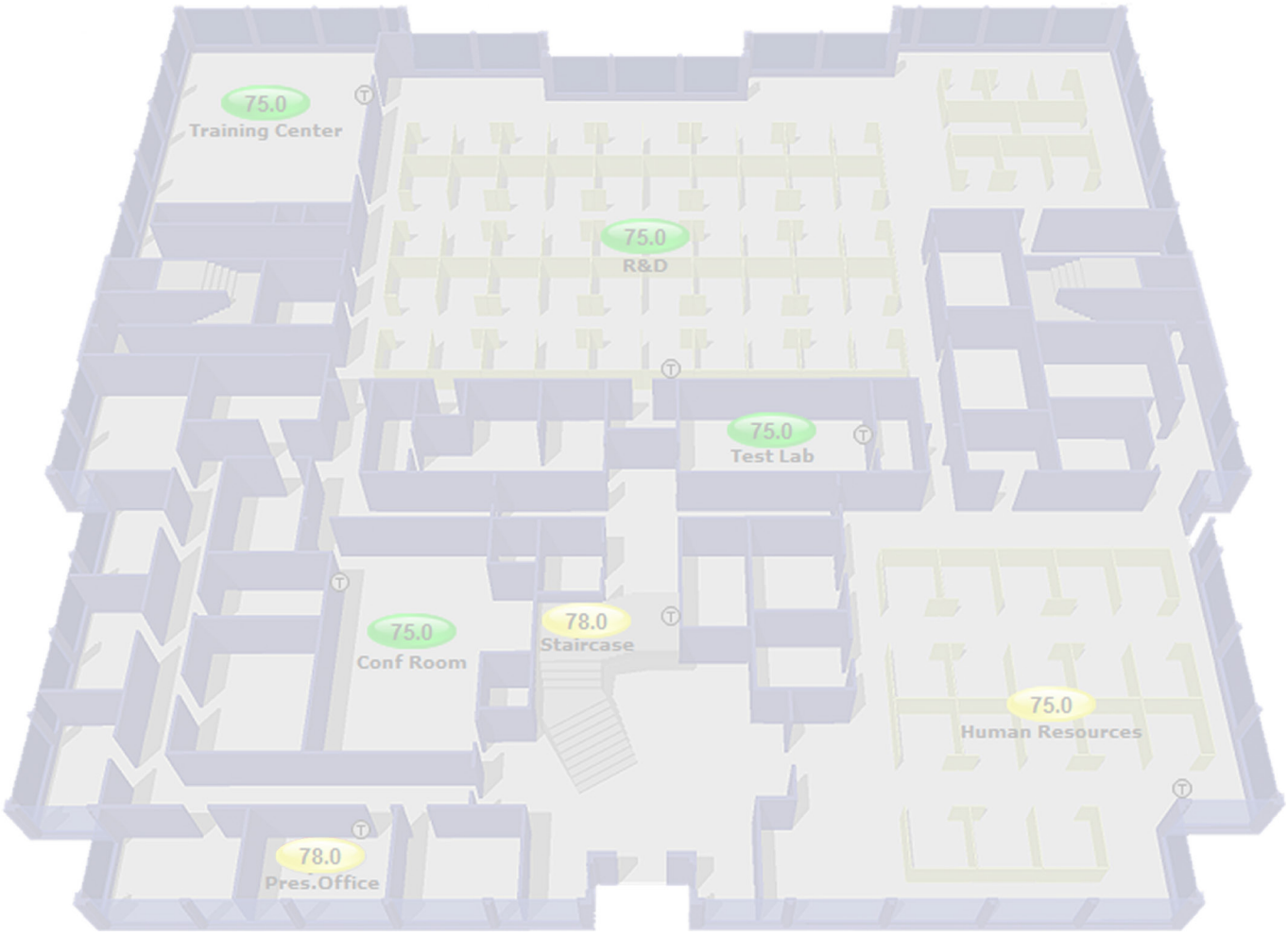
i-Vu® Pro v8.0

Help



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Verify that you have the most current version of this document from **www.hvacpartners.com**, the **Carrier Partner Community** website, or your local Carrier office.

Important changes are listed in **Document revision history** at the end of this document.

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Updated on 5/22/2024

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What is an i-Vu® Pro system?

An i-Vu® Pro system is a web-based building automation system that can be accessed from anywhere in the world through a web browser, without the need for special software on the workstation. Through the web browser, you can perform building management functions such as:

- adjust setpoints and other control parameters
- set and change schedules
- graphically trend important building conditions
- view and acknowledge alarms
- run preconfigured and custom reports on energy usage, occupant overrides, and much more

i-Vu® Pro tools

Develop and configure graphics and a system database for your i-Vu® Pro system using the following i-Vu® Pro tools.

NOTE The i-Vu® Pro v8.0 Tech Tools and Customer Tools USB drives have a built-in license that expires 2 years after the software is released. When prompted during installation, browse to the i-Vu® Pro v8.0 non-expiring license that you obtained from Carrier.

Use...	To...
ViewBuilder	Create or edit graphics
SiteBuilder	Create and modify the system database Build a system for multiple CCN Gateways

Tech tools for the Installer only:

Use...	To...
EquipmentBuilder	Build or edit control programs (.equipment files) for programmable controllers. Can also produce graphics, sequence of operation, and screen files
Alarm Notification	Receive a message on any networked computer that is running the i-Vu® Pro Alarm Notification Client application
Virtual BACview®	View and change property values and the controller's real time clock
BBMD Configuration Tool	Configure BACnet/IP Broadcast Management Devices (BBMDs) **NOTE** If your system has multiple routers that reside on different IP subnets, you must set up one router on each IP subnet as a BACnet/IP Broadcast Management Device (BBMD).

