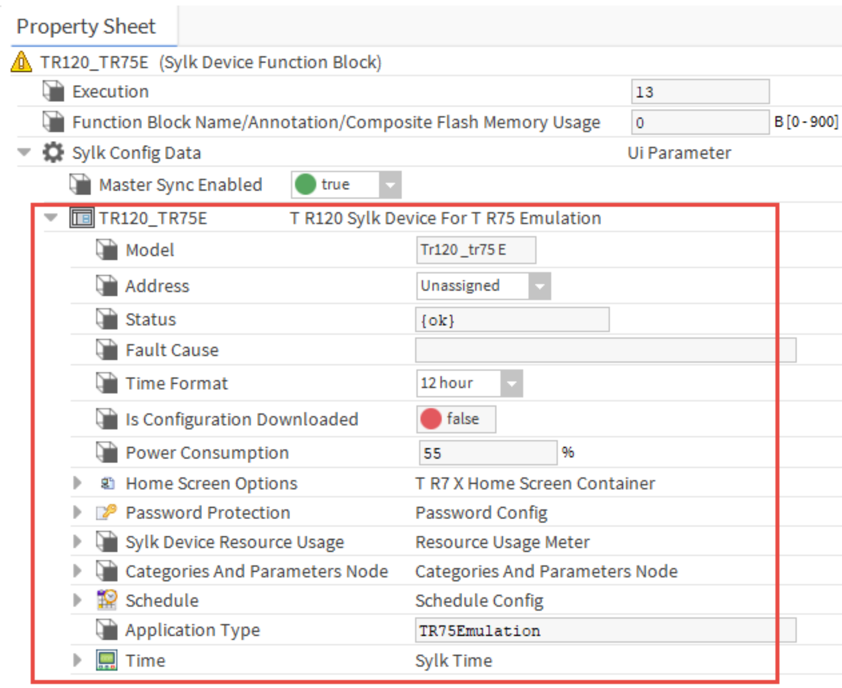


Fig. 411 Sylk Device Property Sheet (TR120_TR75E)

Step 1. **Address**: This option allows you to select a device address from the drop-down list.

Note: *When you add the Sylk device to the wiresheet view, it will automatically assign a unique address. You can change the assigned address manually.*

Step 2. **Time Format**: Set the time format of the Sylk device (12 hours or 24 hours).

Step 3. **Home Screen Options**: This option allows you to configure the home screen settings.

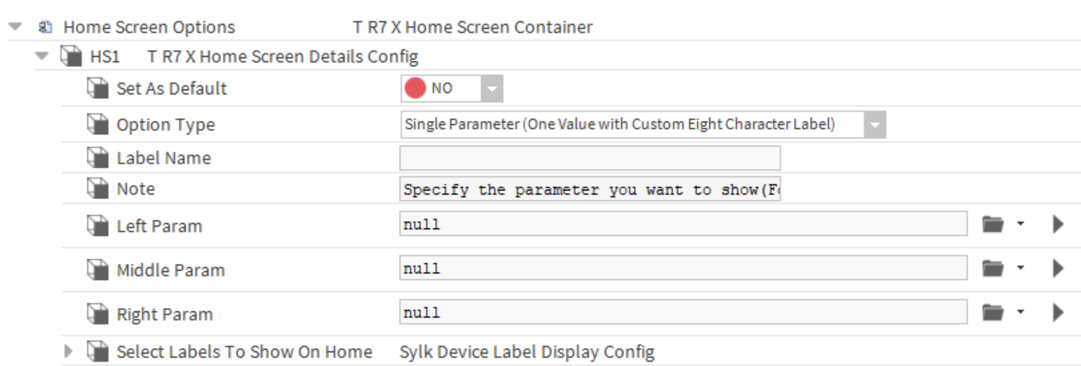


Fig. 412 Home Screen Settings

- **Set As Default:** Select this option if the current home screen needs to be set as default.
- **Option Type:** Select the type of screen:
  - **Single parameter (one value with custom eight character label):** This option displays one label in the home screen.
  - **Multiple parameter (up to three values with fixed label):** This option displays all three labels on the home screen.
- **Label Name:** Add the label name as per requirement.

Note: *Specify the parameter you want to show (For a single parameter home screen, only the middle parameter will be considered).*

- **Left Parameter:** Map the parameter that needs to be shown on the left side of the home screen.
- **Middle Parameter:** Map the parameter needs to be shown in the middle of the home screen.
- **Right Parameter**: Map the parameter that needs to be shown on the right side of the home screen.
  To map the parameter with home screen follow the steps below:

  i). Click the **Folder icon** ( ) and select **Component Chooser** from the drop-down list.

Fig. 413 Component Chooser

  ii). On the Select Ord window, click **Drivers > BacnetNetwork > IrmBacnetDevice > Irm Program > Periodic program> Humidity** and click **OK.**
  This action fetches the scheduler location to the scheduler block location filed.

Or

  i). Go to nav window, navigate to the **Station > Drivers > BacnetNetwork > IrmBacnetDevice > Irm Program > Periodic program** wiresheet.

  ii). Select the parameter and press Ctrl + L. This action opens the Ord window,

  iii). Copy the Ord link.

  iv). Navigate to the Sylk device's home screen settings option and paste the Ord URL into any of the parameter fields.

Fig. 414 Parameter Fields

Note: *The Sylk parameter linked to the left param displays the parameter value in the middle of the Sylk device. Sylk parameter linked to the middle param display the parameter value on top of the Sylk device, and the Sylk parameter linked to the right param display the parameter value on the bottom of the Sylk device.*

- **Select Labels To Show On Home Screen:** Select the required option (room top or room bottom) to display the parameter on the home screen shown below:

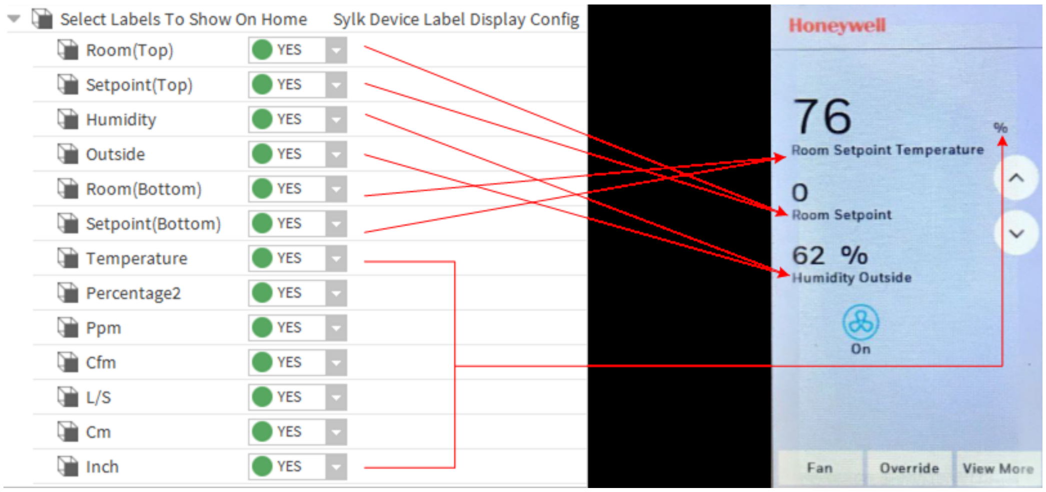


Fig. 415 Home Screen Labels

- **Labels displayed on the top with middle param** – room (top), setpoint (top), and temperature.
- **Labels displayed on the middle with middle param** – room (bottom) and setpoint (bottom).
- **Labels displayed on the bottom with middle param** – humidity and outside.
- Only one engineering unit label is supported by the Sylk device (Ppm, Cfm, L/S, Cm, and inch). If you enable multiple engineering unit labels, then the system will consider the topmost unit label in the sequence in the home screen.
  Example: If you enable Cfm, L/S, and inch unit label in the home screen, then the Sylk device will display Cfm unit, as in topmost unit label.

Step 4. **Password Protection**: The option allows you to set the password for the Sylk device. This feature restricts the tenants from making the changes in the Sylk controller.

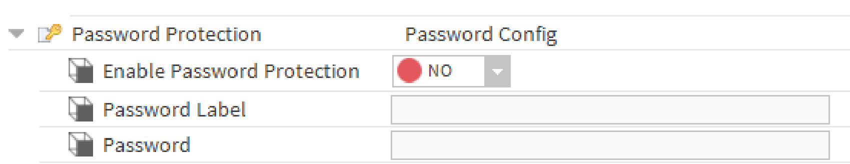


Fig. 416 Set the Password

- **Enable Password Protection**: This option allows you to enable the password protection for the Sylk device.
- **Password Label**: This option allows you to add password label information. The label length should be eight characters.

- **Password**: This option allows you to set the password. Numeric characters are allowed in the password.

Step 5. **Categories And Parameters Node**: Categories and parameters node allows users to reorder the Sylk categories and the Sylk parameters from the workbench and browser. The Sylk device will display the categories and parameters in the order specified in this view or object.

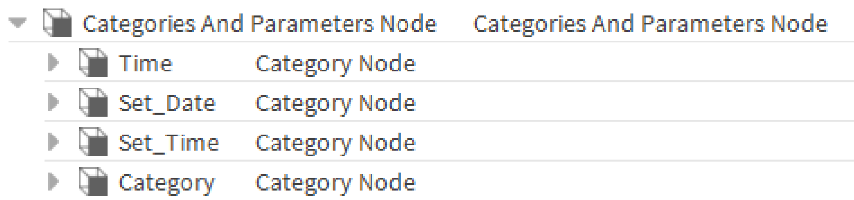


Fig. 417 Categories and Parameters Object

Reordering can be performed once the user completes the Sylk device and parameters configuration. Refer to the following section for more details on reordering, renaming, and disassociation categories and parameters.

- Reorder Parameters and Categories on page 283
- Rename Categories and Parameter on page 285
- Disassociate Parameter and Categories on page 285

Step 6. **Schedule**: The schedule option allows configuring the Sylk device with an enumerated schedule and calendar.

Steps to configure schedule is as follows:

i). Open the Sylk device property sheet and navigate to the **Schedule option**.

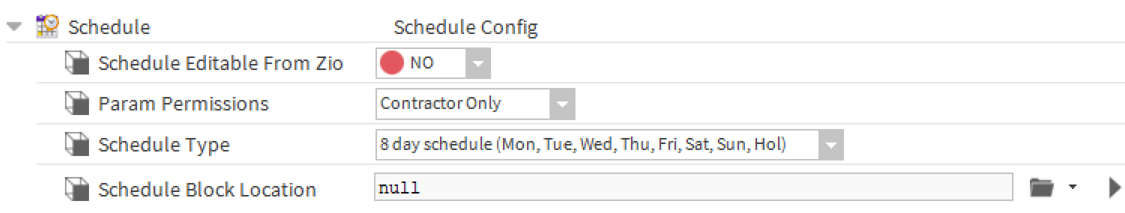


Fig. 418 Schedule Option

ii). Set the **Schedule Editable From Zio** field to **Yes.**

iii). Change **Param Permissions** (contractor only, tenant read-only, and tenant read write) as per requirement.

iv). Change the **Schedule Type** as per requirement (8-day schedule / 7-day schedule / 5-2-1-day schedule / 5-2-day schedule).

v). Enter the schedule block location in the **Schedule Block Location** field.

Steps to add Scheduler Block Location:

i). Click the Folder icon ( ) and select the **Component Chooser** from the drop-down list.

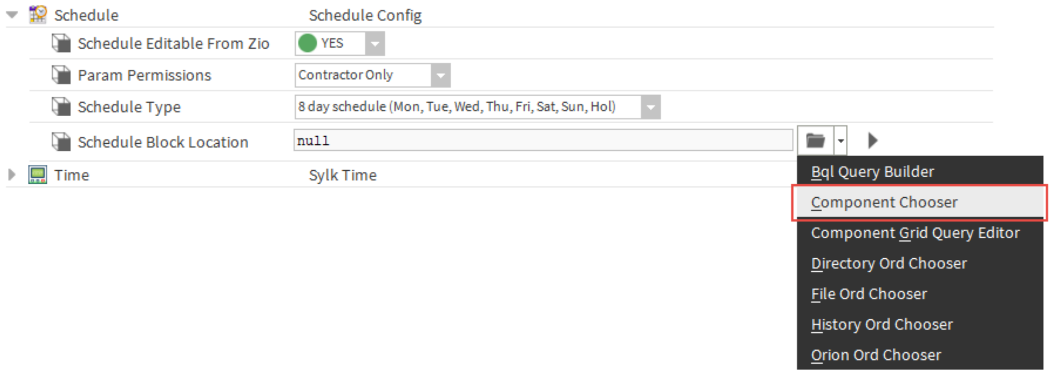


Fig. 419 Component Chooser

ii). On the Select Ord window, click **Drivers > BacnetNetwork > IrmBacnetDevice > Irm Program > Periodic program> EnumSchedule,** and then click **OK.**

This action fetches the enum schedule object to the **Scheduler Block Location** filed.

Or

Go to nav window, navigate to the **Station > Drivers > BacnetNetwork > IrmBacnetDevice > Irm Program > Periodic program> EnumSchedule,** and press Ctrl + L or copy the enum schedule and paste into the field.

iii). This action opens the Ord window, copy the location, and paste in the scheduler block location field.

iv). Click **Save**.

Step 7. **Time**: The time option allows you to enable the time component for the Sylk device. To add this time component, enable the **Time editable From Zio** option and select contractor only, tenant read only, or tenant read write from the drop-down menu.

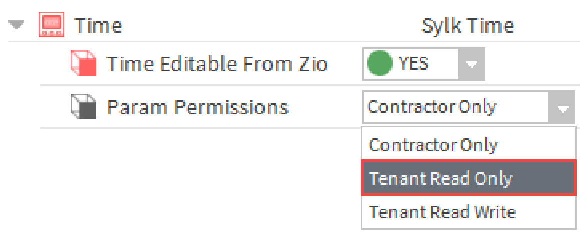


Fig. 420 Enable Time

- If the contractor only is selected, only the contractor can view the time in the Sylk device.
- If tenant read only is selected, the tenant can view the time but cannot change the time.
- If tenant read write is selected, the tenant can view and modify the time. Time includes the year, month, date, hour, and minutes, enabling everything in the time component.

TimeField parameter allows you to customize access for contractor and tenant. For example, the contractor is allowed to change the time but not the date. To provide this type of controlled access, use the timefield parameter. For more details, refer to IRM Function Blocks User Guide - EN2B-0415-GE51.

Reorder Parameters and Categories

The parameters can be reordered either across and within the categories. Categories can also be reordered.

Steps to perform reorder:

Step 1. Navigate to the **TR75H** from the nav window and double-click **Categories and Parameters Node**.

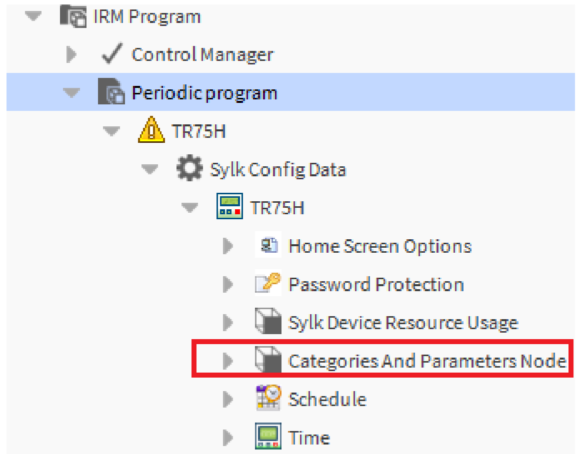


Fig. 421 Categories and Parameters

Or, Navigate to **Wiresheet view** > double click on **TR75H Sylk device** > double-click on **Categories and Parameters Node.**

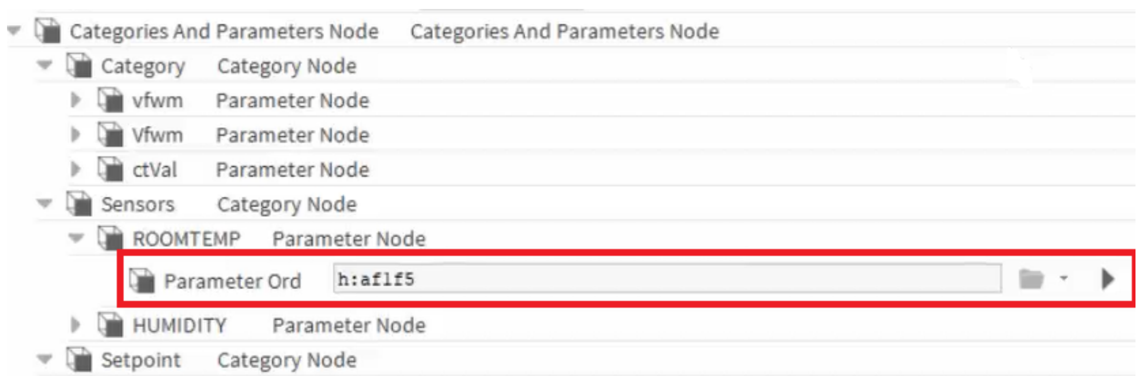


Fig. 422 Parameter Order

Step 2. Right-click on **Categories and Parameters Node > Actions > Load Categories And Parameters**.

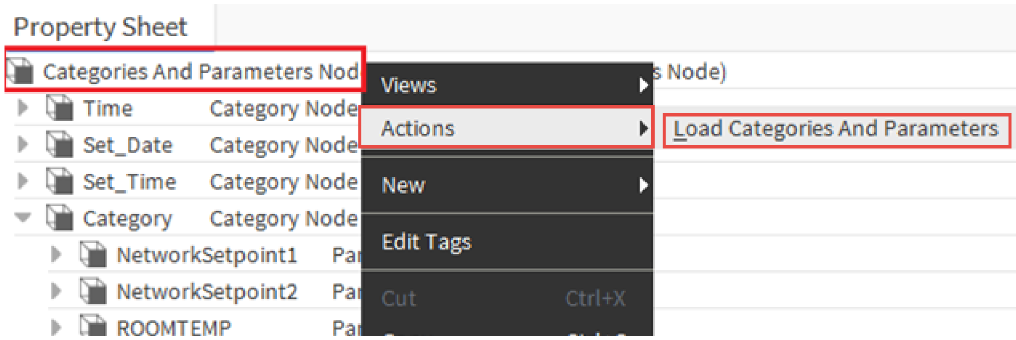


Fig. 423 Load Categories and Parameters

Step 3. This will load all the categories and parameters associated with this Sylk device.

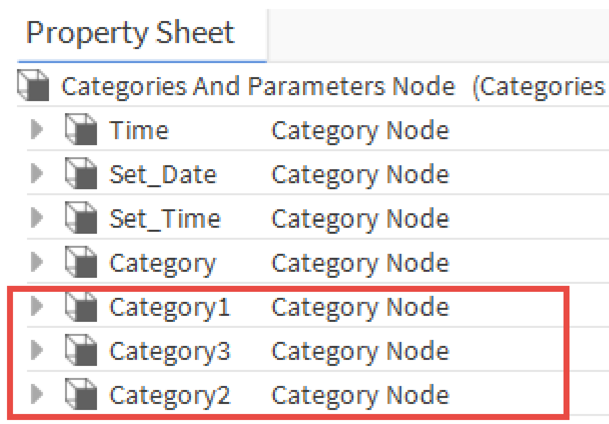


Fig. 424 Categories and Parameters

Step 4. Right-click on **Categories and Parameters Node** from the property sheet and select **Reorder**.

Step 5. Use **Move Up** or **Move Down** to reorder the Category and click **OK**.

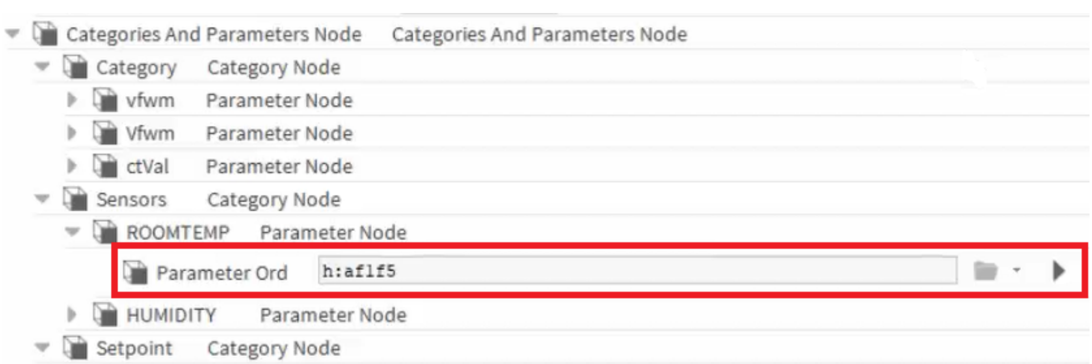


Fig. 425 Reorder Category

Note: *Press Ctrl and click move up or move down to select multiple parameters.*

Similarly, you can reorder parameters associated with the Category.

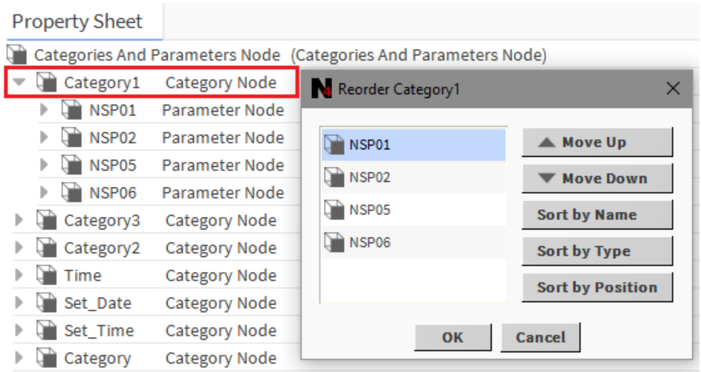


Fig. 426 Reorder Parameters

Once re-ordering is completed and Sylk commission is done, you can view the same order of categories and parameters node in the connected Sylk device.

Step 6. Categories and parameters node allows you to see all the parameters associated with that device. Also, it provides an option to navigate to the parameter using the ord.

Fig. 427 Parameter Node

Rename Categories and Parameter

The categories and parameters field allows user to rename categoriesand parameters from the CentraLine workbench.

Steps to rename Parameter:

Step 1. Select a parameter from the category, right-click, and select **Rename.** Rename window displays, enter the new name, and click **Ok.**

Step 2. Navigate to **Categories and Parameters** node, right-click and select **Actions > Load Categories And Parameters**. This action loads the changes.

In the wiresheet, you can view the changed parameter name. Similarly, the user can rename the categories.

Disassociate Parameter and Categories

The categories and parameters option allows you to disassociate categories and parameters from the associated Sylk Device.

- **To disassociate Parameter**: Select parameter from the **category** > right-click and select **Delete**. This action disassociates the parameter from the Sylk device, and none will be displayed for that Sylk parameter.
- **To disassociate Category:** select **category** > right-click and select **Delete**. This action disassociates all the parameters from the Sylk device, and none will be displayed for all the parameters associated with that category.

Validate Sylk Device

After configuring Sylk Devices with the Sylk parameters, you need to validate the Sylk device configuration. Validate the Sylk device to verify the configuration of added Sylk device. Also, the validation action confirms any incorrect value entered in parameters or limitations for the configured Sylk device.

Steps to validate Sylk Device:

Step 1. Navigate to **Station** > **Config** > **Drivers** > **BacnetNetwork** > **IrmBacnetDevice**.

Step 2. Right-click on the BACnet Program and select **Actions > Validate Sylk Devices.** It validates all the Sylk devices in the wiresheet view.

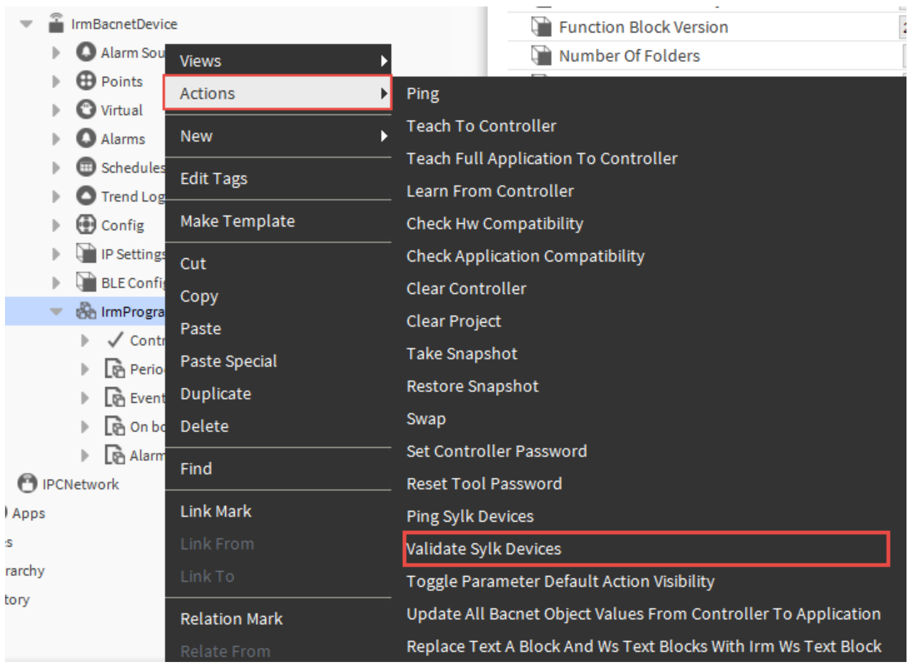


Fig. 428 Validate Sylk devices

Alternatively, If you want to validate a single Sylk device, follow the below steps:

Step 3. Navigate to **Station > Config > Drivers > BacnetNetwork > IrmBacnetDevice > Irm Program > Periodic program** or **Event program.**

Step 4. Right-click on the Sylk Device and select **Actions > Validate Sylk Devices.**

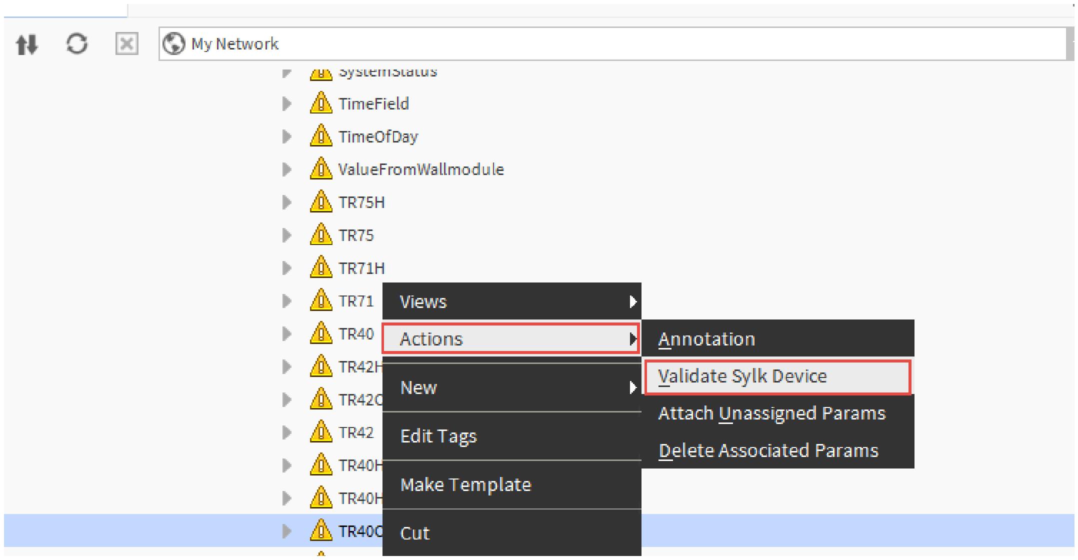


Fig. 429 Validate Sylk Device

After performing the validate Sylk device action, you can view the status of the specified Sylk devices in the job log window. Using the job log information, discover and resolve all issues.

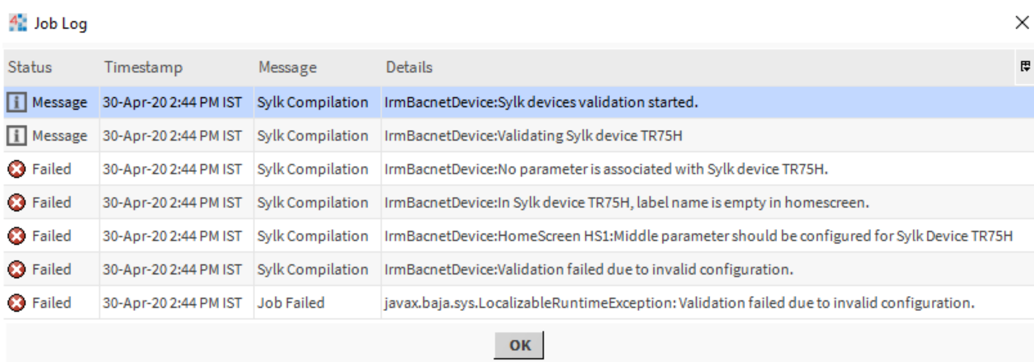


Fig. 430 Job Log

Validate Sylk device operations can be done in online mode or offline mode while setting Sylk devices on the workstation.

Teach to Controller

After you validate the Sylk device configuration, perform Teach to Controller operation. This installs the Sylk device application file in the Sylk devices like TR75, TR40, etc.

Steps to perform a teach to controller:

Step 1. Right-click on the **Irm Program** > **Actions** > click **Teach to Controller.**

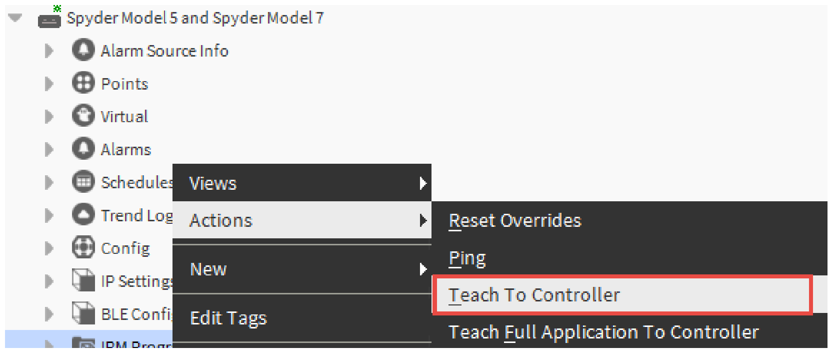


Fig. 431 Teach to Controller

Step 2. Select **Overwrite BACnet objects values in Device** or **Overwrite BACnet object values in Application**.

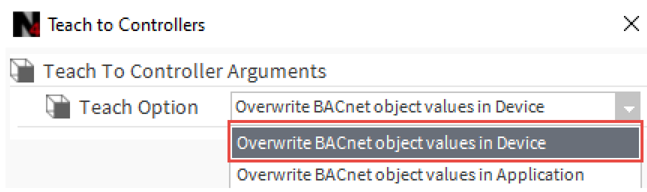


Fig. 432 Teach to Controllers dialog box

- **Overwrite BACnet objects values in Device**: This option overwrites BACnet object values in the controller and directly teaches the application in the controller.
- **Overwrite BACnet object values in Application**: This option update all BACnet object values and default values from controller to application. Then it teaches application in the controller.

The changes are written to the controller. The applications are synchronized. The successful action is displayed via **Irm Operations Monitor.** After the Sylk application is installed on the controller, the Sylk device reboots and displays updated values on the Sylk device.

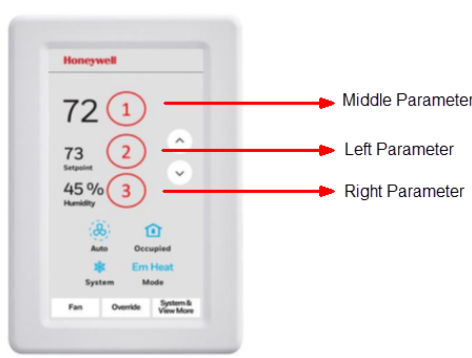


Fig. 433 Sylk device display

Verify the Sylk device resource usage

After loading the Sylk application file into the controller, you can verify the Sylk device resource usage. These fields are read only. The Sylk device resource usage displays how many resources are utilized by each Sylk parameter as well proxy size of data by the controller.

Steps to verify the Sylk device resource usage:

Step 1. Open the workstation and navigate to the **Sylk application.**

Note: *Ensure the controller is communicating with the station.*

Step 2. Open the **Sylk Device** and click **Sylk Device Resource Usage**.

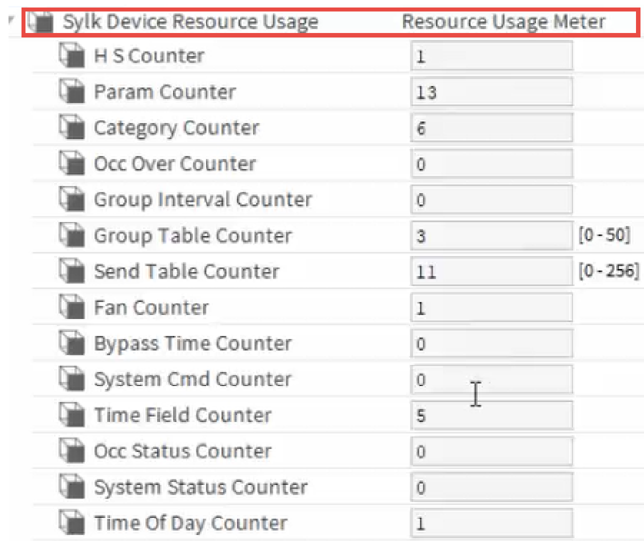


Fig. 434 Sylk Device Resource Usage

Step 3. Check that the **Is Configuration Downloaded** option is **True**.

Important: *If any configuration changes are done in the Sylk device or parameters, the Is Configuration Downloaded will change to false. To update the changes, perform validate Sylk devices and teach to controller operation on the Sylk device.*

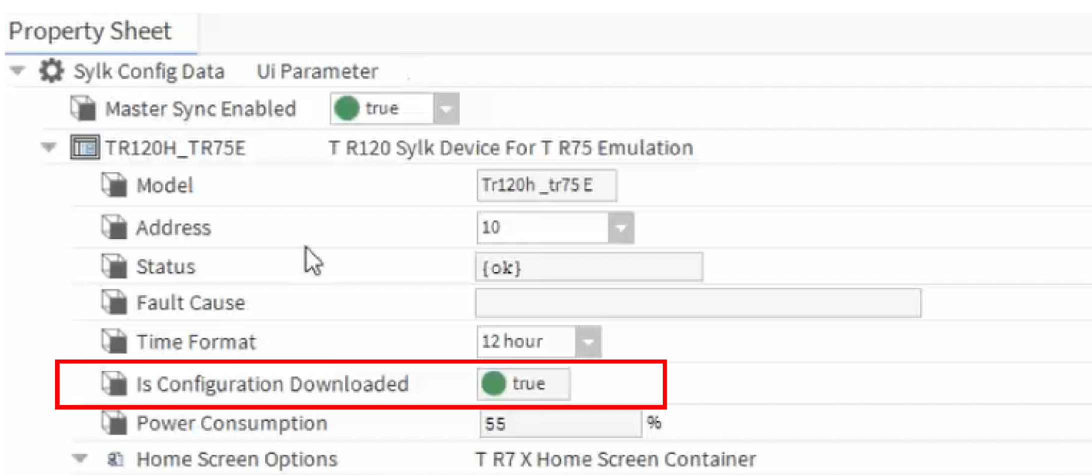


Fig. 435 Sylk Device Property Sheet

Sylk Parameter Summary

Steps to view all the associated parameters to the Sylk device:

Step 1. Navigate to the **Irm Program** > **Views** > **select Sylk Parameter Summary**.

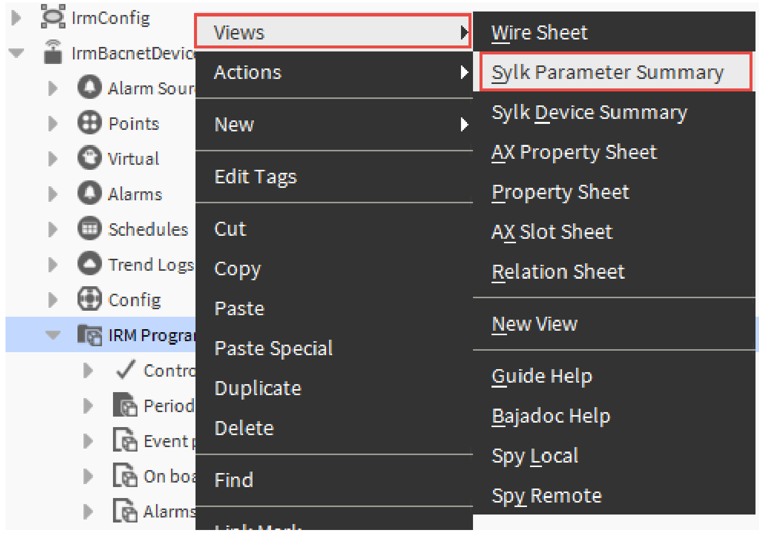


Fig. 436 Sylk Parameter Summary

TR75H	Category	ROOMTEMP	slot:/Drivers/BacnetNetwork/IrmBacnetDevice/IRM$20Program/contrc	honeywellSylkDevice:TemperatureParam
TR75H	Category	SensorOffset	slot:/Drivers/BacnetNetwork/IrmBacnetDevice/IRM$20Program/contrc	honeywellSylkDevice:SensorOffsetParam
TR75H		SystemCommand	slot:/Drivers/BacnetNetwork/IrmBacnetDevice/IRM$20Program/contrc	honeywellSylkDevice:SystemCommand
TR75H		SystemStatus	slot:/Drivers/BacnetNetwork/IrmBacnetDevice/IRM$20Program/contrc	honeywellSylkDevice:SystemStatus
TR75H	Category	TimeField	slot:/Drivers/BacnetNetwork/IrmBacnetDevice/IRM$20Program/contrc	honeywellSylkDevice:TimeFieldParam
TR75H	Category	TimeOfDay	slot:/Drivers/BacnetNetwork/IrmBacnetDevice/IRM$20Program/contrc	honeywellSylkDevice:TimeOfDayParam
TR75H	Category	ValueFromWallmodule	slot:/Drivers/BacnetNetwork/IrmBacnetDevice/IRM$20Program/contrc	honeywellSylkDevice:ValueFromWallModu
TR75H	Category	BypassTime	slot:/Drivers/BacnetNetwork/IrmBacnetDevice/IRM$20Program/Perioc	honeywellSylkDevice:BypassTimeParam
TR42CO2	Category	CO2	slot:/Drivers/BacnetNetwork/IrmBacnetDevice/IRM$20Program/Perioc	honeywellSylkDevice:CO2Param
TR75H	Category	ControllerValue	slot:/Drivers/BacnetNetwork/IrmBacnetDevice/IRM$20Program/Perioc	honeywellSylkDevice:ValueFromControlle
TR75H		FanCommand	slot:/Drivers/BacnetNetwork/IrmBacnetDevice/IRM$20Program/Perioc	honeywellSylkDevice:FanCommand
TR75H	Category	HUMIDITY	slot:/Drivers/BacnetNetwork/IrmBacnetDevice/IRM$20Program/Perioc	honeywellSylkDevice:HumidityParam
TR75H	Category	NetworkSetpoint	slot:/Drivers/BacnetNetwork/IrmBacnetDevice/IRM$20Program/Perioc	honeywellSylkDevice:NetworkSetpointPar
TR75H		OccupancyOverrideCommand	slot:/Drivers/BacnetNetwork/IrmBacnetDevice/IRM$20Program/Perioc	honeywellSylkDevice:OccupancyOverride(

Fig. 437 Sylk Parameter Summary View

By following the procedure above, you can add and configure Sylk devices with the supported Sylk parameters. After configuring the Sylk parameters with the Sylk devices, create the Sylk proxy file and commission it to the controller.

To replace the TR4x device with the TR7x device. Replace the TR42 device with the TR75 Sylk device and re-associate all parameters with the device. The Sylk devices configuration must then be validated and perform teach to the controller.
This action requires less effort to reconfigure the device. It also helps to establish a connection with the same Sylk device. However, the associated parameters vary from device to device.

Sylk Configuration Examples

Users can configure the Sylk parameters according to the requirements as shown in the examples below:

TR75H Sylk Configuration

In the Sylk device property sheet, the TR7x configuration would be auto-selected under the model tab based on the function block dropped in the wiresheet.

Check to ensure that the Wall Module's bus address dial (located on the back of the module) matches exactly with the setting of the configuration tool. Select 12 or 24-hour format.

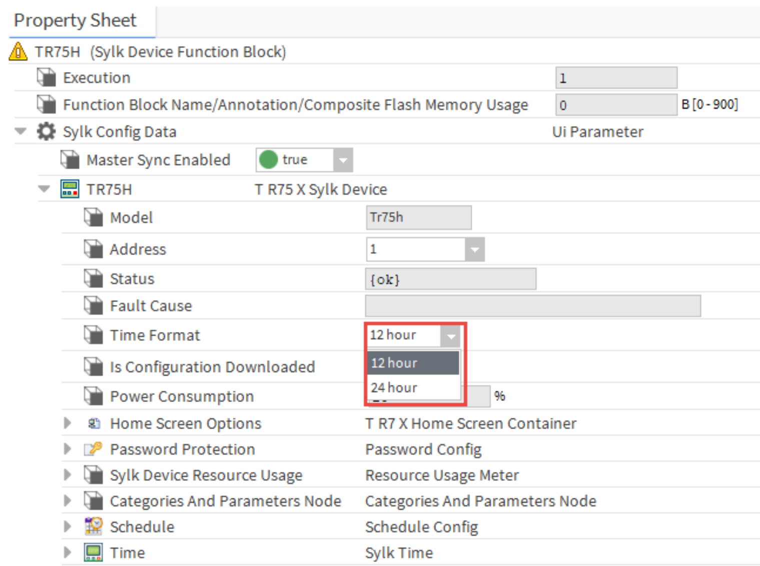


Fig. 438 TR75H Property Sheet

TR75H Logic Configuration

To configure the Sylk device, drag-drop the required Sylk parameters. Make sure the Sylk device supports the selected Sylk parameter.

Following are the Sylk Parameter details:

- **ROOMTEMP**: To measure the temperature of the space.
- **OccupancyOverrideCommand**: To override the unoccupancy mode to occupied mode.
- **OccupancyStatus**: Displays the occupancy status in the wall module.
- **SensorOffset**: To provide the sensor offset to the wall module.
- **ValueFromWallModule**: To provide the value from the wall module to the controller.
- **SystemCommand**: To override the system command from the wall module.
- **PassThru**: The passthru object passes temperature inputs and transfers the value to network outputs.
- **SavePermanent**: This object is used to save values in non-volatile memory. The value is not lost when the supply voltage is switched off.

- **Encode**: The Encode function translates enumerations of a digital value into different enumeration numbers, allowing standard and custom enumerations to be combined and used together.

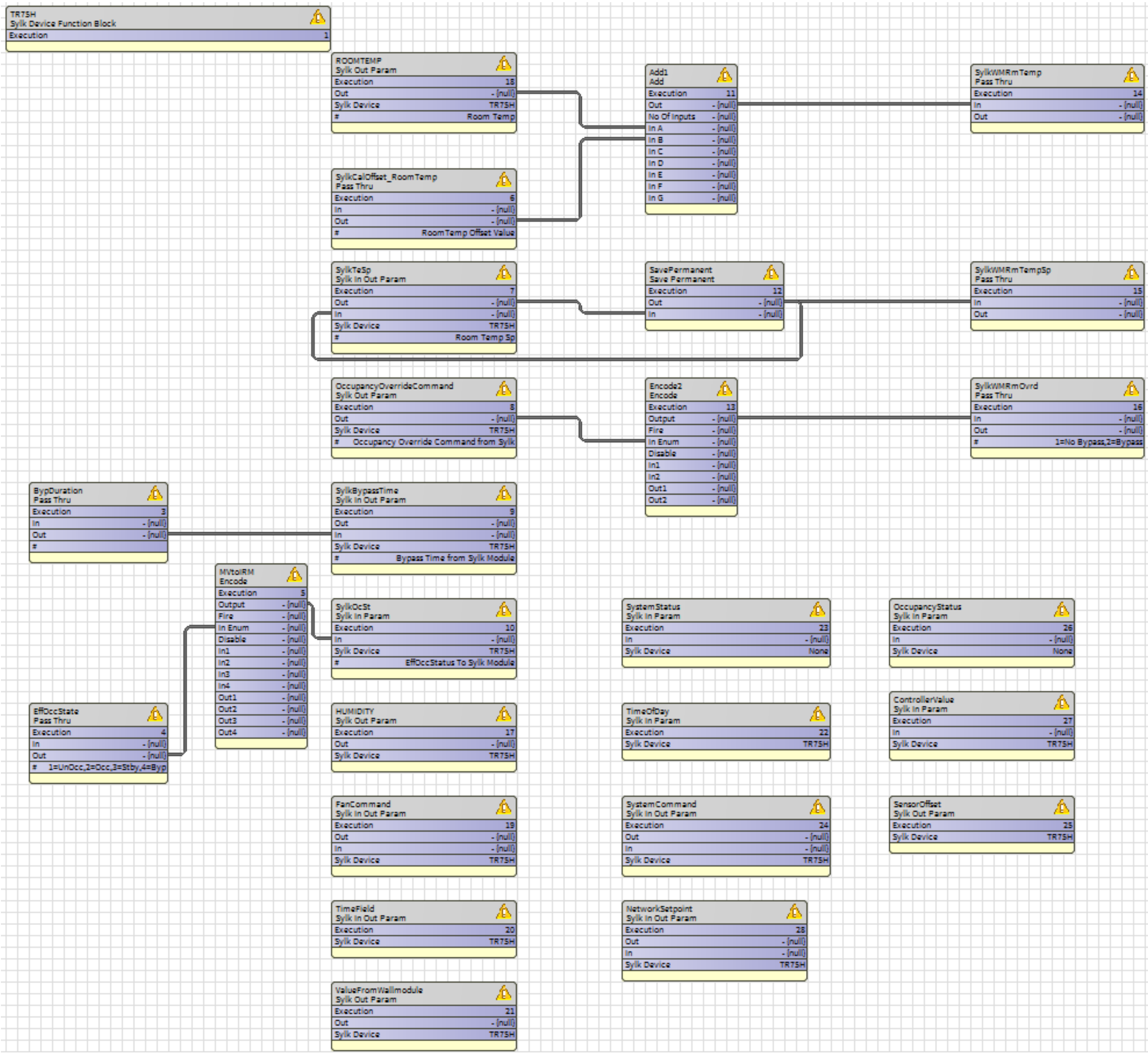


Fig. 439 TR75H Logic Configuration example

TR71H Sylk Configuration and Logic

TR71H Logic Configuration

To configure the Sylk device, drag-drop the required Sylk parameters. Make sure the Sylk device supports the selected Sylk parameter.

Sylk Parameter details are as follows:

- **ROOMTEMP**: To measure the temperature of the space.
- **OccupancyOverrideCommand**: To override the unoccupancy mode to occupied mode.
- **PassThru**: The PassThru object passes temperature inputs and transfers the value to network outputs.
- **SavePermanent**: This object is used to save non-volatile memory values. When the supply voltage is switched off, the value remains unchanged.
- **Encode**: Enumerations of a digital value are translated into different enumeration numbers by the Encode function, allowing standard and custom enumerations to be combined and used together.

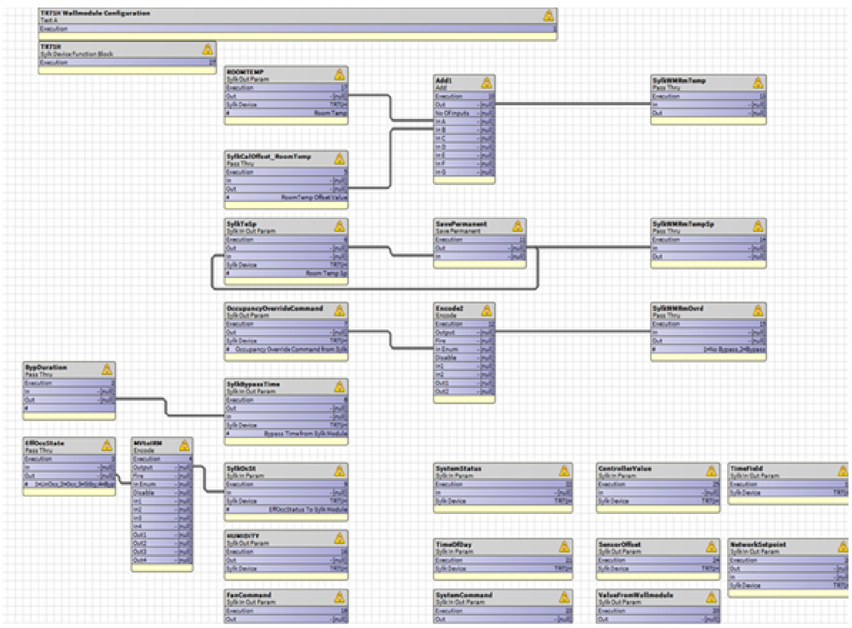


Fig. 440 TR71H Configuration

TR120H and TR75E Sylk Configuration

To configure the Sylk device, drag-drop the required Sylk parameters. Make sure the Sylk device supports the selected Sylk parameter.

Following are the Sylk Parameter details:

- **ROOMTEMP**: To measure the temperature of the space.
- **OccupancyOverrideCommand**: To override the unoccupancy mode to occupied mode.
- **OccupancyStatus**: Displays the occupancy status in the wall module.
- **SensorOffset**: To provide the sensor offset to the wall module.
- **ValueFromWallModule**: To provide the value from the wall module to the controller.
- **SystemCommand**: To override the system command from the wall module.
- **PassThru**: The passthru object passes temperature inputs and transfers the value to network outputs.
- **SavePermanent**: This object is used to save values in non-volatile memory. The value is not lost when the supply voltage is switched off.
- **Encode**: The Encode function translates enumerations of a digital value into different enumeration numbers, allowing standard and custom enumerations to be combined and used together.

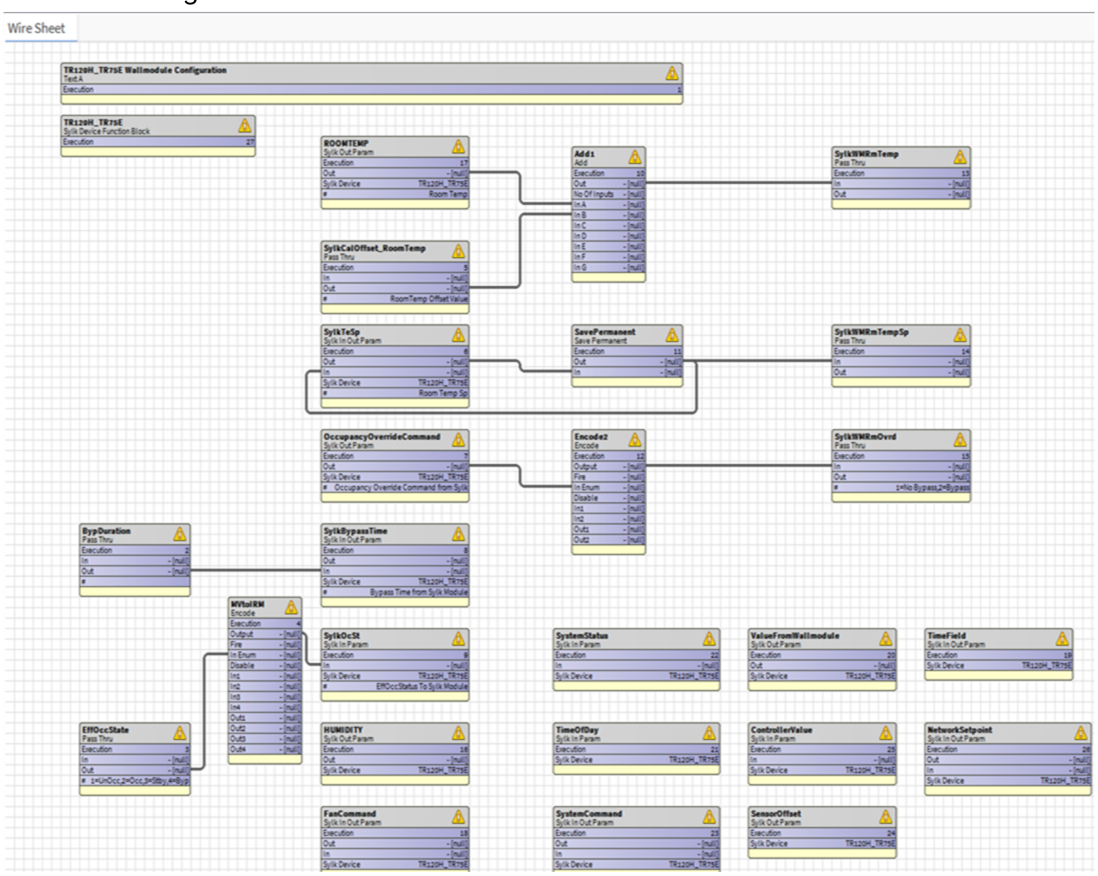


Fig. 441 TR120H and TR75E Logic configuration

TR42x and TR40x Sylk Configuration

The TR40x and TR42x are temperature wall modules with basic setpoint, override, and fan options. TR40x and TR42x Sylk device is designed for a broad range of applications.

The TR40x and TR42x wall modules include:

- Models available with display (TR42) or without display (TR40).
- Models available with or without built-in humidity or CO2 sensors.

TR42x Sylk Configuration

TR40 Sylk sensors do not allow to override the current schedule or remote commanding capabilities.

Check to ensure that the Wall Module's bus address configured using the dip switches (located on the back of the module) matches exactly with the setting of the configuration tool.

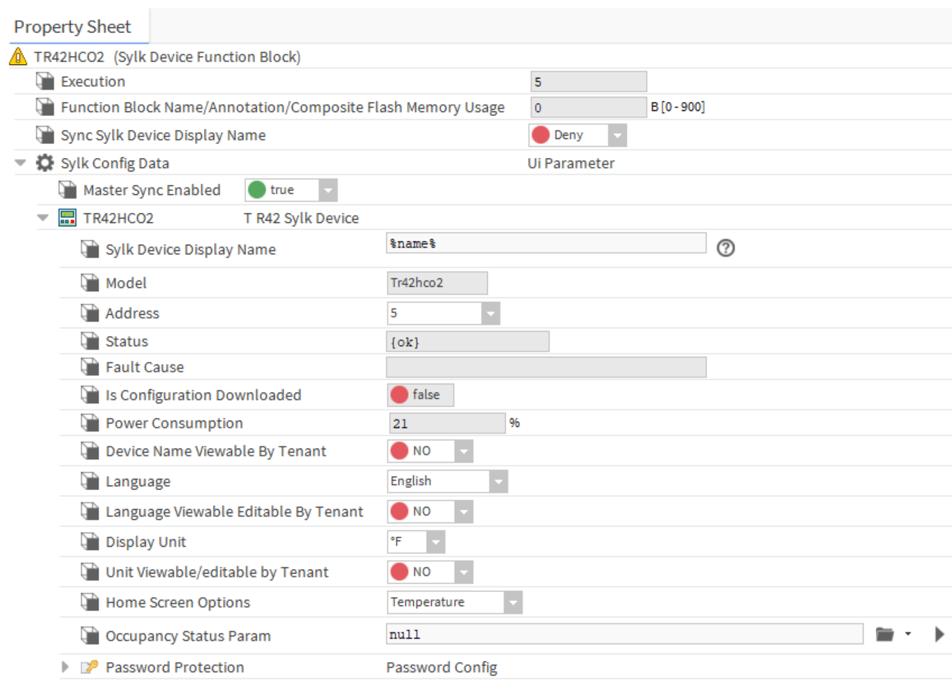


Fig. 442 TR42HCO2 Property Sheet

TR42x Logic Configuration

To configure the Sylk device, drag-drop the required Sylk parameters. Make sure the Sylk device supports the selected Sylk parameter.

Sylk Parameter details are as follows:

- **ROOMTEMP**: To measure the temperature of the space.
- **SensorOffset**: To provide the sensor offset to the wall module.
- **PassThru**: The PassThru object passes temperature inputs and transfers the value to network outputs.

- **SavePermanent**: It is used to save values in non-volatile memory. The value is not lost when the supply voltage is switched off.
- **Encode**: The Encode function translates enumerations of a digital value into different enumeration numbers, allowing standard and custom enumerations to be combined and used together.
- **HUMIDITY**: Measures the percent humidity of the space.
- **CO2**: Measures the CO2 concentration in the space.

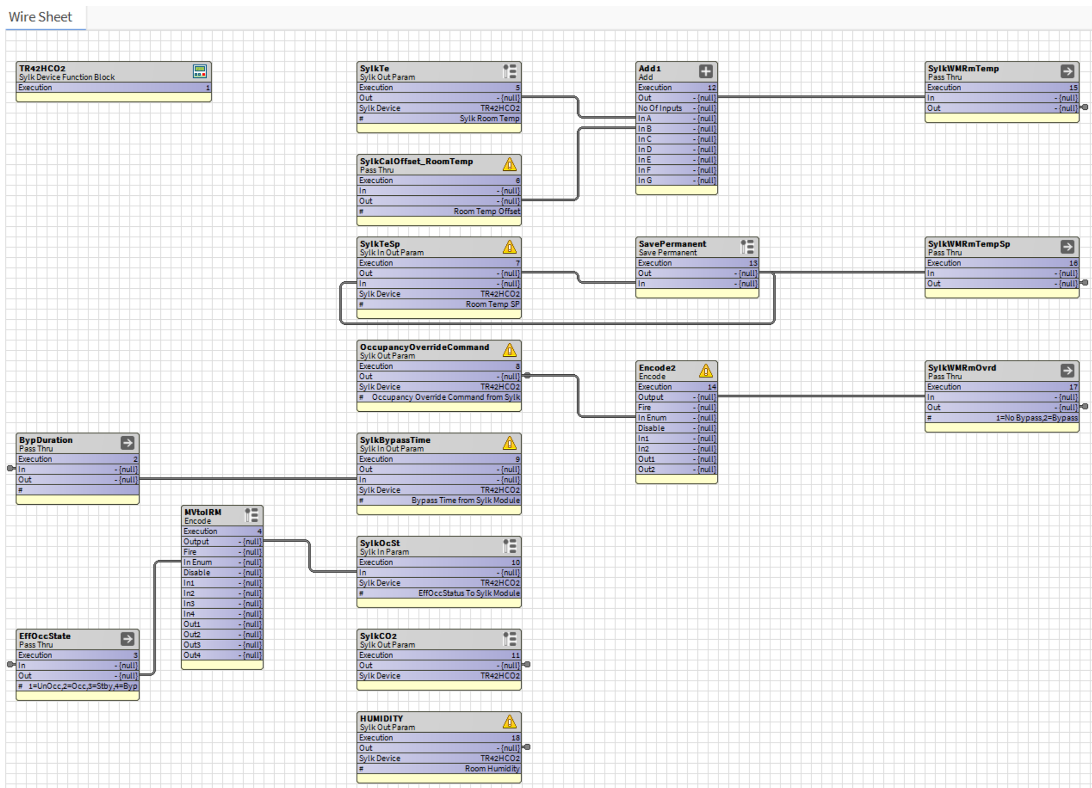


Fig. 443 TR42 Logic Configuration

TR42 Configuration (Encode-Snap)

Property Sheet

MVtoIRM (Encode)

Execution	4
Output	- {null}
Fire	- {null}
In Enum	- {null}
Disable	- {null}
In1	- {null}
In2	- {null}
In3	- {null}
In4	- {null}
In5	- {null}
In6	- {null}
In7	- {null}
In8	- {null}
In9	- {null}
Out1	- {null}
Out2	- {null}
Out3	- {null}
Out4	- {null}
Out5	- {null}
Out6	- {null}
Out7	- {null}
Out8	- {null}
Out9	- {null}
In1 Par	1.00
In2 Par	2.00
In3 Par	3.00
In4 Par	4.00
In5 Par	255.00
In6 Par	255.00
In7 Par	255.00
In8 Par	255.00
In9 Par	255.00
Out1 Par	1.00
Out2 Par	0.00
Out3 Par	3.00
Out4 Par	2.00
Out5 Par	0.00
Out6 Par	0.00
Out7 Par	0.00
Out8 Par	0.00
Out9 Par	0.00

Property Sheet

Encode2 (Encode)

Execution	14
Output	- {null}
Fire	- {null}
In Enum	- {null}
Disable	- {null}
In1	- {null}
In2	- {null}
In3	- {null}
In4	- {null}
In5	- {null}
In6	- {null}
In7	- {null}
In8	- {null}
In9	- {null}
Out1	- {null}
Out2	- {null}
Out3	- {null}
Out4	- {null}
Out5	- {null}
Out6	- {null}
Out7	- {null}
Out8	- {null}
Out9	- {null}
In1 Par	0.00
In2 Par	1.00
In3 Par	255.00
In4 Par	255.00
In5 Par	255.00
In6 Par	255.00
In7 Par	255.00
In8 Par	255.00
In9 Par	255.00
Out1 Par	1.00
Out2 Par	2.00
Out3 Par	0.00
Out4 Par	0.00
Out5 Par	0.00
Out6 Par	0.00
Out7 Par	0.00
Out8 Par	0.00
Out9 Par	0.00

Fig. 444 TR42 Encode-Snap

TR40 Sylk Configuration

To configure the Sylk device, drag-drop the required Sylk parameters. Make sure the Sylk device supports the selected Sylk parameter. Sylk Parameter details are as follows.

- **ROOMTEMP**: To measure the temperature of the space.
- **HUMIDITY**: Measures the percent humidity of the space.
- **CO2**: Measures the CO2 concentration in the space.

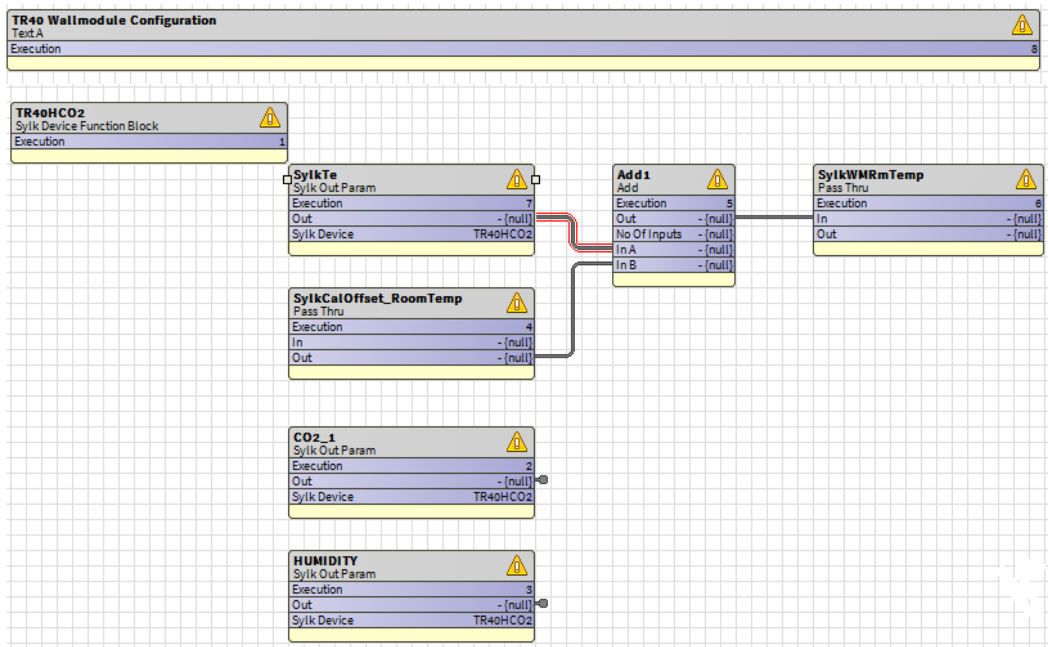


Fig. 445 TR40 Sylk Configuration

C7400S Configuration

In the Sylk device property sheet, the C7400s configuration would be auto-selected under the model tab based on the function block dropped in the wiresheet.

Ensure that the sensor bus address is configured using the dip switches matches exactly with the setting of the configuration tool. No other configuration is required to be configured for C7400S Sylk sensors.

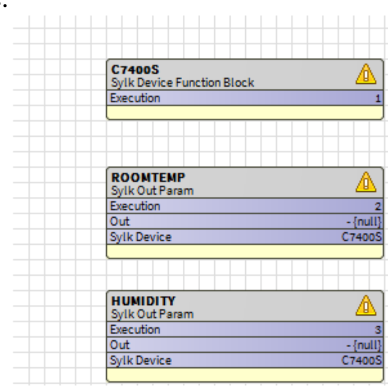


Fig. 446 C7400S Configuration Logic

Delete a Sylk Device

If you want to remove a Sylk Device from a configured station, follow the below steps:

Steps to delete a Sylk Device is as follows:

Step 1. Right-click on the **Sylk Device** from the nav window.

Step 2. Select **Delete.**

Alternatively,

Double-click on **Periodic program**, navigate to the wiresheet view, select the Sylk device, and press delete.

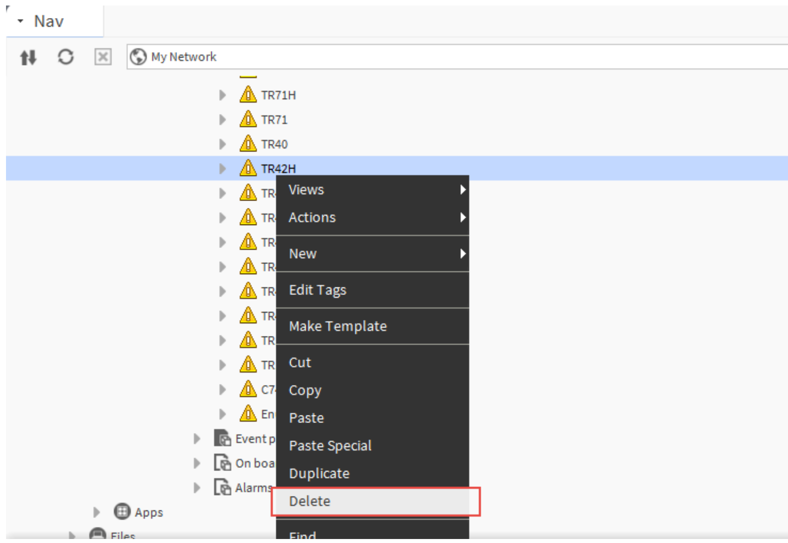


Fig. 447 Delete Sylk Device

Note: *Whenever you modify any Sylk device or parameter configuration, the impacted Sylk device will not perform to read and write function. This modification will not impact the read and write function of other commissioned Sylk devices.*

Sylk Actuator

The IRM NX supports following Sylk actuator models:

MS3103, MS3105, MS4103, MS4105, MS7403, MS7405, MS7503, MS7505, MS8103, MS8105 Spring Return Direct Coupled Actuators (DCA) are used within heating, ventilating, and air-conditioning (HVAC) systems. They can drive a variety of quarter-turn, final control elements requiring spring return fail-safe operation.

Applications includes following operations:

- **Volume control dampers:** The volume control dampers mounted directly to the drive shaft or remotely (with accessory hardware).
- **Quarter-turn rotary valves:** The Quarter-turn rotary valves such as a ball or butterfly valve mounted directly to the drive shaft.
- **Linear stroke globe or cage valves:** The Linear stroke globe valves mounted with linkages to provide linear actuation.
- Available with cable on select models.

Inputs and Outputs of the Sylk Enabled Actuators

As shown in figure below, Sylk actuator has two inputs and five outputs. All the inputs and outputs communicate with the IRM NX controllers over a Sylk bus.

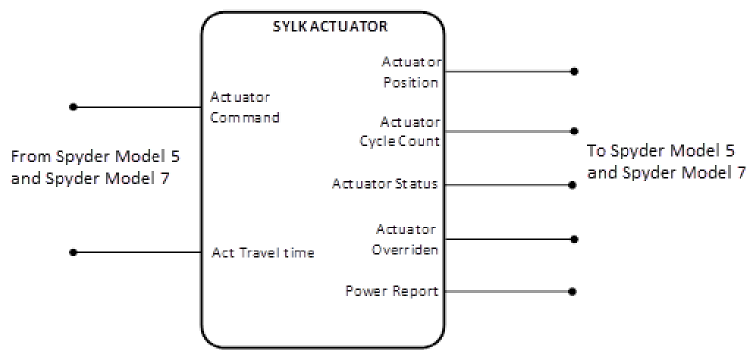


Fig. 448 Sylk Actuator Inputs and Outputs

- **Actuator Command:** Actuator commands are generated by the controller's output. An Actuator moves in response to a command.
- **Actuator Travel Time:** The actuator travel time is the time required by the actuator to travel from 0 % to 100 % open or 100 % to 0 % open. This time interval depends on the actuator type and varies from 0 to 500 seconds.
- **Actuator Position:** This is feedback from the actuator’s current position ranging between 0 to 100 % and can be linked into the BACnet controller for monitoring.
- **Actuator Cycle Count:** It shows how many time actuators cycles from open to close position.
- **Actuator Status:** Actuator status returns a number with the following meaning:
  - **0:** No Error
  - **1:** Under Voltage

- **2:** Over Voltage
- **3:** Stall
- **4:** OverVoltage and Stall
- **5:** UnderVoltage and Stall

- **Actuator Overridden:**It provides actuator overridden status if the actuator is overridden externally.
- This will return “True” if the unit is in Test Mode. It occurs if the address port is manually turned to position 6.
- **Power Report:** This is a relative measurement. It is only calculated for the last commanded move, ranging from 0 to 100.

Add a Sylk Actuator

To configure the Sylk actuator device, you need to add it to the wiresheet.

Steps to add Sylk actuator device:

Step 1. Navigate to **Station** > **Config** > **Drivers** > **BacnetNetwork** > **IrmBacnetDevice** > double-click **IrmProgram**. This action opens periodic program wiresheet.

Step 2. Drag IrmFolder from the palette and drop onto **Periodic program** wiresheet.

Step 3. Navigate to the palette, select the **SylkActuator** from the **SylkDevices** list and drop it to **Periodic program** wiresheet.

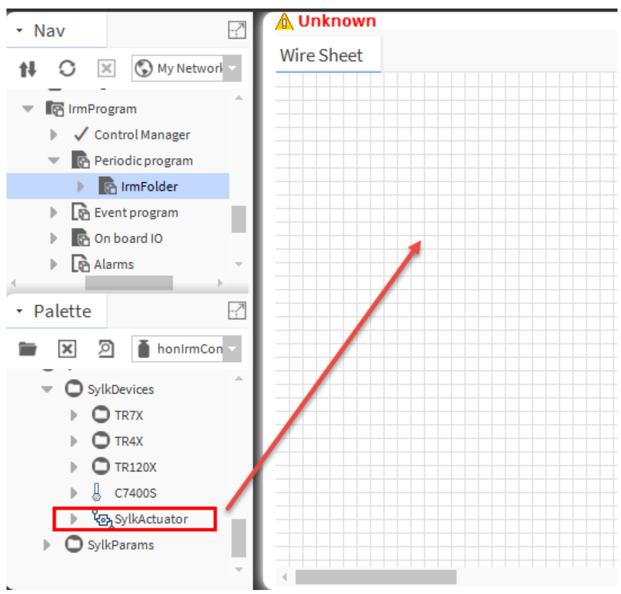


Fig. 449 Adding Sylk Actuator to the Wiresheet.

Step 4. Enter the **SylkActuator** name and click **OK**. This adds the Sylk Actuator under IrmBacnetDevice.

Step 5. Expand **SylkActuator** or double-click on **SylkActuator** and check the power consumption and configure the Sylk actuator device.

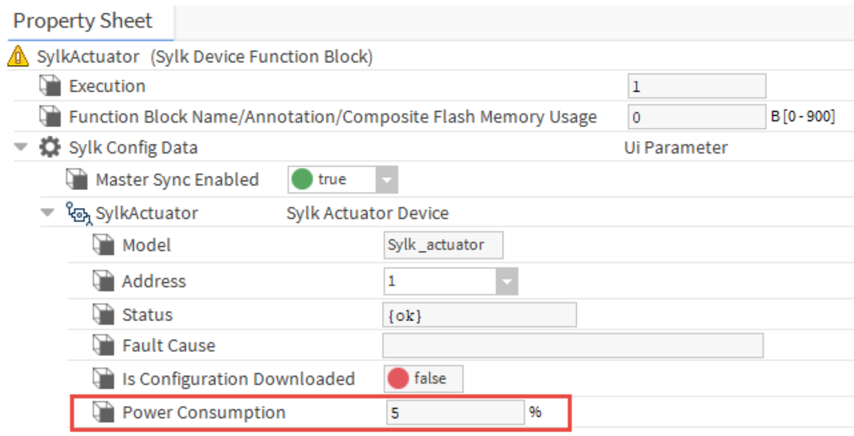


Fig. 450 Sylk Actuator Property Sheet

Sylk Actuator Device Type

Once you have added the **SylkActuator** in the Periodic program folder, configure the parameters of the **SylkActuatorDevice**.

Table 41 Parameters Supporting Sylk Actuator

Sylk Actuator Variables	Sylk Actuator Type		
Status Variables			
Parameter	**Zelix**	**Diamond**	**Zeus**
Actuator Position	Y	Y	Y
Actuator Cycle Count	Y	Y	Y
Actuator Status	Y	Y	Y
Actuator Overridden	Y	Y	Y
Power Report	Y	N	N
Control Variable			
Actuator Timing	Y	Y	Y
Actuator Position Request	Y	Y	Y

Configure Sylk Actuator Inputs

Steps to configure Sylk Actuator inputs:

Step 1. Navigate to **Station** > **Config** > **Drivers** > **BacnetNetwork** > **IrmBacnetDevice** > double-click **IrmProgram**. This opens the **Periodic program** wiresheet view.

Step 2. Navigate to the palette section, expand **Sylk > SylkParms** > select **SylkActuatorInputParam**.

Step 3. Drag **SylkActuatorInputParam** from the palette and drop into the Irm Folder wiresheet.

Step 4. Double-click on the **SylkActuatorInputParam** modules.

Step 5. Expand **SylkActuatorInputParam** property sheet, select **sylkDevice** as SylkActuatorDevice, and **inputType** as actuator or act travel time from the drop-down list.

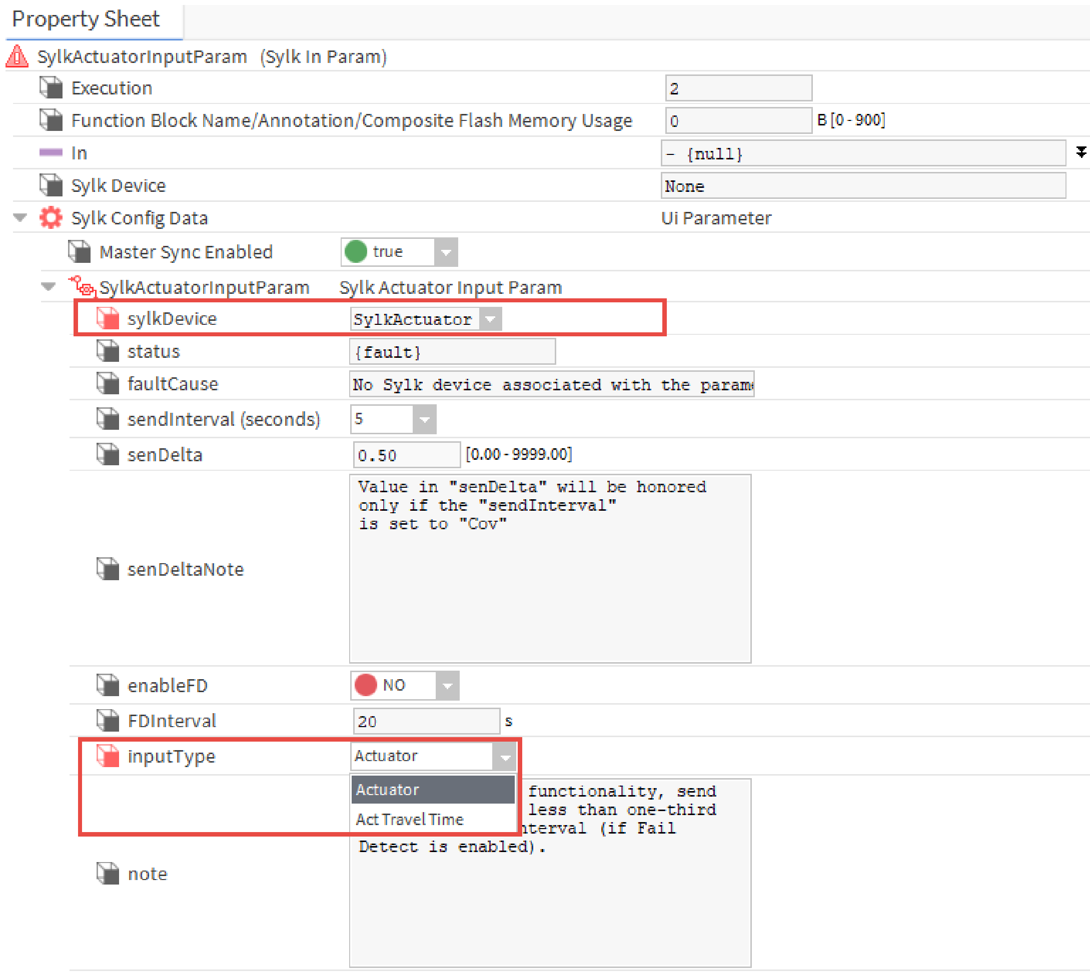


Fig. 451 Sylk Actuator Input Parameter Configuration

Configure Sylk Actuator Inputs Parameter

- **In**: Provides the Sylkactuator value to the controller.
- **Master Sync Enabled**: Enable or disable master sync.
- **sylkDevice**: Select the required Sylk actuator device from the drop-down menu.
- **Status**: Read-only point. Shows the status of the parameter. (alarm, fault, overridden, disabled, down, stale, null, unackedAlarm). For more details see Sylk component status behaviors.
- **faultCause**: Read-only point, displays the reason for the fault parameter. This property is empty unless a fault exists.
- **sendInterval (seconds):** sendInterval is the time interval for sending data from the controller to the network on a regular basis. The controller will send the input parameter value to the Sylk device based on the user-configured sendInterval (in

seconds).
For example, if the sendInterval value is set to 5 seconds, the controller will send the value of the input parameter to the Sylk device every 5 seconds. The allowed interval range is 5 to 75 seconds. The sendInterval value is set to 5 seconds by default.

If sendInterval is set to Cov (change of value), the controller will only send the value of the input parameter to the Sylk device when it changes. With Cov selection, the GPU (guaranteed periodic update) feature is added. To avoid data loss due to high network traffic, the controller updates the input parameter value to the Sylk device every 60 seconds.

Note: *If the Sylk device is configured at a higher address, it is possible that the Sylk device will miss reading the network's periodic parameter update. It is recommended that enableFD be set to "No." (If enableFD is set to "Yes," the Sylk parameter value will be set to default if it does not receive parameter updates, which may affect its behavior.)*

Note: *Only use Cov at critical points. Cov utilize Sylk bandwidth for communication . Excessive bandwidth usage may result in data loss between Sylk devices.*

- **senDelta**: SenDelta is another name for the delta value for significant event notification. It allows the controller to send the input parameter value to the Sylk device only when the difference between the last sent value and the current value is greater than or equal to senDelta. Otherwise, the value change will not be propagated to the Sylk device.

  For exmple: If the senDelta is two, the last sent input parameter value is two, and the current value is five. The difference in parameter values is three (5 - 2 = 3), which is greater than the senDelta value (two). This enables the controller to send the current value of the input parameter (five) to the Sylk device.
  It regulates the increase in network traffic caused by the frequent changes in the values of input parameters. This can be used to tune the controller so that minor value changes do not propagate to the network. The senDelta value is set to 0.5 by default.

Note: *The senDelta feature is only available when the sendInterval is set to "Cov." A senDelta of zero indicates that any value change is significant and is propagated to the network.*

- **enableFD**: Fail Detect is the time until the controller is notified of a failure on this point.
  - **Yes**: If enableFD is set to true, the Sylk device anticipates a periodic update to the input parameter. If it does not receive parameter updates from the controller, an alarm is generated and the Sylk input parameter value is set to the default value.
  - **No**: If enableFD is set to false, the parameter retains the last value that was written to it. When it receives updated values from the controller, it will set the value. It does not allow parameter values to be set to their default value.
- **FDInterval**: FDInterval for Sylk actuator input parameter is 20 secs.

Note: *To ensure proper functionality, sendInterval must be less than one-third of Fail Detect interval (if fail detect is enabled).*

- **inputType**: You can use this option to select Sylk Actuator input. SylkActuatorInputParam can be set to one of two input actuator and act travel time values.

- **Actuator**: The controller output is used to generate the actuator command. An actuator moves in response to a command.
- **Actuator Travel Time**: The actuator travel time is the amount of time it takes the actuator to travel from 0 % to 100 % open or 100 % to 0 % open. This time interval varies depending on the type of actuator and ranges from 0 to 500 seconds.

Configure Sylk Actuator Outputs

Steps to configure Sylk Actuator output:

Step 1. Navigate to **Station** > **Config** > **Drivers** > **BacnetNetwork** > **IrmBacnetDevice** > double-click **IrmProgram**. This opens the **Periodic program** wiresheet view.

Step 2. Navigate to the palette section, expand **Sylk > SylkParms >** select **SylkActuatorOutputParam**.

Step 3. Drag **SylkActuatorOutputParam** from palette and drop into the IrmFolder wiresheet.

Step 4. Double-click on the **SylkActuatorOutputParam** modules.

Step 5. Expand **SylkActuatorOutputParam** Property Sheet, select **sylkDevice** as SylkActuatorDevice, and **outputType** as actuator position or actuator cycle count or actuator status or actuator overriden or power report from the drop-down list.

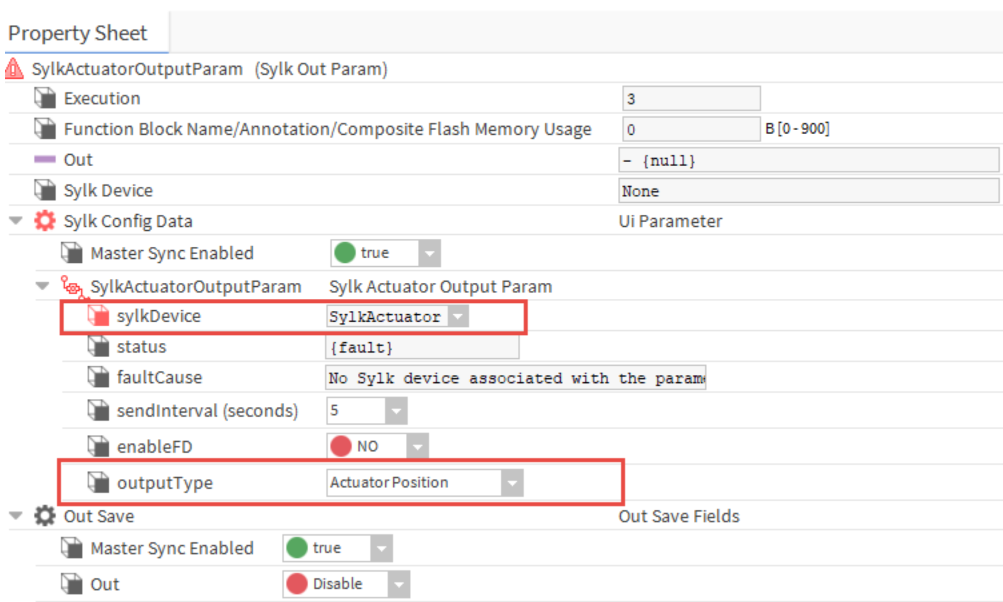


Fig. 452 Sylk Actuator Output Parameter property

Note: *A separate parameter configuration is required for adding input or output point type for Sylk actuator.*

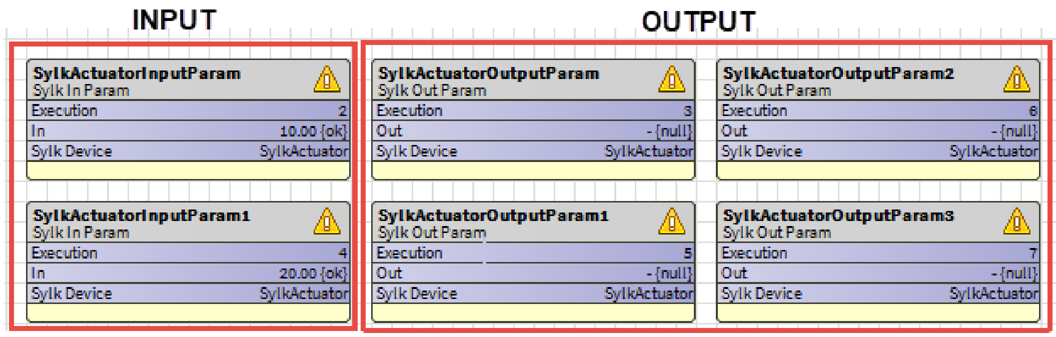


Fig. 453 Sylk Actuator Input or Output point type

Configure Sylk Actuator Outputs Parameter

- **Out**: Provides the respective value to the controller from the Sylk device.
- **Master Sync Enabled**: Enable or disable master sync.
- **sylkDevice**: Select the required Sylk actuator device from the drop-down menu.
- **Status**: Read-only point. Shows the status of the parameter. (alarm, fault, overridden, disabled, down, stale, null, unackedAlarm). For more details see Sylk component status behaviors.
- **faultCause**: Read-only point, displays the reason for the fault parameter. This property is empty unless a fault exists.
- **sendInterval (seconds):** SenDelta is another name for the delta value for significant event notification. It allows the controller to send the input parameter value to the Sylk device only when the difference between the last sent value and the current value is greater than or equal to senDelta. Otherwise, the value change will not be propagated to the Sylk device.

Note: *The senDelta feature is only available when the sendInterval is set to "Cov." A senDelta of zero indicates that any value change is significant and is propagated to the network.*

- **enableFD**: Fail Detect is the time until the controller is notified of a failure on this point.
  - **Yes**: If enableFD is set to true, the Sylk device anticipates a periodic update to the input parameter. If it does not receive parameter updates from the controller, an alarm is generated and the Sylk input parameter value is set to the default value.
  - **No**: If enableFD is set to false, the parameter retains the last value that was written to it. When it receives updated values from the controller, it will set the value. It does not allow parameter values to be set to their default value.
- **outputType**: This option allows you to customize the Sylk actuator output. SylkActuatorOutputParam can be configured to produce the following outputs:
  - **Actuator Position**: This is feedback from the actuator's current position ranging between 0 to 100 % and can be mapped into the controller for monitoring.

- **Actuator Cycle Count**: It shows how many time actuators cycles from open to close position.
- **Actuator Status**: Actuator status returns a number with the following meaning:
  - 0- No Error
  - 1- Under Voltage
  - 2- Over Voltage
  - 3- Stall
  - 4- OverVoltage and Stall
  - 5- UnderVoltage and Stall
- **Actuator Overridden**: It provides actuator overridden status if the actuator is overridden externally. This will return “True” if the unit is in Test Mode. It occurs if the address port is manually turned to position 6.
- **Power Report**: This is a relative measurement. It is only calculated for the last commanded move, ranging from 0 to 100 %.

Enum Schedule Configuration

Steps to configure Enum Schedule:

Step 1. Navigate to **Station** > **Config** > **Drivers** > **BacnetNetwork** > **IrmBacnetDevice** > double-click **IrmProgram**. This opens the **Periodic program** wiresheet .

Step 2. Navigate to the honIrmControl palette and expand **Date_Time.**

Step 3. Drag **EnumSchedule** from palette and drop into the wiresheet.

Step 4. Double-click on the **EnumSchedule** modules and expand **Schedule Config**.

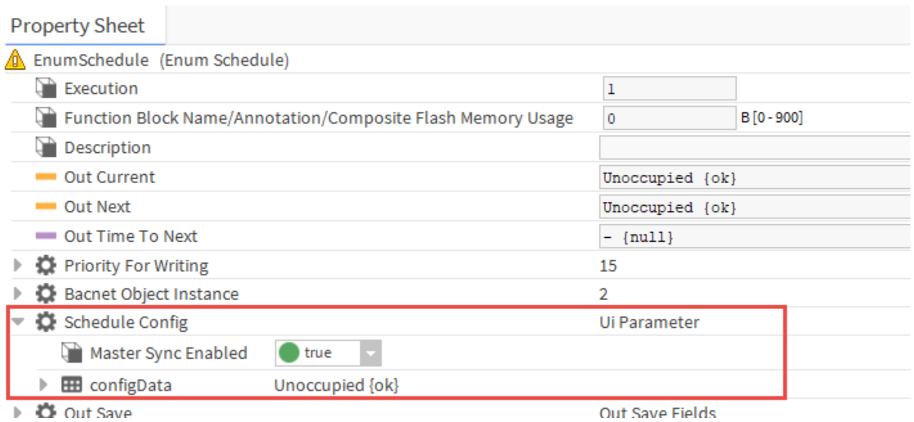


Fig. 454 Configure Schedule properties

Step 5. Select **Master Sync Enabled** to **true.**

Step 6. Click **ConfigData** to view the AX Scheduler.

Fig. 455 Config Data

Note: *Before configuring the ConfigData properties of the schedule configuration, add supported Sylk devices to the wiresheet.*

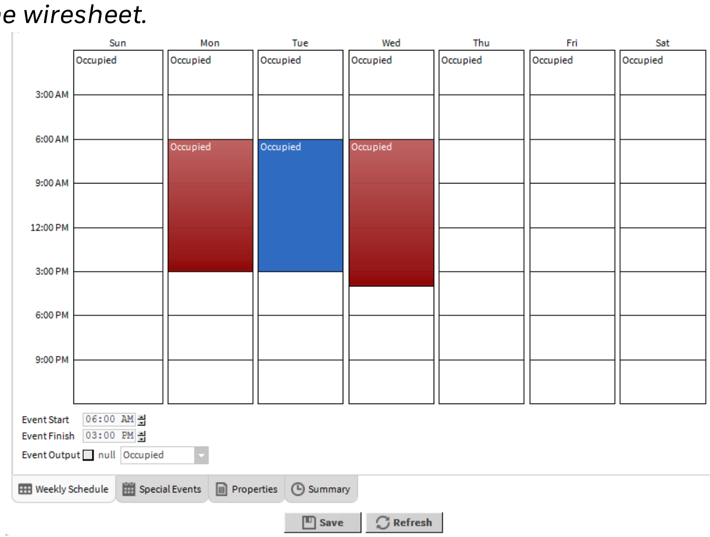


Fig. 456 Weekly Schedule

Step 7. Click **Save**.

Alternatively, click **Refresh** and click **NO**, if you do not want to save the changes.

Note: *The Sylk wall module supports four events per day. However, the IRM NX controllers BACnet schedule supports more than four events per day. So, the user cannot edit the schedules in-wall module when more than four events are configured per day.*

Configure Sylk Schedule Event

Steps to configure Sylk Schedule Event:

Step 1. Open the property sheet of the Sylk wall module.

Step 2. Set the **Schedule Editable From Zio** field to **Yes.**

Step 3. Select the permissions from the Param permission drop-down list as per the requirement (Contractor Only, Tenant Read-only, and Tenant Read Write).

Step 4. Change the **Schedule Type** as required (8-day schedule/ 7-day schedule/ 5-2-1-day schedule/ 5-2-day schedule).

Step 5. Enter the schedule block location in the **Schedule Block Location** field.