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Use...	To...
MSTP Capture Utility	Capture BACnet traffic on MS/TP. It is intended for situations where Carrier Control Systems Support needs a network capture to troubleshoot communications.
Test & Balance	• Calibrate airflow in a VAV or VVT Zone controller • Calibrate the static pressure in a VVT Bypass controller • Commission air terminals • Override reheat and terminal fans **NOTE** Use Test & Balance to manipulate the controllers associated with an air source, but not the air source itself, or heating and cooling equipment, such as chillers and boilers.
Snap	Build custom control programs using individual blocks of programming code called microblocks
LonWorks Integration Tool	Generate the microblock addresses automatically for third-party LonWorks points
AppLoader	Use to download .clipping files to restore factory defaults and check **Module Status** (Modstat) through the Rnet port
Field Assistant	Service or start up and commission a piece of equipment or a network of controllers.

A typical i-Vu® Pro system

An i-Vu® Pro system uses a network of microprocessor-based controllers to control heating and air conditioning. A web-based server communicates with these controllers and generates the i-Vu® Pro interface that the user can access through a web browser. Through the interface, you can gather information, change operating properties, run reports, and perform other building management functions on a single building or an entire campus.

The i-Vu® Pro client uses a supported web browser to access i-Vu® Pro Server as a website.

i-Vu® Pro supports:

- Unlimited simultaneous users
- Multiple operating systems and databases
- CCN, Open, and third-party devices
- Built-in alarming, trending, and reporting
- Third-party integration
- Secure server access using TLS

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What's new in v8.0

What's new in the i-Vu® Pro v8.0 application

Feature	Improvement
Security enhancements	• Apache Tomcat web server has been upgraded to v9.0.x and TLS 1.3 • The i-Vu® Pro application has been upgraded to OpenJDK Java 11 LTS. • Acknowledge alarms with comments • Require operators to acknowledge alarms before deleting
Device Password	Supported only for controllers with a drv_gen5_<version no.>_driverx A Site-level password that restricts access to the controller setup pages when connecting through the Service Port. It can be set in SiteBuilder or the i-Vu® Pro interface from the Site level on the **Properties** page.
Connections	You can select a network connection in a new table on the **System Options** > **Connections** > **Configure** tab without having to go to the **View** tab.
Driver Properties	The following only applies to a controller with the drv_gen5 driver. The Driver Properties pages match most of the controller setup pages that you access through the Service Port. **NOTE** The Quick Setup is only available through the Service Port. In the navigation tree, right-click the controller and select **Driver Properties** > **Settings** tab to access the controller setup interface. See the controller's *Installation and Start-up Guide* for details on using the interface.
Interface	New i-Vu® logo

Reporting	• Custom reports: You can now edit custom report variables directly from a graphic.
	• Schedule reports: Add e-signatures to scheduled reports
	• Add a custom logo to reports
	• Life Sciences Reporting
	  ○ Mean Kinetic Temperature (MKT) Report
	  ○ Trend Values Report
	  ○ Out of Range Report

BACnet Rev. 19	To implement BACnet Rev. 19, the Display microblocks that are used to model a third-party BACnet device's options, have new fields on the microblock popup's **Properties** > **Details** tab.

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Feature	Improvement
BACnet/SC (page 219)	Added support for BACnet/SC
Color groups for color maps	You can select from three color groups to enhance visibility of floorplans and color maps if using .svg floorplans.
Viewing vector graphics (page 13)	New buttons for manipulating display options for the .svg floorplans and site graphics.
New manual command to view security settings	The new manual command **sreview** displays the application installation's security best practices compliance data. Included are web server security settings, SSL certificate details, email security settings, password policy, and the latest software updates. See *Manual Commands* (page 170) for details.
Semantic tagging (page 152)	Semantics tags and rules are included in the i-Vu® Pro v8.0 application to apply semantic meaning to locations in the system. You can use the tags that are included or create custom tags and custom rules. You can use the tags to define a path. See *Using semantic tags in a path* (page 183).
Add-ons	Free access to LDAP and Trend Export add-ons with purchase of Life Sciences license
Alarm Notification update	You can use an IPv6 Server address in the **Server** field. In the i-Vu® Pro interface, in **System Settings** > **General** tab > **Alarms**, you can restrict access to the IPv6 address.
ACxelerate automated commissioning (page 276)	Allows you to verify and report on the health state of VAV dampers and reheat valves in your single VAV boxes.
i-Vu® XT or TruVu™ icons	New icons in the navigation trees for i-Vu® XT or TruVu™ routers, devices, drivers, and equipment.
Legacy autopilot	The legacy autopilot feature has been removed from the i-Vu® Pro application. It is replaced by an improved version available as an add-on. See the **Autopilot** add-on on the Current Products page.

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What's new in the SiteBuilder v8.0 application

Feature	Improvement
Improved security settings	To increase security, the i-Vu® Pro application defaults to the following settings: • If your system is set to use TLS, the i-Vu® Pro application automatically uses TLS 1.3. • The i-Vu® Pro application requires SOAP applications to run over HTTPS. • The i-Vu® Pro application allows only add-ons that have been approved by Carrier. **NOTE** If needed, you can override these defaults in SiteBuilder; however, doing so will lessen the security of your system.
Device Password	Supported only for a router with a drv_gen5 driver. Set this password on the **Network** tree > **Site** level to restrict access to the controller setup pages when connecting through the Service Port.
Select MS/TP port	i-Vu® XT or TruVu™ router only—On the **Add BACnet Network** dialog, when adding an MS/TP network, you can now select the physical port that the network will use.
IPv6 addressing	BACnet/IPv6 is a new Media Type when adding a BACnet Network. You can use IPv6 addresses to: ○ Automatically configure the IPv6 addresses by entering the Device Instance ○ Add BACnet/IPv6 networks ○ Add Hierarchical Systems • Restrict connections to an IPv6 address
New i-Vu® XT or TruVu™ icons	New icons in the navigation trees for i-Vu® XT or TruVu™ routers, devices, drivers, and equipment.
BACnet/SC	Added support for BACnet/SC

What's new in the Snap v8.0 application

Feature	Improvement
New microblocks	Many new microblocks are now available. See New microblocks for Snap v8.0 in the Microblock Reference.
Tools	New menu option **Tools**. You can now add plugins. See Miscellaneous Snap menu commands and features.
Custom Microblocks	New menu option **Custom Microblocks**. See To create a custom microblock.
BACnet Rev. 19	New fields in the Property Editor have been added to implement features of BACnet Rev. 19. These fields appear in the Display microblocks used to model a third-party BACnet device.