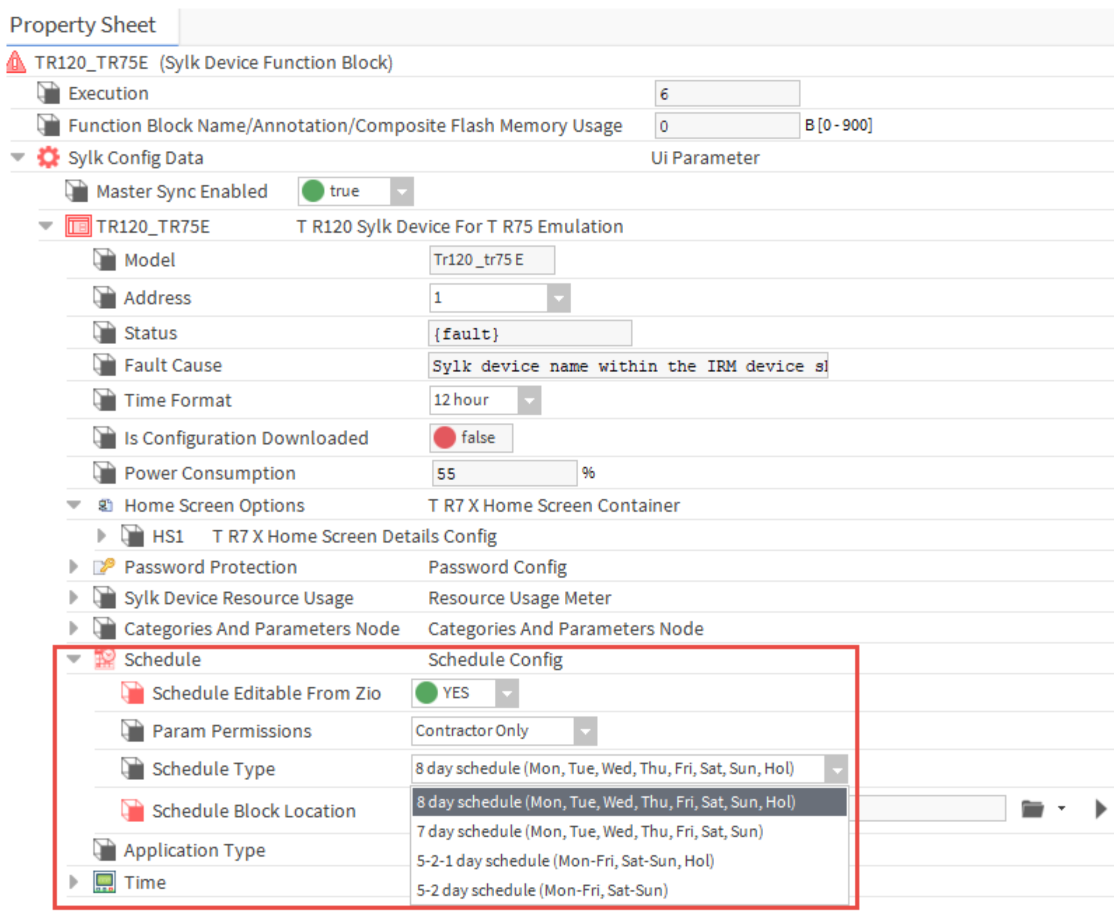


Fig. 457 Sylk Schedule Configuration

Note: *Schedule configuration workflow changes after changing any schedule changes in the tool, perform Sylk commission.*

Configure Schedule Block Location

Steps to configure Schedule Block Location:

Step 1. Click Folder icon ( ) and select the **Component Chooser** from the drop-down list.

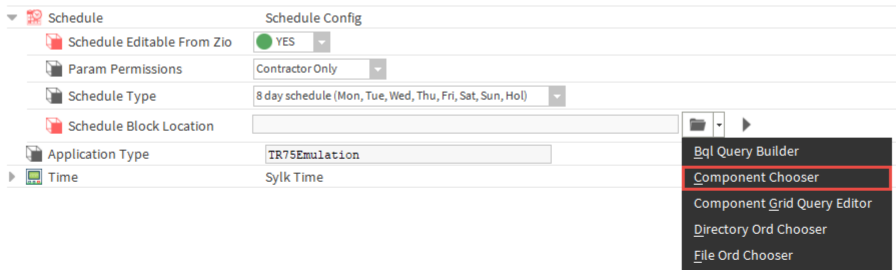


Fig. 458 Component Chooser

Step 2. On the Select Ord window, click **Drivers** > **BacnetNetwork** > **IrmBacnetDevices** > **Irm Program** > **Event Program** > **EnumSchedule**, and click **OK.**

This action fetches the scheduler location to the **EnumSchedule Block Location** filed.

Step 3. Click **Save** Or click **Refresh** to cancel the changes.

Alternatively, go to nav window, navigate to the **Station** > **Config** > **Drivers** > **BacnetNetwork** > **IrmBacnetDevices** > **Irm Program** > **Event Program** > **Select EnumSchedule,** and press Ctrl + L.

This action opens the Ord window, copy the location,

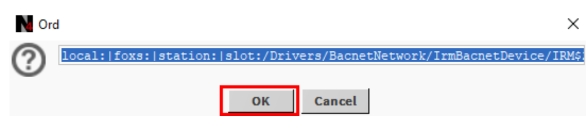


Fig. 459 Ord Window

Navigate to Schedule Config option and paste the link in the Scheduler Block Location field.

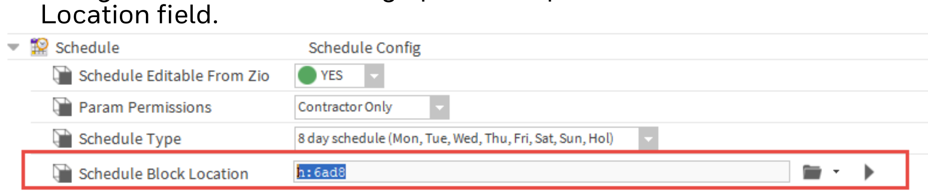


Fig. 460 Scheduler Block Location

Step 4. Click **Save** to save the changes.

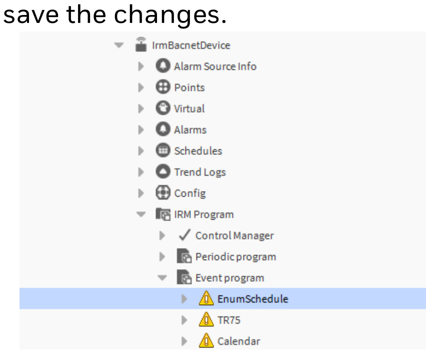


Fig. 461 Enum Schedule

Configure Global Schedule Event

BACnet Schedule Export sends schedule or calendar components to IRM BACnet schedule or calendar objects in the station.

Prerequisites: A operational CentraLine-N4 workbench connected to a remote host station. To export, the BACnet device should include a schedule or calendar object.

The BACnet Schedule Export Manager view location: Go to **Bacnet Network > Bacnet Device > Schedules.**

The BACnet Schedule Export Manager view displays schedule components in the station as BACnet schedule objects or calendar objects. However, these server-type exported components available for any device on BACnet networked. It does not write to specific objects in a BACnet device, which acts as a client.

The BACnet Schedule Export Manager view displays schedule components as BACnet schedule objects or calendar objects in the station. These server-type exported components, on the other hand, are available to any BACnet networked device. It does not write to any specific objects in a BACnet device, which acts as a client.

Note: *The IRM NX controllers does not support priorityForWriting function for Global Schedule event. To use the global schedule event, you need to disable priorityForWriting function.*

To disable priorityForWriting function: *Click Edit after selecting the global schedule event from the database. Click the skip writes property in the scheduling event edit box, then set the priorityForWriting property to True.*

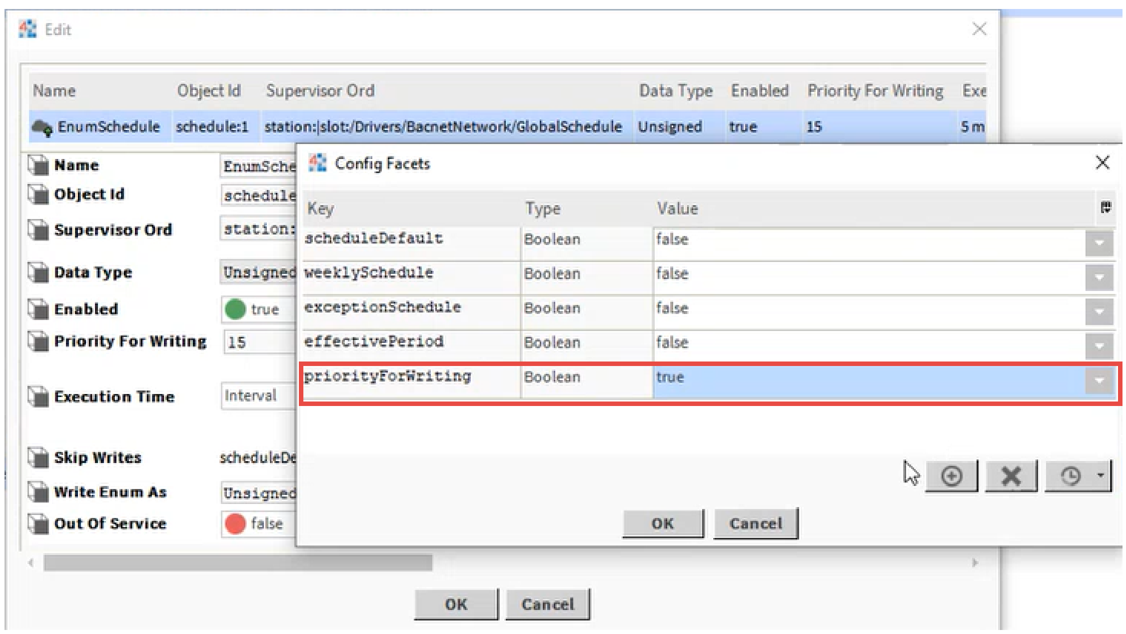


Fig. 462 Disabling priorityForWriting Feature for Global Schedule Event

Configure Enum Range

Perform the following operation to configure the Enum Range:

- Define Enum range on page 312
- Add Entry in Enum Library on page 312
- Modify Enum Library on page 313

Define Enum range

Steps to define Enum range:

Step 1. Double-click on **ConfigData > Properties > Facets option,** select **default range** (honIrmControl: ScheduleStatesEnum), and click (>>) icon.

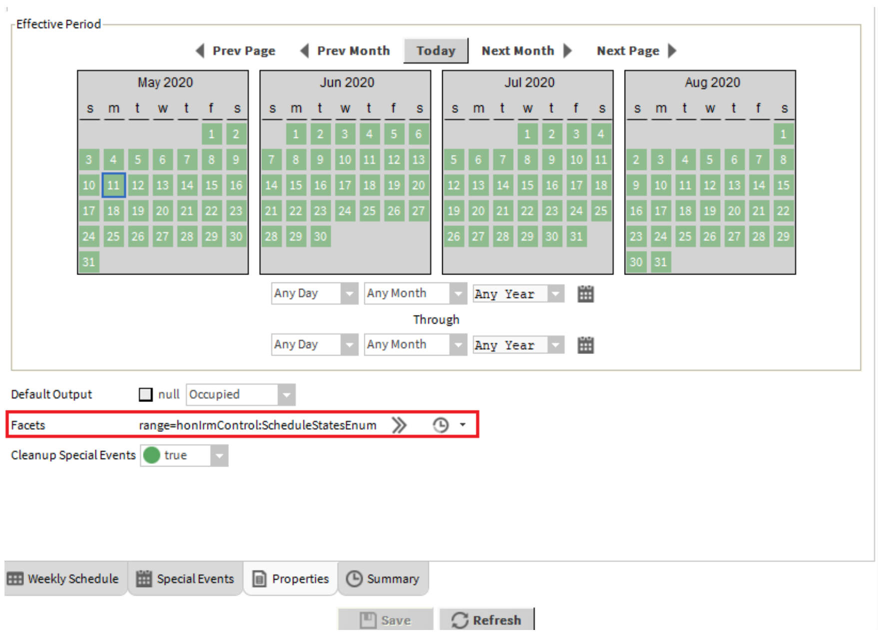


Fig. 463 Defining Enum Range

Step 2. Select the default **Enum** range, click the (...) icon, and click the (>>) icon. This action open the Enum Library.

Add Entry in Enum Library

Steps to add entry in the Enum Library:

Step 1. Select the blank fields.

Step 2. Enter the **Ordinal** value, display information in the respective field and click **Add.**

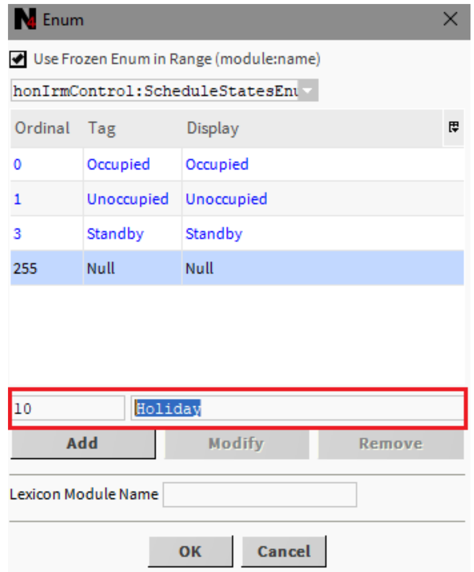


Fig. 464 To add an Entry in Enum Library

Note: *Working with default facets configuration when the schedule is linked to the Sylk Device is recommended. Suppose the user configures the value of the facet other than the default configuration. In that case, the Sylk module may not operate correctly.*

Note: *In a Zio enum library maximum of 255 entries can be added.*

Modify Enum Library

Steps to modify the entry in the Enum Library:

Step 1. Select the entry.

Step 2. Modify the **Ordinal** value**, Display** field**,** and **Tag** field and click **Modify.**
Or

Step 3. Change the **Ordinal** value**, Display** field**,** and **Tag** field and click **Add**.

Additional Configuration

The following are the additional configuration available on the Scheduler:

- Event time tuning
- Event Output
- Right-click menus

Event Time Tuning: You can specify the start and end times for each selected event by selecting the hours or minutes from the calendar or by entering the event start and end values in the corresponding boxes.

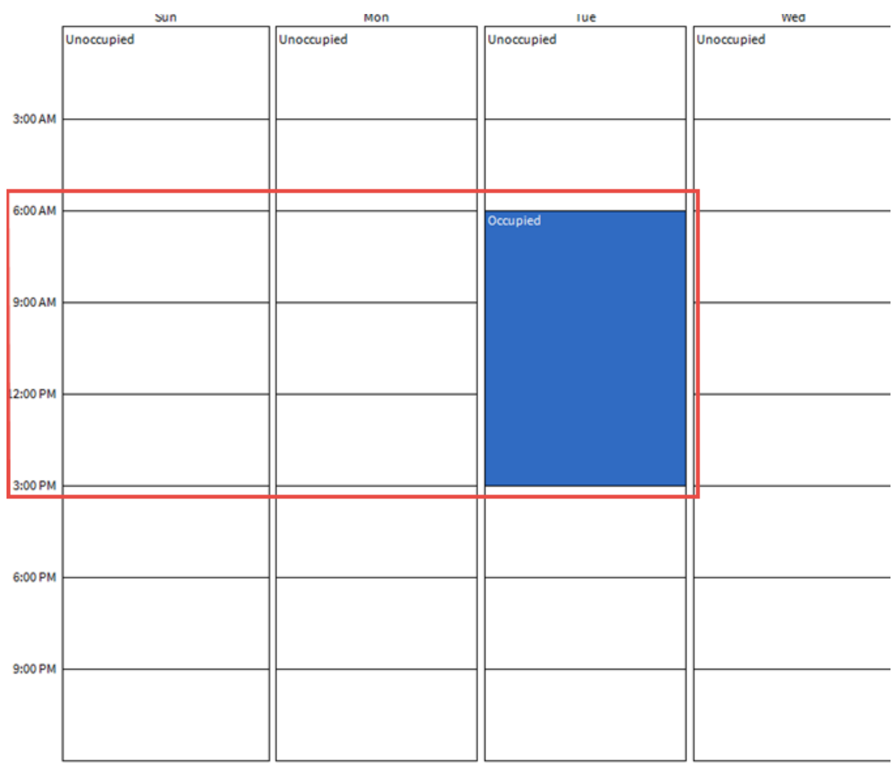


Fig. 465 Schedule Event Time Selection

Event Output: Select the required output value from the drop-down list.

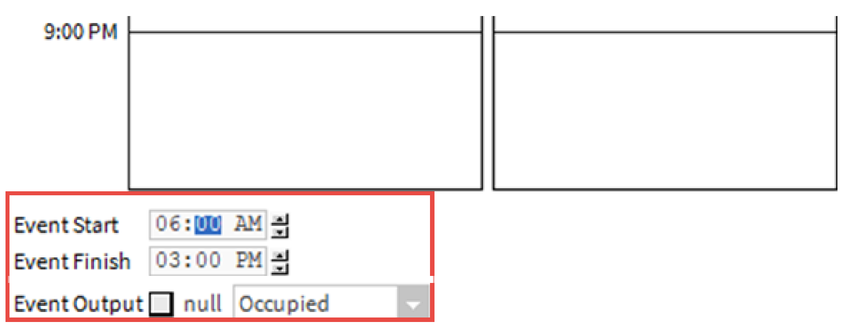


Fig. 466 Schedule Output Value Selection

Right-click menus: The table below describes the available right-click menus (in the schedule area) and their descriptions.

Table 42 Right-click menus

Options	Descriptions
Delete Event	Deletes the selected event.
Paste Day	It appears if the copy day option was used. It copies all events into the selected day.
All Day Event	It makes currently selected (or last entered) events extend to an entire day.
Apply M-F	It copies all the events in the selected day to Mon, Tue, Wed, Thu, and Fri (and overwrites any existing events on those days).
Copy Day	It copies all the events in the selected day.
Clear Day	It clears all the events on the selected day.
Clear Week	It clears all the events in the entire weekly schedule.

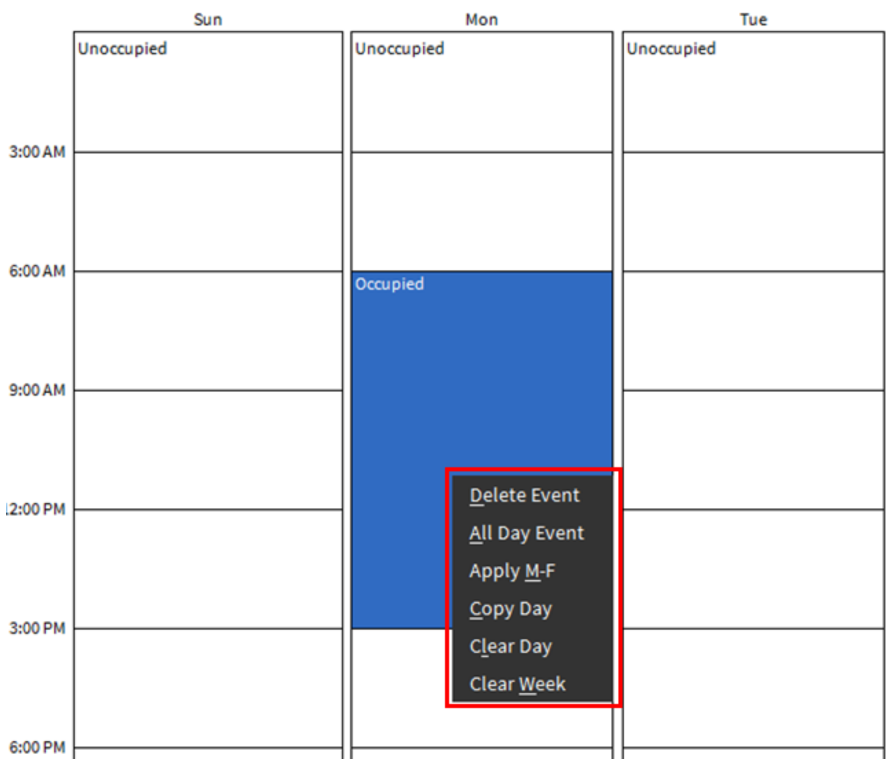


Fig. 467 Right-click menus

Special Events

In the schedule view, each schedule object's special events are configured on a special events tab. The event times and values entered for any special event are only valid for that schedule.

Suppose the special event is set up as a "reference" type. In that case, the days of its occurrence should be specified as a reference in the calendar schedule functional block. It enables you to change the days of special events that occurred while editing one or more referenced CalendarSchedules on a global scale.

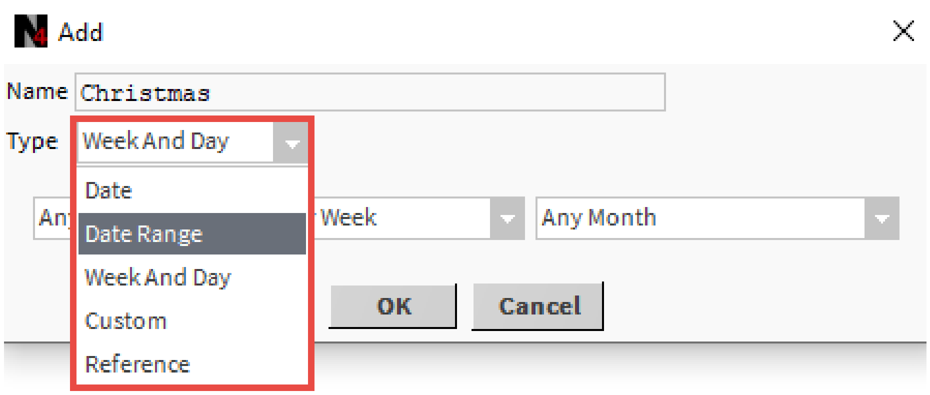


Fig. 468 Schedule – Special events

Table 43 Special Events

Options	Descriptions
Date (default option)	By various combinations of weekday, numerical date, month or month combinations, and year.
Date Range	By start and end range, using for each a combination of day, month, year.
Week and Day	By the combination of day of the week, week in the month, month. ***Note:*** *Calendar Week type will not support.*
Custom	By combination of any day, month, weekdays, any week, and year. ***Note:*** *Custom type events for Special events not supported by IRM Compact VAV and FCU controller.*
Reference	By reference to a specific Calendar Schedule component in the station.

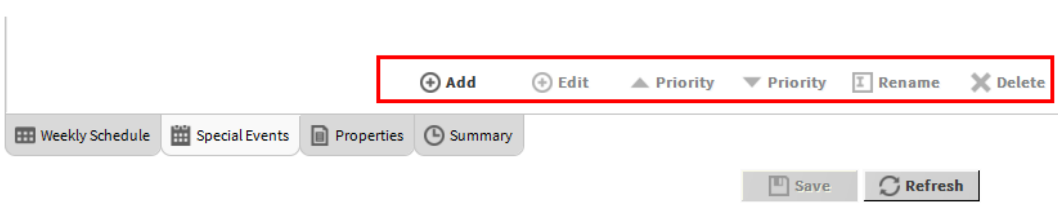


Fig. 469 Special Events Options

Table 44 Special Event options

Options	Descriptions
Add	Add a new special event.
Edit	Edit day(s) selection criteria (but not changing special event type).
Rename	Rename selected special event.
Priority (up)	Move special events up in the priority list.
Priority (down)	Move special events down in the priority list.
Delete	Removes selected special events from the schedule component.

Special Events

Sylk wall module supports the following exception:

- One exception schedule to configure for a holiday.
- BACnet schedule supports more than one exception schedule.

You can edit one of the first exception schedules in the wall module, and the second exception schedule onwards cannot be edited.

To implement this limitation, you must configure the calendar object with multiple holidays and use calendar references to create an exception schedule in the IRM schedule.

Note: *The TR120x and TR75x wall modules can edit the schedule for one holiday. Since IRM NX controller supports a unique schedule for each holiday, when you integrate TR120x and TR75x, the user can edit only the first holiday created in the schedule.*

When working with TR120x and TR75x wall modules, use the Calendar object to create multiple holidays and assign one schedule for all the holidays. When you edit the holiday schedule, it will apply to all the holidays.

Create Event for Multiple Days

You can create one event and apply to multiple days.

Steps to create event for multiple days:

Step 1. Add a **Calendar** function block in the wiresheet, define all the holidays dates, and date ranges on the calendar.

Note: *When using the schedule and calendar function block in the application, controller time should be synchronized for the system time; else, the schedule function block will have wrong references and might not work correctly. TSYNC is the best way to synchronize time in the controller.*

Step 2. Navigate to **EnumSchedule > ConfigData > Special Events,** create one **Exception Schedule**, select **calendar Type** as **Reference**, and click **OK.**

Now define the time events for this Exception Schedule. The schedule will execute these time events for all the dates defined in the Calendar.

Step 3. Wall module displays this exception schedule time events (as this is the first one) as Holiday time events on display.

Step 4. You can modify the holiday time events. These modified time events get written back to the first Exception Schedule, which is configured as calendar type as Reference. Hence same time events get applied to all the defined dates on the Calendar.

Scheduled Event Default Output

The schedule block output (Out slot) will be the default value whenever a scheduled event (special or weekly) is not defined or effective.

The white area in listed events indicates where the default value is used and displays the current default value.

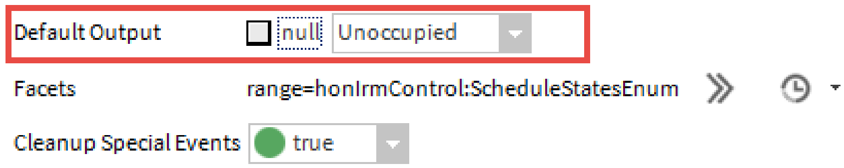


Fig. 470 Schedule event default value

Configuring WmConfigHvacA using Sylk Device

The honIrmControl provides “WmConfigHvacA” function blocks that can be configured and used to build the required application logic that supports various wall operating device.

Note: *The WmConfigHvacA function block can be placed no more than three times onto the wiresheet. It can only be configured as a Sylk wall module once. Instead of using the Sylk wall module, the function block can also be configured as a wired or external wall module (a Modbus wall module).*

The function block supports various wallmodules (WM) Wired, Sylk TR40/42 and an external WM. The external WM communicates e.g. via BACnet to the room controller.

For more detail about WmConfigHvacA functional block, refer to IRM Function Blocks User Guide - EN2B-0415-GE51.

Steps to configure WmConfigHvacA functional block:

Step 1. Expand the Irm Program and double-click **Periodic Program.**

Step 2. Open the **honIrmControl** palette and scroll down to the **Wallmodule**.

Step 3. Expand **Wallmodule**, drag the **WmConfigHvacA,** and drop it onto the wiresheet.

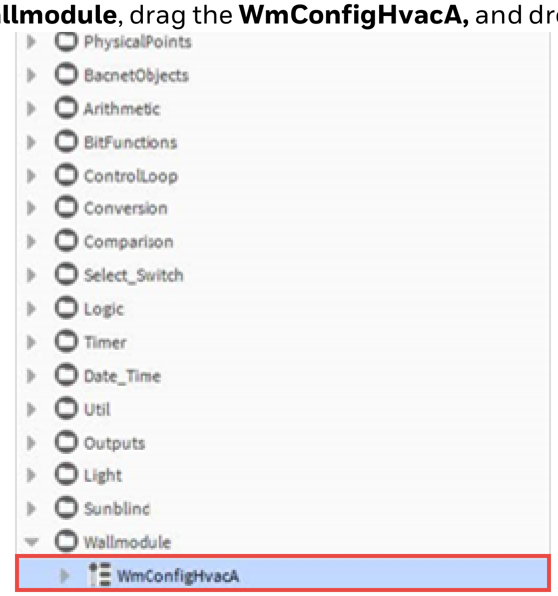


Fig. 471 honIrmControl Palette

Step 4. Change the name if desired in the “Name” dialog box and click **OK.**

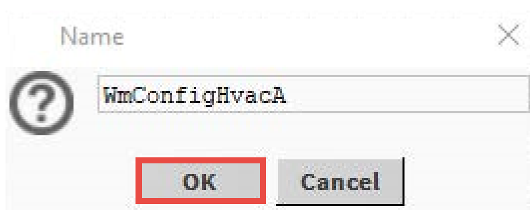


Fig. 472 Name Dialog Box

Step 5. Double-click the **WmConfigHvacA**. This action displays the property sheet.

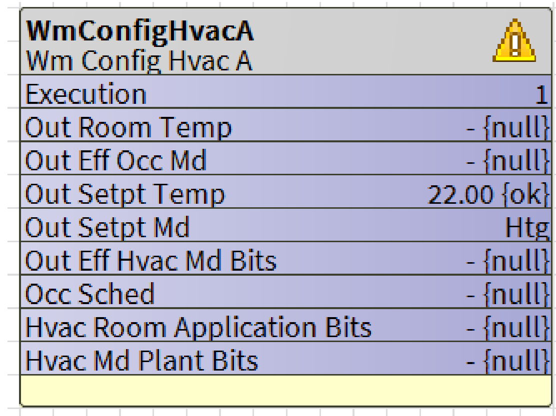


Fig. 473 WmConfigHvacA

Step 6. Expand **General Settings**, select the desired wall model from the drop-down list.

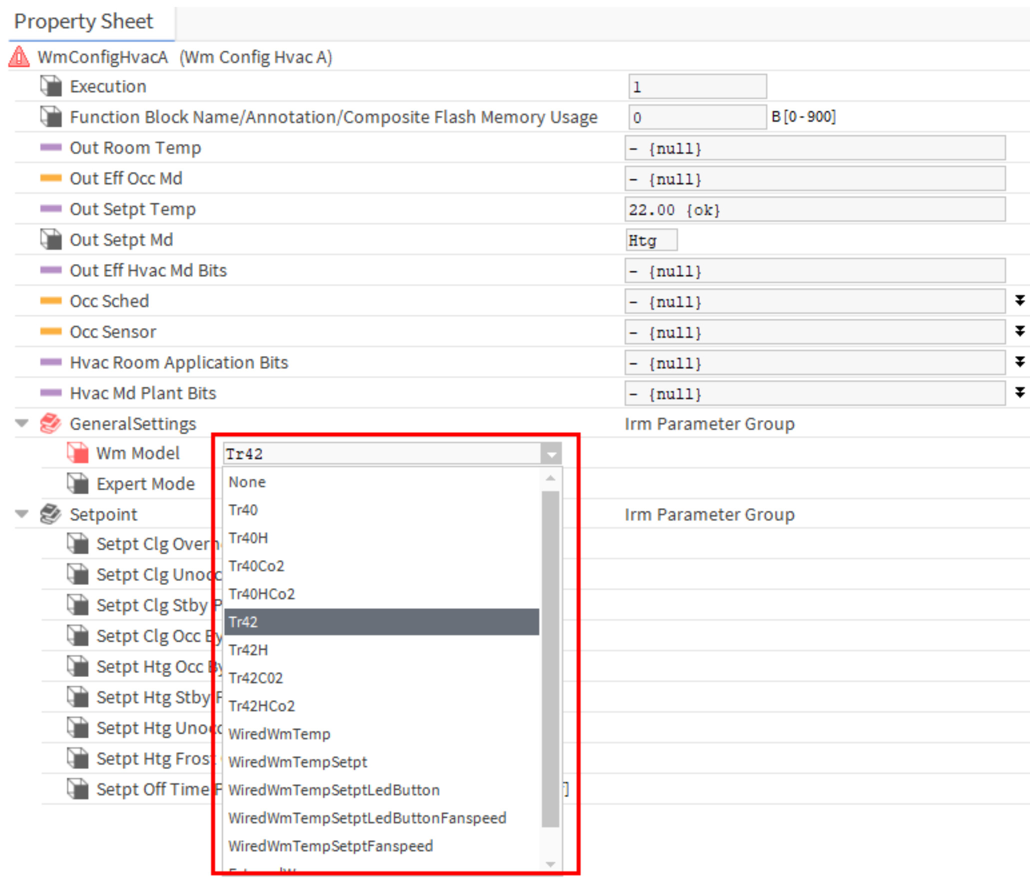


Fig. 474 Wm Model Selection

Based on the Wall model selection, the general setting configuration varies.

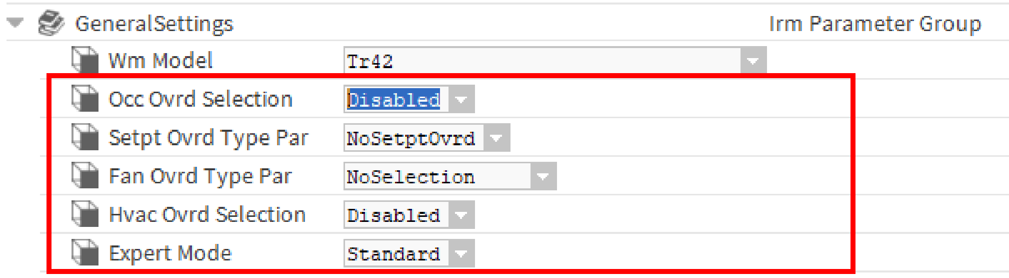


Fig. 475 Configure the Sylk Wallmodule Address

- **Occ Ovrd Selection:** This is used to check whether the room user may or may not overwrite the occupancy mode from the wall module. For example, the room user could switch to BYPASS in UNOCCUPIED mode to get the OCCUPIED setpoint. Accordingly, I/O slots and parameters are displayed or hidden depending on this parameter.
  The overwrite can be done from a Wired WM with an overwrite button, a Sylk Wallmodule via the display, or an external WM.
  Values:
  - **1:** No Occupancy Overwrite
  - **2:** Occupancy Overwrite
- **Setpt Ovrd Type Par:** Since this parameter is also available as an input, please refer to the input **Setpt Ovrd Type** description.
  Default Value:
  - **1:** No Setpoint Overwrite
- **Fan Ovrd Type Par:** Since this parameter is also available as an input, please refer to the input **Fan Ovrd Type** description.
  Default Value:
  - **1:** No Selection: No fanspeed selection possible from wallmodule
- **Hvac Ovrd Selection:** Hvac Ovrd Selection is used to select whether the room user may or may not overwrite the wall module's HVAC mode (Cooling or Heating). For example, the room user could switch to HEATING in the winter to avoid COOLING if the sun shines into the room. The overwrite can be done from a Sylk-TR42-Wallmodule or an external WM (Not from a wired wallmodule). With “No HVAC overwrite,” the parameter Sylk Wallmodule – Show Item Bits should also be adjusted.
  Values:
  - **1:** No HVAC overwrite
  - **2:** HVAC overwrite allowed
- **Expert Mode:** In **Expert Mode**, more I/O slots and parameters are displayed for advanced programmers, providing more functionality.
  Values:
  - **0:** Standard (Default)
  - **1:** Expert

Step 7. Expand **SylkWallmodule**, enter the **Show Item Bites** and verify the **Wm Address.** .

Fig. 476 Wallmodule Address

- **Wm Address:** This parameter is used to configure the Sylk Wallmodule address.
  Range:
  - 0-15 (1 = Default = Factory default from Sylk-TR42-Wallmodule)
- **Show Items Bits:** Add the bit values of the items you want the operator to see.
  Bit-Values:
  - **1:** Show Room Temperature
  - **2:** Show Setpoint
  - **4:** Show the effective occupancy mode
  - **8:** Show and allow the change of the occupancy overwrite
  - **16:** Show and allow the change of the effective HVAC mode
  - **32:** Show the fan stage and allow the change of the fan stage
  - **64:** Show the humidity
  - **128:** Show the air quality
  - **Default:** 255 (All Bits true, show all)

Note: *The power supply of the controller needs to be AC (20 - 30 VAC). Otherwise, the Humidity and Air Quality cannot be measured and shown.*

Step 8. Expand the Setpoint and configure the desire setpoint.

Step 9. Expand the SetpointOvrd and configure the desire setpoint overrides.

Step 10. Click **Save**.

CHAPTER

7 MODBUS ENGINEERING

*PRESS RELEASE Modbus Organization Replaces Master-Slave with Client-Server July 9, 2020 — The Modbus Organization Board of Trustees announces it is expunging all occurrences of inappropriate language of the query and response paradigm of Modbus communications. With recent events, all companies and individuals with the ability to make positive changes should do so. As the holder of the standard for an industrial network with one of the largest installed bases in the world, it is important to complete the replacement of the current terminology with more thoughtful references. All instances of "**master-slave**" in the organization's literature and on its website will be removed. Current electronic content is being updated as of this announcement. Board Chair Todd Snide commented, "The time is overdue for these words to be removed. The terms are unnecessary and insensitive to the people who experience racism in this country and around the world. We urge our member companies and all those who use the Modbus protocol to take similar action to rid their documentation and communications of these terms."*

*The organization is using "**client-server**" to describe Modbus communications, characterized by communication between client device (s), which initiates communication and makes requests of server device(s), which process requests and return an appropriate response (or error message). About Modbus-Organization, Inc. Headquartered in Massachusetts, the Modbus Organization is an association of users and suppliers of control and automation devices. The organization works to support the Modbus protocol, provide information and tools for individuals and companies using Modbus. It maintains the authoritative website for Modbus information.*

Additional information about the Modbus Organization can be found on the organization's website, www.modbus.org. Contact information: Lenore Tracey, Executive Director Modbus Organization, Inc. +1 (508) 435-7170 lenore@modbus.org

The controller has a removable 2-wire with shield, non-isolated RS-485 interface that is Modbus compatible (terminal 16, 17, and 18). It is installed in a gray terminal block. The controller can only act as a Modbus client.

The RS-485 interface suitable for Modbus communication is 2-wire with shield non-isolated hence the following considerations apply:

- Maximum Modbus length ("L"): 4000 ft (9.6 – 78.8 kbps) or 2600 ft (115.2 kbps). It is recommended that you select a low baud rate (for example, 19.2 kbps) for reliable operation.
- Use only shielded, twisted-pair of cables and daisy chain topology.

- Ground noise should not exceed the EIA-485 common mode voltage limit.
- Must conform to TIA/EIA 485 cabling guidelines.
- It Should not extend beyond a single building.

Table 45 Default Modbus Details

Specification	Description
Baudrate	19200
Parity	Even parity
Bytesize	8 bit
Stop bits	1 stop bit

The Modbus protocol is described in two documents, both of which can be found at www.modbus.org.

- Modbus_over_serial_line_V1_02.pdf
- Modbus_Application_Protocol_V1_1b3.pdf

Addressing and Wiring Rules of Modbus Interface

- Use shielded twisted pair cable J-Y-(St)-Y 4 x 2 x 0.8 and connect the Modbus shield to a noise-free earth ground (only once per Modbus network).
  Shielding is especially recommended when the Modbus cable is installed in areas with expected or actual electromagnetic noise. Avoiding such areas is to be preferred.
  You must use three wires:
  - One wire for Modbus +
  - One wire for Modbus –
  - One wire for the signal common

    When using one pair for Modbus (+) and Modbus (-) and one wire of another pair for the signal common, CAT 5 cable may also be used.
- Maximum 8 Modbus devices, maximum 155 read/write data points total Overloading the network will impact the performance.
- Address: Can be from 1 to 247.

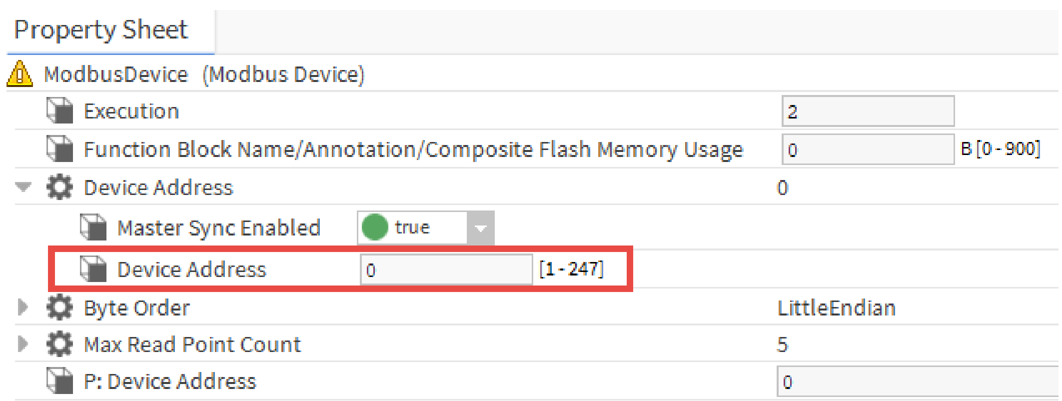


Fig. 477 Modbus Device address

Note: *Never use the address 0 because it is used by the IRM NX controller exclusively for broadcasting Modbus addresses.*

- Address must be unique on the Modbus.
- Dip switch setting (when available) must be correct (depending on its physical connection) for every Modbus device address.
- Termination and bias must be correct for every Modbus device.
- The wire connections on Modbus devices can be referred to by a different names and descriptions. The Modbus terminals are named as follows.
  - **Transmit Data**: TxD, Tx, T+/R+, D1, B
  - **Receive Data**: RxD, Rx, R-/T-, D0, A
  - **Signal Ground**: GND, COMMON
- Terminal A and B are not clearly defined and can vary from one manufacturer to another. Verify the correct definition of A and B with the manufacturer of the Modbus device before wiring.

Wiring Topology

Only daisy chain wiring topology is allowed.

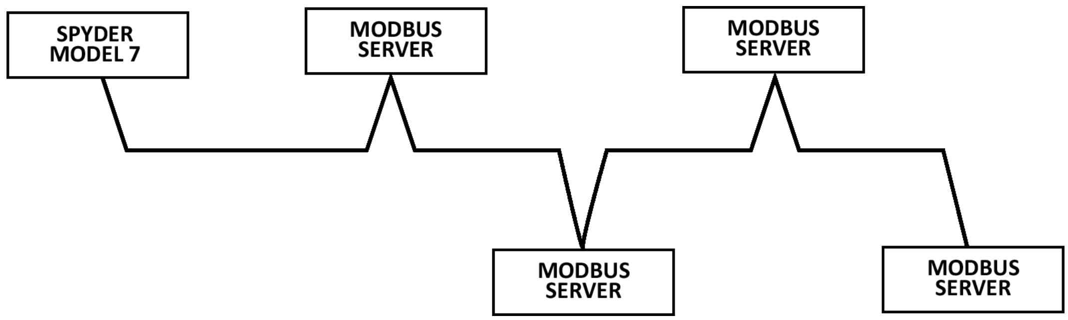


Fig. 478 Modbus Wiring Topology

Other wiring topologies (such as star wiring and mixed star wiring) are prohibited. This is to avoid communication problems of the physical layer.

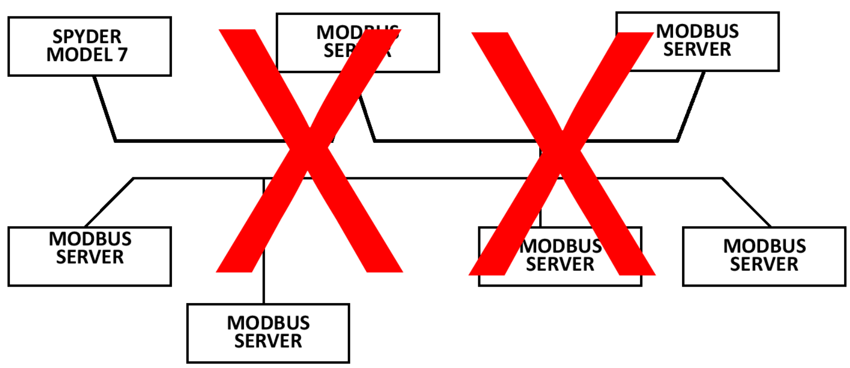


Fig. 479 Prohibited Wiring Topology (example)

Preliminary Checks and Configuration

It is recommended that you conduct your investigation and checks in the following order.

1. **Get Modbus RTU server device documentation:** It is mandatory to have the vendor's documentation of the Modbus functionality for every Modbus device that is to be connected to the Modbus device. This will allow obtaining most of the required information, but most likely not all of it. Missing information can be obtained from the support function of the vendor.
2. **Verify usage and activation of the correct Modbus device interface**: Modbus devices may not have the Modbus interface activated by default. Activation may be necessary via software, for example, setting a parameter via the Modbus device's user interface. In addition, activation may be necessary via hardware, such as shorting the Modbus device's input. While using any Modbus device, verify that you have the correct hardware variant which supports Modbus on the RS-485 interface as expected.
3. **Verify RTU Transmission Mode**: All Modbus devices must use transmission mode RTU. No other transmission mode (for example, ASCII) is supported.

4. **Ensure only one Modbus RTU client is on the bus**: Only one Modbus client is allowed on the bus, the IRM NX controller. It does not support "Multi-client" or "Modbus plus" devices, nor does it support such configurations on the Modbus. As per the Modbus standard, the IRM NX controller (as the client device) does not have a Modbus address. The IRM NX controller must be added to the Bacnet Network.
5. **Configure Baud Rate:** All Modbus devices must have an identical Baud rate, an identical Parity, and an identical number of stop bits. Typically, the Baud rates of Modbus devices are set and changed via their user interfaces or their separate configuration software.

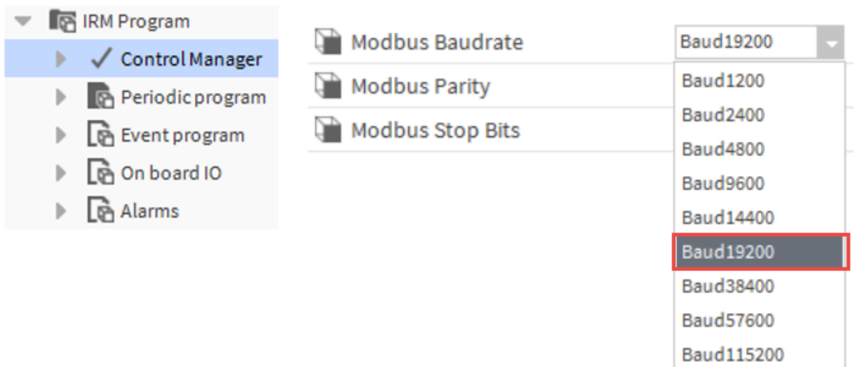


Fig. 480 Modbus Baud Rate

6. **Configure Parity:** Modbus devices may have a configurable parity, they will not have a configurable number of stop bits. If a Modbus device has an un-matching number of stop bits, this device cannot be used.

Note: *Modbus devices that have implemented "no parity" may have 1 or 2 stop bits.*

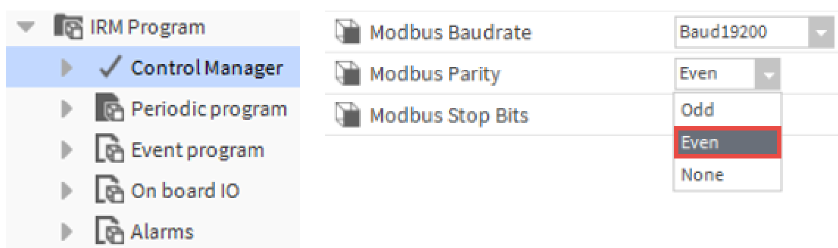


Fig. 481 Selecting Modbus Parity

In most cases, select Modbus Parity as “Even.”

7. **Configure Stop Bits:** If Modbus Parity = “None, " select Modbus Stop Bits = “2”.

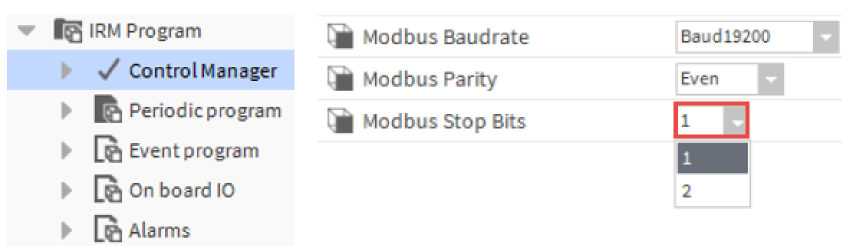


Fig. 482 Selecting Modbus Stop Bits

Adding Modbus Device

Steps to add a Modbus device to the Bacnet Network:

Step 1. Copy a **IrmBacnetDevice** from **honIrmControl** palette to the **BacnetNetwork.**

Step 2. In the Nav tree, expand the **IRM Program** folder of the controller and double-click **Periodic program**.

Step 3. Copy a **ModbusDevice** from the **honIrmControl** palette to the periodic program wire sheet.

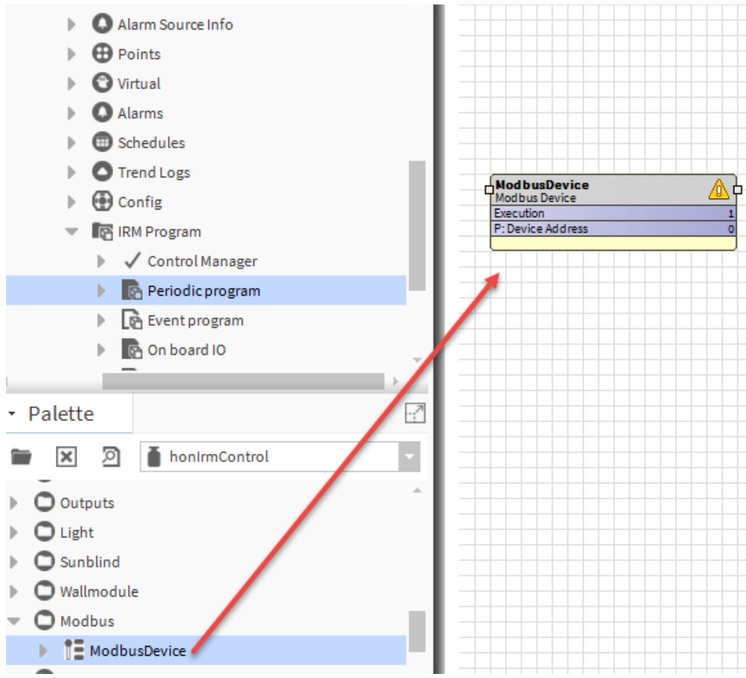


Fig. 483 Adding Modbus Device

If required, you can change the Modbus device name.

Configure Modbus Device Settings

Steps to configure Modbus Device Settings:

Step 1. Double-click on the Modbus device and check the device settings.

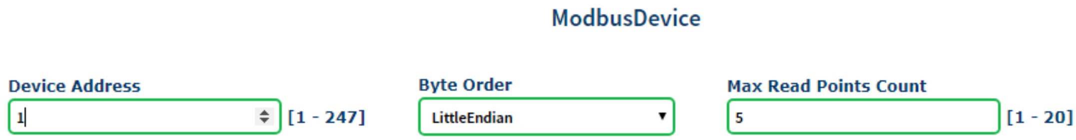


Fig. 484 Modbus Device Settings

- **Device Address:** Modbus devices have addresses ranging from 1 to 247. Every Modbus device must have a unique address. The third-party Modbus devices addresses are set and changed through their user interfaces or separate configuration software.
- **Byte Order:** he Modbus standard defines the serial bit order as least significant bit first and most significant bit last.

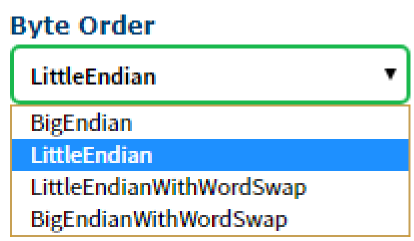


Fig. 485 Byte Order

However, the Modbus standard does not define the byte and word order of messages. Hence, Modbus devices will transmit most significant byte first or lower significant byte first. For 32-bit values, most significant word first or lower significant word first may be implemented.

BigEndian

Int32, Uint32, Float	
Byte1	Most Significant Byte
Byte2	Second most...
Byte3	Third most...
Byte4	Least Significant Byte

Int16, Uint16	
Byte1	Most Significant Byte
Byte2	Least Significant Byte

Single Bit
Byte1

LittleEndian

Int32, Uint32, Float	
Byte1	Least Significant Byte
Byte2	Third most...
Byte3	Second most...
Byte4	Most Significant Byte

Int16, Uint16	
Byte1	Least Significant Byte
Byte2	Most Significant Byte
	Least Significant Byte

Single Bit
Byte1

LittleEndianWithWordswap

Int32, Uint32, Float	
Byte1	Second most...
Byte2	Least Significant Byte
Byte3	Most Significant Byte
Byte4	Third most...

LittleEndianWithWordswap

Int32, Uint32, Float	
Byte1	Third most...
Byte2	Most Significant Byte
Byte3	Least Significant Byte
Byte4	Second most...

- **Max Read Points Counts:** The controller can request a single register from a Modbus device and receive a single value in return. In addition, the controller can request multiple registers (start register and number of registers) and return multiple values in a single response. This method reduces data traffic on the bus, resulting in faster communication.

  When the controller recognizes multiple registers with the same operating mode, it automatically requests multiple registers in a message. The Modbus device manufacturer, on the other hand, has limited the number of registers that can be requested with a single message.

  In a single message, the IRM can query up to 20 consecutive registers. This restriction can be specified in **Max Read Points Count.**

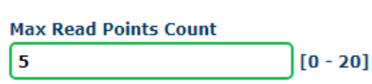


Fig. 486 Max Read Points Counts

Step 2. Select the **Read Point** tab and click on **Add**.

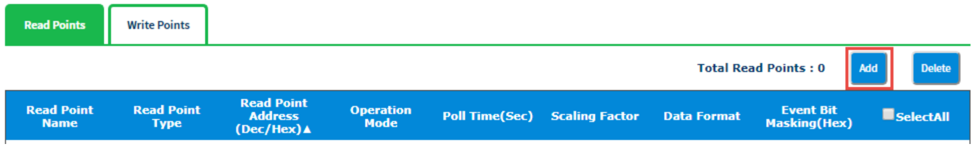


Fig. 487 Read Point tab

Step 3. Enter the following details in the **Modbus Read Point** window.

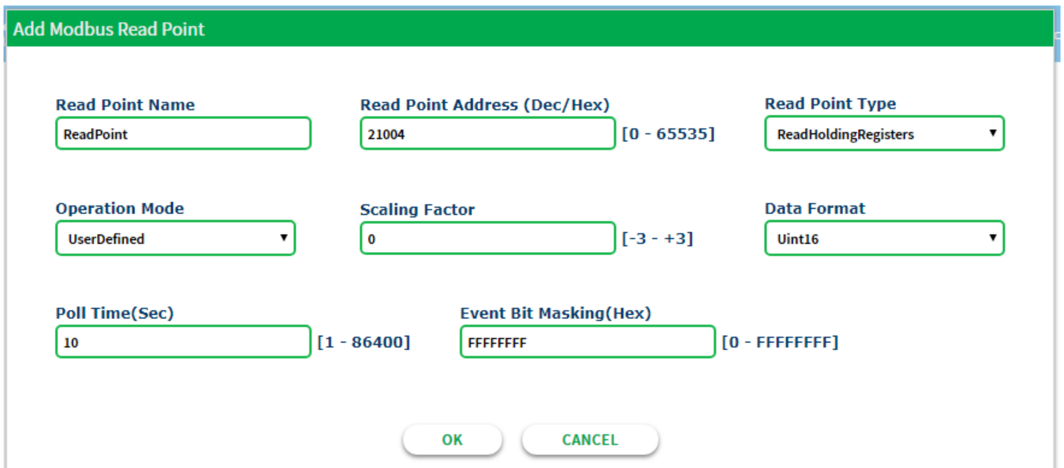


Fig. 488 Modus Read Point Window

- **Read Point Name:** Enter the read point name.
- **Read Point Address:** Enter the read point address, the range is 0 to 65535.

  Each coil or contact is 1 bit and assigned a data address between 0000 and 9998.

  Each register is one word = 16 bits = 2 bytes and has a data address between 0000 and 9998.
- **Read Point Type:** This function is used to read Modbus Server Register type

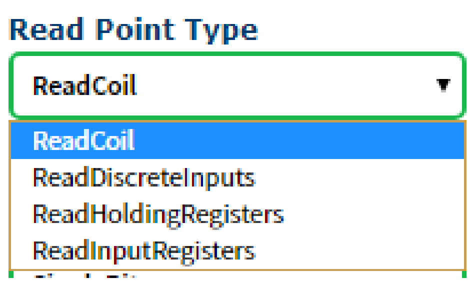


Fig. 489 Read Point Type

  - **ReadCoil:** This function is used to read from 1 to 2000 contiguous status of coils in a remote device.
  - **ReadDiscreteInputs:** This function is used to read from 1 to 2000 contiguous status of discrete inputs in a remote device.
  - **ReadHoldingRegisters:** This function is used to read the contents of a contiguous block of holding registers in a remote device.

- **ReadInputRegisters:** This function is used to read from 1 to 125 contiguous input registers in a remote device.
- **ReadMultipleRegister:** A single message with the initial address and the number of registers can be used to read several registers with sequential addresses from a Modbus device. Then, a single message with all register contents is transmitted to the bus, and a single response is also sent. This lightens the bus's load.
  For all registers with the same Read Point Type, the same Operation Mode (Poll rate), and consecutive Read Point Addresses, the firmware automatically sends just 1 message.

- **Operation Mode (Poll Rate):** This parameter allows adapting to the communication and processing performance of the Modbus device. If the Modbus device does not respond fast enough, increase the poll rate.

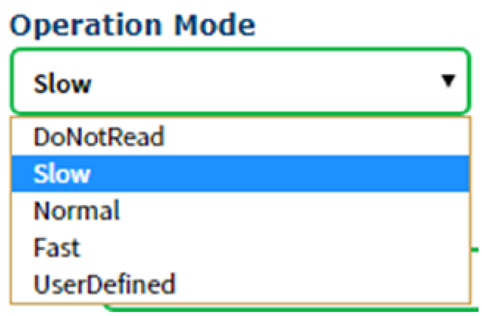


Fig. 490 Operation Mode

  - **DoNotRead:** Output is NULL.
  - **Slow:** Register is read after multiple of 5 seconds, one register at a time.
  - **Normal:** Register is read after all high priority registers are read, one register at a time.
  - **Fast**: Register is read every 50 ms.

- **UserDefined**: This allows the user to define polling time.

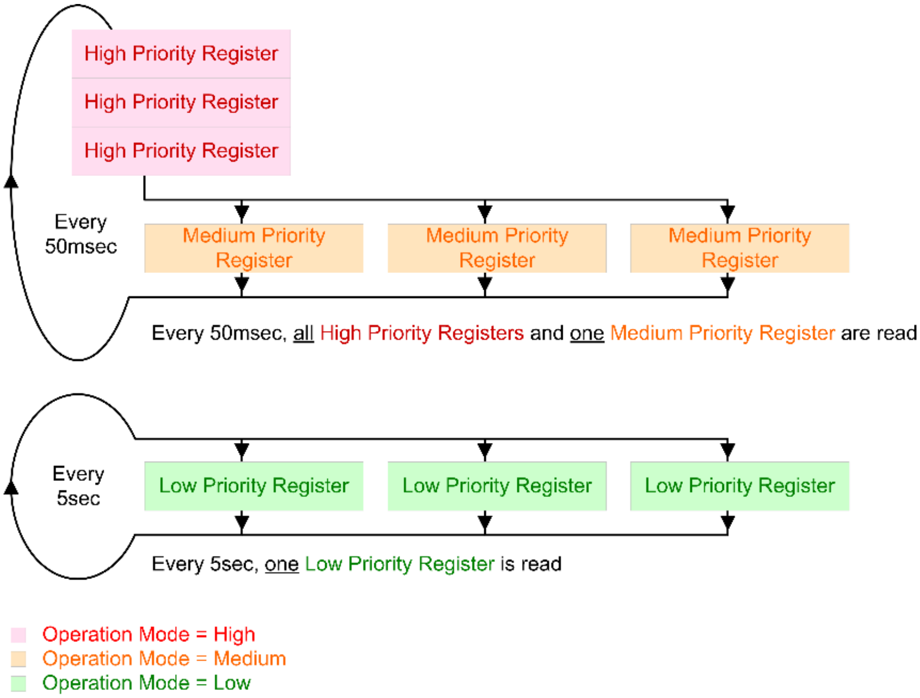


Fig. 491 Operation Mode Priority

- **Scaling Factor:** To convert the register value to the required units, apply a scaling factor of 10 to it.

  Example:

  - Read value = 1500. With Scaling Factor -3 the calculated value = 1.5
  - Read value = 1500. With Scaling Factor +2 the calculated value = 150000

- **Data Format:** Determines the number of consecutive registers written and how the value is converted to register values.

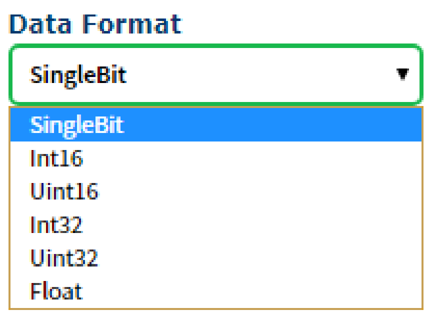


Fig. 492 Data Format

SingleBit

Int16:	-32768 to 32767
Uint16:	0 to 65535
Int32:	-2147483648 to 2147483647
Uint32:	0 to 4294967295
Float:	-3.4E+38 to +3.4E+38 (32 Bit)

- **Poll Time (Sec):** Allows the user to define the polling time. This is a number between 60 and 86400.

Fig. 493 Poll Time (Sec)

- **Event Bit Masking:**

Fig. 494 Event Bit Masking

If the Event Program reads the Read Point, the value can be masked using the Event BitMask. When the masked value changes, the Event Program logic inn wiresheet is executed immediately. Masked value means a logical AND with the Modbus value.

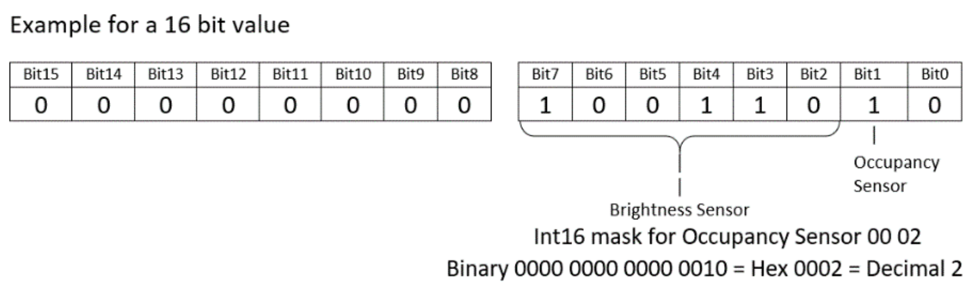


Fig. 495 Example for 16 bit value

The Event Program wire sheet logic is executed on a regular basis. Furthermore, it can be carried out immediately (event-driven). Such an event can be triggered by a Modbus value.

- **Masked Occupancy Sensor:** When the Occupancy Sensor Bit changes, the Event Program wire sheet logic is immediately executed.
- **Occupancy Sensor (0xFFFF) none masked:** When the Occupancy Sensor or the Brightness Sensor changes, the Event Program wire sheet logic is executed immediately.

Step 4. Click **OK.**

Step 5. Select the **Write Point** tab and click **Add**.

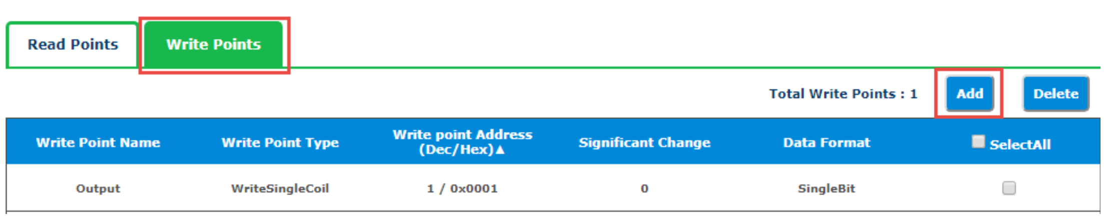


Fig. 496 Write Point tab

Step 6. Enter the following details in the **Modbus Write Point** window.

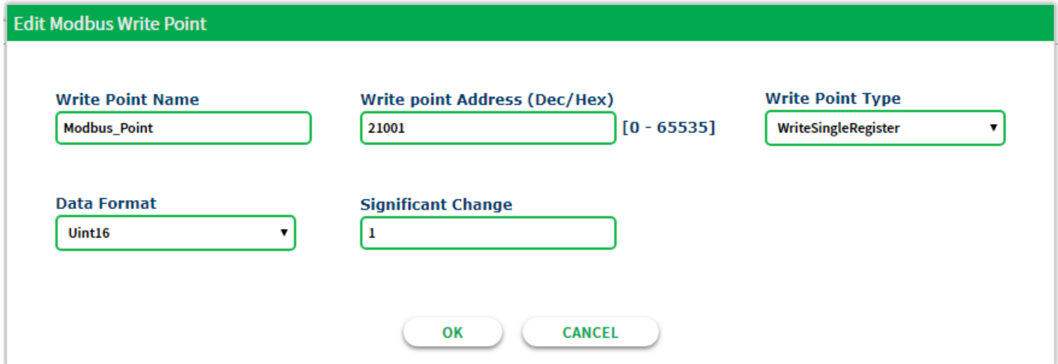


Fig. 497 Modbus Write Point Property

- **Write Point Name:** Enter the write point name.
- **Write Point Address:** The write point address is the data address and not the coil or register number of the Modbus device.
    - **Decimal Range**: 0-65535
    - **Decimal format**: 65535
    - **HEX Range**: 0 – FFFF
    - **Hex format**: 0xfff
- **Write Point Type**:

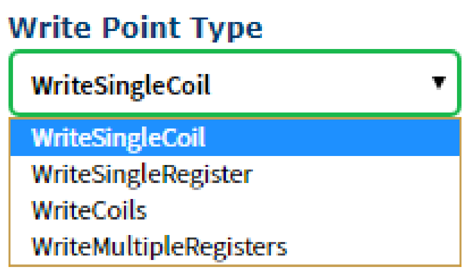


Fig. 498 Write Point Type

    - **WriteSingleCoil:** This function is used to write a single output to either ON or OFF in a remote device.
    - **WriteSingleRegister:** This function is used to write a single holding register in a remote device.
    - **WriteCoils:** This function is used to force each coil in a sequence of coils to either ON or OFF in a remote device.
    - **WriteMultipleResisters:** The WriteMultipleRegisters is chosen as the Write Point Type. When the registers are set to WriteMultipleRegisters and have consecutive Write point Addresses, the firmware automatically transmits just one message for the registers.
      A single message containing the initial address, the number of registers, and the values can be used to write many registers with successive addresses to a Modbus device. Then, on the bus, there is only 1 message sent, and there is only 1 reply. This reduces the bus's load.

Note: *It is possible to select WriteRegister and WriteMultipleRegisters.*

- *If WriteMultipleRegisters are selected and the addresses are consecutive, then there will be one message.*
- *If WriteMultipleRegisters are selected and there are gaps in addresses, then there will be multiple messages.*

- **Data Format**: Determines the number of consecutive registers written and how the value is converted to register values.

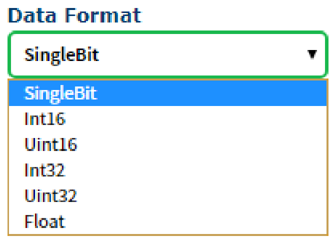


Fig. 499 Data Format

SingleBit

Int16:	-32768 to 32767
Uint16:	0 to 65535
Int32:	-2147483648 to 2147483647
Uint32:	0 to 4294967295
Float:	-3.4E+38 to +3.4E+38 (32 Bit)

- **Significant Change:** A significant change for analog values is recommended to reduce the bus load. This ensures that values are only sent when the value has changed significantly from the value previously sent.

To finish the Modbus configuration, click the save icon and then click periodic or event program in the nav tree.

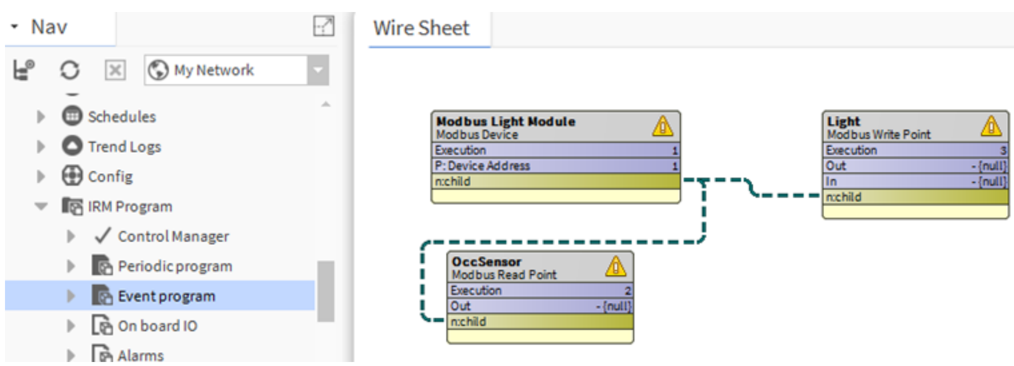


Fig. 500 Significant Change

Delete Modbus Device

Steps to delete complete Modbus device function block with read and write points configured:

Step 1. Right-click on the **Modbus Device** > **Actions**, and select **Delete Modbus Device**.

Note: *The standard delete function is not applicable for deleting the Modbus device.*

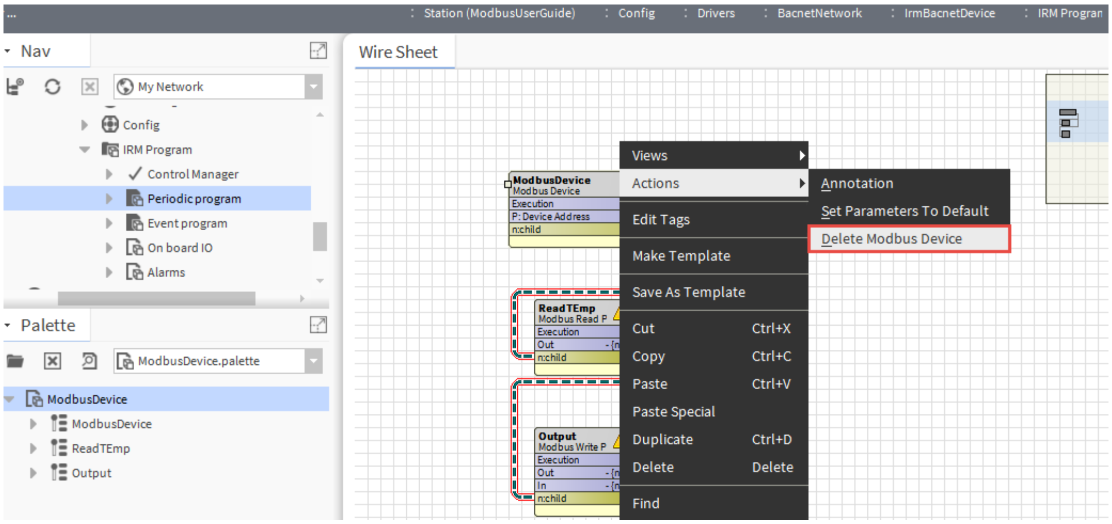


Fig. 501 Delete Modbus device

Duplicate Modbus Device

Saving Modbus Block as a Template

When you use the “Duplicate” function in the periodic program and event program wire sheets, it copies only the device and not the connected function blocks. Use the “Save As Template” function to save a complete Modbus device configuration as a template.

Steps to save Modbus block as a template:

Step 1. Right-click on the **Wire Sheet** view on the item you want to reuse and select **Save As Template**.

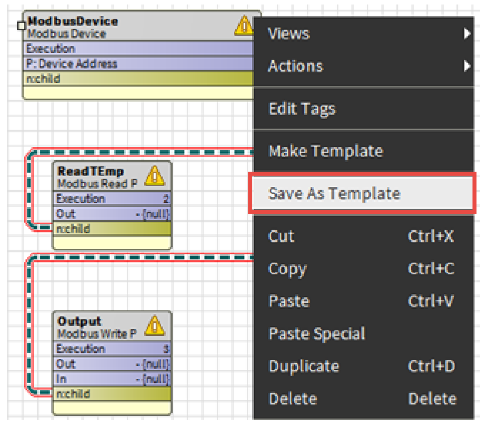


Fig. 502 Save as template

Step 2. Select location to save the template and click **Save**.

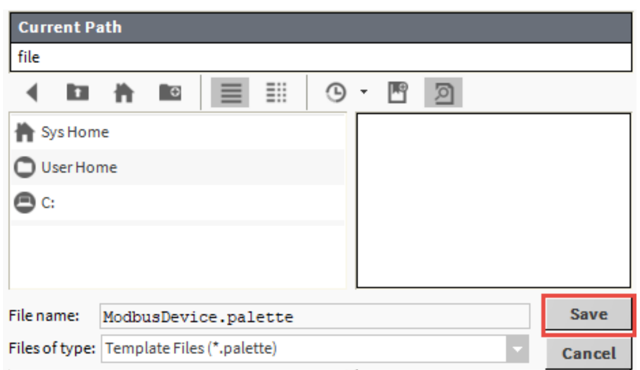


Fig. 503 File Chooser

The template saved as Modbus palette. The default name will be the name of the identified function block. If you want to add or update a function block to an existing modbus template. Insert the template into the wire sheet, then click **Save As Template**, select an existing palette file, and then click **Append**.

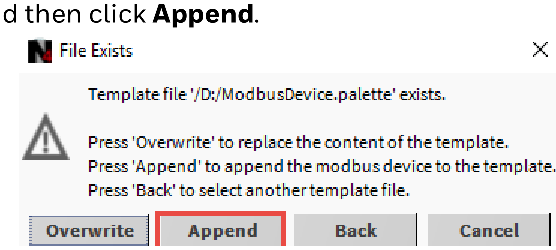


Fig. 504 Save As Template

Open Modbus Template

Steps to open Modbus template:

Step 1. Open **Palette** and click **Browse**.

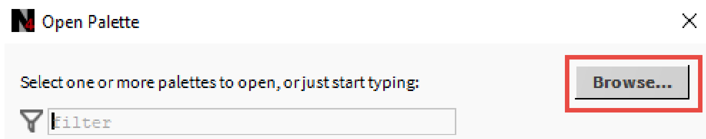


Fig. 505 Open Palette

Step 2. Select the Modbus template file and click **Open.** This adds Modbus template to the palette.

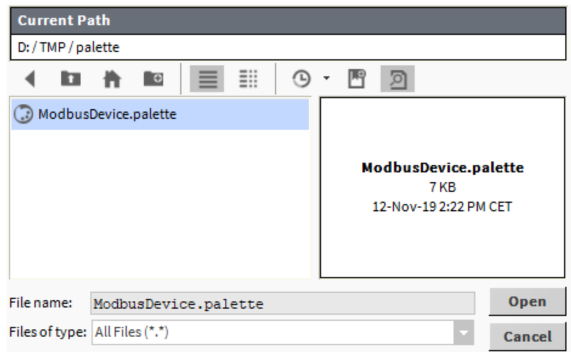


Fig. 506 Modbus Template file

Step 3. Double click on the **ModbusDevice** in the palette panel.

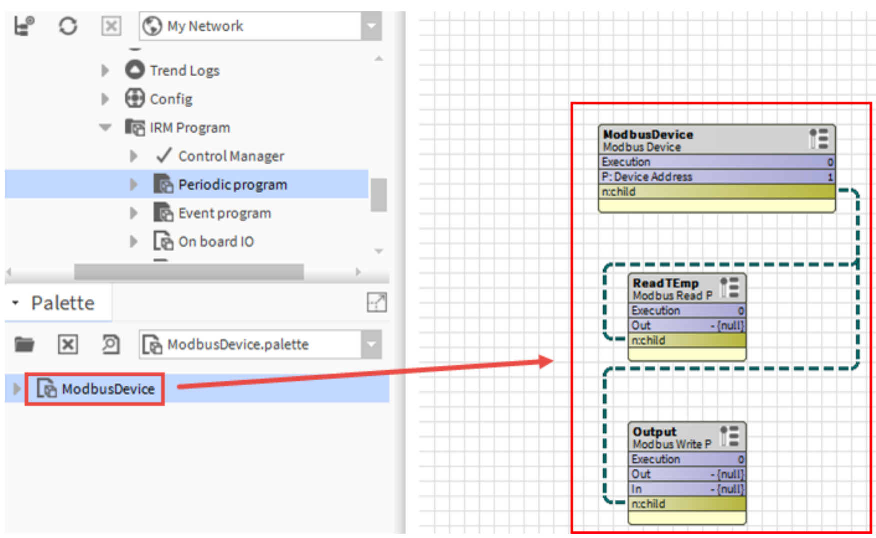


Fig. 507 Function Blocks

On the wire sheet, select each component, copy the selection and paste it to your target wire sheet (for example, periodic program).

CHAPTER

8 OTHER OPERATIONS

Controller Firmware Download

Before upgrading the controller firmware, check the latest software release bulletin or tech tip for the latest firmware for IRM NX controller.

Steps to upgrade the controller:

Step 1. Navigate to **IrmBacnetDeviceManager** view, select the controllers from the database, and click **Download Firmware**.

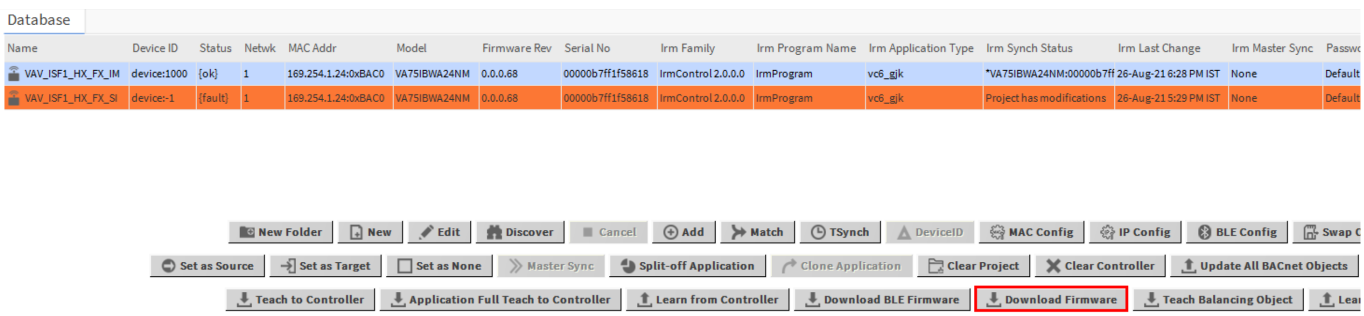


Fig. 508 Download Firmware

Step 2. Navigate to the directory where you downloaded the firmware file, select the IRM NX controllers firmware file (IRMN4-IMG_Vxxxx.bin), and click **Open**.

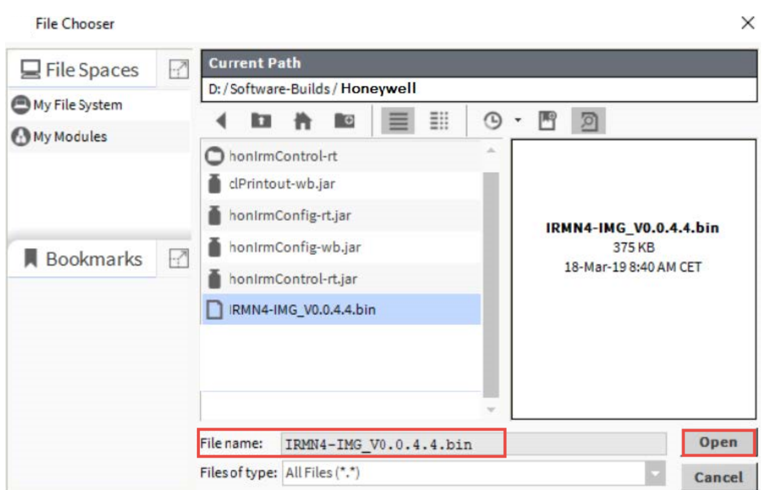


Fig. 509 File Chooser window

The firmware download process begins as indicated at the top of the firmware download progress bar. When the firmware download is complete, a "Success" message appears.

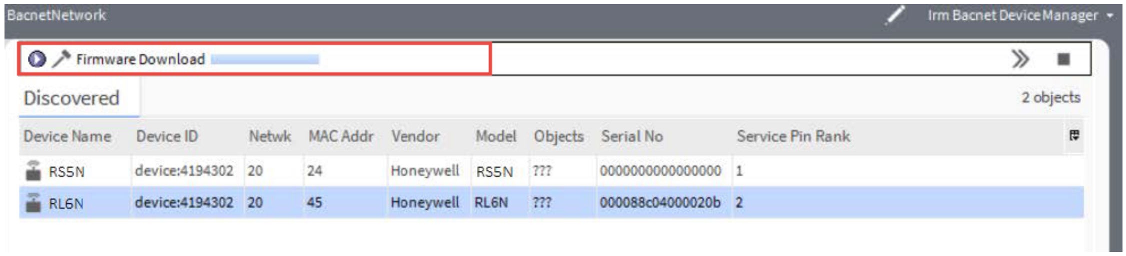


Fig. 510 Irm Bacnet Device Manager view

Note: *Whenever a new firmware upgrade request is initiated before the provisioning of the previous firmware upgrade has been completed, an invalid configuration error is encountered. Provisioning time is approximately 10 minutes after upgrading to a new firmware.*

Solution: *Retry to upgrade the firmware.*

Note: *The controller may become unreachable if a station or BACnet network is moved from one device to another while upgrading firmware on the IRM NX controller.*

Solution: *Reset, or power cycle the controllers, which have Ref In or Ref Out mapped to points to the station or BACnet network.*

Important: *Values updates after a controller power failure. If a controller has a power failure and the device restarts, it takes three to five minutes to update the values in the wiresheet. To accelerate the value update on the wiresheet, refresh the wiresheet by navigating to another page and returning to the wiresheet.*

Hide Slots

Steps to hide function block slots:

Step 1. Right-click the **function block** icon, of which you want to hide slots.

Step 2. In the context menu, click **Pin Slots.**

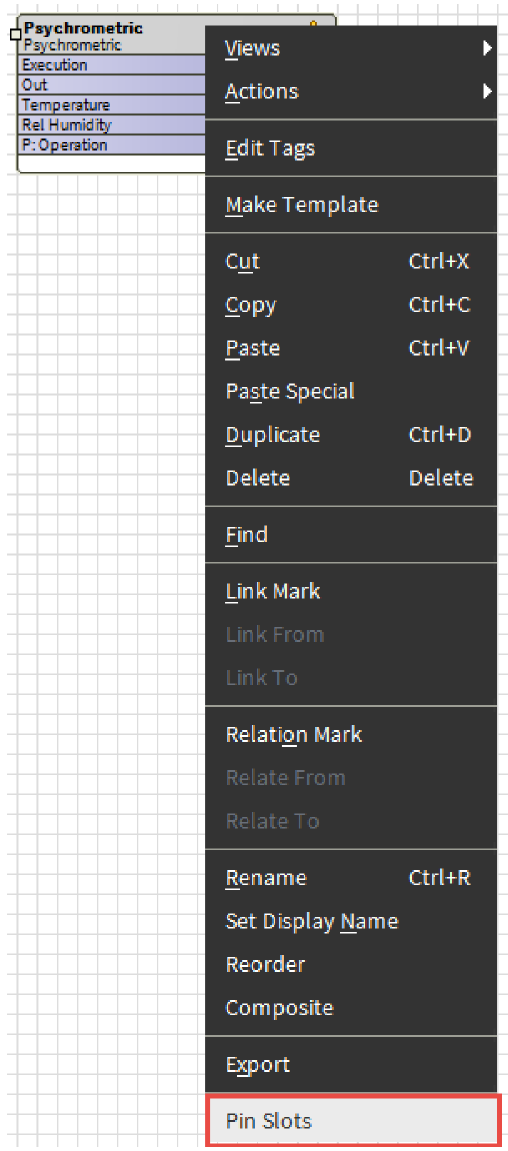


Fig. 511 Context menu

Step 3. Click the slot you want to hide and click **OK**.

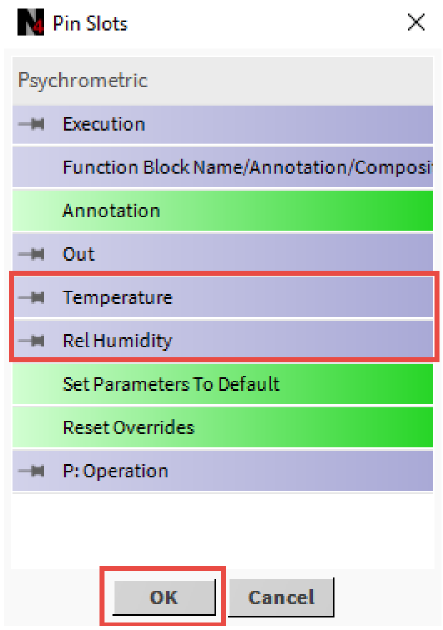


Fig. 512 Pin slots

The “Temperature” and “Rel Humidity” slots in the functional block figure (A) below were selected for hiding. Figure (b) shows the updated view of the functional block after performing the hide operation..

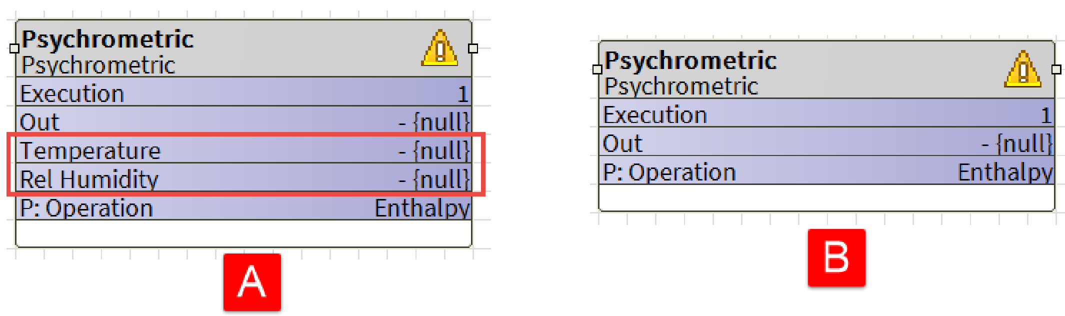


Fig. 513 Function block

Note: *Any slots that are hidden manually in the Pin Slots dialog are not saved in the controller. The hidden slots will be visible again after performing “clearing the project” or “learning the application from the controller” operation.*

Bulk Operations

Change Multiple Datapoint Names

While performing a batch operation, such as changing the names of multiple datapoints in the same group, it is important to maintain the project's uniqueness.

Steps to change datapoint names in a batch:

Step 1. In the Nav tree, expand the **Services folder** and double-click on the **Program-Service.**

Step 2. Click the **Find Objects** button. This action opens the **Bql Query Builder** dialog box.

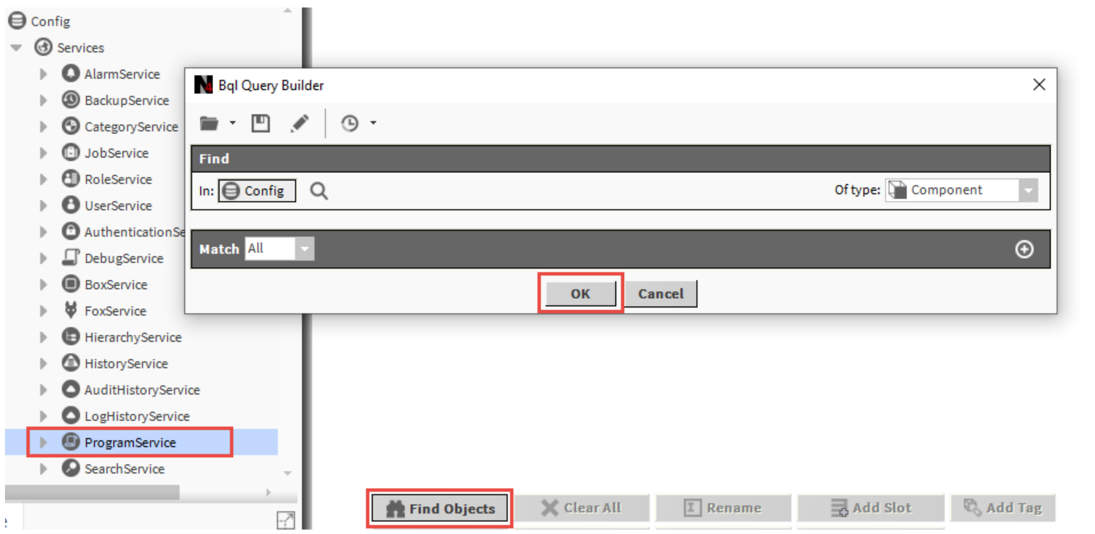


Fig. 514 Bql Query Builder dialog box

Step 3. Click the magnifier icon to search a device. The **Choose Root** dialog box displays.

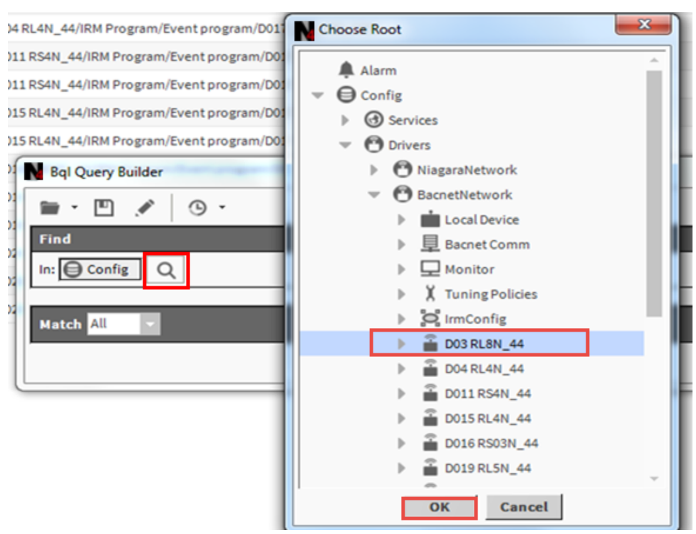


Fig. 515 Choose Root dialog box

Step 4. Select the device and click **OK.**

Step 5. The **Bql Query Builder** dialog box appears and displays the selected device name.

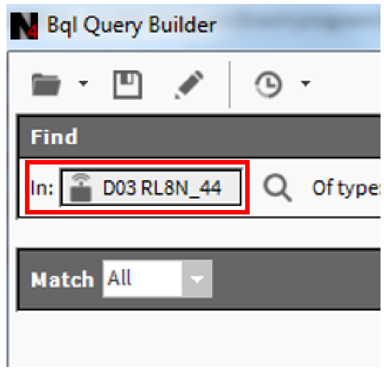


Fig. 516 Bql Query Builder dialog box

Step 6. Select **Custom Type** from the **Of type** drop-down list.

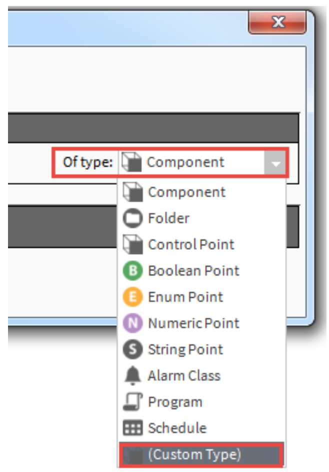


Fig. 517 To select Custom Type

Step 7. Select **honIrmControl** and **Bacnet Boolean Input** from the drop-down list.

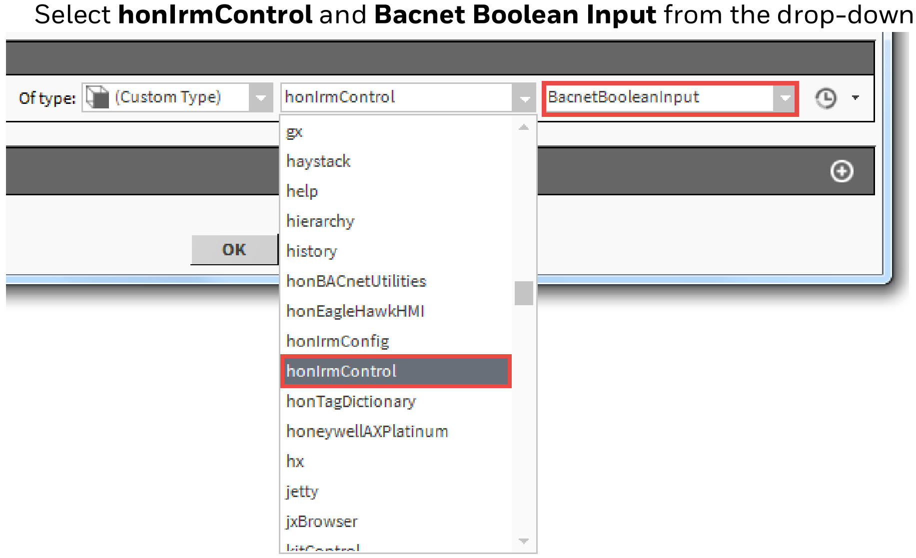


Fig. 518 Bql Query Builder Dialog Box

Step 8. .Click **OK.**

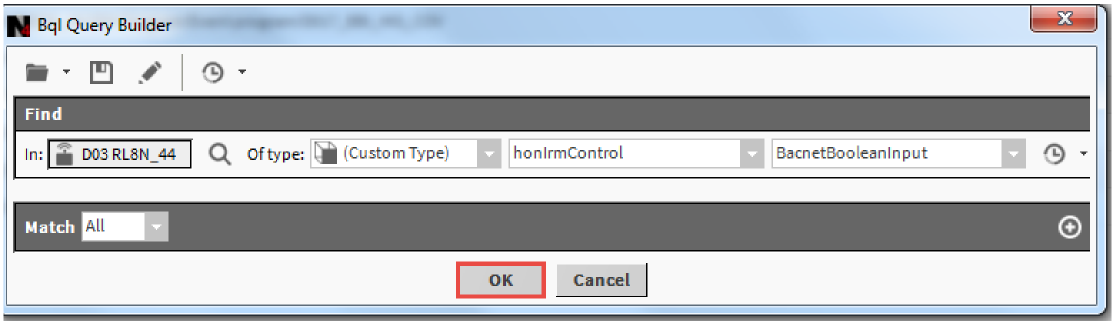


Fig. 519 Bql Query Builder

The datapoints found are listed on the Batch Editor view.