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What's new in the ViewBuilder v8.0 application

Feature	Improvement
v8.0 cumulative patch #5	
New Interactive Zone graphic control	New sensor-agnostic and mobile-friendly interactive zone control.
v8.0	
SVG Floorplans	This new control allows scalable floorplans that can include the Node Name header and color bar. Also provides the ability to scale the floorplan graphic to fill the entire pane, to zoom in/out, to display the floorplan in 3D, and to toggle the ducting on/off when applicable. We recommend Inkscape™ or Adobe® Illustrator®; contact the Graphics Department for further information.
New i-Vu® XT or TruVu™ icons	New icons in the navigation trees for i-Vu® XT or TruVu™ routers, devices, drivers, and equipment.

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Using the i-Vu® Pro application

Running i-Vu® Pro Server

The i-Vu Pro Server application communicates with the system's controllers and accesses and maintains the system database. You view and edit the system in client web browsers. i-Vu Pro Server must be running for an operator to log in from a web browser.

The application's **Current Users**, **Connections**, and **Output** tabs let you monitor the status of the system. Output information is continually archived to **I-VuProx.x\logs**< date >**\core.txt**.

To start the i-Vu® Pro system

1 Click **Start** > **All Programs** > **i-VuPro x.x** > **i-Vu Pro Server**.

TIP If you run the i-Vu Pro Server application as a Windows® service, your computer can automatically start the application every time the computer starts. See *Running i-Vu Pro Server as a Windows service* (page 328).

2 Open a web browser on one or more client computers.

3 Verify that your web browser is set up to display the i-Vu® Pro interface. See *Setting up i-Vu® Pro client devices and web browsers* (page 304).

4 Type the i-Vu® Pro server's address in the web browser's address field.

NOTE You can type `http://localhost` if i-Vu Pro Server and the web browser are running on the same computer.

5 Enter a **Name** and **Password**.

To send a message to logged in operators

Messages are delivered immediately to i-Vu® Pro client web browsers. You can send multiple messages, but the operator must click **Ok** for the first message before the next message can be delivered. If the web browser window is minimized, the message is not visible.

1 On the i-Vu Pro Server application's **Current Users** tab, click beside the user you want to send a message to. Or, click **Notify All Users**.

2 Type a message.

3 Click **OK**.

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To log off an operator

From the i-Vu Pro Server application

NOTE The operator will be logged off without warning.

1 On the i-Vu Pro Server **Current Users** tab, right-click the operator, then select **Log Off User**.

2 Click **Yes**.

From the i-Vu® Pro interface

NOTE The operator will be logged off without warning.

1 In the i-Vu® Pro interface, press **Ctrl**+**M**.

2 Type `whoson` in the manual command field.

3 Obtain the ID number of the operator you want to log off.

4 Press **Ctrl**+**M**.

5 Type `logoffuser x` (where x is the ID number).

6 Click **OK**.

To shut down a system

1 In the i-Vu Pro Server application, select **Server** > **Shut Down**.

2 Optional: Select a delay option, then edit the **Notification message**.

3 Click **Shut Down**.

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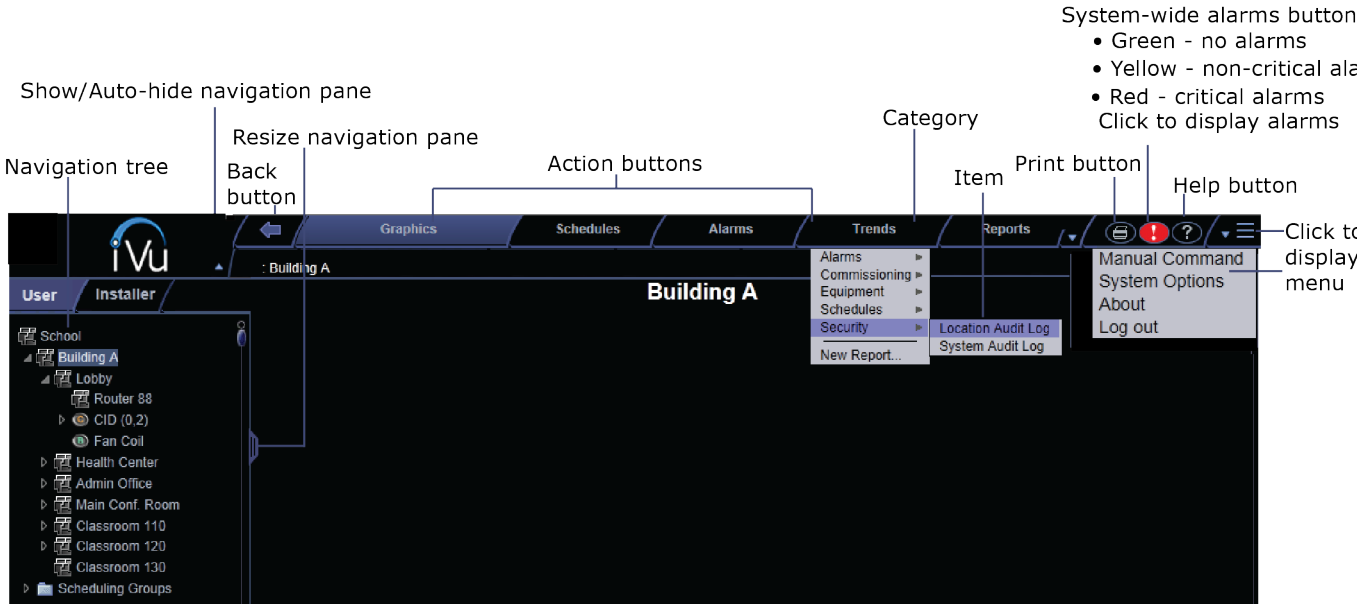
Getting to know the interface