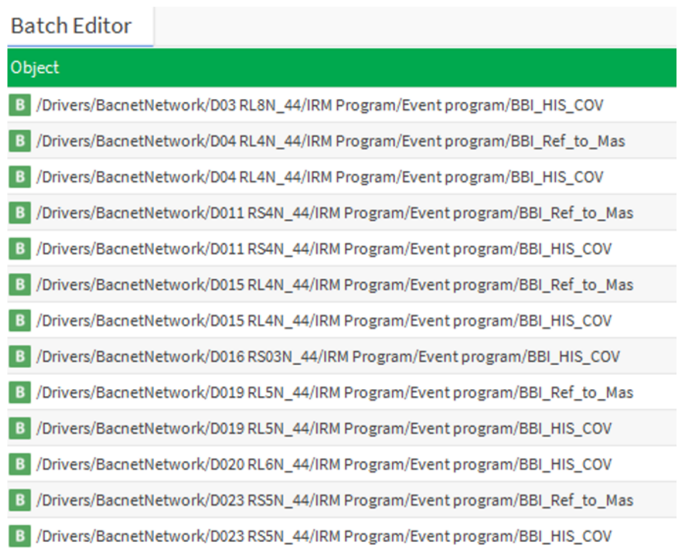


Fig. 520 Batch Editor view

Step 9. On the **Batch Editor** view, click the **Rename** button.
The rename dialog box displays.

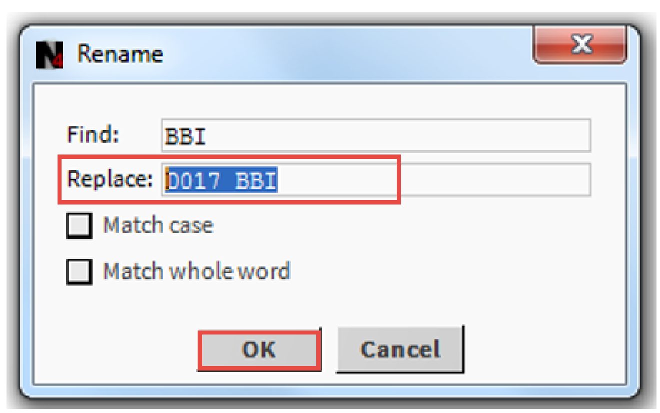


Fig. 521 Rename dialog box

Step 10. In the **Replace** field, enter the desired name. For example, 'D017' should be added as a prefix to the existing datapoint name 'BBI.'
If desired, select additional options **Match case** or **Match whole word**.

Step 11. Click **OK**. The replacement results displays in the **BatchEditor Results** message box.

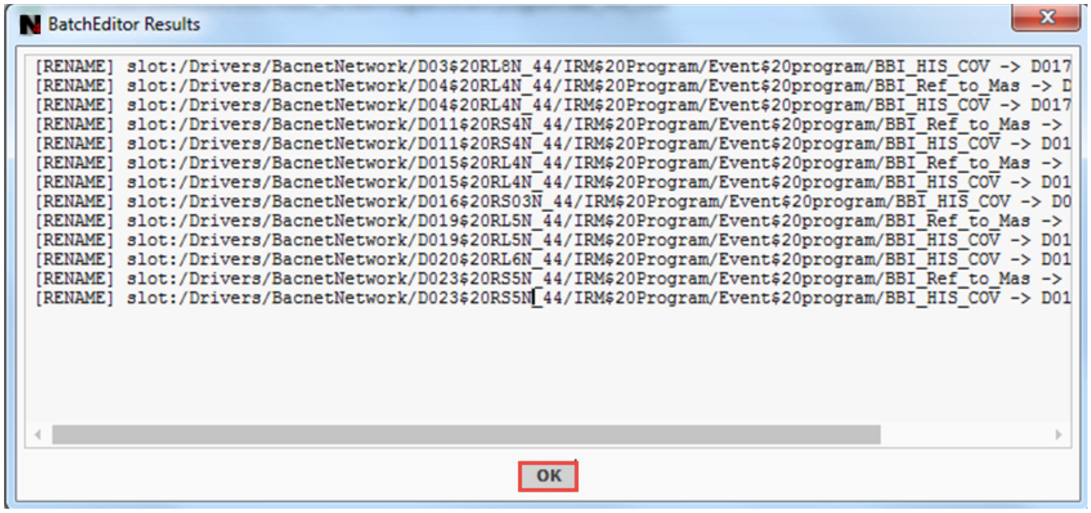


Fig. 522 Batch Editor Resultd message box

Step 12. The datapoint names on the wiresheet are changed accordingly.

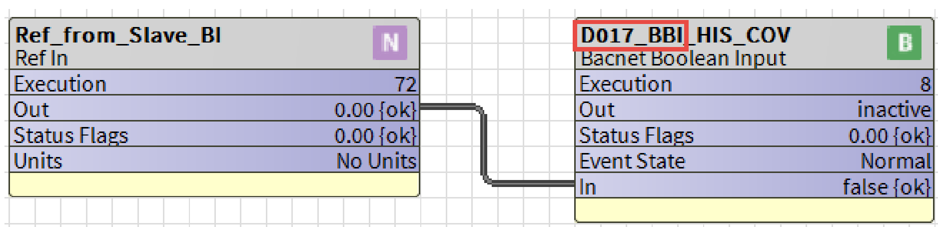


Fig. 523 wiresheet

Step 13. Perform a **Teach to Controller** operation in the application. This action implements all the changes in the Bacnet points.

Create a Backup Controller and Application

Backup the Station

Steps to backup the station:

Step 1. Navigate to the station name.

Step 2. Right-click the **Station** node, and select **Backup Station.**

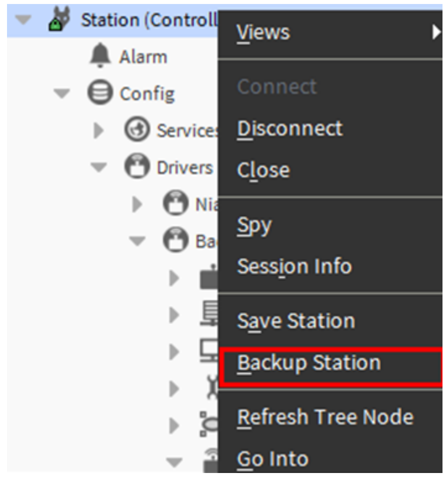


Fig. 524 Backup Station

While the station continues running, it saves the configuration and creates a backup file (.dist). The backup is stored in the **user> userName> Niagara4.x > CentraLine > backup.**

Backup the Application

Steps to backup the application:

Step 1. Navigate to **My File system** in the CentraLine-N4 workbench.

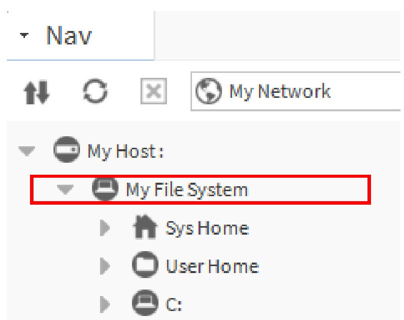


Fig. 525 My File System

Step 2. Right-click the file system directory (sys Home, User Home or C:) where you want create backup > **New** > click **PaletteFile.palette.**

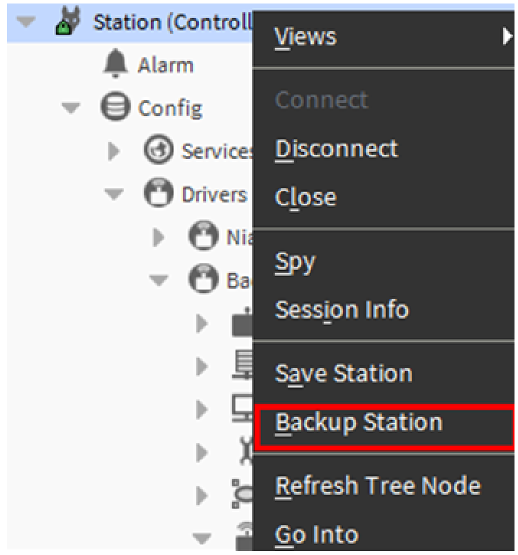


Fig. 526 PaletteFile.palette

Step 3. Enter the Palette name and click **OK**.

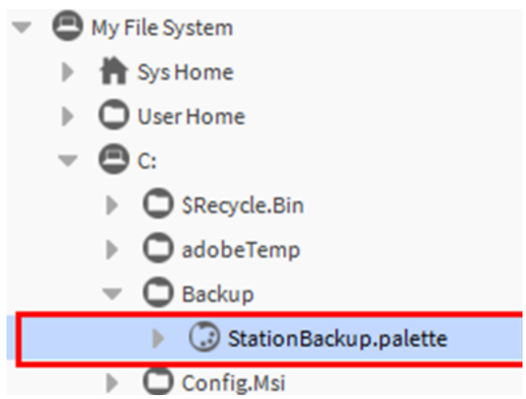


Fig. 527 StationBackup.palette

It adds the backup palette folder in the user local system.

Step 4. Navigate to the workbench **Window** > **Side Bars** > and select **Palette.**

Step 5. Type **baja** and double click to open baja Palette.

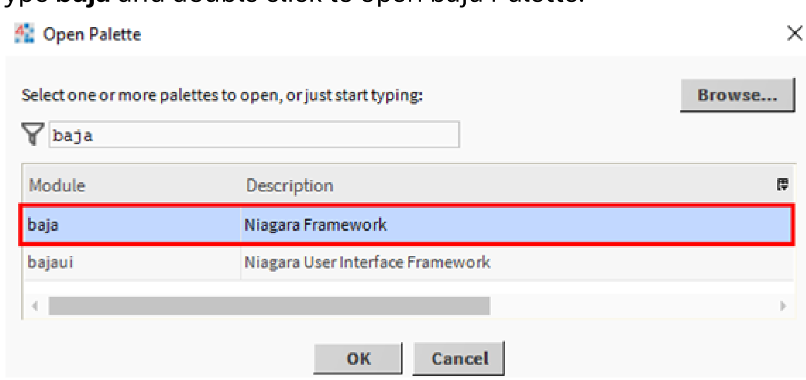


Fig. 528 Open baja Palette

Step 6. Select the **UnrestrictedFolder** and copy under the **Palette** folder.

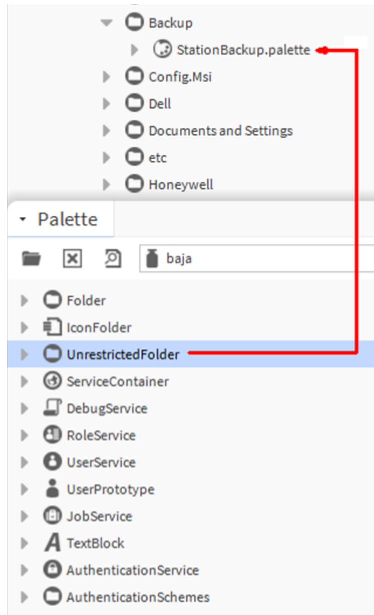


Fig. 529 Unrestricted Folder

Step 7. Enter the name of the unrestricted folder and click **OK**.
The backup folder is created.

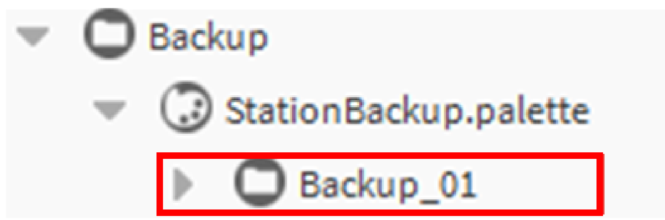


Fig. 530 Unrestricted Folder name

Step 8. Navigate to **BacnetNetwork**, right-click on the controller and click **Copy**.

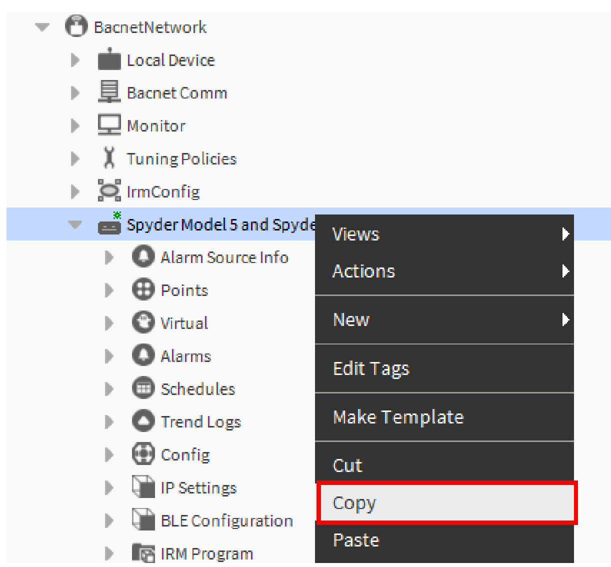


Fig. 531 Copy IRM NX controller

Step 9. Navigate to the backup folder and paste the controller configuration. This saves the controller configuration on the user's local system.

Note: *Do not alter the controller configuration file after pasting it in the backup folder. Any change will damage the file.*

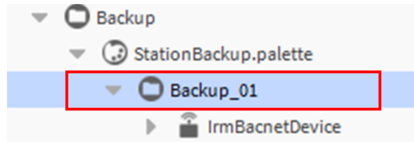


Fig. 532 Controller backup

This controller backup file can be restored on any station.

Steps to Restore the Backup

Steps to Restore the Controller Backup:

Step 1. Open the Palette and click browse using a file chooser.

Step 2. Locate the backup file in the user's local system and open the file.

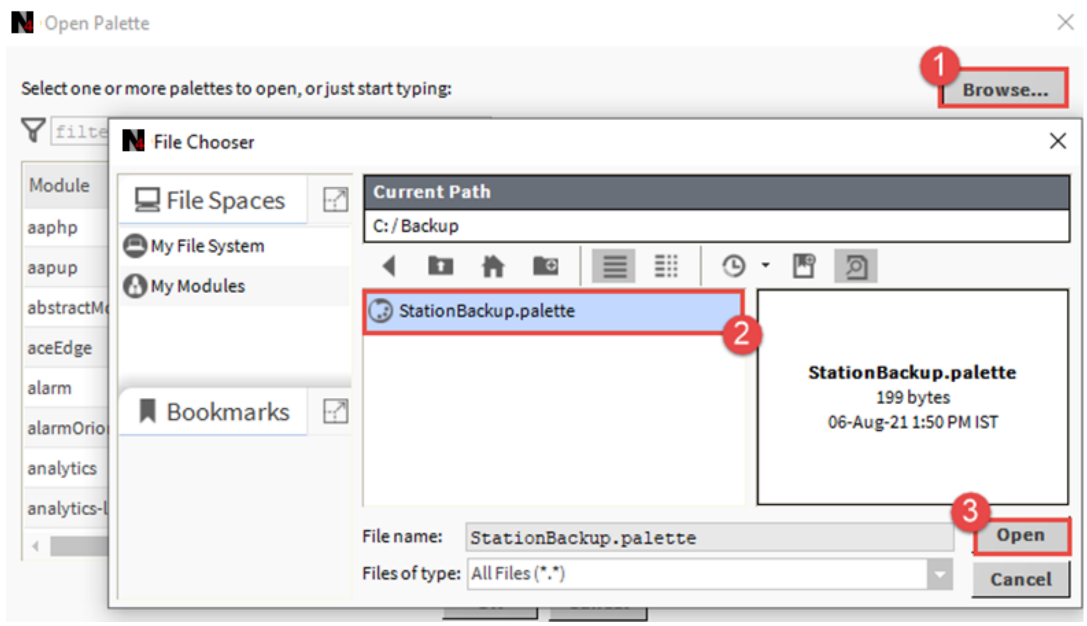


Fig. 533 File Chooser dialog box

Step 3. Controller backup file in the Palette window.

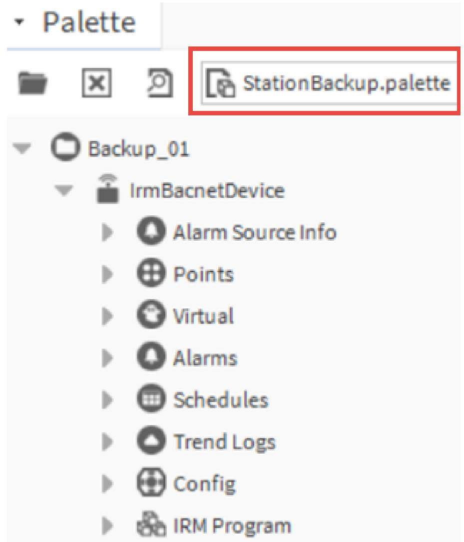


Fig. 534 Palette window

Step 4. Copy backup palette file under the new **BacnetNetwork.**

Reset to Factory Default

Steps to reset the controller to factory default settings:

Step 1. Power off the controller.

Step 2. Power on the device while holding the service pin button pressed.
Wait for 10-15 seconds until the communication LEDs (Rx & Tx) blinks.

Step 3. Release the service pin button.

After the factory reset, following changes occur in the controller.

- The entire configuration of the application clears from the controller.
- The controller will search for a new mac address. Auto MAC will be triggered once the controller receives the “you are” command.

CHAPTER

9 PRE-ENGINEERED TEMPLATES AND BALANCING

Templates

A template is a deployable package of Niagara objects. A template's purpose is to allow a group of configured objects to be encapsulated and deployed as a unit. The goal is to eliminate repetitive configuration steps when performing multiple installations with similar functionality.

Templates include a component tree with a single base component and associated support objects. A template is contained in a file with the.ntpl file extension. For ease of distribution, template files can be grouped into modules. In addition, one or more instances of a template may be deployed to a station.

IP/ MSTP VAV Template

The IP/MSTP VAV controllers supports the Global VAV template. The template contains an embedded group of configured objects that are deployed with the global VAV template.

The Global VAV template package includes two templates.

- VAV_ISF1_HX_FX_IM.ntpl
- VAV_ISF1_HX_FX_SI.ntpl

For more information on the Global VAV template features and configuration, refer the Global VAV Template Design Guide - 31-00466 and Global VAV Template Engineering Guide - 31-00465 documentation.

Balancing

The VAV balancing is supported by the IRM NX VAV controllers.

The time spent starting and balancing each VAV box individually and waiting for them to reach the airflow setpoint is saved by balancing the controllers and calculating the flow calibration factors for the correspondence VAV boxes.

You can use a global balancing tool to balance setpoints, perform max-min balancing, and move dampers on multiple controllers.

Global Balancing Points

Following are the balancing points available in the global balancing point.

Table 46 Global Balancing Point Description

Object mapping	Object Name	Object ID	R, W, R/W	Engineering Units	Range, States, etc	Description
	Device Balance State	600	R		**0** = Not balanced **(default)** **1** = Setpoint/ Min-Max balanced **2** = Max balanced **3** = Min balanced	Modified by balance tool to indicate balance state.
	Flow Calibration Factor	601	R/W	Unitless	0...<+inf 0.813 **(default)**	Firmware balancing point.
	Damper Type	602	R		**0** = Floating **(default)** **1** = 0-10v, **2** = 2-10v	Modified by balance tool. Not currently implemented.
	Damper Control Type	603	R/W		**0** = CW (Direct) **(default)** **1** = CCW (Reverse)	Allows damper direction configuration through balancing tools.
	Drive Time	604	R/W	second	90 s **(default)** for 60 hertz frequency 108 sec for 50 hertz frequency	Allows damper drive time configuration through balancing tools.
CfgDuctArea	Duct Area	606	R/W	square feet, square meter	0...<+inf	Allows duct area configuration through balancing tools.
BalMaxMeasFlowAct	Measured Max Flow	607	R/W	cfm, cmh, l/s	0...<+inf	Balancing tools write field measured max flow to this point during balancing.
BalMinMeasFlowAct	Measured Min Flow	608	R/W	cfm, cmh, l/s	0...<+inf	Balancing tools write field measured min flow to this point during balancing.

Table 46 Global Balancing Point Description (Continued)

Object mapping	Object Name	Object ID	R, W, R/W	Engineering Units	Range, States, etc	Description
CfgMaxFlowSetpt	Set Point Max Flow	609	R/W	cfm, cmh, l/s	0...<+inf	Cooling max flow setpoint.
CfgMinFlowSetpt	Set Point Min Flow	610	R/W	cfm, cmh, l/s	0...<+inf	Cooling min flow setpoint.
	Device Zeroed State	611	R		**0** = Not Zeroed **(default)** **1** = Zeroed	Modified by balance tool to indicate zeroed state.
	Temperature Compensation	612	R	N/A	N/A	Not currently implemented.
	Balancing Method	613	R		**0** = Double point **(default)** **1** = Single point	Modified by balance tool to indicate balance method used.
	Set Point Single Flow	614	R	cfm,cmh, l/s	0...<+inf	Firmware balancing point.
	Measured Single Flow	615	R	cfm,cmh, l/s	0...<+inf	Firmware balancing point.
	Corrected K Factor	616	R	Unitless	0...<+inf	Firmware balancing point.
	Current Sensed Air Flow	618	R	cfm,cmh, l/s	0...<+inf	Firmware balancing point.
	Damper Manual Position	620	R	%	0...100 0 **(default)**	Firmware balancing point.
	Damper Manual Flow	621	R	cfm,cmh, l/s	0...<+inf 0 **(default)**	Firmware balancing point.

Table 46 Global Balancing Point Description (Continued)

Object mapping	Object Name	Object ID	R, W, R/W	Engineering Units	Range, States, etc	Description
	Balancing Type	622	R		**0** = Auto mode. VAV operating in normal state **2** = Balance Max. Damper commanded to achieve max flow setpoint. **3** = Balance Min. Damper commanded to achieve min flow setpoint. **4** = Balance Single point. Device is in setpoint / K-factor mode. **5** = Manual Position. Damper is overridden to specified position. **6** = Manual Flow. Device is commanded to achieve specified flow. **15** = Balance Zero. Not currently implemented.	Modified by balance tool to indicate balance process used.
	Damper Position	623	R	%	0...100, null	Firmware balancing point.
	Clear Balance	624	R		**0** = False **(default)** **1** = True	Firmware balancing point.
BalMaxMeasFlowSpt	Sensed Max Flow	626	R	cfm,cmh, l/s	0...<+inf 0 **(default)**	Controller sensed airflow during two-point maximum calibration.
BalMinMeasFlowSpt	Sensed Min Flow	627	R	cfm,cmh, l/s	0...<+inf 0 **(default)**	Controller sensed airflow during two-point minimum calibration.
	Sensed Single Flow	629	R	cfm,cmh, l/s	0...<+inf 0 **(default)**	Firmware balancing point.

Table 46 Global Balancing Point Description (Continued)

Object mapping	Object Name	Object ID	R, W, R/W	Engineering Units	Range, States, etc	Description
	Setpoint Tolerance	630	R	cfm,cmh, l/s	0...<+inf 0 **(default)**	Firmware balancing point.
	Sync Direction	631	R		**0** = Close **(default)** **1** = Open	Firmware balancing point.
	Zero Process Status	632	R		**0** = False **(default)** **1** = True	Firmware balancing point.
	Sync Status	633	R		**0** = False **(default)** **1** = True	Firmware balancing point.
	Action Elapsed Time	634	R	second	0...<+inf	Firmware balancing point.
CfgKFactor	Manufacturer K Factor	635	R/W	cfm, cmh, l/s	0...<+inf	Manufactured defined K-factor for VAV must be assigned by programmer prior to balancing.
BalKFactorOffset	K Factor Offset	636	R/W	cfm, cmh, l/s	> – inf...<+inf 0 **(default)**	Offset applied by balancing tool during K-factor calibration mode.
BalBoxZeroOffset	Pressure Offset	637	R/W	In WC, pascal	0...<+inf 0 **(default)**	Offset applied by balancing tool during zero calibration mode.
OvrReheatPos	Reheat Ovrd	638	R/W	%	0...100 null **(default)**	Balancing tool can override reheat through this point.
	Reheat Eff Pos	639	R/W	%	0...100 null **(default)**	Firmware balancing point.
OvrPeriphPos	Periphheat Ovrd	640	R/W	%	0...100 null **(default)**	Balancing tool can override peripheral heat through this point.
	Periphheat Eff Pos	641	R/W	%	0...100 null **(default)**	Firmware balancing point.
	VAV Fan Spd Ovrd	642	R/W	%	0...100 null **(default)**	Balancing tool can override VAV fan speed through this point.

Table 46 Global Balancing Point Description (Continued)

Object mapping	Object Name	Object ID	R, W, R/W	Engineering Units	Range, States, etc	Description
	VAV Sys Type	643	R		**0...7** **Bit0 = Reheat** **Bit1 = Peripheral heat** **Bit2 = Fan** **0** = Hide reheat, peripheral heat and vav fan option **1** = Show reheat option only **2** = Show peripheral heat option only **3** = Show reheat and peripheral heat option only **4** = Show vav Fan option only **5** = Show reheat and vav Fan option only **6** = Show peripheral heat and vav fan option only **7** = Show reheat, peripheral heat and vav fan option	Firmware balancing point.

Flow Balancing View

A Variable Air Volume (VAV) system allows a single unit to provide the appropriate amount of cooling to multiple zones with different cooling loads. The VAV regulates the air volume to the zone by opening or closing the damper. This damper is controlled by a floating motor installed on an integrated actuator of the IRM NX VAV controller.

The Flow balancing tool can be configured with various parameters and indicators to optimize the calibrations used to balance the airflow.

Important: *It is recommended to use Global VAV Balancing Tool or Honeywell Connect Mobile VAV Balancing application to perform calibration and balancing for the IP VAV controllers.*

Prerequisites

- The controller must be online.
- The controller must be in a commissioned and synchronous state.
- Configure the following “Application Details Config” features under control manager in the engineering tool.

Application Type	Select VAV Zone Terminal Single Duct Application.
Application Feature	• Air balance supported is mandatory and other features as programmed in the application. • Reheat valve override supported option to calibrate the reheat valve. • Peripheral heat valve override supported option to calibrate the peripheral heat valve.

Fig. 535 Application Details Config

- To work with flow balancer view, the user must configure the Bacnet objects according to the parameters listed in the table below, such as specific point name, object ID, point type, and respective units in the application. For details about Bacnet objects, see Flow Balancing View on page 361.

Following are the balancing points available in the Flow balancing tool.

Table 47 Bacnet objects for Flow balance tool

Point Name	Point Type	Object ID	Metric Unit	Imperial Unit
CfgKFactor	Analog value	1000	Liter per second	Cubic feet per minute
CfgDuctArea	Analog value	1001	Sq meter	Square foot
CfgMaxFlowSetpt	Analog value	1002	Liter per second	Cubic feet per minute
CfgMinFlowSetpt	Analog value	1003	Liter per second	Cubic feet per minute
BalKFactorOffset	Analog value	1004	Pascal	Inches of WC
BalKFactorOffset	Analog value	1005	Liter per second	Cubic feet per minute
BalMaxMeasFlowAct	Analog value	1006	Liter per second	Cubic feet per minute
BalMaxMeasFlowSpt	Analog value	1007	Liter per second	Cubic feet per minute
BalMinMeasFlowAct	Analog value	1008	Liter per second	Cubic feet per minute
BalMinMeasFlowSpt	Analog value	1009	Liter per second	Cubic feet per minute
FlowOvrdState	Analog value	1010	No unit	No Unit
FlowOvrdPct	Analog value	1011	Percentage	Percentage
FlowOvrdFlow	Analog value	1012	Liter per second	Cubic feet per minute
BoxFlow	Analog value	1013	Liter per second	Cubic feet per minute
VelSenPress	Analog value	1014	Pascal	Inches of WC
DamperPos	Analog value	1015	Percentage	Percentage

Note: The configuration must be completed before downloading the program to the controller.

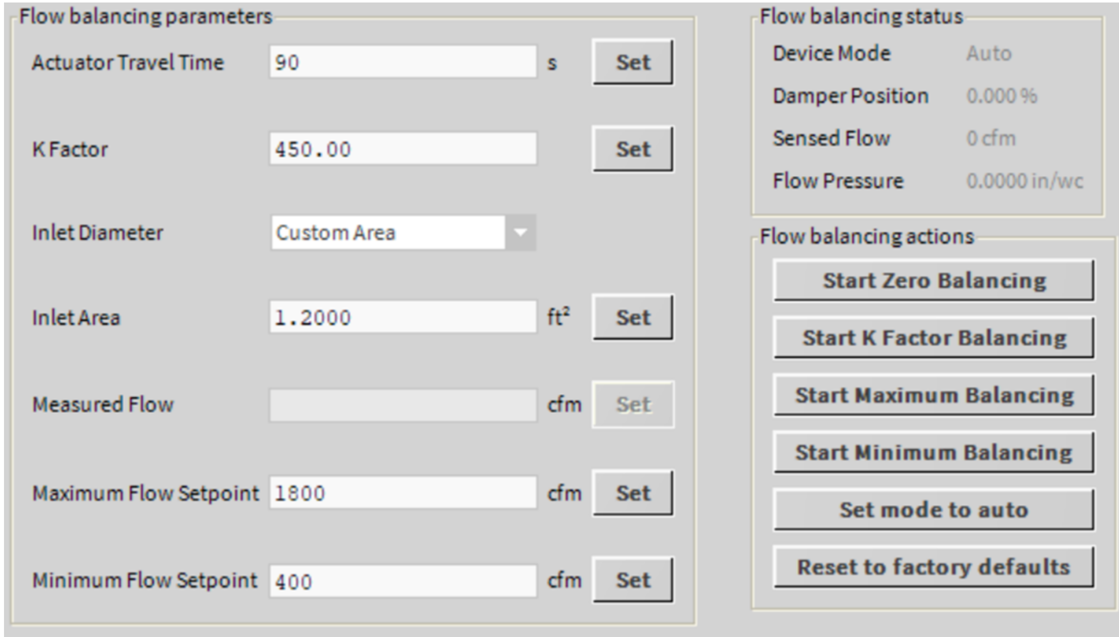


Fig. 536 Flow Balancing View

Bacnet objects details and requirement for Air flow balancing

The user must configure the Bacnet objects in the application using the parameters listed in the Table 47, "Bacnet objects for Flow balance tool," on page 360.

- **CfgKFactor:** This data point is used to set a factory k factor value in the balancing tool. Currently, the tool expects a value greater than equal to 10.
- **BalKFactorOffset:** This data point will be set with the K Factor value sent from the balancing tool. After performing k factor balancing, the balancing tool will set the calculated k factor.

  The balancing tool makes sure that the calculated K Factor value is equal to CfgKFactor plus BalKFactorOffset.
- **BalBoxZeroOffset:** The balancing tool will set this value after performing zero calibration.
- **CfgDuctArea:** The user will set this value based on the VAV controller.
- **CfgMaxFlowSetpt:** The user will set the maximum flow setpoint value in the balancing tool. The same value will be used in the application.
- **CfgMinFlowSetpt:** The user will set the minimum flow setpoint value in the balancing tool. The same value will be used in the application.
- **BalMaxMeasFlowAct:** The balance maximum flow actual value will be set by the user in the balancing tool. The maximum flow balancing the actual measured flow will be set to this data point. This data point is used in a 2-point balancing ratio block.

  If the VAV controller is k factor balanced, the balancing tool will set the maximum flow setpoint to this data point.

- **BalMaxMeasFlowSpt:** The maximum flow setpoint value will be set by the user in the balancing tool. The same value will be used in an application in a 2-point balancing ratio block.
- **BalMinMeasFlowAct:** The balance minimum flow actual value will be set by the user in the balancing tool. When doing, the minimum flow balancing the actual measured flow will be set to this data point. This data point is used in a 2-point balancing ratio block.

  If the VAV controller is K Factor balanced, the balancing tool will set the minimum flow setpoint to this data point.
- **FlowOvrdState:**

  Max balancing flow override state is 7.

  - The effective flow setpoint will be set to the maximum flow setpoint in the application, and the controller will ramp up its output and the damper will open until the sensed flow equals the flow setpoint.
  - When the measured flow reaches the effective flow setpoint (abs (CfgMaxFlowSetpt – BoxFlow) < = (CfgMaxFlowSetpt * 0.05)) for at least 5 seconds, the balancer enters the measured flow and the same value is assigned to data point BalMinMeasFlowAct.

  Min balancing flow override state is 6.

  - The effective flow setpoint will be set to the minimum flow setpoint in the application, and the controller will ramp down its output and the damper will close until the sensed flow equals the flow setpoint.
  - When the measured flow reaches the effective flow setpoint (abs (CfgMaxFlowSetpt – BoxFlow) = (CfgMaxFlowSetpt * 0.05)) The balancer will enter the measured flow for at least 5 seconds, and the same value will be set to data point BalMinMeasFlowAct.

  Zero balancing flow override state is 5

  - In the application, the effective flow setpoint will be set to 0, and the controller's output will be ramped down and the damper closed until the sensed flow equals the flow setpoint.
  - When the flow reaches the effective flow setpoint, the balancing tool calculates the offset pressure and assigns it to a data point. BalBoxZeroOffset.

  K Factor balancing flow override state is 7

  - The effective flow setpoint will be set to the maximum flow setpoint in the application, and the controller will ramp up its output and the damper will open until the sensed flow equals the flow setpoint.
  - When the measured flow reaches the effective flow setpoint, the balancing tool calculates the offset k factor and assigns it to data point BalKFactorOffset.
    KFactorNew = Flow Measured / (VelSenPress)

  Mode to Auto flow override state is 0

  - When the mode is set to Auto in the balancing view, the application is set to auto mode).

Note: *If the measured airflow does not reach the effective airflow setpoint within the set actuator travel time, verify the K Factor value and the flow control loop.*

Important: *Before migrating the existing controller application to the current application, the user must configure proper units for CfgKfactor, BalBoxZeroOffset, and BalKFactorOffset data points based on the measurement type (earlier, these points did not have any units).*

- **FlowOvrdPct:** When the application sets the datapoint FlowOvrdState to 3, the damper is overridden to FlowOvrdPct. This is not a required data point for balancing.
- **FlowOvrdFlow:** When the application sets the datapoint FlowOvrdState to 2, the effective flow setpoint is set to FlowOvrdFlow, and the controller ramps its output to reach the effective flow setpoint. This is not a necessary data point for balancing.
- **BoxFlow:** This data point determines whether or not the flow has been attained while balancing. This is used in the balancing sensed flow.
- **VelSenPress:** This data point is used in the balancing flow pressure.
- **DamperPos:** This data point is used in the balancing damper position.

Flow velocity function block.

$$flow = K\sqrt{\Delta P - offset}$$

and

$$Vel = flow/area$$

Flow calculation with metric and imperial unit.

The below metric units are calculated from VAV controller specification in imperial units.

- **Inlet area**: 1.2 sq ft = > 0.1115 sq meters
- **Maximum Flow Setpoint**: 1400 cfm = > 2379 m3/h
- **Minimum Flow Setpoint**: 700 cfm = > 1189 m3/h
- **K Factor**: 1400 cfm @ 1” wc = > 2379 @ 249 pa

Table 48 Pressure value in Imperial and Metric unit

Pressure	Imperial	Metric Unit
inch wc	**K Factor:** 1400 cfm @ 1” wc **Area:** 1.20 sq feet	**K Factor:** 2379 m3/h @ 249 pa **Area:** 0.11 sq meter
1	**Flow:** 1400 cfm	**Flow:** 2379 m3/h
2	**Flow:** 1979.70 cfm	**Flow:** 3364.41 m3/h
0.25	**Flow:** 700 cfm	**Flow:** 1189.5 m3/h
1.45	**Flow:** 1685.82 cfm	**Flow:** 2864.70 m3/h
0.12	**Flow:** 484.97 cfm	**Flow:** 824.11 m3/h

Configuring Flow Balance Parameters

Steps configure Flow Balance Parameters:

Note: *Before you start operating the flow balancer tool, you must configure the object names with specific object ID, object type, and respective units in the application to operate in the flow balancer view, see* Table 47, "Bacnet objects for Flow balance tool," on page 360.

Step 1. In the Nav tree, browse to **Station** > **Config** > **Drivers**> **BacnetNetwork** > **IrmBacnetDevice** > **IRM Program** > **Control Manager.**

Step 2. Double-click on **Control Manager** and configure **Application Details Config**.

Step 3. Navigate to the **Application Type** as **VAV Zone Terminal Single Duct Application** from the drop-down list.

Step 4. Navigate to the **Application Features** as air balancing supported. If you want to calibrate the reheat and peripheral heat valves, select reheat valve override supported and peripheral heat valve override supported options.

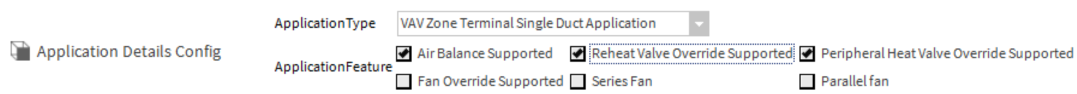


Fig. 537 Application Details Config

Step 5. Navigate to the **Measurement Type** and select Metric or Imperial.
The object unit must be compatible with the global measure type. If not, it will throw an error when you run the Flow balancer view.

When the configuration is finished, the tool is integrated into the application. The Flow Balancer View recognizes and validates the VAV application's configured data points. The Flow Balancer View uses the values from the configured data points to perform the balancing.

Step 6. Right-click **IrmBacnetDevice** and select **Views** > **Flow Balancing View**. The Flow Balancing View appears on the right pane.

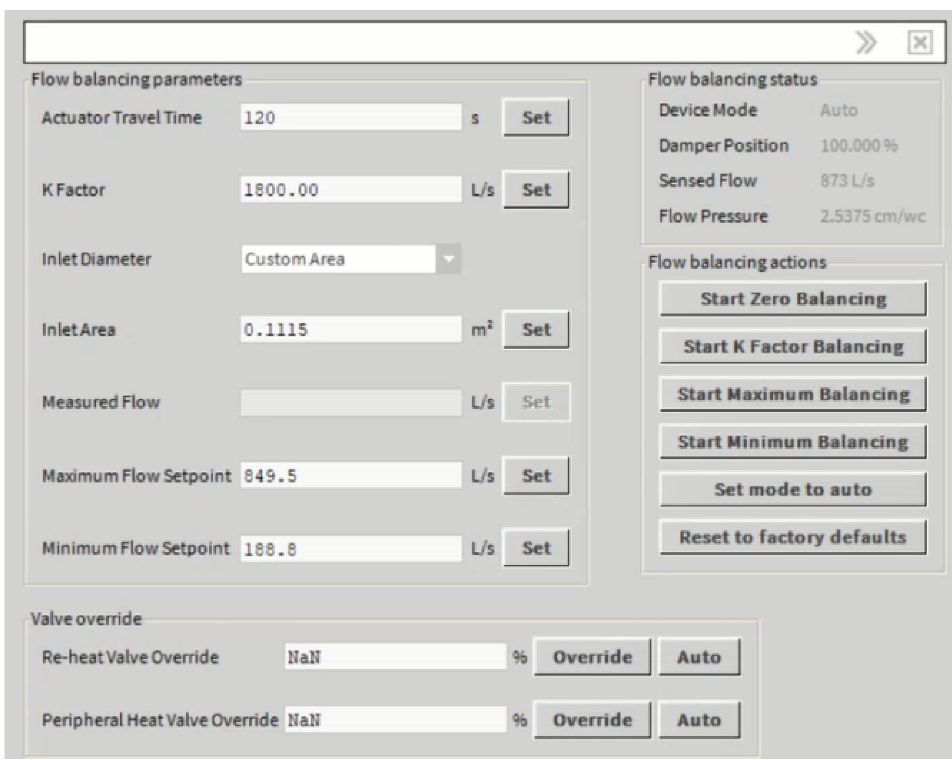


Fig. 538 Flow Balancing View

If the configured object ID, object type, and respective units in the application do not match, the Flow balancer tool identifies and generates errors.

The application validates in five stages:

Stage 1: Validates if the device supports balancing or not.

Stage 2: Validates if the device is online or offline.

Stage 3: Validates if the device is VAV application supported or not.

Stage 4: Validates if the device is commissioned or not.

Stage 5: Validates if the object rules are correctly configured or not.

- Checks configured objects with object names.
- Checks configured objects name with object Ids.
- Checks configured objects names with object type.
- Checks configured object Ids with the object unit.

Flow Balance Operations

The following type of balancing you can be performed on the Flow balancer View.

- Zero Flow Balance Calibration on page 365
- K Factor Calibration on page 366
- Two Point Calibration on page 366
- Set Mode to Auto on page 366
- Restore to Factory Defaults on page 366

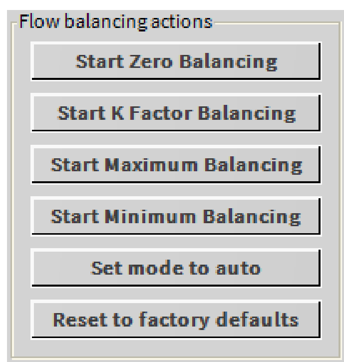


Fig. 539 Flow Balancing Actions

Zero Flow Balance Calibration

To start zero balancing, click on **Start Zero Balancing.**

The damper is completely closed. If any flow pressure is detected, that value is considered to be the flow pressure offset. After the completion of zero balancing the device, the mode is set to automatic operation.

Two Point Calibration

You can start maximum balancing in any order. The flow balance tool does not enforce any rules on the order of balancing.

- **Maximum balancing:** To start maximum balancing, click on **Start Maximum Balancing**.

  The controller adjusts the damper in an attempt to achieve the maximum flow setpoint. When the setpoint is reached, the measured flow field becomes active, and the actual measured flow value can be entered. After completing maximum balancing, the device remains in manual mode (open maximum).
  You can start minimum balancing in any order. The flow balance tool does not enforce any rules on the order of balancing.
- **Minimum balancing:** To start minimum balancing, click on **Start Minimum Balancing**. The controller adjusts the damper in an attempt to achieve the minimum flow setpoint. When the set point is reached, the measured flow field becomes active, and the actual measured flow value can be entered. After minimum balancing is completed, the device remains in manual mode (open minimum).

K Factor Calibration

To start the K factor calibration method > click on **Start K Factor Balancing**.

Important: *After a warning message, the minimum point calibration and maximum point calibration data is reset to factory defaults.*

The controller adjusts the damper in an attempt to achieve the maximum flow setpoint. When the setpoint is reached, the measured flow field becomes active, and the actual measured flow value can be entered.

The tool calculates and displays the K factor value after entering the measured flow. The tool prompts you to save this value to the device. You can calculate the K factor without using the tool and enter the calculated value in the K factor field. After K factor balancing is completed, the device remains in manual mode (open maximum).

Set Mode to Auto

When the device is enabled, click **Set mode to auto** to enable automatic operation. If the device is in manual mode when you exit the view, the tool prompts you to switch to automatic mode.

Restore to Factory Defaults

To restore the factory default value of the zero calibration, K factor calibration, minimum flow calibration, and maximum flow calibration values, click the **Restore to factory defaults**.

Flow Balancing Parameters

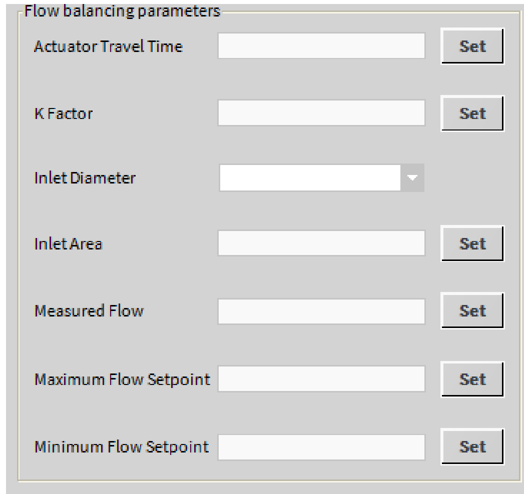


Fig. 540 Flow Balancing Parameters

- **Actuator Travel Time:** The time required for the actuator to travel from 0 % to 100 % open or 100 % to 0 % open.The time interval varies depending on the type of actuator and ranges from 0 to 500 seconds.
- **K Factor:** Allows you to change the K Factor value from 0 to 10000 manually.
- **Inlet Area:** The area of the inlet duct is displayed. In this field, you can choose between a standard diameter and a custom area. The inlet area can range from 0 to 100 square feet.
- **Measured Flow:** Displays the actual airflow when measured by the balancer using an air flow hood or other T&B calibrated tool. This value can be edited.
- **Maximum Flow Setpoint:** This field allows you to set the flow setpoint for maximum flow calibration and K Factor calibration from 0 to 138850 cfm. When you set the calibration source value, the controller begins to stabilize the airflow.
- **Minimum Flow Setpoint:** This field allows you to specify the flow setpoint value, which ranges from 0 to 138850 cfm. To obtain minimum flow calibration, set the minimum flow setpoint lower than the maximum flow setpoint value. When you set the calibration source value, the controller begins to stabilize the airflow.