Computer and large-screen mobile interface



Small-screen mobile interface

Most of the i-Vu® Pro interface is the same on small-screen mobile devices except for the differences shown below.

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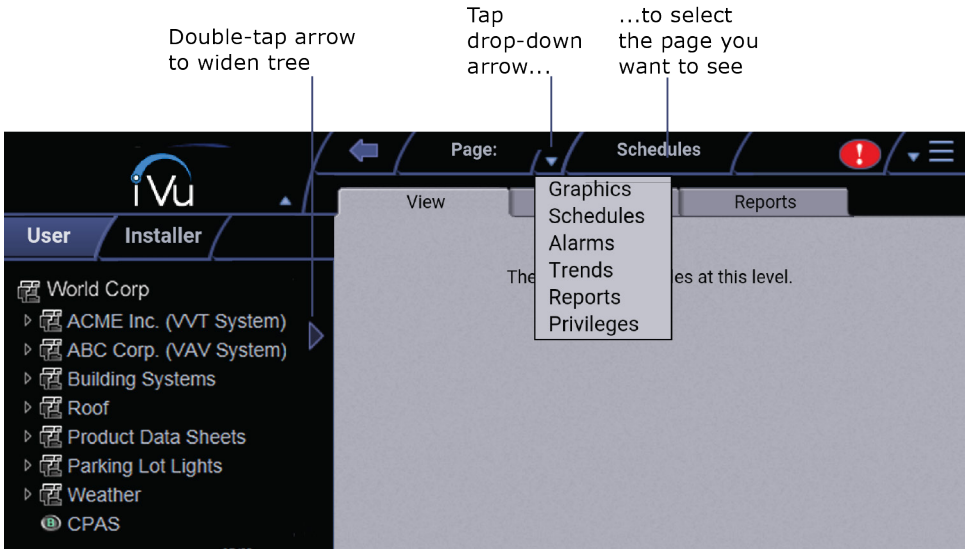

- When you click to hide the tree, the button changes to .
- **Help** and **Print** are in the menu.

NOTES

- After you log in, you will see the page defined as your starting location on the **My Settings** page. To change your opening page, see *To change My Settings* (page 311, page 163).
- Roles/privileges control what an operator can see or do in the i-Vu® Pro system. If you cannot see or do something that you read about in Help, ask your System Administrator to check your role/privileges.
- Use only the i-Vu® Pro interface to navigate; do not use the web browser's navigation buttons.
- Click on any tab to refresh the page.

Navigation trees

User tree

This tree lets you navigate through the i-Vu® Pro interface using the system's geographic layout. You set this up on the Installer tab under **Arrange User View**.

Installer Tree

This tree lets users with the appropriate privileges navigate through the i-Vu® Pro interface using the system's network layout.

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Schedule Groups tree

On this tree, you can create groups that can consist of areas, equipment, or other groups. You can then assign a schedule to the entire group instead of the individual items. See *To apply a schedule to a group of items* (page 48).

System Options tree

Click > **System Options** (page 310) for the setup and maintenance of your system.

My Settings	Lets you change settings that are specific to you such as your password, viewing preferences and contact information. See *To change My Settings* (page 311, page 163).
System Settings	Contains the system-wide settings that control the way the i-Vu® Pro system runs. See *System Settings* (page 312).
Operators **Privilege Sets** **Operator Groups**	Lets your system administrator define operators and what they can see and do in the i-Vu® Pro interface. See *Operator access* (page 156).
Categories	Lets you define categories for *schedules* (page 51), *alarms* (page 91), *graphics* (page 22), properties, *trends* (page 60), and *reports* (page 128). Categories allow you to view or control groups of similar items.
Scheduled Reports	Shows any report that was scheduled on the report's page. See *To manage scheduled reports* (page 146, page 102) for details.
Connections	Lets you set up, start/stop, and troubleshoot your network connections.
Services	Shows internal processes of the i-Vu® Pro application for troubleshooting.
License Administration	Lets you update your i-Vu® Pro license.
Update	Click **Update** to select and apply patch, service packs, drivers, language packs, graphics libraries, and Help updates.
Client Installs	Lets you install applications that are to run on client computers.

Navigating the system

To navigate in the i-Vu® Pro interface:

1. Select the item you want in the navigation tree.
2. Select the action buttons and their drop-down menus.
3. Use the tabs to filter the information further.
4. Click links on **Graphics** and **Properties** pages to jump to related pages and open microblock popups.

   NOTE Use only the i-Vu® Pro interface to navigate; do not use the browser's navigation buttons.
5. Click on any tab to refresh the page.

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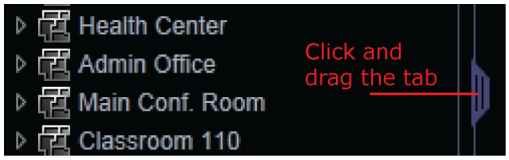
To show, hide, or resize the navigation tree

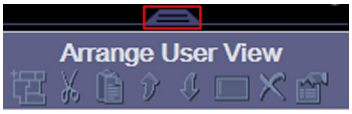
On a computer or large screen mobile device

Click at the top of the navigation tree to hide or show the tree.

Click and drag the tab on the right side of the tree to adjust its width.



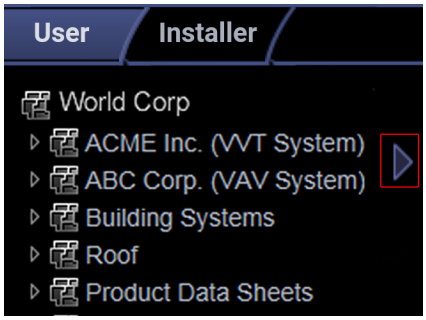
In the **Installer** view, click and drag the tab at the top of **Arrange User View** to adjust the height of the window.



On a small-screen mobile device

Touch at the top of the navigation tree to hide the tree. Touch to show it.

Double-tap the arrow on the right side of the tree to widen the tree. Double-tap again to return to the original size.



Viewing vector graphics

When viewing a vector graphic of a floorplan or site map in the i-Vu® Pro interface, you can manipulate the views using buttons on the **Graphics** page.

The buttons are only present if, in ViewBuilder, when editing the **SVG Floorplan** Control Properties > **General** tab, you select them to display.

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Select in ViewBuilder...	to see this button on the i-Vu® Pro Graphics page	Click button to...
Add 3D Toggle		See 3D walls in your floorplan.
Add Ducting Toggle		See ducting, if it was integrated into the floorplan graphic. **NOTE** When the ducting is visible, click on a solid rectangle (representing equipment) to open the corresponding equipment graphic.
Allow Zoom		Switch from a summary graphic to individual areas.
N/A		Scroll through areas one at a time.

Zooming in and out

On a computer

- To zoom in and out on the i-Vu® Pro interface:
  - Hold down **Ctrl** and press + or -. Press **Ctrl+0** to return to 100%.
  - Hold down **Ctrl** while rolling your mouse wheel.
  - Use your web browser's zoom functions.
- If a graphic does not fit in the action pane, right-click it and select **Scale to Fit** to make it fit the action pane. Select **Scale to Fit** again to return the graphic to its original size.

On a mobile device

Apple® iPad and iPhone

- Double-tap to zoom in/out.

Microsoft® Surface™

- Pinch-zoom works on individual frames, instead of the whole screen. So, you can zoom and scroll the navigation pane and action pane separately.
- If browser text is too small, use **Ctrl +** to increase your browser's zoom level, then reload the page.

Google™ Nexus™ and Nexus Lumia

- Pinch-zoom to zoom in/out.

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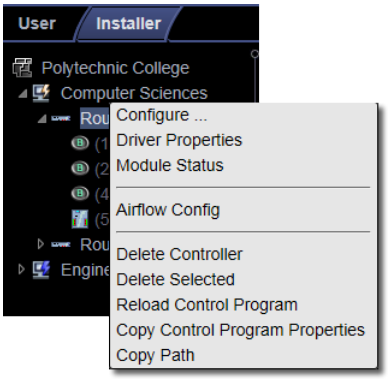
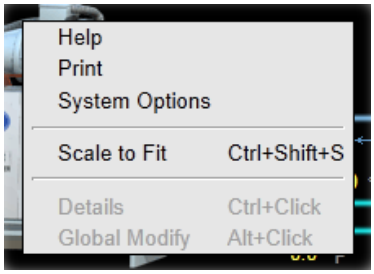
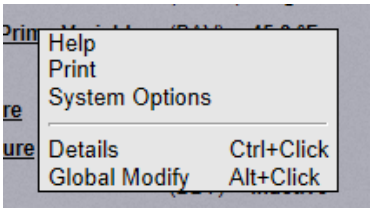
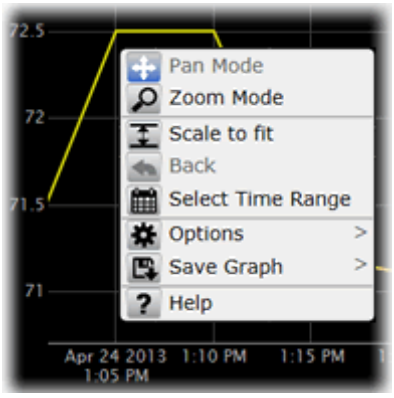
Using right-click menus

On a computer

You can right-click the following items to select options:

A tree item	The action pane
	
A property	**A trend**
	

On a mobile device

To access the right-click menu for:

- A tree item–Select the item first, then touch and hold the item for several seconds.
- The action pane–Touch and hold the item for several seconds.

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To print the action pane

On a computer

Click at the top of the page to print the contents of the action pane. Set the print orientation to **Landscape** in the **Print** dialog box.

TIP To print a Graphics page that exceeds the size of the action pane, right-click the graphic and select **Scale to Fit**.

On a mobile device

Touch and then select **Print**.

Colors and status in the i-Vu® Pro interface

The following colors indicate equipment status the i-Vu® Pro interface. These colors are visible on graphic pages and in the setpoint graphs.

Color	Color Name	Status Code	Condition Indicated
	Mustard	none	In equipment when running i-Vu Pro Design Server
	Purple	0 or 15	In a controller—non-operational or no communications In equipment—a hardware or software error
	Charcoal	14	In a controller—a download is required or is already in progress In equipment—a controller has stopped
	Coral	13	Control program error
	Red	2 or 9	Heating or cooling alarm
	Orange	8	Maximum cooling
	Dark blue	3	Maximum heating
	Yellow	7	Moderate cooling
	Light blue	4	Moderate heating
	Gray	1	Unoccupied/inactive
	White	10	Occupied/active
	Light green	6	Free cooling
	Green	5	In a controller—operational or operational read only In equipment—No heating or cooling

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The colors below are from the Classic SVG Floorplan Color palette. You can change the color scheme in all vector floorplans to either Modern or Color Sensitive here:

1 Browse to http://<system_name>/_svgfloorplan.

2 Click the desired color palette and close the folder.

NOTE Your selection takes affect immediately for all vector floorplans in your system and will not affect any floorplans that were not created as vector (.svg) graphics.