Valve Override

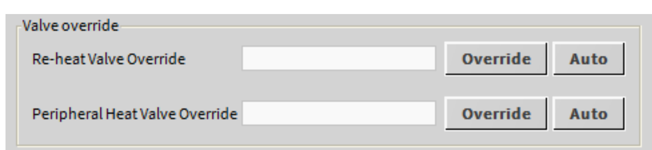


Fig. 541 Valve Override

- **Re-heat Valve Override:** This field allows you to override the value of the reheat valve. This field visible when the “Reheat Valve Override Supported” feature is enabled in the “Application Details Config” under control manager.

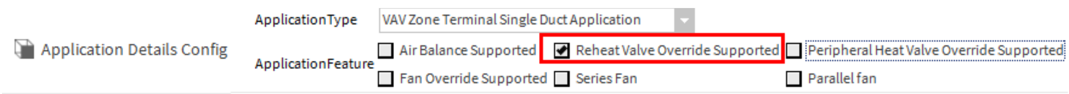


Fig. 542 Reheat Valve Override Supported

Steps to override the reheat valve position:

Step 1.   Type the reheat value in percentage and click the **Override**.

Note: *Click the auto button to set the reheat heat valve into automatic operation.*

- **Peripheral Heat Valve Override:** This field allows you to override the value of the peripheral heat valve. This field is visible when the “Peripheral Heat Valve Override Supported” feature is enabled in the “Application Details Config” under control manager.

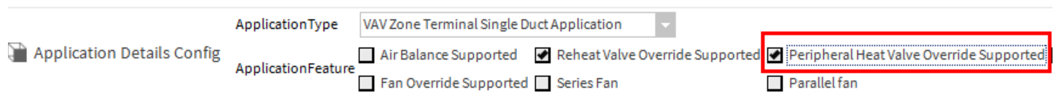


Fig. 543 Peripheral Heat Valve Override Supported

Steps to override the peripheral heat valve position:

Step 1.   Type the peripheral heat value in percentage and click the **Override.**

Note: *Click the auto button to set the peripheral heat valve into automatic operation.*

Flow Balancing Status

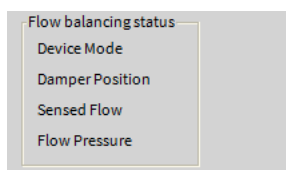


Fig. 544 Flow Balancing Status

- **Device Mode:** Displays the current device mode.
- **Damper Position:** Displays the current damper position.
- **Sensed Flow:** Displays the actual airflow as measured by a pressure sensor.
- **Flow Pressure:** Displays the current flow pressure.

Venom Application Balancing

When the Venom balancing view is first opened, this service is automatically added to the station. The service is transient by default, which means that its properties are not saved to the station BOG file and it will not be present after a station restart. If changes to the service's properties are made and need to be retained after restarting, the slot sheet view of the Services container can be used to clear the VenomBalanceService's Transient flag..

The service includes the following properties:

- **Damper Full Open:** True (default) = the zero calibration job will command half of the devices to 'Damper 100 %'.
  False = the zero calibration job will command half of the devices to 'Max Flow'.
- **Auto Update Database:** True (default) = a 'Sync Device to Wiresheet' will be performed on a IrmBacnetDevice or an 'Upload' will be performed on a device on successful completion of flow balancing.
  False = no sync or upload will occur automatically.
- **Flow Cal Poll Interval:** (default 5 seconds) During flow balancing, the device damper position and velocity pressure will be sampled at this rate. If the damper drive time is very slow and the calibration view drops out of its wait state too early, increasing this value may allow correct operation.
- **Network View Device Refresh Interval:** (default 5 minutes) While the Venom Balance Network View is active, devices values will be polled at this interval. This will detect any changes to device variables that occurred from a source other than the Venom tools.
- **Poll Delay Between Devices:** (default 100 milliseconds) This is a wait time that occurs between polling one device's variables and the next. This value can be increased if more time is needed for other station polling to occur (i.e. proxy points), however the Venom Balance Network View will take longer to populate the device values.

Global Balancing Object

The global balancing object is a part of the engineering tool. It allows you to configure the balancing object as per the project requirement and generates the balancing data report of the controller. Following are available Global Balancing Object points.

Property Sheet

Global Balancing Object (Global Balancing Object)

Device Balance State	ID: 600_Value: 0.0(NotBalanced)
Flow Calibration Factor	ID: 601_Value: 0.0
Damper Type	ID: 602_Value: 0.0(Floating)
Damper Control Type	ID: 603_Value: 0.0(Direct)
Drive Time	ID: 604_Value: 0.0 s
Duct Area	ID: 606_Value: 0.0
Measured Max Flow	ID: 607_Value: 0.0
Measured Min Flow	ID: 608_Value: 0.0
Set Point Max Flow	ID: 609_Value: 0.0
Set Point Min Flow	ID: 610_Value: 0.0
Device Zeroed State	ID: 611_Value: 0.0(notZeroed)
Temperature Compensation	ID: 612_Value: 0.0(Enable)
Balancing Method	ID: 613_Value: 0.0(DoublePoints)
Set Point Single Flow	ID: 614_Value: 0.0
Measured Single Flow	ID: 615_Value: 0.0
Corrected K Factor	ID: 616_Value: 0.0
Current Sensed Air Flow	ID: 618_Value: 0.0
Damper Manual Position	ID: 620_Value: 0.0 %
Damper Manual Flow	ID: 621_Value: 0.0
Balancing Type	ID: 622_Value: 0.0(Balanced_Done)
Damper Position	ID: 623_Value: 0.0 %
Clear Balance	ID: 624_Value: 0.0(False)
Sensed Max Flow	ID: 626_Value: 0.0
Sensed Min Flow	ID: 627_Value: 0.0
Sensed Single Flow	ID: 629_Value: 0.0
Setpoint Tolerance	ID: 630_Value: 0.0
Sync Direction	ID: 631_Value: 0.0
Zero Process Status	ID: 632_Value: 0.0
Sync Status	ID: 633_Value: 0.0
Action Elapsed Time	ID: 634_Value: 0.0 s
Manufacturer K Factor	ID: 635_Value: 0.0
K Factor Offset	ID: 636_Value: 0.0
Vav Fan Spd Ovrd	ID: 642_Value: 0.0 %
Vav Sys Type	ID: 643_Value: 0.0(None)
Reheat Eff Pos	ID: 639_Value: 0.0 %
Periphheat Ovrd	ID: 640_Value: 0.0 %
Vav Fan Spd Ovrd	ID: 642_Value: 0.0 %
Vav Sys Type	ID: 643_Value: 0.0(None)

Fig. 545 Global Balancing Object property sheet

The balancing report can be generated using the online controller or wire sheet values.

- **Online Controller Values:** Reads the values from the online controller only.
- **Wire Sheet Values:** Read the wire sheet values mapped to the online and offline controller.

You can perform the following operation in the Global Balancing Object:

- Map the Balancing objects with Bacnet Objects on page 371
- Teach Balancing Values to Controller on page 373
- Learn Balancing Object from Controller on page 373
- Generating Balancing Report on page 375
- Global Balancing Application Sync on page 377

Map the Balancing objects with Bacnet Objects

Steps to map the balancing objects with Bacnet objects:

Step 1. Click the **Folder** icon ( ) and select **Component Chooser** from the drop-down list.

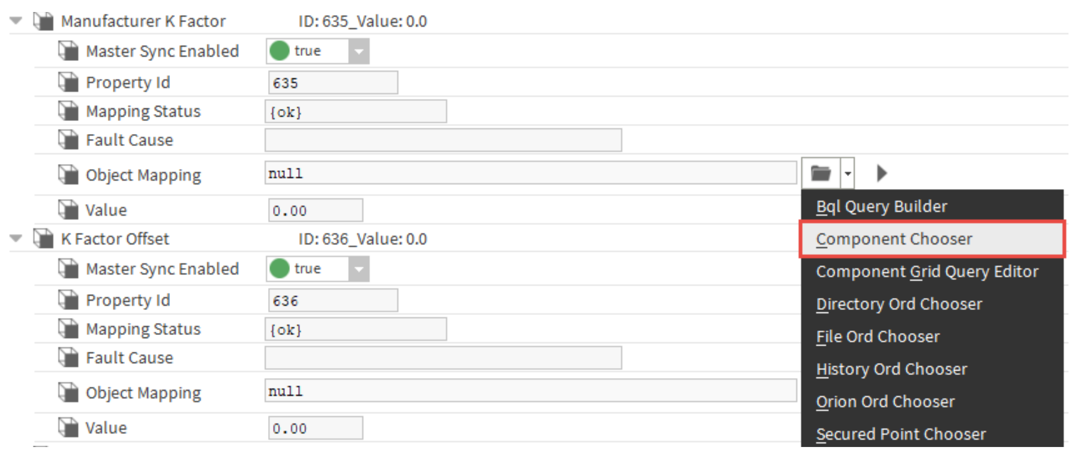


Fig. 546 Component Chooser

Step 2. On the Select Ord window, navigate to the **Drivers** > **BacnetNetwork** > **IrmBacnetDevice** > **IRM Program** > **Periodic program**> select the **Bacnet Object** and click **OK**.

This action map the Bacnet object with the balancing object.

Or

Navigate to the **Station** > **Drivers** > **BacnetNetwork** > **IrmBacnetDevice** > **IRM Program** > **Periodic program**> select the **Bacnet Object** and press Ctrl + C.

Navigate to the balancing object and press Ctrl + V in the **Object Mapping** field.

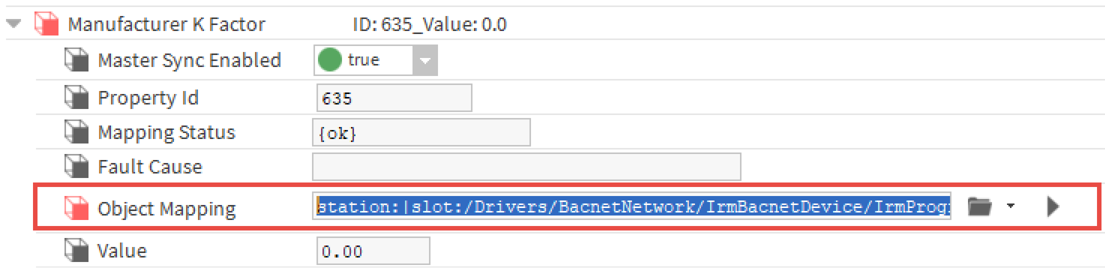


Fig. 547 Object Mapping

Step 5. Click **Save.**

Step 6. Click the arrow icon (▶). This opens the Bacnet objects property sheet.

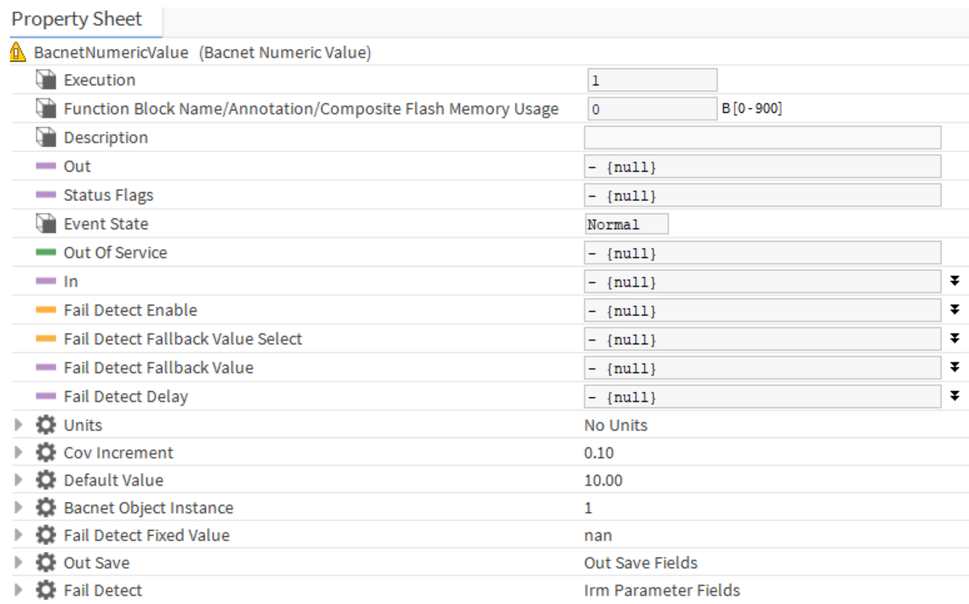


Fig. 548 Bacnet Objects property sheet

Step 7. Expand **Default Value**, enter the **Default Value**, and click **Save.**

To send the modified balancing object values from the workbench to controller, perform **Teach Balancing Values To Controller**. See Teach Balancing Values to Controller on page 373.

Similarly, to bring the updated balancing object values from the controller to the workbench, perform **Learn Balancing Object From Controller**. See Learn Balancing Object from Controller on page 373.

You can also generate the report. For more details, see Generating Balancing Report on page 375.

Teach Balancing Values to Controller

Teach Balancing Values To Controller: This allows the commission engineer to send the modified balancing values from the workbench to the IRM NX controller.

Note: *Set the desired measurement type before configuring the Global VAV Balancing Tool.*

Steps to teach balancing values to controller:

Step 1. Navigate to the **BacnetNetwork > IrmBacnetDevice > IRM Program > Control Manager >** double-click **Global Balancing Object.** This opens the global balancing object property sheet.

Step 2. Right-click the **Global Balancing Object > Actions> Teach Balancing Object To Controller**.

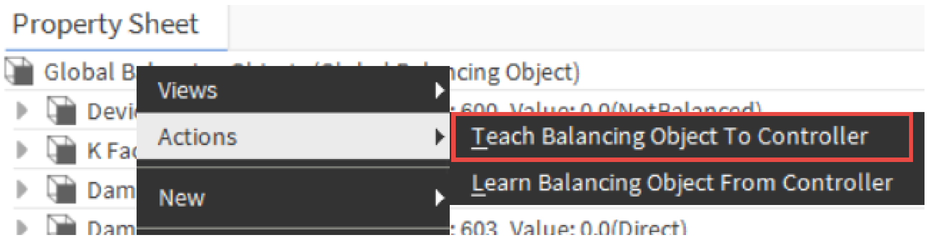


Fig. 549 Teach Balancing Object To Controller

Teach Balancing Values to Multiple Controllers

Steps to teach balancing values to multiple controllers:

Step 1. Right-click on the **BacnetNetwork > Views > Irm Bacnet Device Manager** view.

Step 2. Select all the controllers from the device list.

Step 3. Select **Teach Balancing Object**.

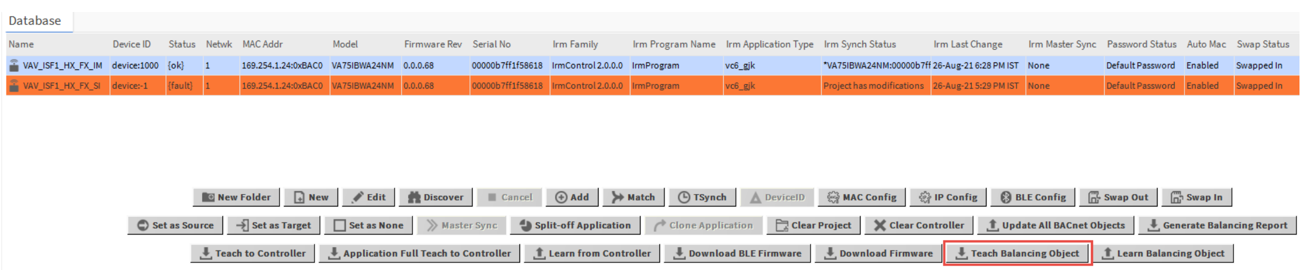


Fig. 550 Teach Balancing Object Option

Step 4. Click **Yes**.

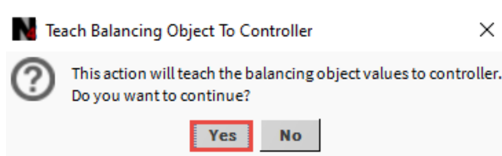


Fig. 551 Popup Message Window

The Balancing value changes are updated in the controller, and the successful action is displayed in the workbench job service.

Learn Balancing Object from Controller

Learn Balancing Object From Controller: This allows the commissioning engineer to bring the modified balancing values from the IRM NX controller to the workbench.

Steps to learn balancing object from controller:

Step 1. Navigate to the **BacnetNetwork** > **IrmBacnetDevice** > **IRM Program** > **Control Manager** > double-click **Global Balancing Object**.

Step 2. Right-click the **Global Balancing Object** > **Actions**> **Learn Balancing Object From Controller.**

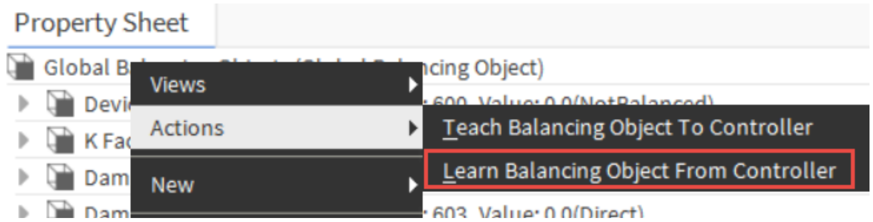


Fig. 552 Learn Balancing Object From Controller

Note: *Make sure to map the balancing components with the BACnet objects points correctly (BacnetNumericValue, BacnetBooleanValue, or BacnetEnumValue).*

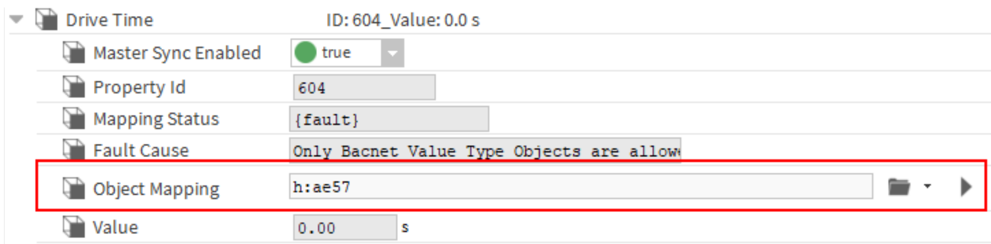


Fig. 553 Mapping The Balancing Objects

Note: *The balancing objects do not support the input and output points.*

Learn Balancing Values from Multiple Controllers

Steps to learn balancing values from multiple controllers:

Step 1. Right-click on the **BacnetNetwork** > **Views** > **Irm Bacnet Device Manager** view.

Step 2. Select all the controllers from the database.

Step 3. Select **Learn Balancing Object**.

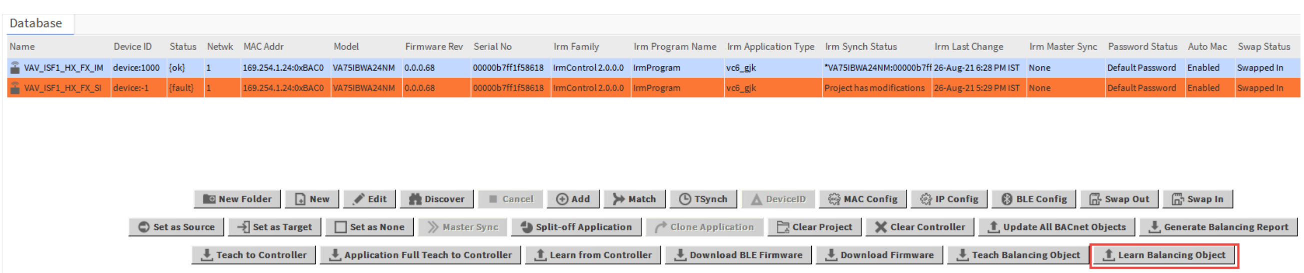


Fig. 554 Learn Balancing Object to Controller dialog box

Step 4. Click **Yes**.

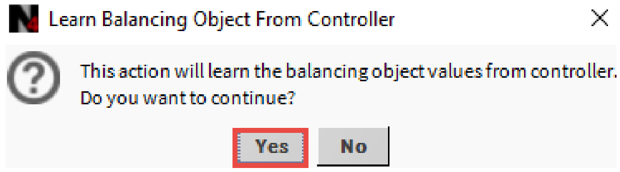


Fig. 555 Popup message window

The Balancing values uploaded into the project and the successful action displayed in the workbench job service.

Generating Balancing Report

You can generate the balancing data report for the set of controllers by using the online controller values or the wire sheet values.

- **Online Controller Values**: Reads the values from the online controller only.
- **Wiresheet Values**: Reads the wire sheet values linked to the online and offline controller.

Generating Balancing Report for Multiple Devices

Steps to generate a balancing report for a set of devices:

Step 1. Navigate to the **Irm Bacnet Device Manager** view and select the devices.

Step 2. Select **Generate Balancing Report**. This opens the generating balancing report dialog box.

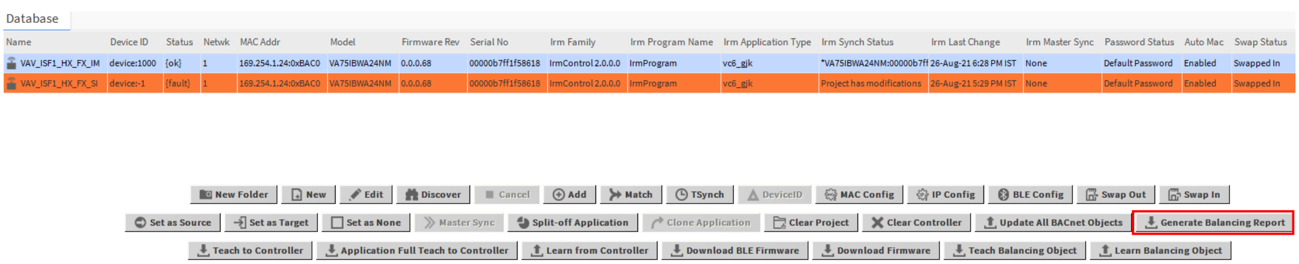


Fig. 556 Generating Balancing Report dialog box

Step 3. Select **From Online Controller Values** or **From Wiresheet Values**.

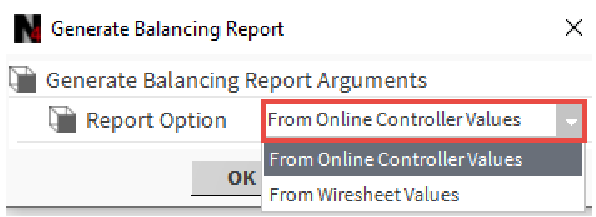


Fig. 557 Generating Balancing Report

Step 4. Click **OK.**

Generating Balancing Report from the Station

Steps to generate balancing report from the station:

Step 1. Navigate to the **BacnetNetwork.**

Step 2. Select **IrmConfig**, right-click the **Actions > Generate Balancing Report**.

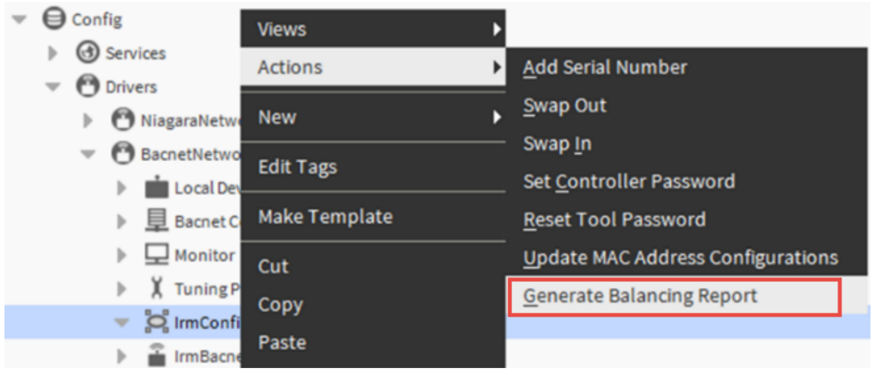


Fig. 558 Actions

Step 3. Select **From Online Controller Values** or **From Wiresheet Values.**

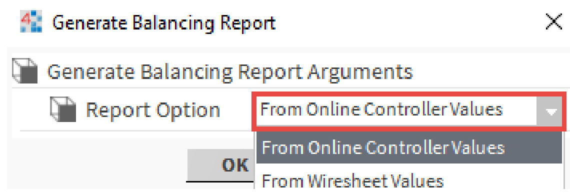


Fig. 559 Generating Balancing Report

Step 4. Click **OK.**

The report is saved in the shared directory (C:\Users\User account\Niagara4.x\CentraLine\stations\"current station name"\shared\BalancingReports). Go to the BalancingReports inside the shared folder and open the Balancing Report CSV file.

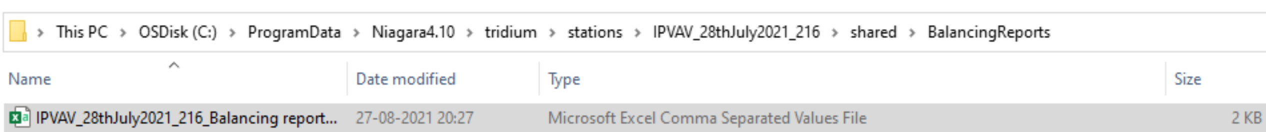
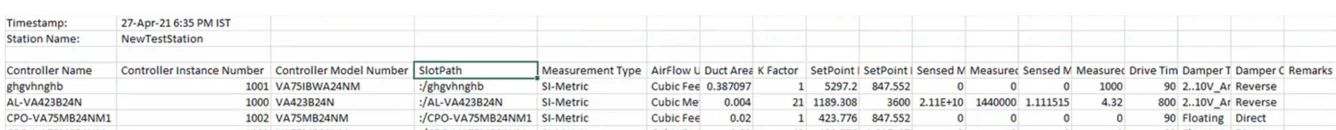


Fig. 560 Balancing Report CSV file

File Format: Stationname_Balancing report_unique number



Timestamp:	27-Apr-21 6:35 PM IST																	
Station Name:	NewTestStation																	
Controller Name	Controller Instance Number	Controller Model Number	SlotPath	Measurement Type	AirFlow U	Duct Area	K Factor	SetPoint I	SetPoint I	Sensed M	Measurec	Sensed M	Measurec	Drive Tim	Damper T	Damper C	Remarks
ghgvhnghb	1001	VA75IBWA24NM	:/ghgvhnghb	SI-Metric	Cubic Fee	0.387097	1	5297.2	847.552	0	0	0	1000	90	2..10V_Ar	Reverse		
AL-VA423B24N	1000	VA423B24N	:/AL-VA423B24N	SI-Metric	Cubic Me	0.004	21	1189.308	3600	2.11E+10	1440000	1.111515	4.32	800	2..10V_Ar	Reverse		
CPO-VA75MB24NM1	1002	VA75MB24NM	:/CPO-VA75MB24NM1	SI-Metric	Cubic Fee	0.02	1	423.776	847.552	0	0	0	0	90	Floating	Direct		
CPO-VA75MB24NM	1003	VA75MB24NM	:/CPO-VA75MB24NM	SI-Metric	Cubic Fee	0.02	43	423.776	1.91E+07	0	0	0	0	90	Floating	Direct		

Fig. 561 File Format

Global Balancing Application Sync

Steps to Sync Global Balancing Application:

Step 1. Expand the station and double-click **Drivers**.

Step 2. Navigate to the **BacnetNetwork** > **IrmBacnetDevice** > **IRM Program** > **Control Manager** > double-click **Global Balancing Object**. This opens the global balancing object property sheet.

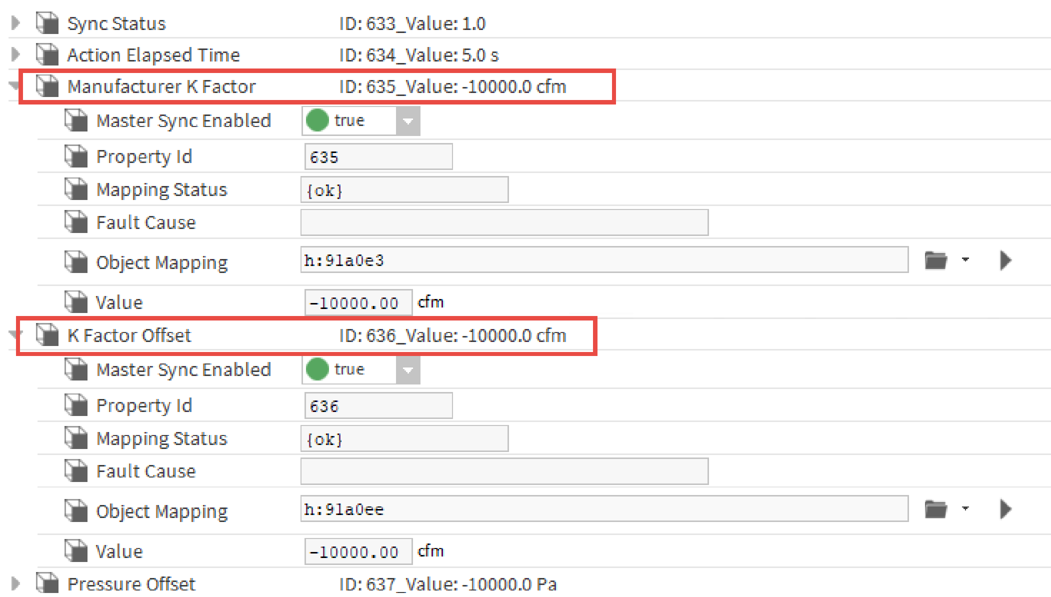


Fig. 562 Global Balancing Application

Step 3. Click **Save** to apply the changes.

Map the balancing objects with the BACnet Objects points (BacnetNumericValue).

Post Balancing Procedure

The Post balancing procedure is performed to sync the updated balanced data from the project to the controller.

You can perform the post balancing procedure for the following device conditions:

- Empty or Factory device balancing on page 378
- Project Balancing State (In Sync) on page 378
- Project Balancing State (Project with modifications) on page 379

Empty or Factory device balancing

Steps to perform the post balancing for the Empty or Factory device:

Step 1. Perform the balancing procedure for the controller. The controller can be balanced using Honeywell Connect Mobile Application or Global VAV Balancing Tool. For more details, see Honeywell VAV Balancing Tools User Guide EN2Z-1086-IE67.

After performing the balancing, the balanced data will be saved in the Bacnet object.

Step 2. Perform the Bacnet object mapping procedure to bring the balanced values from the controller to the wire sheet. For more details, see Map the Balancing objects with Bacnet Objects on page 371.

Important: *If you perform the **Teach balancing to the controller** procedure before syncing the balanced data to the project will erase the balanced data of the controller.*

Step 3. Perform the **Learn Balancing Object From Controller** procedure to sync the balanced values from the controller to the workbench. For more details, see Learn Balancing Object from Controller on page 373.

Step 4. Perform the **Teach Full Application To Controller** procedure to update the new configuration of the project to the controller. For more details, see Teach Full Application To Controller on page 174.

Project Balancing State (In Sync)

Application is already taught and controller and project status is “In Sync.”

Steps to perform the post balancing for the device application is already taught:

Step 1. Perform the balancing procedure for the controller. The controller can be balanced using Honeywell Connect Mobile Application or Global VAV Balancing Tool. For more details, see Honeywell VAV Balancing Tools User Guide EN2Z-1086-IE67.

After performing the balancing, the balanced data will be saved in the Bacnet object.

Step 2. Perform the “sync to application” operation using Honeywell Connect Mobile Application or Global VAV Balancing Tool to update the balanced values in the application Bacnet object.

After performing the “sync to application” operation, the synchronization status will be changed to “controller Bacnet object modified.”

Step 3. Perform the **Learn From Controller** procedure to sync the controller and project with the updated balanced values. For more details, see Learn from Controller on page 177.

After performing the Learn from Controller procedure, the synchronization status will be changed to “In Sync.”

Step 4. Perform the **Learn Balancing Object from Controller** to updated balancing object values in the engineering tool. For more details, refer to Learn Balancing Object from Controller on page 373.

Project Balancing State (Project with modifications)

Application is already taught and controller and project status is “Project has modifications”

Steps to perform the post balancing for the device application is already taught:

Step 1. Perform the balancing procedure for the controller. The controller can be balanced using Honeywell Connect Mobile Application or Global VAV Balancing Tool. For more details, see Honeywell VAV Balancing Tools User Guide EN2Z-1086-IE67.

After performing the balancing, the balanced data will be saved in the Bacnet object.

Step 2. If you perform the “sync to application” operation, the synchronization status will be changed to “Project modified and controller bacnet object.”

If the ‘sync to application” operation is not performed (no sync), the synchronization status will remain as “Project has modifications.”

Step 3. Perform the Learn Balancing Object From Controller procedure to update the balanced data from the controller to the wire sheet. For more details, see Learn Balancing Object from Controller on page 373.

Important: *Any changes in the Bacnet objects mapped to balancing will be overwritten by the values from the controller.*

Step 4. Perform the Teach Full Application To Controller procedure to update the new configuration of the project to the controller. For more details, see Teach Full Application To Controller on page 174.

Using Application Library

Steps of use application library:

Step 1. Open the CentraLine-N4 workbench.

Step 2. Navigate to the platform and connect to the station.

Step 3. Open the **Palette** and click the **Open Palette** icon.

Step 4. In the open palette dialog box, enter “honIrmAppl” and click **OK.**

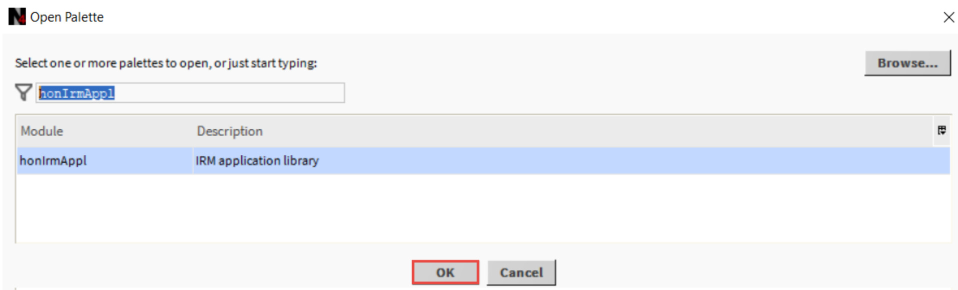


Fig. 563 Open Palette window

Step 5. In the Palette view, expand the **honIrmAppl** folder.

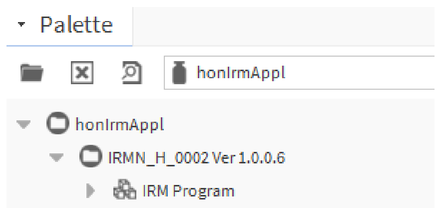


Fig. 564 honIrmAppl Folder

Step 6. Right-click **IRM Program** and select **Copy** from the context menu.

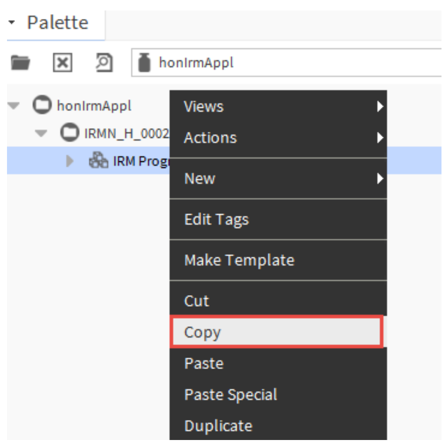


Fig. 565 IRM Program

Step 7. Expand the IrmBacnetDevice, navigate to the IRM Program, and click **Delete** from the context menu. This action will delete the existing program.

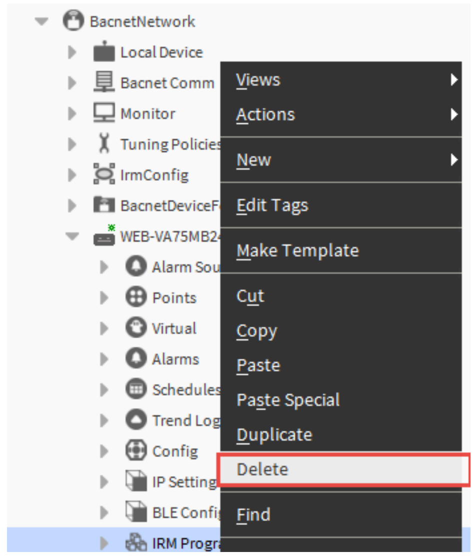


Fig. 566 Delete existing IRM Program

Step 8. Right-click the IrmBacnetDevice and click **Paste**.

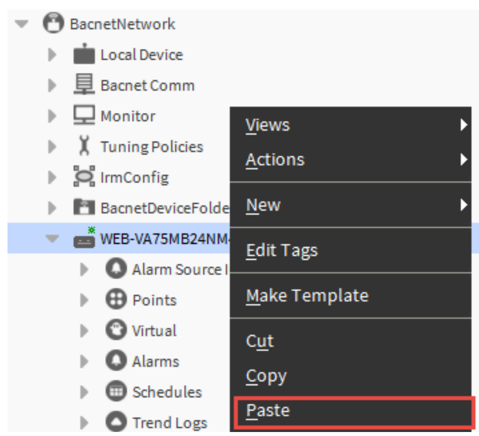


Fig. 567 Adding IRM Program application

The device Nav of the station updates after pasting the IRM Program into the IrmBacnetDevice. Expand the IrmBacnetDevice and double-click the Control Manager. Examine the application's properties such as the application name, function block version, number of folders, and so on.

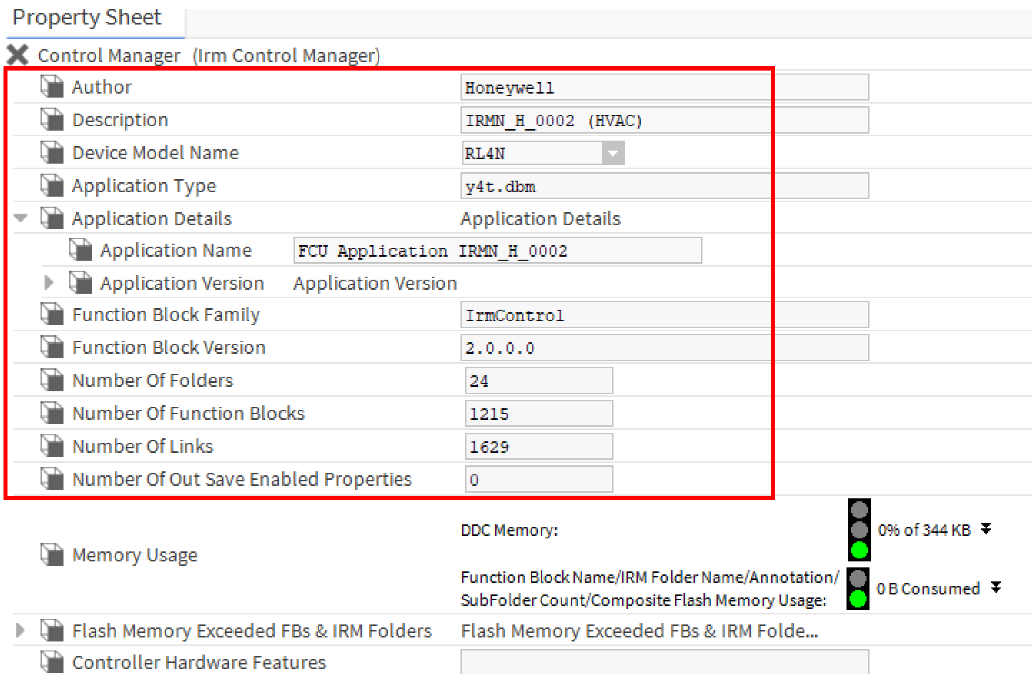


Fig. 568 Application Property

Global VAV Template

The Global VAV template is a deployable package of CentraLine-N4 objects. These templates allow a set of configured objects to be encapsulated and deployed as a unit. The goal is to eliminate repetitive configuration steps when making multiple installations with similar functionality.

The template contains a component tree with a single base component and associated with supported objects. The file extension for the VAV template is *.ntpl.

Integrating the Global VAV Templates in the CentraLine-N4 workbench is recommended to work with IRM NX controller. For more details, refer to Global VAV Template Design Guide - 31-00466 and Global VAV Template Engineering Guide - 31-00465.

Prerequisite

- Check the system requirements before performing engineering or commissioning. Refer to the release notes for more information.
- Make sure that the latest CentraLine-N4 workbench is installed on the computer.
- Use the latest version of the IRM engineering tool.

Deploy Global VAV Template

Deploy a Global VAV template on a station by dragging the templates from sidebar onto the project station. It is similar to dragging and dropping components from a palette.

Steps to Deploy VAV Template:

Step 1. Copy and paste the application template file to the templates folder available under C:\Users\User Account\Niagara4.x\CentraLine\templates).

Step 2. Run the CentraLine-N4 station and navigate to **Window > Side Bars >** click **Template.** This opens the template sidebar.

Step 3. Select application template as per the site requirements.

- VAV_ISF1_HX_FX_IM-2.x", Version 2.x: Supports imperial units).
- VAV_ISF1_HX_FX_SI-2.x", Version 2.x : Supports SI units).

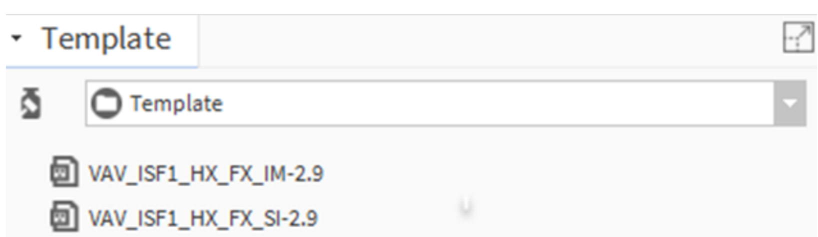


Fig. 569 Template

Step 4. Select the template file and drag the template file from template to the BacnetNetwork.

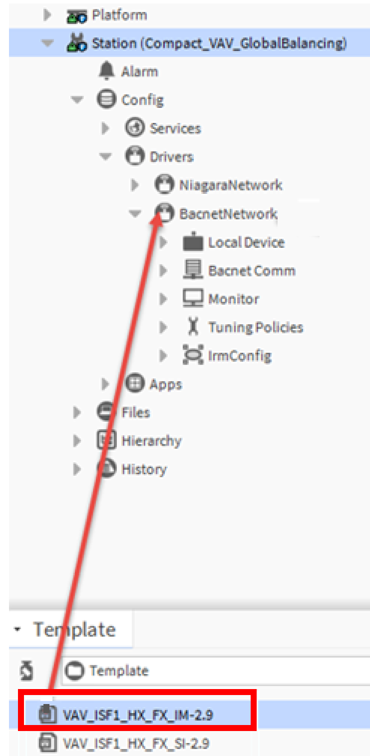


Fig. 570 Station

This action opens the configuration property window of the template.

Step 5. Configure the template properties as per your project requirements. For more details, refer to Global VAV Application Design User Guide - 31-00466.

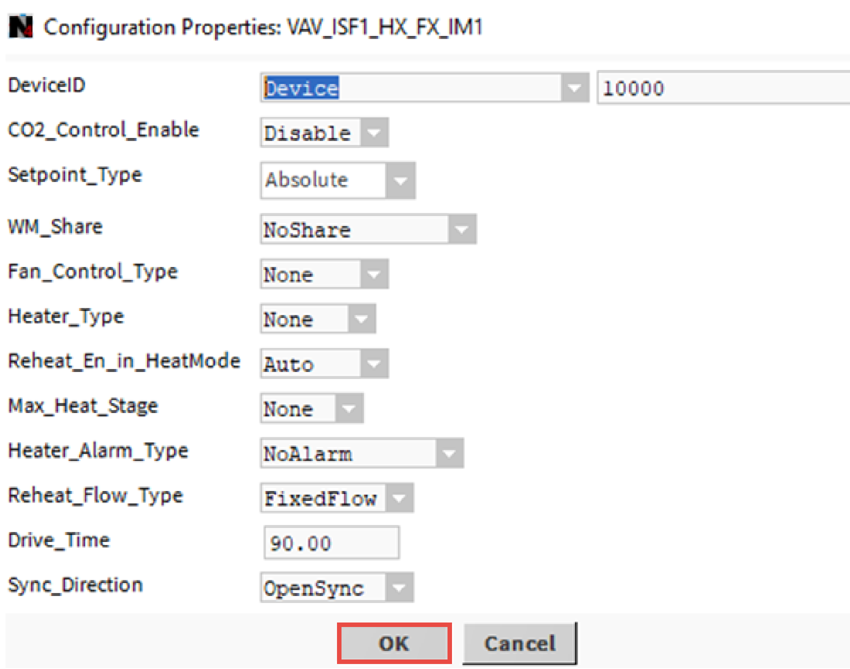


Fig. 571 Configuration properties

Step 6. Click **OK** to save the configuration.

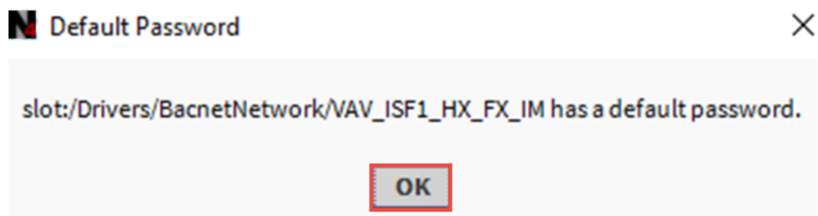


Fig. 572 Default Password

You can reuse the same template in another station by clicking Save As option and saving it with a different filename (keeping the original template unchanged).

After deployment, the VAV templates are displayed under **Station** > **BACnetNetwork**.

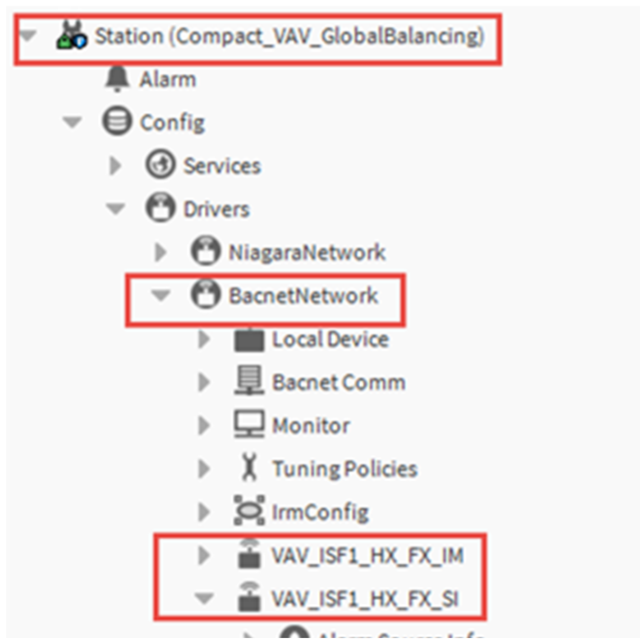


Fig. 573 VAV Templates

Important: *Opening the template via the palette is not recommended; it will not create the PX images in the desired location.*

CHAPTER

10 TROUBLESHOOTING

Best Practices and Troubleshooting Tips

Below are recommendations for larger sites that include more than 30 controllers per MSTP network.

- After initiating the following bulk actions, ensure the Irm BACnet Device Manager view is closed. It will help avoid the traffic in the MSTP traffic in the network and response time to complete the actions will be faster.
  - Teach To Controller or Teach Full Application To Controller
  - Clear Controller
  - Learn from Controller
- When the BACnet Points or schedule are modified over BACnet, the synchronization status changes to "BACnet Object Modified" state. To change it back to In-Sync, perform learn from controller.
- When Teach Full Application To Controller is initiated with more than 30 controllers, there may be a failure for one or two controllers with “app power cycle error” or “lockup error.”
  - **Solution:** Retry Teach Full Application To Controller on the failed devices.
- While performing actions like Clear Controller, Teach To Controller, or Learn from Controller the controller may fail with, “Transaction Id” *error.*
  - **Solution:** Retry Clear Controller, Teach To Controller or Learn from Controller.
- While performing actions like Teach To Controller or Teach Full Application To Controller, teach fails with buffer overflow issue, an infrequent observation.
  - **Solution:** Retry discover devices operation and perform Teach To Controller on page 172 again.
- Before initiating the Controller Firmware Download on page 327, swap out the application to improve the firmware download time.
- It is highly recommended to swap out the IRM Program after commissioning. The following are the advantages of keeping the IRM Program in swap out mode.
  - Improve the system traffic.
  - Reduce heap usage in HAWK-8000, EAGLEHAWK, or Honeywell Plant controller.
  - Quick reboot of HAWK-8000, EAGLEHAWK, or Honeywell Plant controller station.

- When you see rejection proprietary during teach, refer to the latest service bulletin to ensure the engineering tool and firmware versions are compatible.

  Refer to the help document before configuring the special events in the Sylk wall module ORD: *local:|module://honIrmControl/doc/honIrmControl-WmConfigHvacA.html*.
- Do not delete any nodes below the IRM Program if no backup is maintained. If deleted, you have to re-add and configure the complete IRM program.
- It is recommended to check the controller sync status from time to time. Go to Bacnet Network Irm Bacnet Device Manager View on page 28 or Control Manager on page 62 to check controller sync status.
- It is advised to export the Irm bacnet device manager view to the local repository once all the necessary configurations and the device status are in sync and operational.
- You cannot downgrade the engineering tool from a higher to a lower version after upgrading it from a lower to a higher version.
- The user can set the higher poll time for the Bulk Teach & Bulk Firmware download, which could ease out the Network Traffic and help in Teach or Firmware download consistency.
  Refer to the screenshot to navigate to the poll service for the IP network, and for the MSTP network, the poll service will be under the MSTP port.

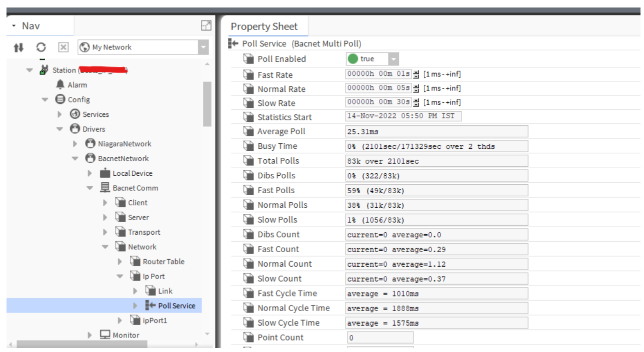


Fig. 574 Poll Service

- If required, the user must set the wait time based on the network load (default is 120 seconds).
  Refer to the screenshot to navigate to the IrmConfig property sheet and set the wait time.

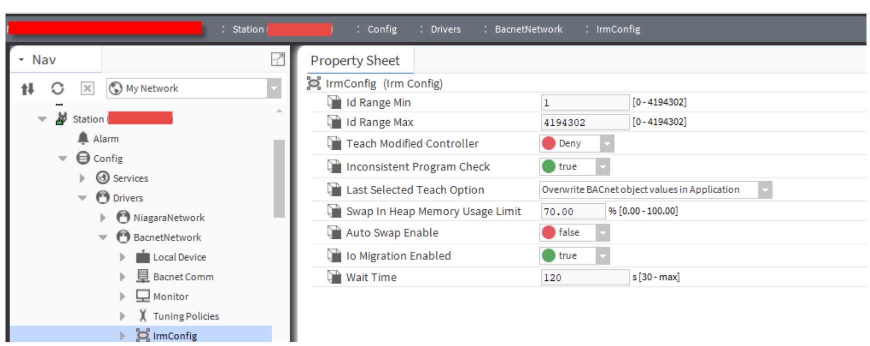


Fig. 575 IRM Config Property Sheet

Service Button

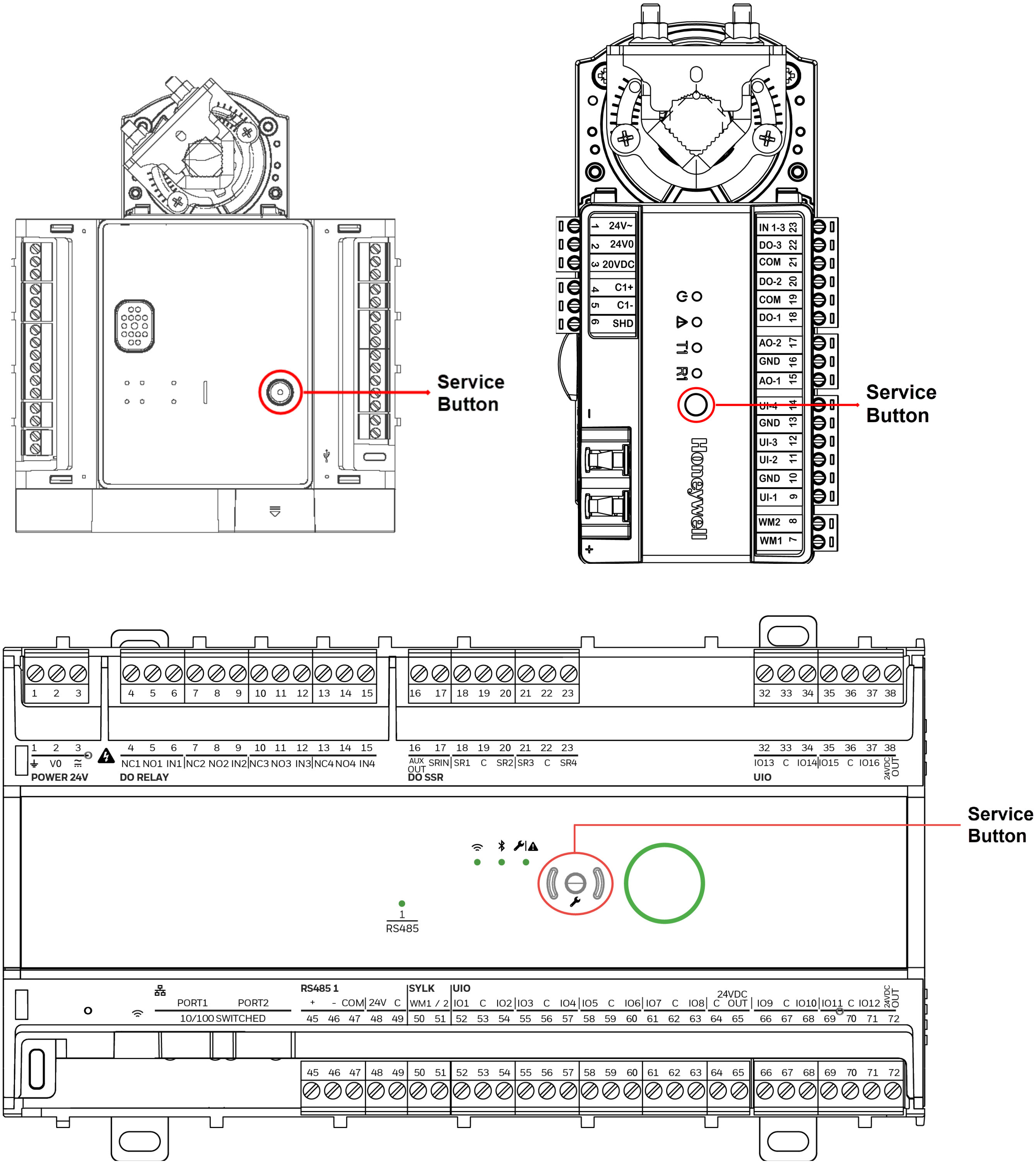


Fig. 576 IRM controllers service button

The service button is used to trigger dedicated events. It is important to distinguish different controller behaviors which are elicited depending upon whether the service button is pressed when the controller is powering up or when it is in normal operation.

Press Service Button during controller power up

The controller is reset to factory settings when you press the service button and turn it on (while the service button is pressed). The factory defaults are as follows:

Note: *Press the service button until the green power LED goes out at least twice and returns to its normal state.*

Following changes happen in the controller after a factory reset:

- The application is cleared from the controller.
- The MAC address will be set to 0xFF (255), meaning that the controller will now search for a new MAC address (Auto MAC will be automatically triggered after controller power-up).
- The Max Master setting will revert to its default value.
- The max info frames will revert to 10.
- The device instance will revert to its default of 4194302.
- The device name will revert to CLME-VAxxxx or UNI-Rxxxxxxxxxx [model name].
- The values of Auto MAC, Min MAC, and Max MAC will be reset to default.
- The Modbus, Ethernet, and Bluetooth settings will revert to their factory settings. The user settings for Modbus and BLE will be erased, the IP address will be reset to default, and the device will enter DHCP IP configuration.

Default Max Master	Default Min MAC	Default Max MAC	Default Baud rate
64	1	64	38400

Note: *0 and 127 mac address reserved for auto mac addressing.*

Press Service Button during Normal Operation

During the regular operation of the controller, a short press (< 1 sec) of the service button will cause a service pin message (BACnet WhoAmI as a Private Transfer (SerialNo. = 130)) to be sent.

Synchronization Status

The synchronization status feature displays the status between the project and the controller in the Bacnet network. The engineering tool performs a synchronization check between the project and controller whenever the controller or project parameters are updated.

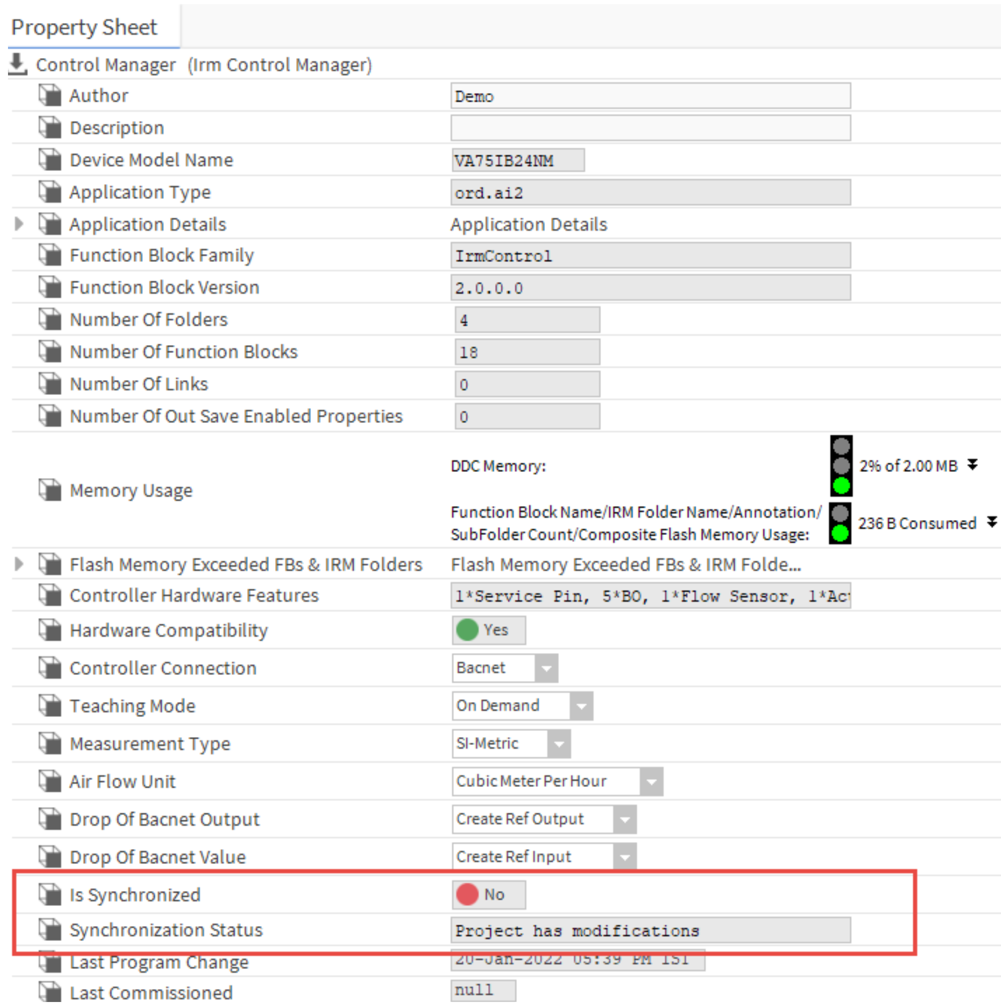


Fig. 577 Synchronization Status on Control Manger

This is the list of available synchronization status engineering tool displays is as follows:

- Unknown
- In Sync
- Out Of Sync
- Controller differs from Project
- Project has modifications
- Project is empty
- Controller is empty
- BACnet Object configuration changed
- Project modified and BACnet Object config. changed in controller

Important: *The engineering tool displays appropriate messages or notifications while performing any action or change in the controller's status. Read all the messages to avoid misleading or incorrect actions, resulting in the deletion or loss of application data.*

Synchronize applications between project and controllers

If inconsistencies occurs between project and controller, the synchronization status displays Out Of Sync.

To synchronize the application perform any of the following actions:

- Teach To Controller: Teach the changes from the project to the controller.
- Learn from Controller: Learn the changes from the controller to the project.
- Check Hw Compatibility: Checks the hardware configuration of the physical controller and the hardware configuration defined in the controller project. Any differences are indicated graphically on the terminals on the wiresheet.
- Check Application Compatibility: Checks the application compatibility in the project and in the controller. See the BACnet device property details.
- Clear Project: Clear the application from the controller.
- Clear Controller: Clear the controller from the database.

Note: *If the “Synchronization Status” goes into unknown, perform **IrmProgram > Actions > Ping**.*

Device Object Rename

After adding the BACnet device to the network, you can rename the device's name.

- **When the controller is online**: When you rename a controller, the engineering tool automatically updates the controller name in the Nav tree. You will get the controller's updated name if you run the discover operation.
- **When the controller is offline**: When you rename an offline controller, the engineering tool keeps track of the changes. Whenever the controller comes online, the engineering tool automatically updates the controller name in the Nav tree.

Steps to rename the device is as follows:

Step 1. Navigate to the **Station** > **Config** > **Drivers** > **BACnetNetwork** > **IrmBacnetDevice**.

Step 2. Right-click on the **IrmBacnetDevice** > select **Rename**.

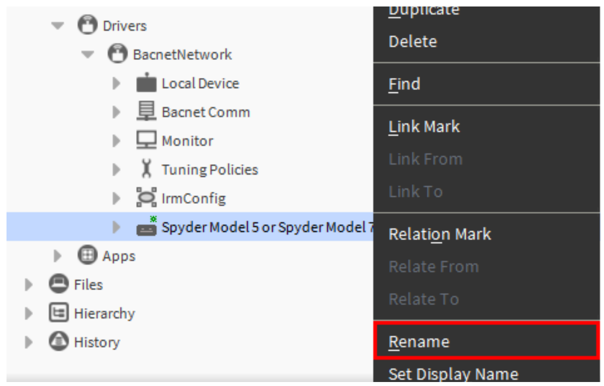


Fig. 578 Device Rename

Step 3. Enter the required name and click **OK**.

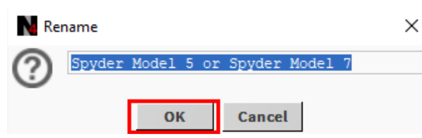


Fig. 579 Rename dialog box

Rename Bacnet Objects

The Rename Bacnet Objects feature is used to customize the BACnet points by adding prefixes and suffixes. Adding prefixes or suffixes will only update the BACnet point name stored in the controller, but not the BACnet point name displayed in the application.

Note: *By default Rename Bacnet Objects feature is disabled.*

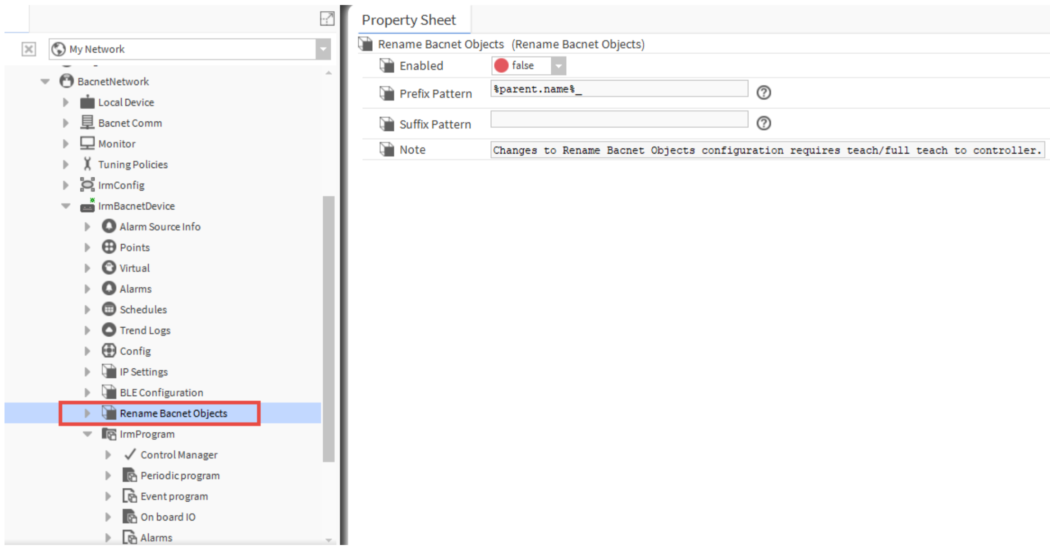


Fig. 580 Rename Bacnet Objects Feature

Steps to rename Bacnet objects:

Step 1. Set **Enabled** option to true.

Step 2. In the **Prefix Pattern** field, enter the prefix name.

Step 3. In the **Suffix Pattern** field, enter the suffix name.
The prefix and suffix pattern are both in BFormat strings. To know more details on BFormat click on icon seen in the Rename Bacnet Objects view below.

Step 4. Click **Save**.

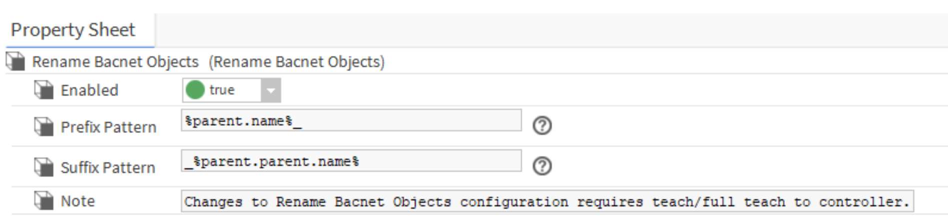


Fig. 581 Rename Bacnet Objects

You can verify the updated bacnet point name in Irm Bacnet Point Manager view.

Step 5. Expand **BacnetNetwork > Controller**, right-click on **Points > Views> Irm Bacnet Point Manager** and select **Offline** discovery.

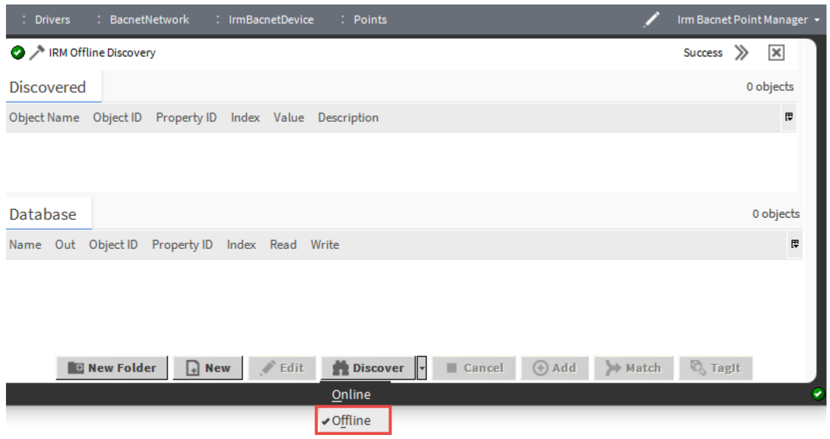


Fig. 582 Offline Point Discovery

Step 6. Click **Discover**.

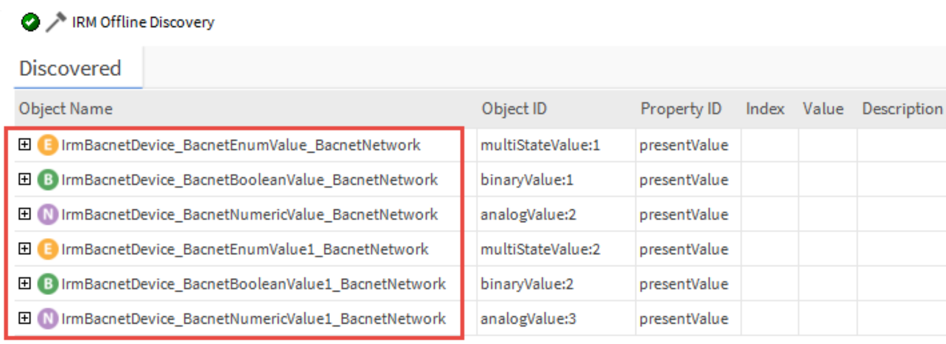


Fig. 583 Renamed Bacnet Points

Step 7. Run **Teach To Controller** or **Teach Full Application To Controller** to apply the changes to the controller.

Also, you can rename BACnet points for multiple controllers from the Irm Bacnet Device Manager view.

Steps to Rename BACnet points of multiple controllers:

Step 1. Right click on **BacnetNetwork** > **Views** > **Irm Bacnet Device Manager**.

Step 2. Select the controllers and click **Rename Bacnet Objects**.

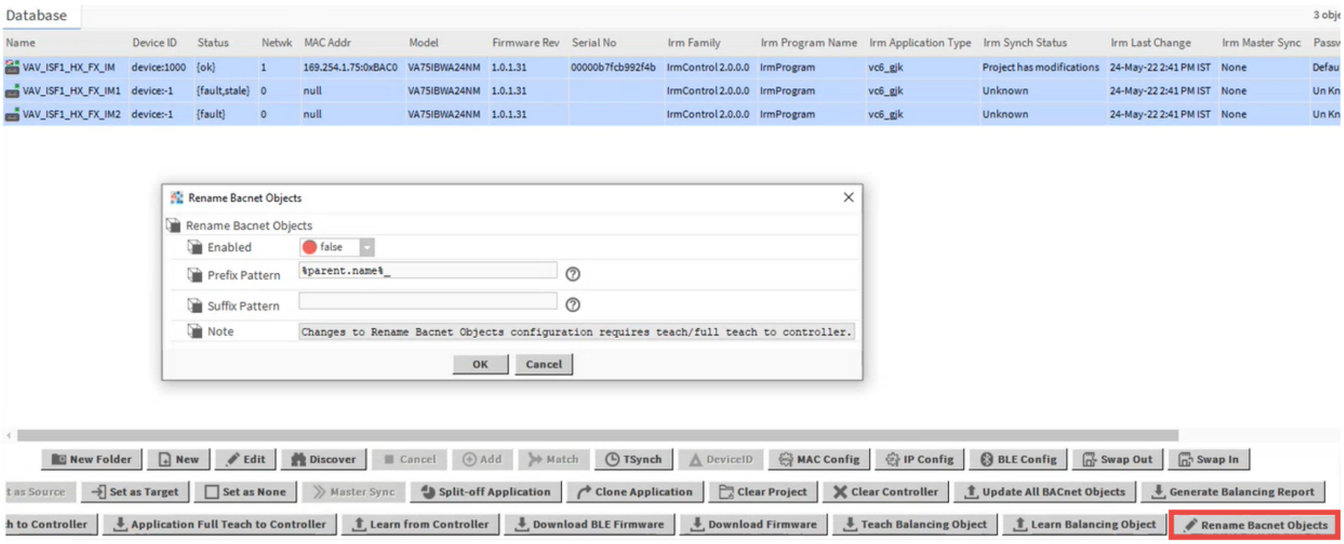


Fig. 584 Rename BACnet points from Irm Bacnet Device Manager View

Note: *The Rename Bacnet Objects feature displays default settings if you select multiple controllers. When you select a single controller, the Rename Bacnet Objects feature will display the settings that existed in the controller.*

Step 3. Set **Enabled** option to True.

Step 4. In the **Prefix Pattern** field, enter the prefix name.

Step 5. In the **Suffix Pattern** field, enter the suffix name.

That prefix pattern and suffix pattern are both in BFormat strings. To know more details on BFormat click on icon.

Step 6. Click **Save.**

Step 7. Run **Teach To Controller** or **Teach Full Application To Controller** to apply the changes to the controller.

Irm Controller Diagnostics

The Irm controller diagnostics primarily monitors the activity in the control engine, BACnet, Modbus trace, and Sylk trace.

Important: *The tool's default setting hides the Irm controller diagnostics feature. You must unhide Irm controller diagnostics in order to use this feature.*

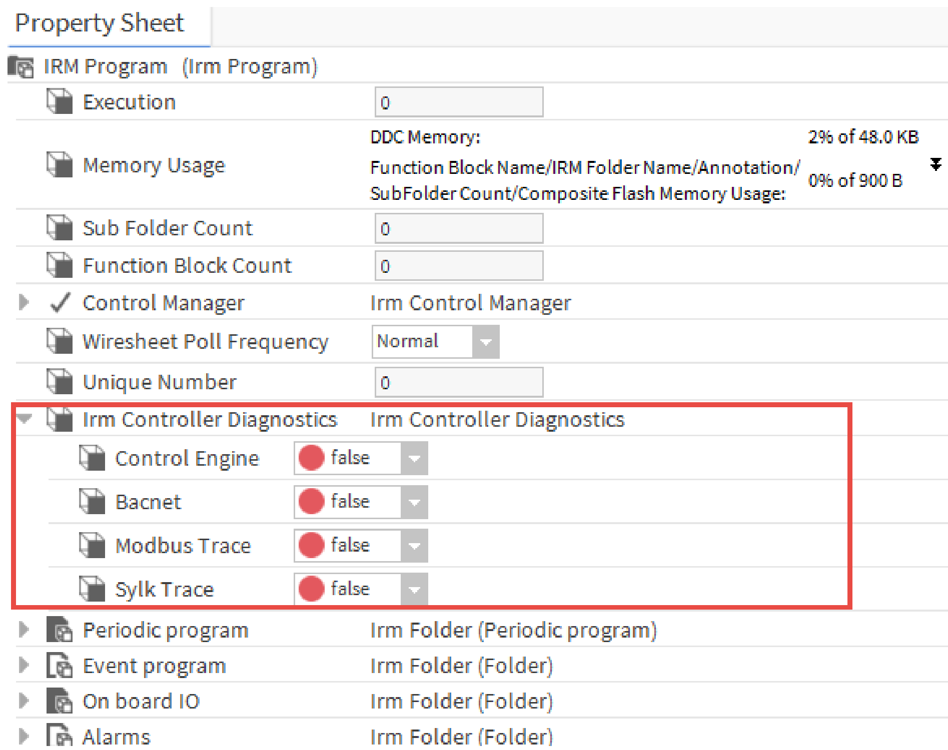


Fig. 585 Irm Program property sheet

- **Control Engine:** To collect logs for the function blocks. These logs are utilized to identify the functionality issues in the function block.
- **Bacnet:** To monitor the BACnet network traffic between engineering tool to controller or vice-versa.
- **Modbus Trace:** To monitor Modbus RS-485 connection activity.
- **Sylk Trace:** To monitor configured Sylk device activity.

Note: *You should enable one of the parameters (control engine or BACnet or Modbus trace or Sylk trace) at a time for diagnostic.*

Steps to access Irm Controller Diagnostics option:

Step 1. Navigate to **BacnetNetwork > IrmBacnetDevice.**

Step 2. Right-click I**RM Program > Views** > select **AX Slot Sheet** and locate **irmControllerDiagnostics** property in the **Slot Sheet**.

Step 3. Right-click **irmControllerDiagnostics** property and select **Config Flags**.

Step 4. In the **Config Flags**, uncheck the **Hidden** option.

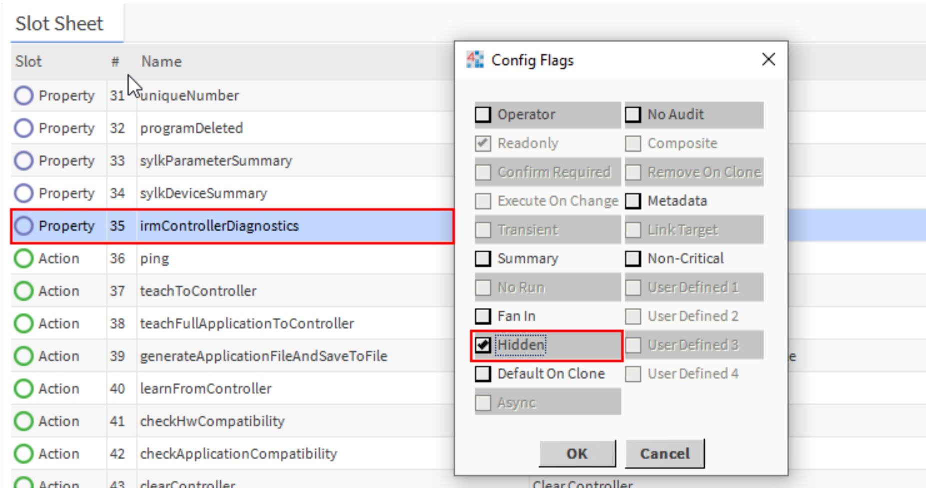


Fig. 586 Slot Sheet

Step 5. Click **Ok.**

The Irm controller diagnostics feature is visible in the IrmProgram property sheet.

Steps to use Irm Controller Diagnostics:

Step 1. Navigate to **BacnetNetwork > IrmBacnetDevice.**

Step 2. Right-click **IRM Program > Views** > select **AX Property Sheet.** This opens the Bacnet Program property sheet.

Step 3. Right-click **Irm Controller Diagnostics > Action > Start Diagnostics.** This action starts the diagnosis of the selected a parameter.

Step 4. Right-click **Irm Controller Diagnostics > Action > Stop Diagnostics.** This action stops the diagnosis process and generates a Diagnostics report.

Step 5. Right-click **Irm Controller Diagnostics > Action > Read Diagnostics**. This action generates the diagnostics file.

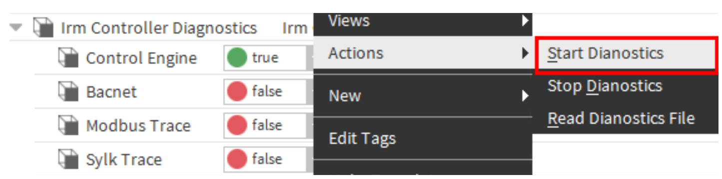


Fig. 587 Irm Controller Diagnostics

Step 6. Open the CentraLine-N4 console, check the location of the Diagnostics file and navigate to the location.

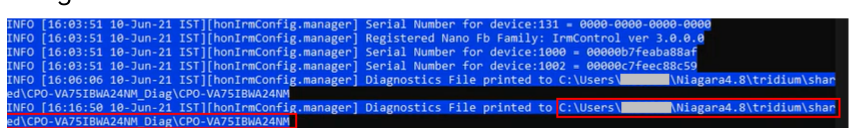


Fig. 588 Console

Share that Diagnostics file with the technical support team to resolve the issue in the controller.

Note: *Currently, you can generate diagnostics reports for a single controller at a time.*

Modifications and Consistency Check

When working on the application, the control manager detects every modification and is indicated graphically by a yellow warning symbol that replaces the original symbols at the modified item on the wire sheet and in the tree.

Important: *This feature is applicable when the Teaching mode is set to On Demand. If the Teaching mode is set to Immediate, the changes are not indicated graphically on the wire sheet in the workbench since they are written instantly to the controller.*

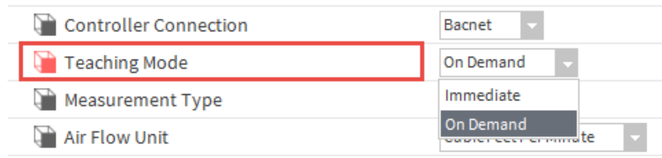


Fig. 589 Teaching Mode

Note: *If you perform a cut and paste or copy and paste action on multiple functional blocks in Immediate mode, the controller will go out of sync. If this happens, you must perform **Teach To Controller**. When moving or copying multiple function blocks from one folder to another, On demand mode is recommended.*

On the property sheet of the controller manager, the synchronization status switches accordingly.

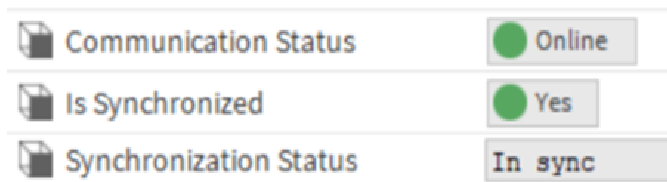


Fig. 590 Synchronization Status

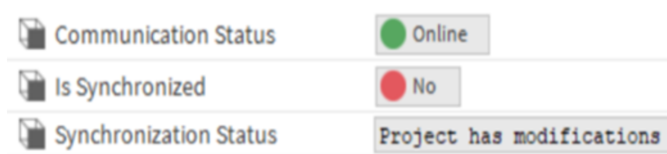


Fig. 591 Non-synchronous States

Depending on where the application is created (station) or changed (station or controller), the application must be taught to the controller or learned from the controller to achieve synchronization. In both cases, if required, the controller or the project must be cleared first.

Configure the Character Set

Steps to set the Character Set to ISO 10646_UTF8:

Step 1. Go to **BacnetNetwork** property sheet.

Step 2. Under **Local Device** property, set the **Character Set** to ISO 10646_UTF8.

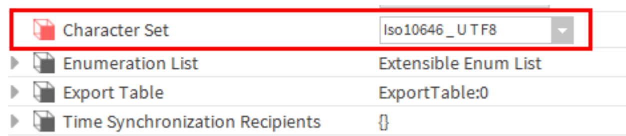


Fig. 592 Character set

Bluetooth configuration is applicable for IP/MSTP VAV controllers.

Important: *Ensure to check the following points before performing Bluetooth configuration.*

- *All IP and MSTP controllers support the UTF-8 format. Therefore, when a user sets the device name using the device object, the tool will write the data in the UTF-8 format.*
- *If the “Character Set” is not set to UTF-8, the controller will not displayed in the “Device Discovery page” of the VAV Balancing app.*

Before changing the controller name, ensure that the Bacnet network is configured for character set UTF-8, or else the VAV balancing app device discovery page will not display the controller.

Bacnet Object limits in the Application

Unsupported linking within the Irm Bacnet Device may result in unintended outcomes. According to a reasonable “thumb rule” all slots accessible by default when adding an function block to the wire sheet are suitable for linking.

The function blocks in the honIrmControl palette provide a lot of flexibility when developing control applications.

For example, if a user wanted to change the lowLimit and highLimit parameters of a Sylk NetworkSetpoint block from the network, the link would be unsupported. These issues are not displayed in the function block by default. They can, however, be made to appear as composite slots, as shown in Fig. 594 . After compositing, external data can be attached to them, as shown in Fig. 401 on page 401.

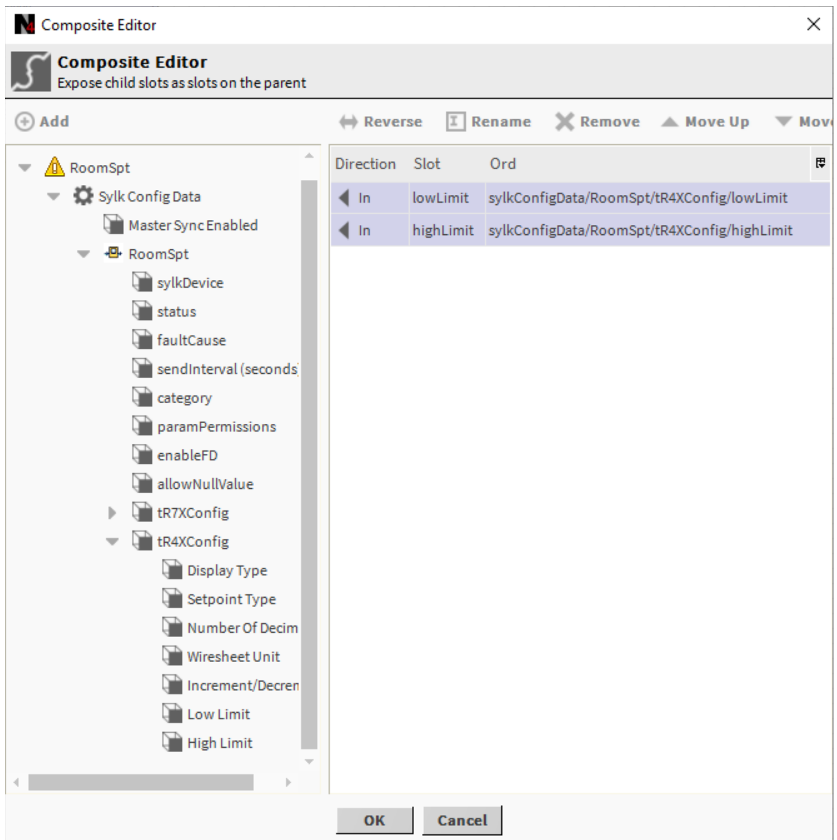


Fig. 593 TR42 limit slots used as Composite slots

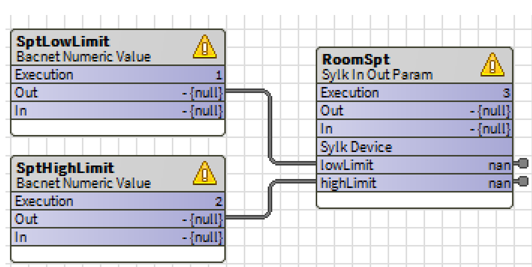


Fig. 594 Linking to Composite slots

The configuration displayed in Fig. 400 on page 400 and Fig. 595 is invalid. Changes to the limitations made during runtime via the BACnet objects will not be propagated to the controller. Furthermore, if you use Maser Sync to change the limitations in the RoomSpt property sheet, the property values will not be sent to the target devices.

In most cases, alternate logic that does not rely on unsupported linkages can be used to satisfy the required sequence. On the Room Spt block, Fig. 595 shows how to enforce setpoint relationships without using composites.

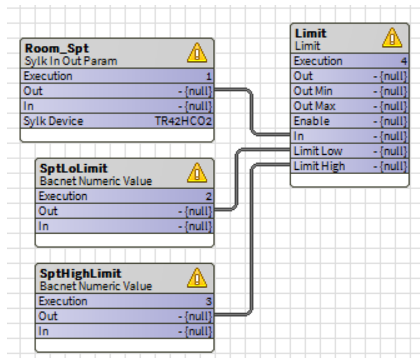


Fig. 595 Enforce setpoint without using composites

The IrmFolder and IrmSubFolder components only provide partial support for the composite feature. When using them to expose a function block slot, a good "thumb rule" to follow is to only make slots visible at the function block's top level. It is not required to drill into the child objects underneath a function block. For example, In and Out slots of Room Spt appearing in and out are eligible for usage in a composite. However, the lowLimit and highLimit values shown in Fig. 596 are invalid.

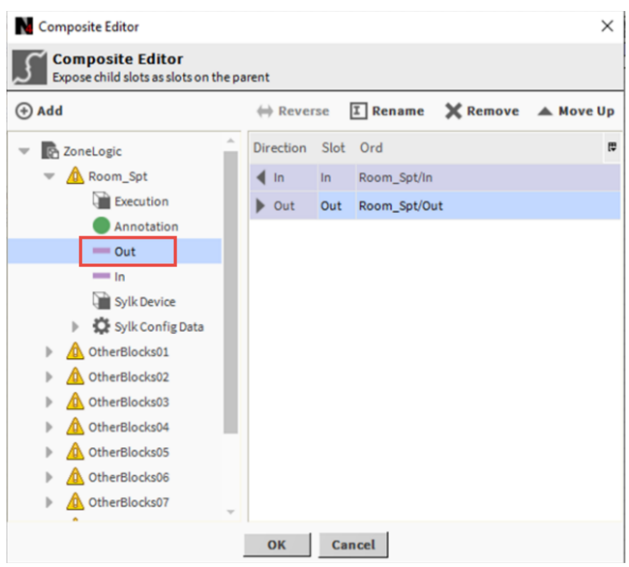


Fig. 596 Valid composite slots for IrmFolder and IrmSubFolder

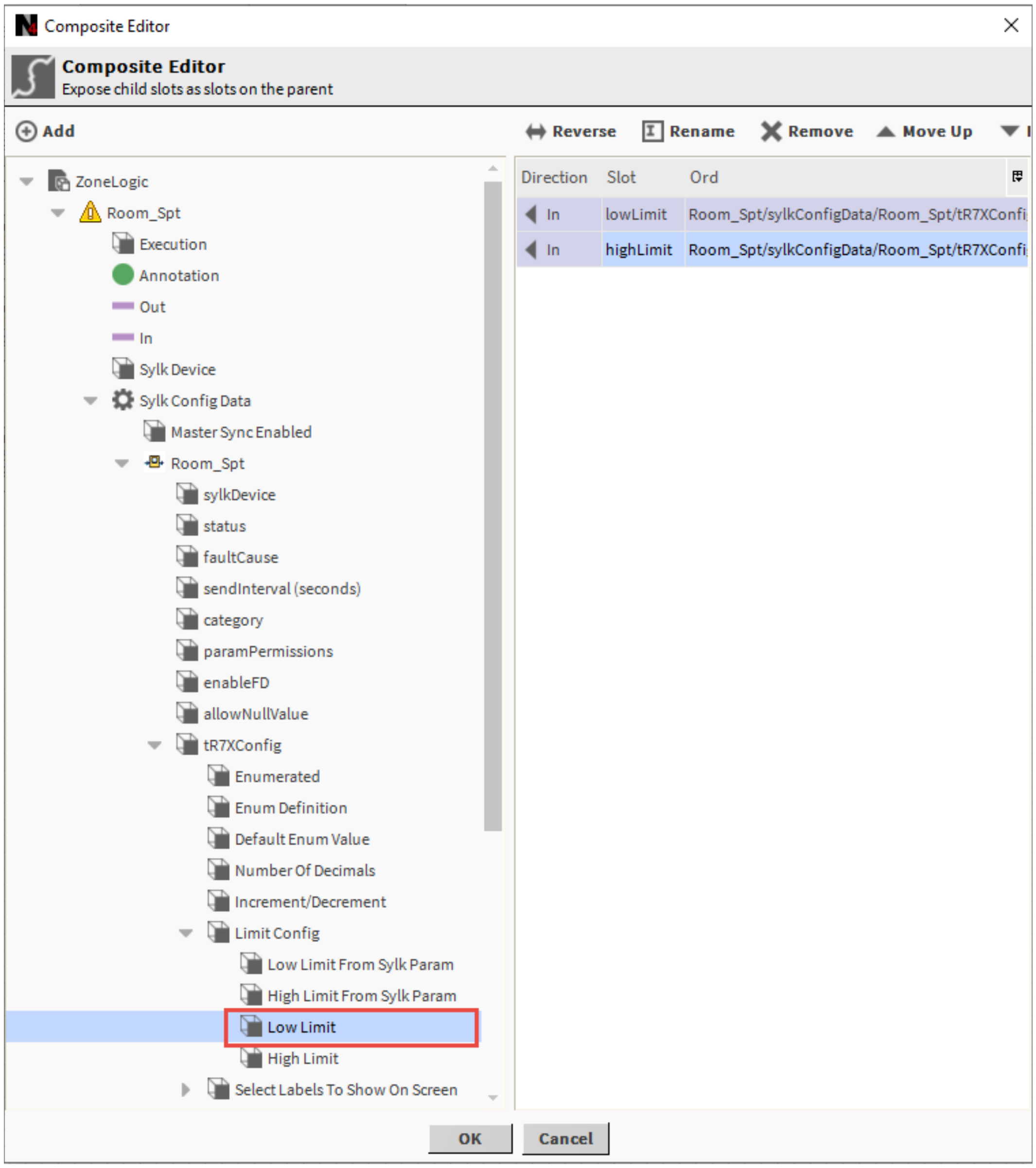


Fig. 597 Invalid composite slots for IrmFolder and IrmSubFolder

Download Bluetooth Firmware

Steps to download Bluetooth Firmware:

Step 1. Right-click on **BacnetNetwork > Views > Irm Bacnet Device Manager** view.

Step 2. Select all the IP or MSTP devices from the device list.

Note: *Download BLE Firmware option will not be available, if any unsupported device is selected from the device list.*

Step 3. Select **Download BLE Firmware**.

Step 4. Navigate to the firmware file and click **open**.