Colors and setpoints

Thermographic colors indicate how much a zone's actual temperature differs from its setpoints.

Five conditions may affect a zone's thermographic color:

- Setpoint adjust
- Timed local override (TLO)
- Optimal start
- Demand level
- Hysteresis

In the examples below, a zone's heating occupied setpoint is 70° and its cooling occupied setpoint is 74°.

If you normally see...	**when the zone temp is...**	**but...**	**then you will see...**
green	72.5°	someone adjusts the setpoints (for example, with a **setpoint adjust** of two degrees, the new setpoints would be 68 and 72°)	yellow
gray	73° (unoccupied)	someone presses the **Override** button on a zone sensor to use the occupied setpoints	green
gray	77° (unoccupied)	the zone is in **optimal start** and is ramping up to its occupied setpoint in the few hours before occupancy	an occupied color
yellow	75°	the zone's electric meter is in **demand level** 2 with relaxed setpoints of 68 and 76°	green
green	73.5°	cooling began when the temperature rose above 74° and the temperature has not yet dropped beyond the 1° **hysteresis** (to 73°)	yellow

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Working with equipment in the interface

You can view and adjust equipment operation from the following pages:

Devices pages

Select the system level on the navigation tree to view the Devices page, where you can:

- Upload source files or just parameters
- Download source files, schedules, parameters, or BBMD tables
- Check status and error messages
- View model, IP address, drivers, device ID
- Edit device names

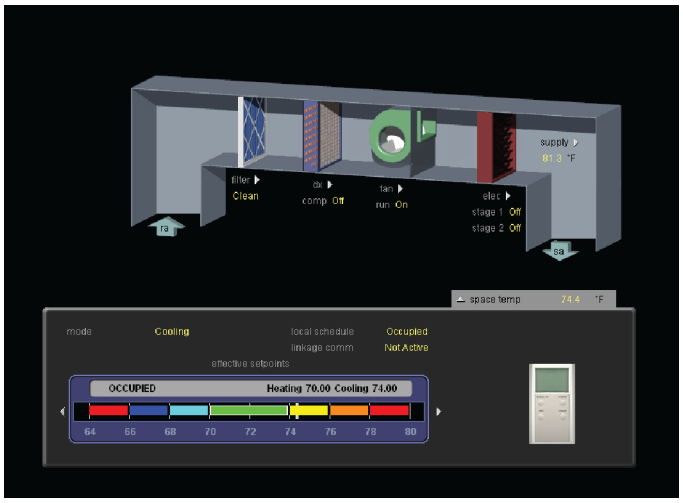
Graphics pages (page 19)

You can view and adjust your essential building controls on most Graphics pages.

Equipment drawings show the current status of mechanical equipment.

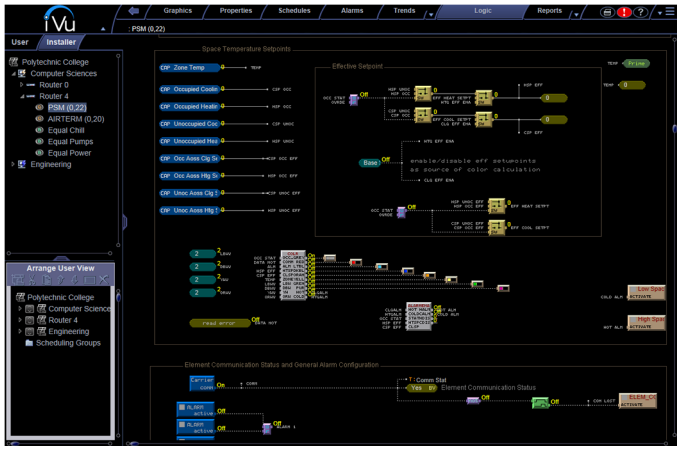
Adjust **setpoints** (page 38) on a Graphics page.

To upload a graphic from ViewBuilder, double-click the controller in the navigation tree or right-click and select **Configure**.



Logic pages (page 28)

Logic pages show the control program for a piece of equipment. Use the sequence of control and yellow status values on the Logic pages for troubleshooting your mechanical equipment.



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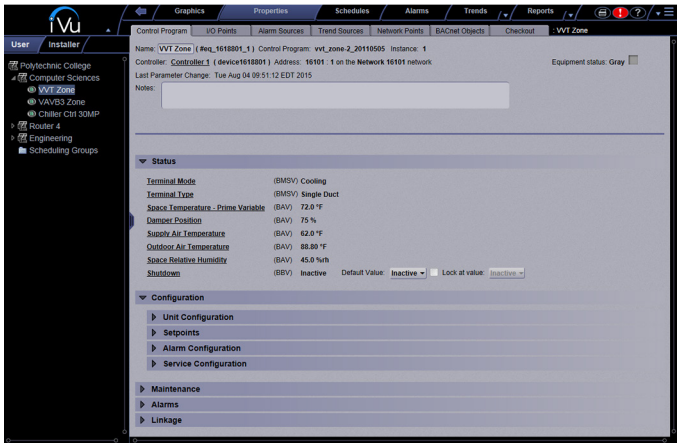
Properties pages (page 25)

You can monitor and control point sources.