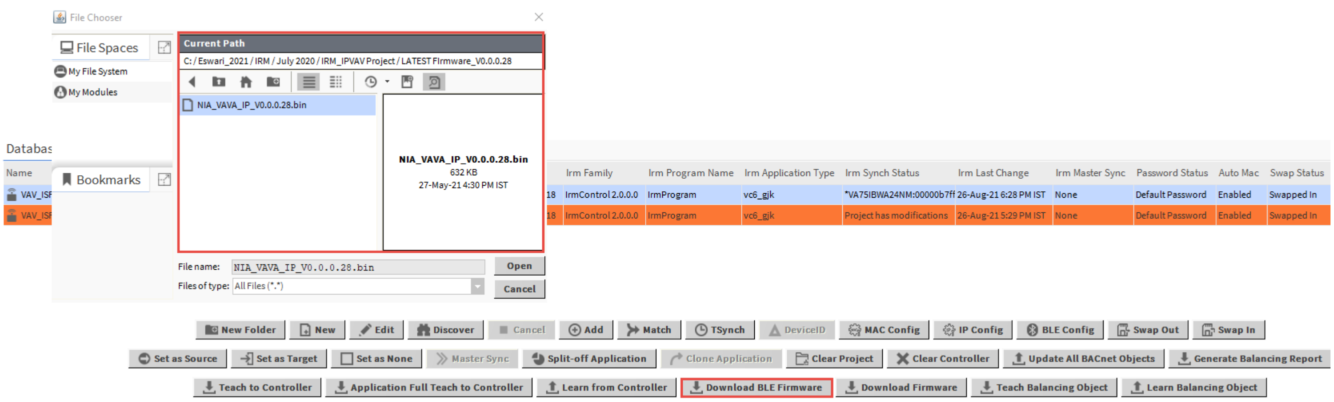


Fig. 598 Download Bluetooth Firmware

Step 5. Check the job log to get the status of the Bluetooth firmware download.

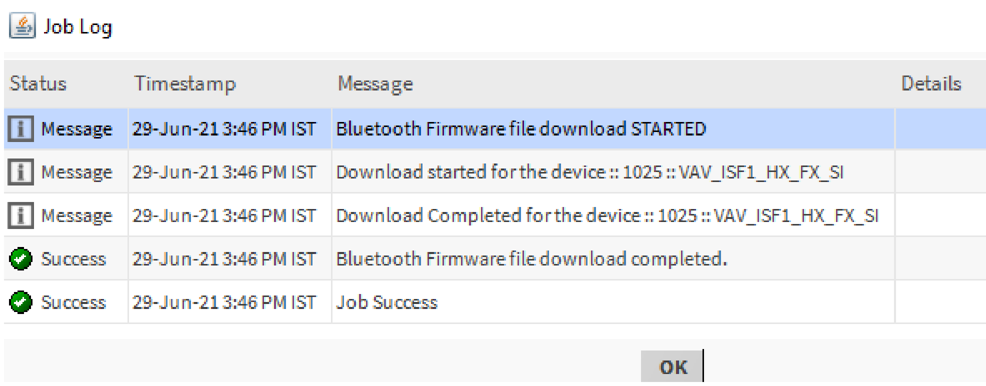


Fig. 599 Job Log

Step 6. Click **OK**.

Step 7. Power cycle the controller.

Troubleshooting Modbus Communication

For a first communication test, connect only one Modbus device using a short cable (cable less than 10 feet in length).

Steps to verify Modbus communication:

Step 1. Create one read point, and the read point should have a known value that can be verified.

Step 2. Verify that the T2 and R2 LEDs are flickering (indicating data communication). Use the engineering tool to verify that the Modbus data can be read and written.

Step 3. T2 LED indicates sending a request message to a Modbus Device, and R2 LED indicates receiving an answer message from the Modbus Device.

Possible error causes could be wrong settings for Baud rate, Parity, and Stop bits.

The function block Modbus Read Point has two outputs.

- **Out:** Received value from the Modbus device.
- **Out Cause:** Error code. 0 = no error; Further values are listed in the Niagara Guide Help of the Modbus Read Point function block. Out Cause pin slot is not visible by default and needs to be enabled.

Possible error causes:

- Reverse Modbus polarity.
- The polling interval defined in Operation Mode is too short (Out Cause = Timeout = 8). Some devices do not support fast polling and, therefore, might not respond in time.

Note: *Modbus device failure behavior: If a Modbus device does not respond to a register poll command, the register is entered into the list of "Failed Registers." After that, the IRM NX controller polls this single register only every 10 seconds. If the register could be read successfully, the register is read again in the defined interval.*

- Read/Write Point Address Offset +1/-1
- Device Setting Byte order

Step 4. Once this is working properly, add the next Modbus device.

Flow Balancing Troubleshooting

- If you run the flow balancing tool without configuring the VAV application, the application will generate an error.

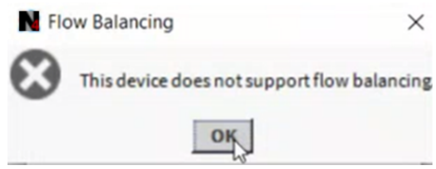


Fig. 600 Error message for unconfigured flow balancing tool

- If you run the flow balancing tool with an incorrect network interface, the application displays error.

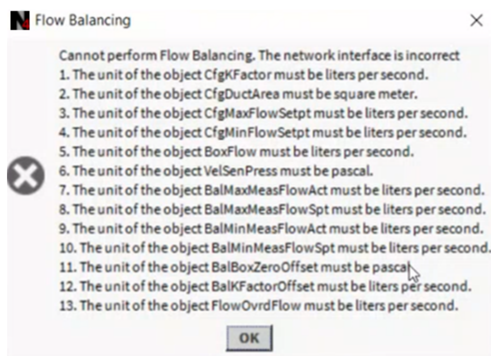


Fig. 601 Error message for incorrect network interface

- If you run the flow balancing tool, the application will generate an error when the device is offline.

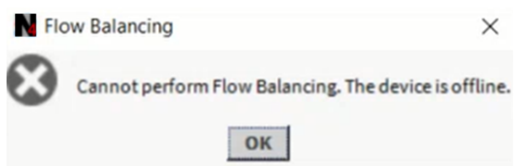


Fig. 602 Error message for offline device

- If you run the flow balancing tool, when the tool doesn't have enough objects to balance, the application will generate an error.

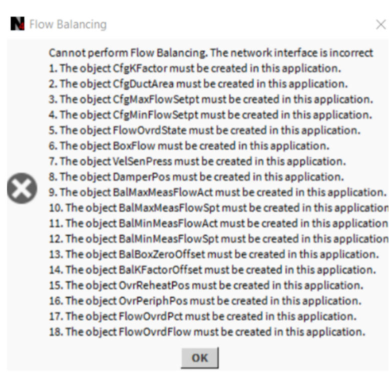


Fig. 603 Error message for insufficient objects to balancing

APDU Size and Segmentation Errors

A Teach full application to controller may be required if the maximum APDU size and segmentation supported under device object properties are not updating in the controller, resulting in commissioning failures.

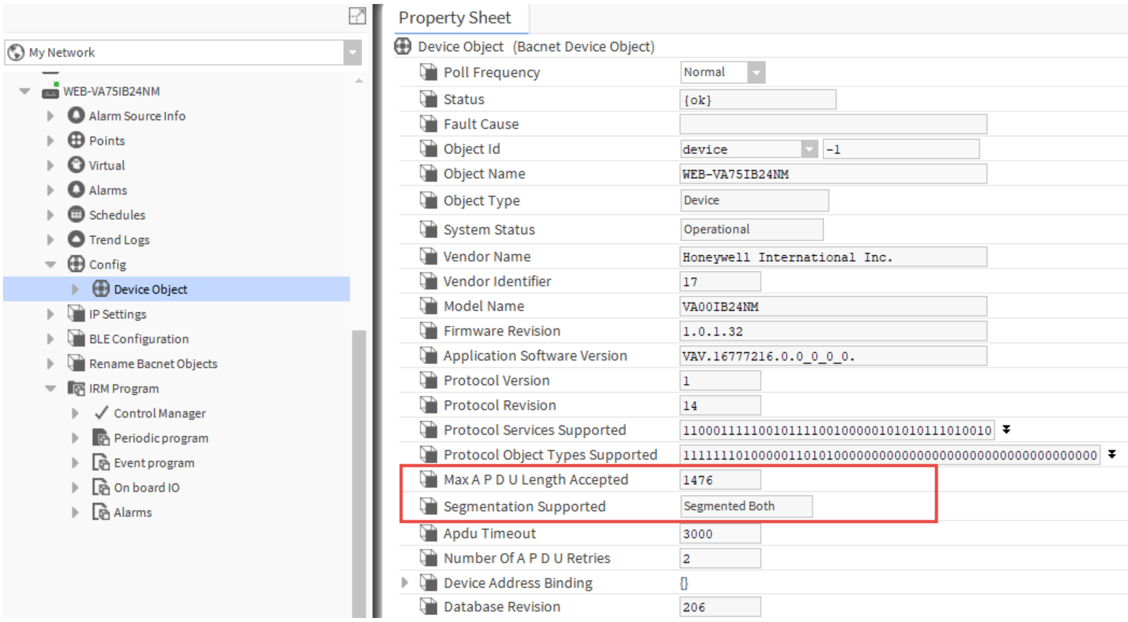


Fig. 604 APDU Size and Segmentation Supported

Important: ***Application Download Failure:*** *A download of an application may fail for a different reason. In the Jobs Sidebar, an error message appears. Parts of the application may have already been downloaded to the controller during a failed application download. The IRM controller could be started and operated using such application parts. This can cause damage the controllers.*

Solution: *If the application download fails, clear the controller and re download the application to avoid damage to the controller or the environment.*

Value Updates after Device Power Failure

If a device had a power failure and the device is restarting, it will take 3 - 5 minutes until the values will be updated in the wire sheet. To accelerate the value update on the wire sheet, please manually refresh the wire sheet by navigating to another page and returning to the wire sheet.

RJ45 Connector for BACnet WiFi Adapter

A BACnet Wifi Adapter can be connected to the controller's RJ45 connector in order to establish wireless communication with a PC with COACH NX so that the application engineer can commission the controller.

Recommendation:

- Maximum10 devices connected to the controller's BACnet MSTP interface.
- Max Master for all the controllers which is connected to the Adapter via MSTP has to be 35,since BAC-A Adapter Max Master is 35.

Note: *When the BACnet Wifi Adapter is connected to the controller's RJ45 connection, it is powered by the controller. It is then prohibited to simultaneously power the BACnet WiFi Adapter via a wall adapter. When, on the other hand, the BACnet WiFi Adapter is instead connected to the controller's BACnet MSTP interface, it is prohibited to simultaneously use an RJ45 plug; instead, the BACnet WiFi Adapter must then be powered by a wall adapter (standard 5-V USB wall adapter with micro USB connector).*

Note: *When using the BACnet WiFi Adapter (BACA-A) to commission the controllers, the following steps should be followed:*

1) Set the property maxMaster to a value of 35 for all controllers on the MSTP bus to which the BACnet WiFi Adapter is to be connected.

2) Ensure that one of the following MAC addresses is free on this MSTP bus: 31 or 32 or 33 or 34.

3) Connect the BACnet WiFi Adapter to the MSTP bus.

Caution: **It is permitted to connect only the BACnet WiFi Adapter to this RJ45 connector. Do not connect IP.**

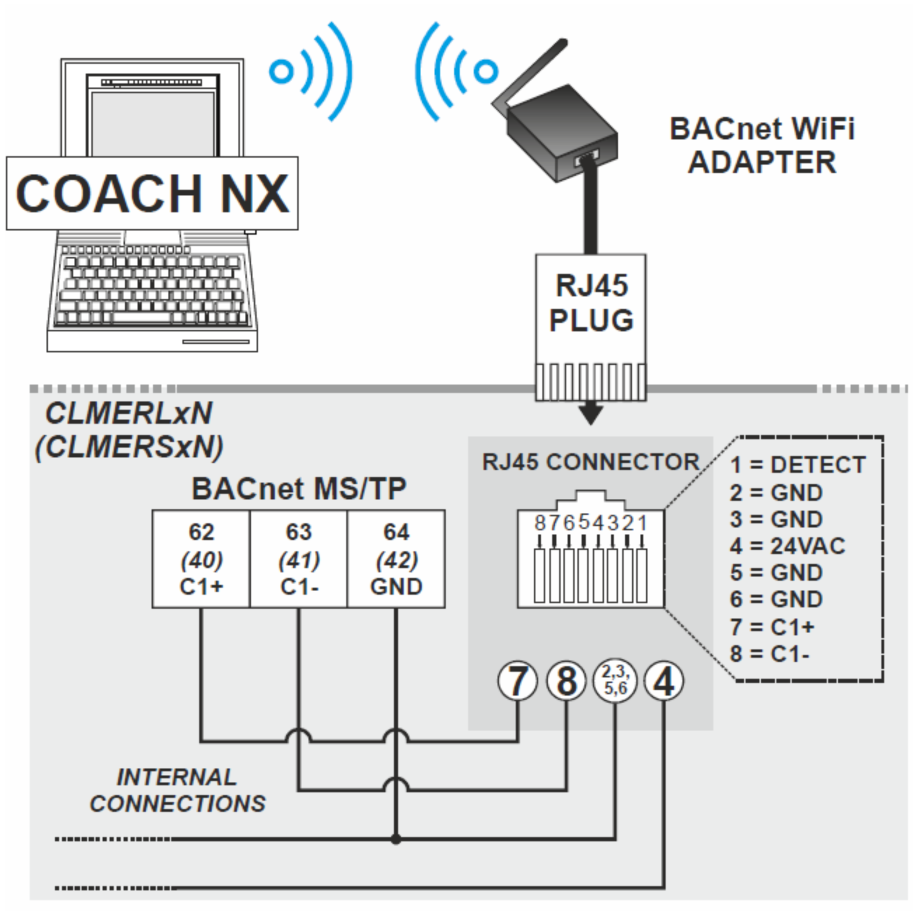


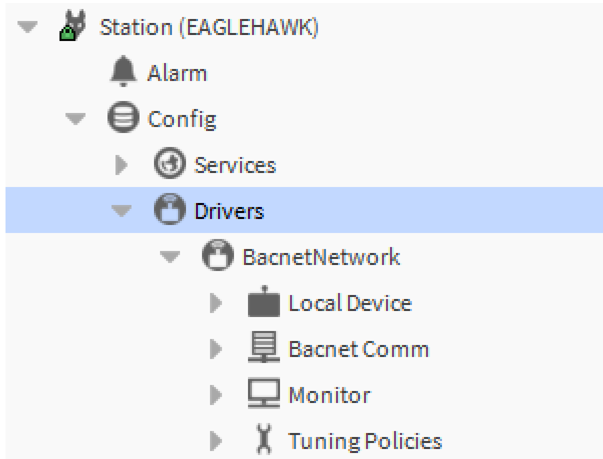
Fig. 25. RJ45 interface and BACnet WiFi Adapter

For more details on install BACnet Wifi Adapter, refer *BACnet Wifi Adapter (BACA-A) - Mounting / Operating Instructions guide - MU1B0592-GE51*.

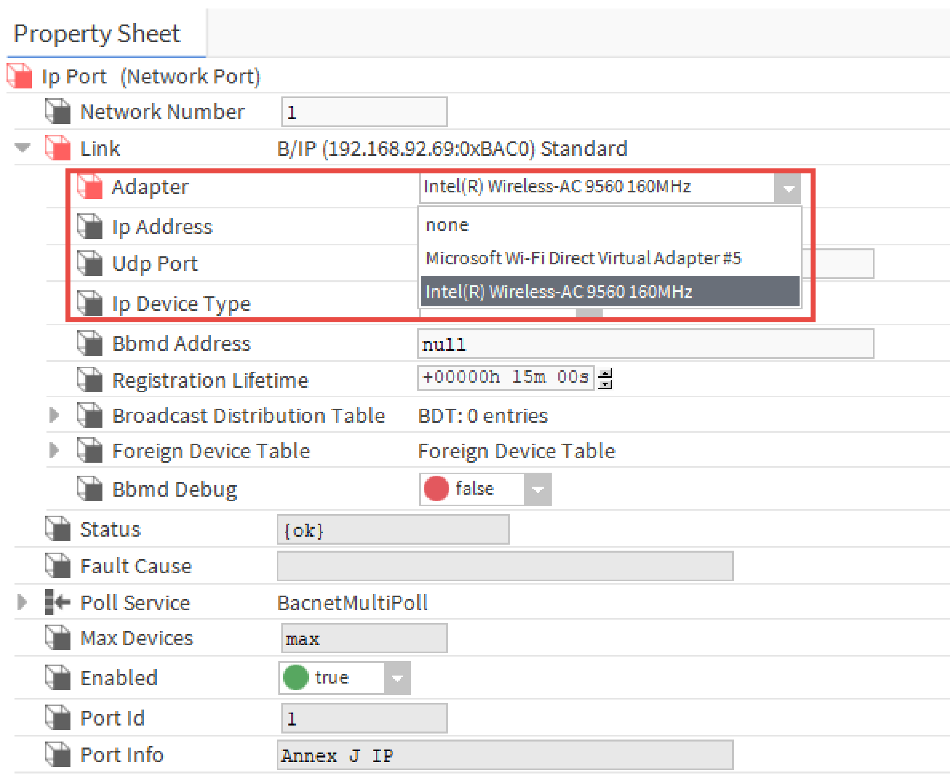
Steps to configure BACnet WiFi Adapter

Step 1. Run Niagara Workbench and add BacnetNetwork under supervisor station.

Step 2. Expand BACnetNetwork.



Step 3. Expand **Bacnet Comm** > **Network** > double-click on **IP Port**.



Step 4. Select the BACnet Wifi adapter from drop-down list. Make sure the Station and BACnet Wifi adapter in same subnet in the computer.

Step 5. Click **Save**.

Fixing Function Block Link Issue

Links are the primary mechanism of execution flow in the CentraLine-N4 Framework. Links allow components to be wired together graphically by propagating an event from one slot to another slot.

A link is used to establish an event relationship between the source link and the target link. The source link generates an event when the output slot value gets modified and the value propagated to the input slot of the target link.

Note: *Connecting a target function block slot from two different source function blocks is not supported by the engineering tool. By enabling the "FanIn" flag, users can override the default CentraLine-N4 behavior and connect from more than one source slot. But this is invalid procedure for creating invalid links in the engineering tool. The background verification process in the engineering tool prevents the user from enabling the fan-in flag.*

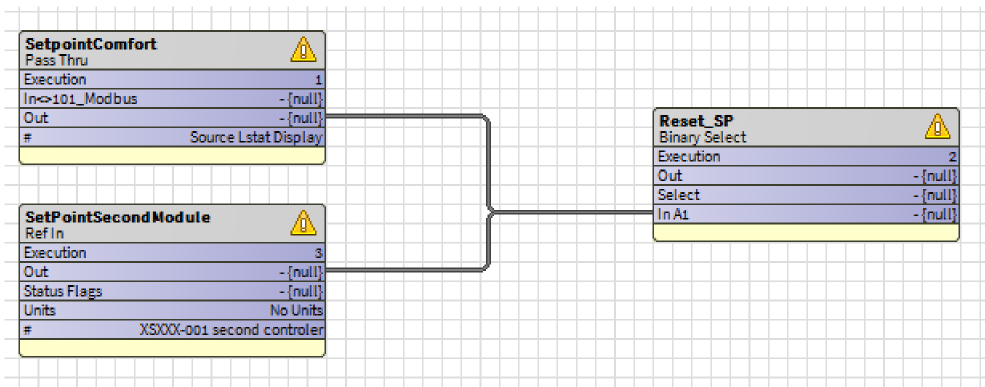


Fig. 605 Link Creation

To resolve this issue, the user must install the most recent engineering tool. This prevents the user from changing the FanIn flag and displays an error message.

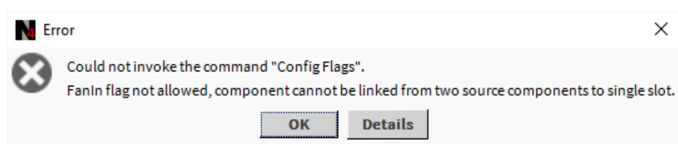


Fig. 606 Error Message

If the FanIn flag is enabled in any of the existing stations, then user will unable to launch the station using the latest engineering tool version. The user need to remove the FanIn flag first, delete if there are multiple links to the same slot, and then launch the station using the latest engineering tool.

Workaround for Tuning Policy behavior issue

Scenario 1

When the IRM NX controller is online, if you set the **Use Cov Property** to true and **Tuning Policy Name** property to **IrmTuningPolicy**.

Issue: If you perform the clear controller operation, the IRM NX controller and BACnet points will go offline.

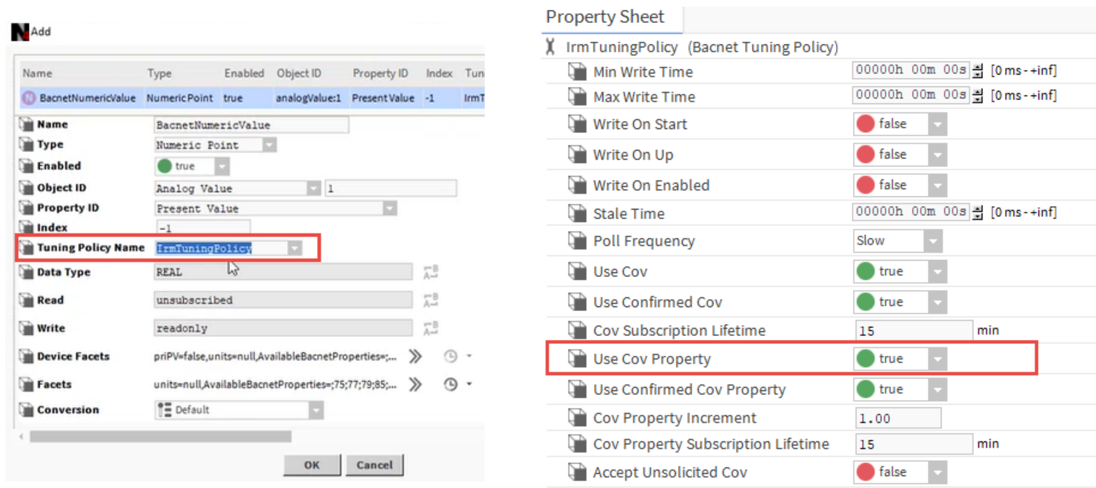


Fig. 607 Tuning Policy Name property

Solution 1: While assigning points to a BACnet device, set the **Tuning Policy Name** property as **Default Policy** (without COV mode).

Or

Go to **Points**, double-click on the point to open the property sheet, and set **Tuning Policy Name** property as **Default Policy**. The controller will be online in a few seconds.

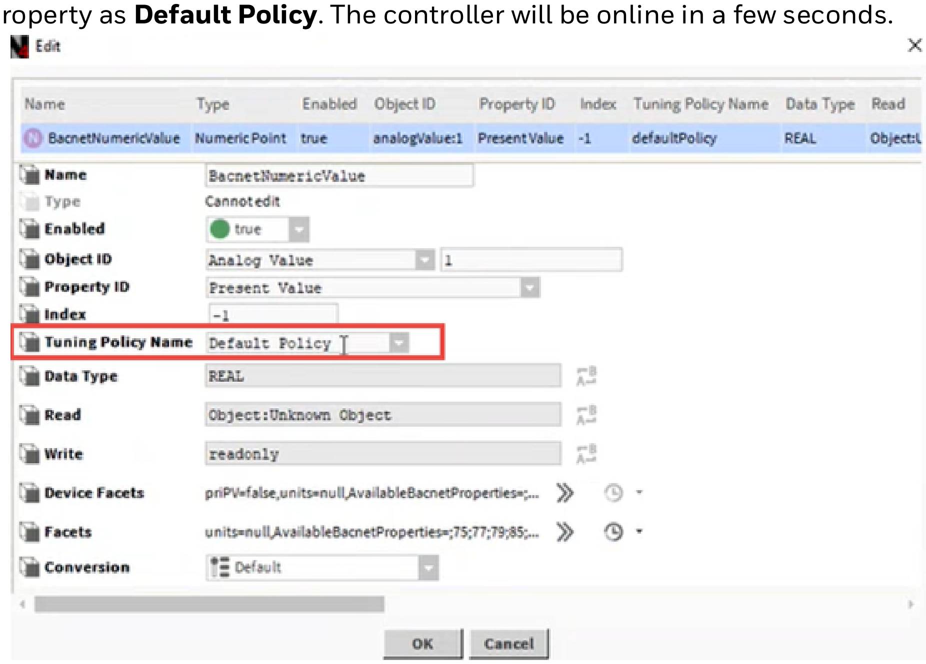


Fig. 608 Editing Point Property

Solution 2: Go to **BacnetNetwork**, double-click on the controller to open the property sheet, and set the **Use Cov** property to **False**. The controller will be online in a few seconds.

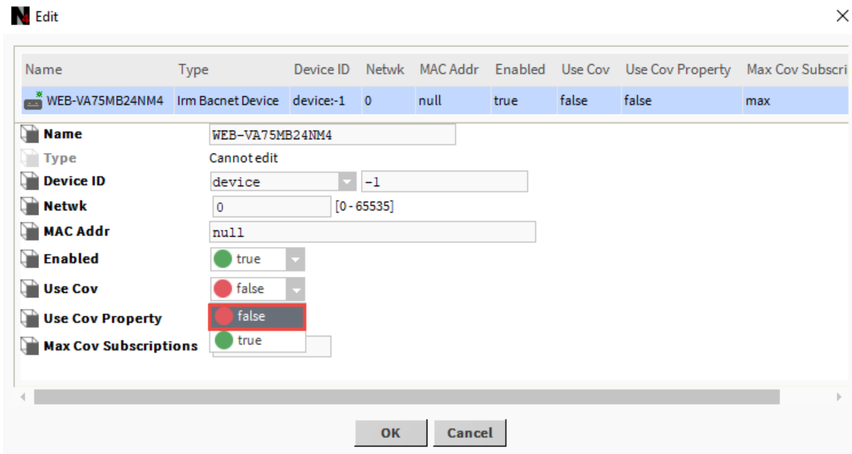


Fig. 609 Editing Controller Property

Scenario 2

When the IRM NX controller is online, if you the set the **Tuning Policy Name** property as **Irm Tuning Policy** in the Global VAV template or Venom template.

Issue: The controller will go offline if the match operation is performed on an online device.

Solution: When creating a template, make sure that all of the points are disabled by default.

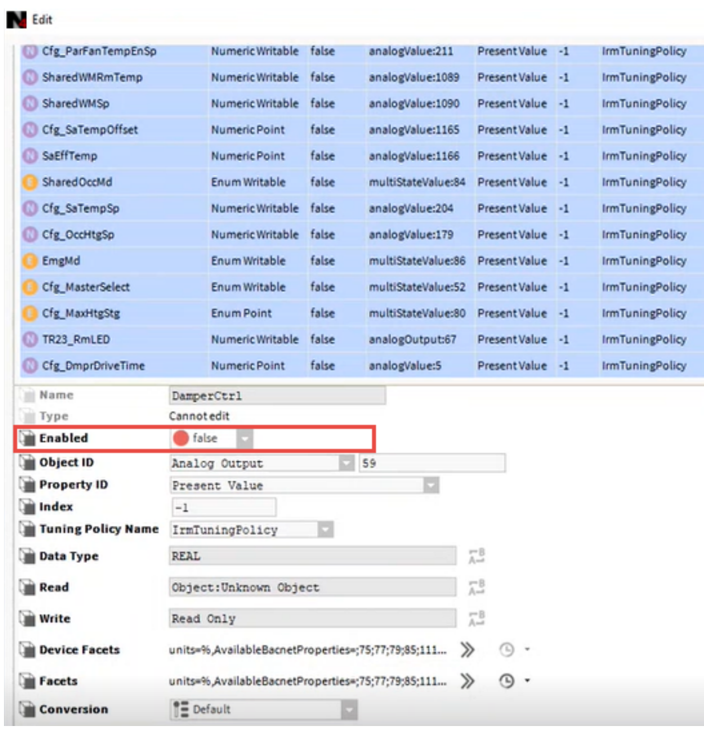


Fig. 610 Points edit window

While performing the match operation between the template and the device, do not set the **Use Cov** property to True.

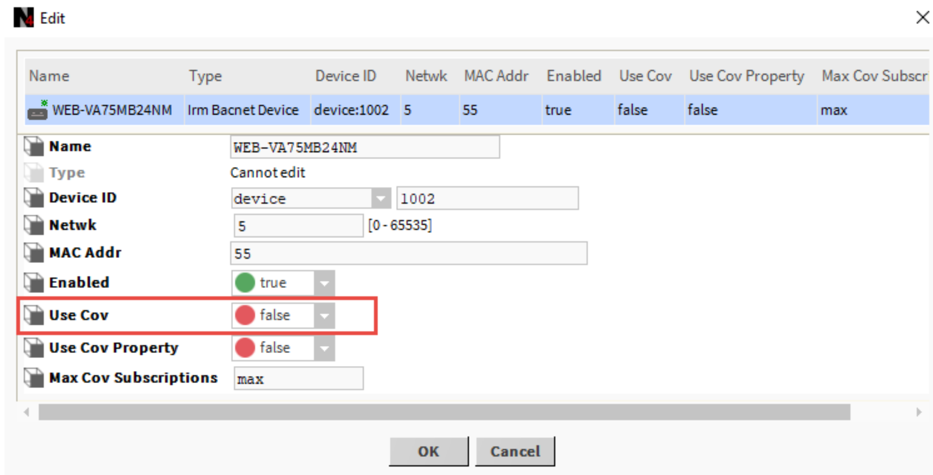


Fig. 611 Use Cov Property

Important: *Disable the BACnet points if the TuningPolicyName property is IrmTuningPolicy. You can enable the points after commissioning or teach the controller operation.*

Replacing Defective Controller

Use this method to replace defective controller with the new controller. When a controller become defective it become inoperative. You can replace the defective controller with new controller and restore the configuration and application data to the new controller.

Note: *When replacing the MSTP controller, make sure the max master is within the same range as the other controllers in the network.*

Steps to replace defective controller with new controller:

Step 1. Replace defective controller with new controller and connect to the **Bacnet Network**.

Step 2. Navigate to the **Irm Bacnet Device Manager** view and click **Discover**. The new controllers in the Bacnet Network are discovered.

Note: *The new controllers is in factory default state.*

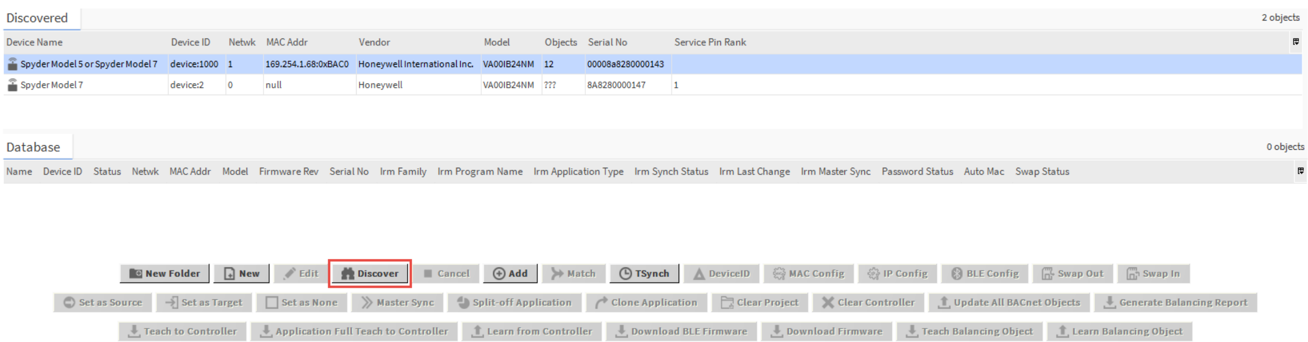


Fig. 612 Discovered Controller

Step 3. Select the new controller from the Discovered section and the existing controller from the Database section.

Step 4. Click **Match.**

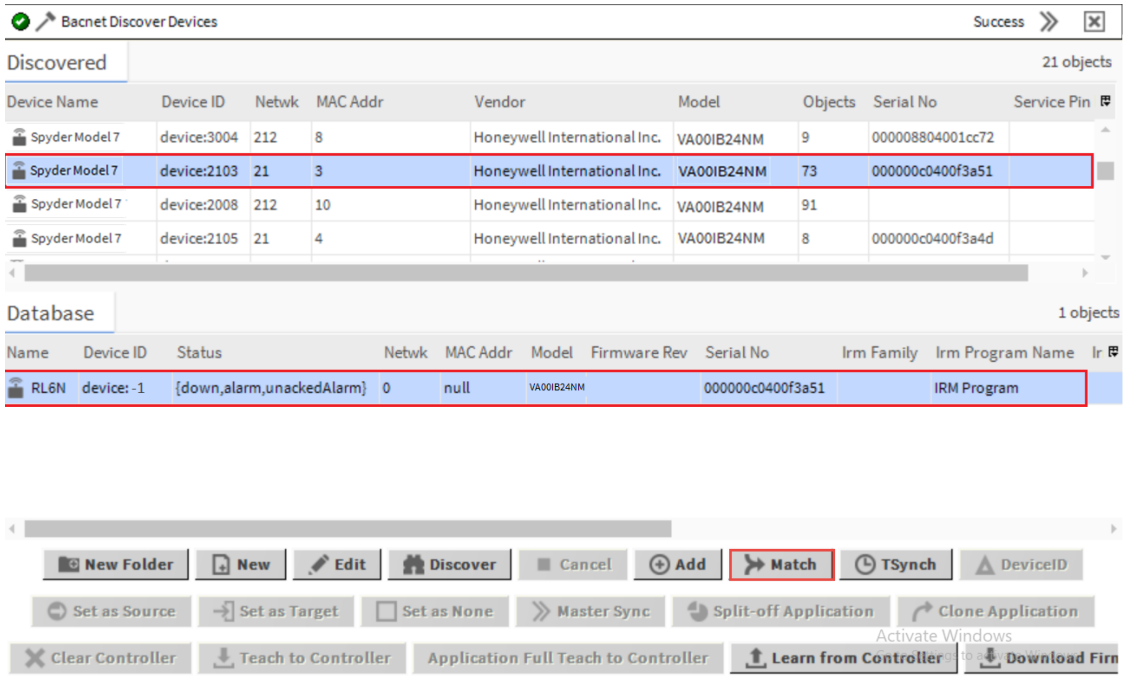


Fig. 613 Irm Bacnet Device Manager View

The new controllers properties matched to the existing controller indicated in the Database section.

If desired, you can change the name, device id, network number, and MAC address, and enable Use Cov by selecting "true" from the drop-down list.

Step 5. Click **OK.**

Step 6. Perform the hardware compatibility check to ensure that the application is appropriately designed to run seamlessly in the created device.

Step 7. Click **Teach Full Application to Controller**.

Note: *If a large application is created in the controller, it is recommended to perform Teach Full Application To Controller.*

Configure IP Address Of Computer

There are two ways to configure the IP address on a computer.

- Obtaining IP address automatically
- Manually configuring TCP/IP Properties

Obtaining IP address automatically

Step 1. Go to Internet Protocol 4 (TCP/ IPv4) properties.

Step 2. Set **Obtain an IP address automatically** and **Obtain DNS server address automatically**.

Step 3. Click **OK** to save the settings.

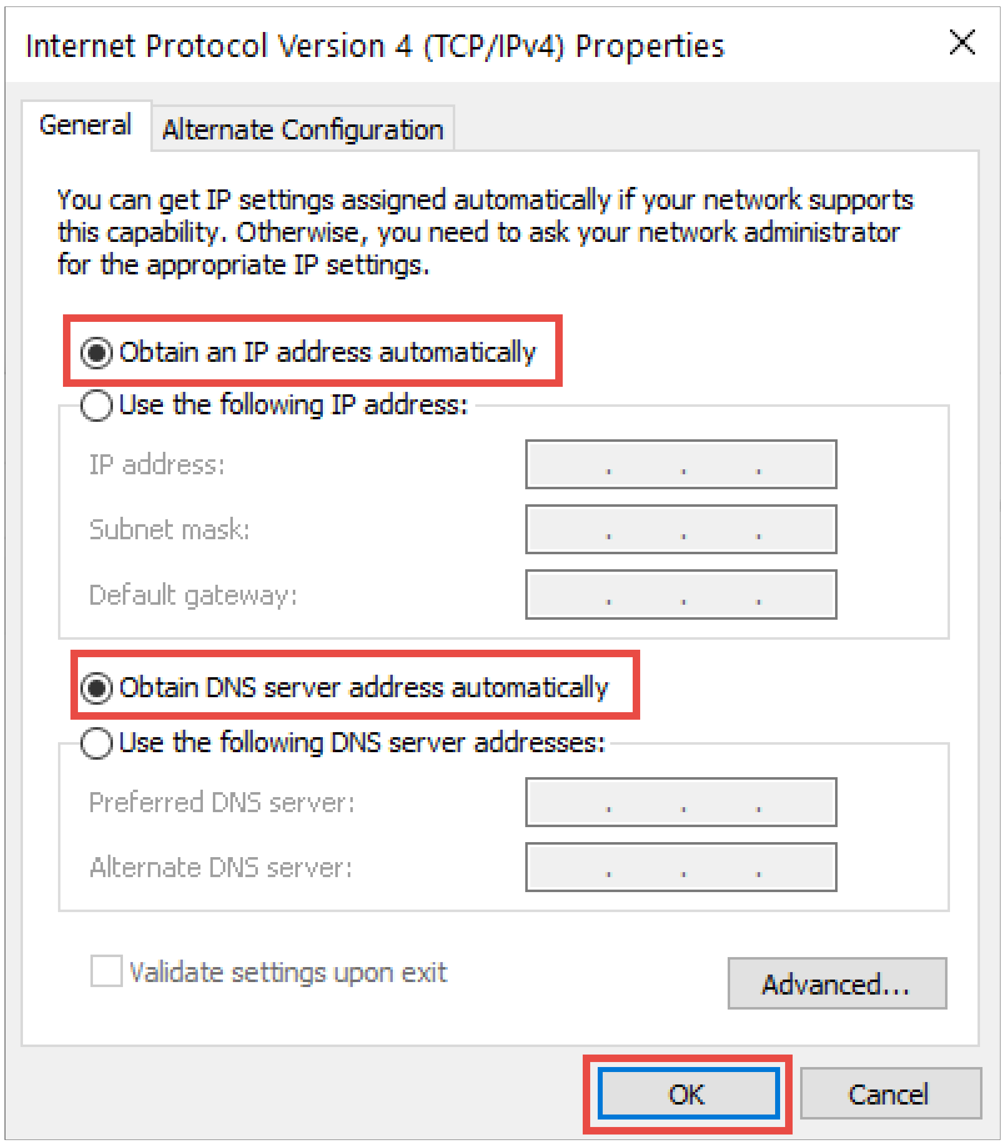


Fig. 614 Automatic IP Address Configuration

Manually configuring TCP/IP Properties

Step 1. Go to Internet Protocol 4 (TCP/ IPv4) properties.

Step 2. Select **Use the following IP address**, type IP address, subnet mask and default gateway IP address into it.

If the router's LAN IP address is 169.254.1.0, please type in IP address 169.254.1.x (x is from 2 to 253?, subnet mask 255.255.255.0, and default gateway 169.254.1.1.

Step 3. Select **Use the following DNS server addresses**.

You can keep Preferred DNS server and the Alternate DNS server blank.

Step 4. Click **OK** to save the settings.

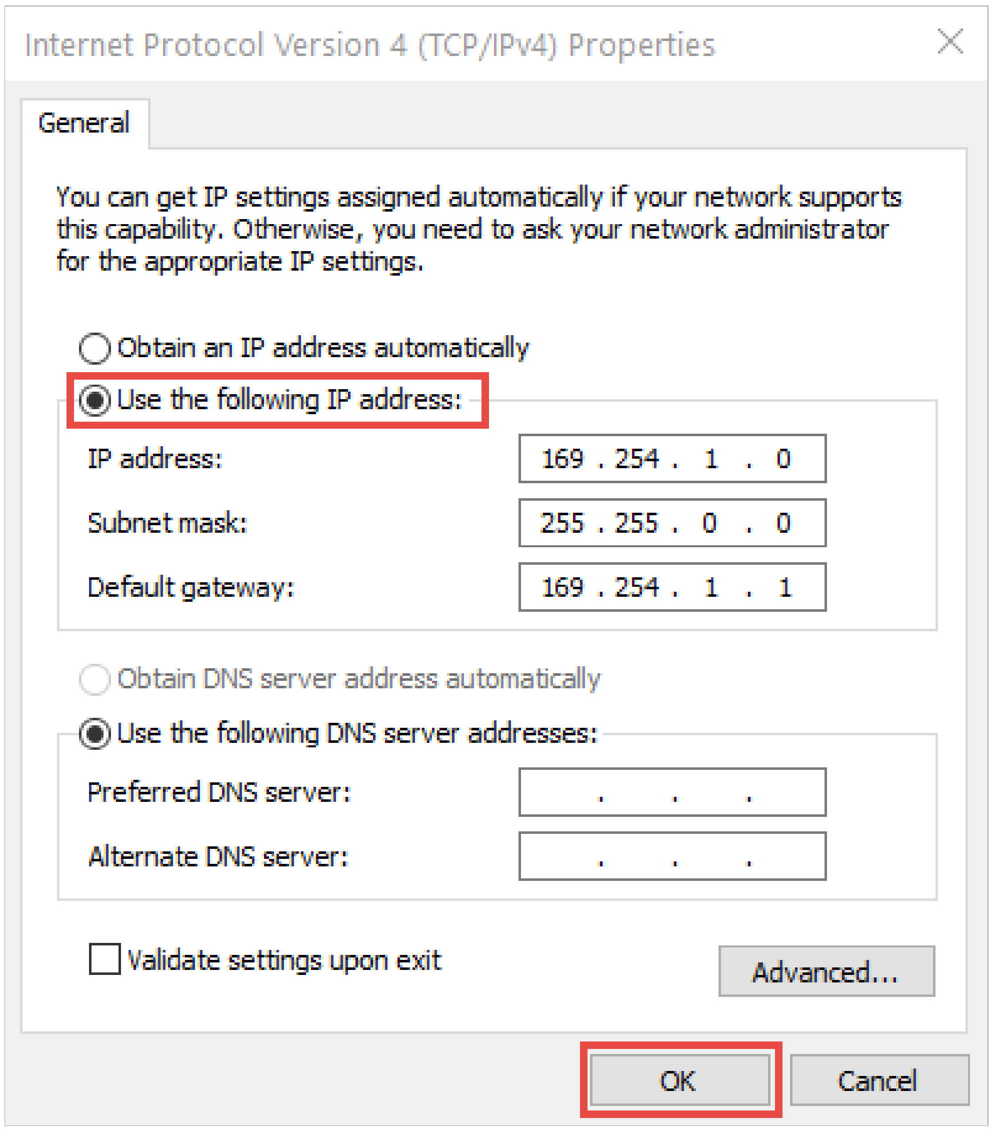


Fig. 615 Manual IP Address Configuration

Step 5. Click **OK** to save and apply your settings.

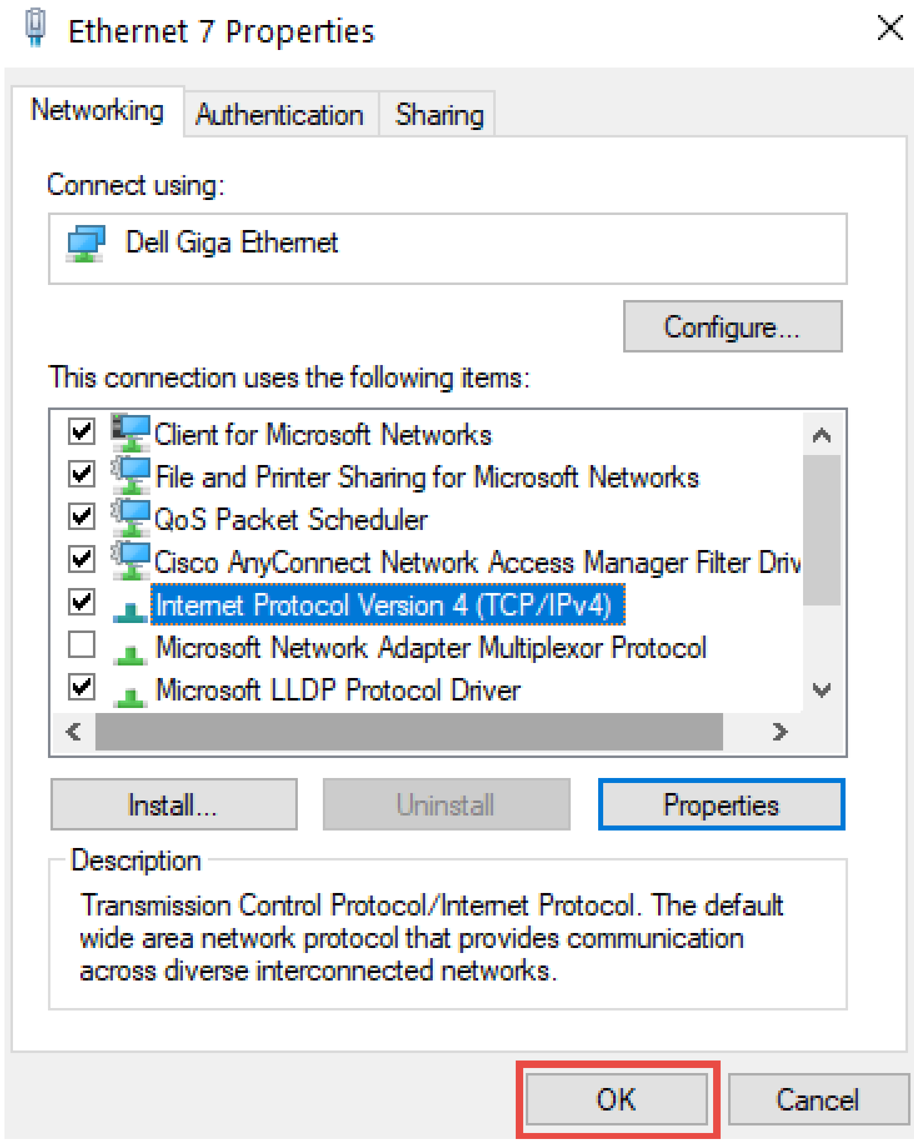


Fig. 616 Applying Updated IP Settings

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EN2B-0414GE51-R0423