1 Select the equipment in the navigation tree.

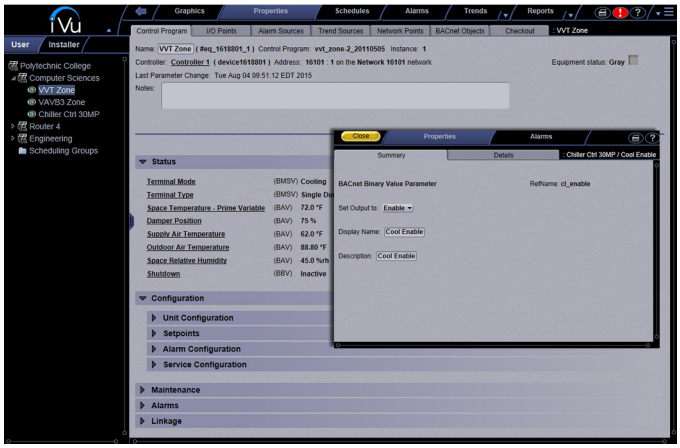
2 Click **Properties** page > **Control Program** tab.

3 Expand the plus sign next to the desired table.



Properties/Microblock popups

Click a property or point to open the microblock popup to view and change details, including forcing or locking values.



Graphics pages

You can view and adjust your system from Graphics pages, which include navigation maps, floor plans, and equipment.

Some typical items that may appear on a graphics page are:

- Button or switch to turn equipment on or off
- Input field to set a property value
- Drop-down list to select a state

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- Interactive zone sensor to override an unoccupied schedule
- Setpoint graph to adjust *setpoints* (page 38)
- Trend graph to view *trend* (page 55) information
- Link to jump to another i-Vu® Pro page or to the Internet
- A data table, chart, or color map that pulls information from a *custom report* (page 128).

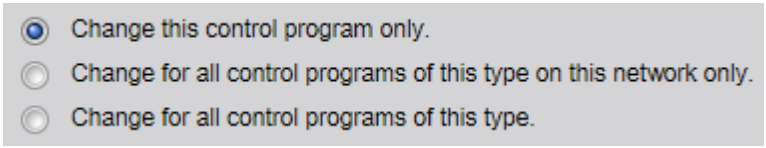
NOTES

- Right-click a value, then select **Details** to view and change properties in the microblock pop-up.
- Right-click a value, then select **Global Modify** (page 30) to view and change the property in other control programs.
- A yellow dashed box around a value indicates the value is locked or forced.

- If a graphic does not fit in the action pane, right-click it and select **Scale to Fit** to make it fit the action pane. Select **Scale to Fit** again to return the graphic to its original size.
- When a chart that is based on a report is displayed on a Graphics page, you can hover over various points on the chart to see values. You can also click on each item in the legend to turn that information on and off. See "*Using a custom report as the source for a Graphics page* (page 128)" in i-Vu® Pro Help for more information on a chart.

To attach a graphic in the i-Vu® Pro interface

1. On the navigation tree, right-click the item that you want to attach a graphic to, then select **Configure**.
2. Equipment graphic only: If the system has other control programs of this type, select which control programs you want to change.



NOTES

- If the control program is in an IP router, the second option will change the graphic for all control programs of this type only on the IP network.
- If the control program is on the network below an IP router, the second option will not change the graphic for the router's control programs of this type.

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3 Do one of the following:

If the graphic is...	
In the **Views Available** list	a. Select the graphic, then click **Attach**. b. Click **Accept**.
Not in the **Views Available** list	a. Click **Add New**. b. Browse to select the view file. c. Click **Open**. d. Click **Continue**. e. Click **Close**. f. Click **Close** again.

NOTES

- Select a graphic in the **Attached** list to edit the following information for the graphic:
  - **Display Name**–The name that appears in the **Graphics** button drop-down list
  - **Category**–The name of the category that multiple graphics may be sorted into in the **Graphics** button drop-down list

    NOTE Changes to **Display Name** or **Category** apply only in the i-Vu® Pro interface and are not retained if you *export source files* (page 275).
  - **Reference Name**–The name that is used to create links to the graphic in ViewBuilder
  - **Default View**–Sets the selected graphic as the default view if the tree item has multiple graphics. The default graphic is bolded in the **Attached** list.
    Included in download–Equipment graphics only. Select to have the .view file included in an **All Content** download so that it can be uploaded by Field Assistant. The graphic will have beside it in the **Attached** list. Requires 4.x or later drivers.

- You can click **Delete Unused** at the bottom of the **Views** section to delete all unattached graphic files from your system.

To edit a graphic from the i-Vu® Pro application in ViewBuilder

1 In the i-Vu® Pro interface, double-click the controller in the navigation tree or right-click and select **Configure**.

2 Click **Edit Existing** button under **Views.**

3 Click **Save as** and place the file in an appropriate folder.

4 Open ViewBuilder.

5 Select **File** > **Open.** Browse to your saved graphic and click to open.

6 Edit and save with a new name - the original system name is locked and cannot be used for an edited graphic.

NOTE Names are case sensitive and should not have spaces and/or special characters.

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To edit a graphic on an i-Vu® Pro client

On an i-Vu® Pro client, you can get a copy of a graphic from the server, edit it, then put it back on the server.

To get the graphic

1. On the i-Vu® Pro navigation tree, right-click the item that the graphic is attached to, then select **Configure**.
2. At the bottom of the **Views** section, click **Edit Existing**.
3. Select the graphic you want to edit.
4. Click **Save**.
5. Browse to the folder you want to put the file in.
6. Click **Save**.
7. Click **Close**.
8. Click **Close** again.

To put the edited graphic back on the server

1. On the i-Vu® Pro navigation tree, right-click the item that the graphic is attached to, then select **Configure**.
2. At the bottom of the **Views** section, click **Add New**.
3. Browse to select the .view file.
4. Click **Open**.
5. Click **Continue**.
6. Click **Close**.
7. Click **Close** again.

To organize multiple graphics for a tree item

In the i-Vu® Pro interface, you can create categories and assign graphics to them so that the **Graphics** button drop-down menu has the graphics arranged by category. This is typically done in ViewBuilder or SiteBuilder. See "To define i-Vu® Pro navigation" in ViewBuilder Help and "To attach graphic files" in SiteBuilder Help.

To add a Graphics category in the i-Vu® Pro interface

1. On the **System Options** tree, click ▷ to the left of the **Categories** folder, then select **Graphic**.
2. Click **Add**.
3. Type the **Category Name** and **Reference Name**.
4. Optional: Select a privilege so that only operators with that privilege can access graphics in the category.
5. Click **Accept**.

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NOTES

- To edit a category, select the category, make your changes, then click **Accept**.
- To delete a category, select the category, click **Delete**, then click **Accept**.

To assign a graphic to a category in the i-Vu® Pro interface

1 On the navigation tree, right-click the item that the graphic is attached to, then select **Configure**.

2 Under **Views**, select the graphic in the **Attached** list.

3 Select the category in the **Category** field.

4 Click **Accept**.

To control equipment using an interactive zone sensor

An equipment graphic may include an interactive zone sensor that provides you with the following control.

If the sensor is a...	You can...
ZS 	• Click ▲ to raise the setpoint or ▼ to lower the setpoint. • Click ⏻ to override the schedule and put the zone in an occupied state. To cancel an override, continue clicking ⏻ until the display shows 0. • See that the zone is in an occupied state when the green LED is lit.
SPT Standard, Plus, or Pro 	• Click the **WARMER** or **COOLER** button to adjust the setpoint. • Click the **MANUAL** button to override the schedule and put the zone in an occupied state. • Click the **INFO** button to cycle through the following information: • Outside air temperature, if enabled in the control program • Override time remaining • Heating setpoint • Cooling setpoint • See the **Occupied/Unoccupied** state in the display.

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If the sensor is a...	You can...
SPT Pro Plus 	• Click the **WARMER** or **COOLER** button to adjust the setpoint. • Click the **MANUAL** button to override the schedule and put the zone in an occupied state. • Click the **INFO** button to cycle through information such as: • Outside air temperature • Override time remaining • Heating setpoint • Cooling setpoint • Click the **FAN** button to adjust the fan speed. • Click the **MODE** button to perform customer-specific functions. • See the **Occupied/Unoccupied** state in the display.

To control equipment using an interactive zone control

An equipment graphic may include an Interactive Zone control that provides you with the following control.

To...	Click...
View or change temperature	Click . Use to raise or lower the setpoint. **TIP** Check the **Show Zone Color** option in the control's properties in ViewBuilder to match the color of the control's border with the thermographic color of the zone.
Set timed override	Click . Use to override the schedule and put the zone in an occupied state. ○ **0** — No override is active. ○ **999** — Continuous override is active. The override remains in effect until the schedule transitions to occupied or until you cancel it. ○ Any other number — Number of minutes remaining until the next transition to an unoccupied state. To cancel an override and return control to the schedule, continue clicking until the display shows 0.

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To...	Click...
View or change fan speed	Click . Use to change the fan speed. **NOTE** Check the **Allow Fan Adjustment** option in the control's properties in ViewBuilder to enable fan speed control.

Click **Accept** to confirm changes.

Properties pages

Properties pages are automatically generated from control programs. **Properties** pages show the status of a piece of equipment and the points/properties currently stored in it. See *Check out point setup* (page 267) for details.

Use **Properties** pages to:

- View the status of a piece of equipment. See *Colors and status in the i-Vu® Pro interface* (page 16).
- View or change the equipment point/properties currently stored in the controller.
- *Commission equipment* (page 266)
- Set up Linkage.

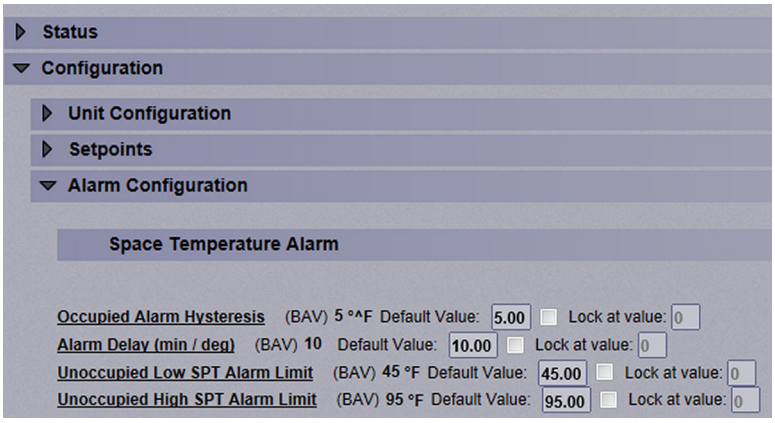
Refer to your individual controller's *Installation and Start-up Guide* for detailed explanations of the points/properties.

To view or edit properties on a Properties page

1 Select a controller on the navigation tree, click **Properties**, and then select the appropriate tab.

NOTE You must resolve any condition described in red text at the top of the page before a **Properties** page can obtain current information from its controller.

2 Click ▶ to show property details.



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3 Do one of the following to change a property:

- Select or clear a checkbox
- Select an item on a drop-down list
- Change text in a text field

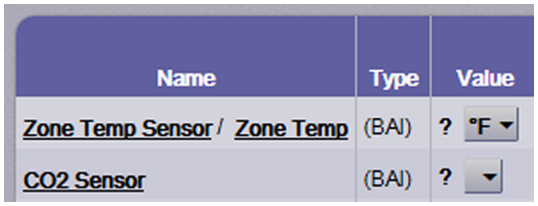
4 Click **Accept**.

NOTES

- Click the bold, underlined point name to open the editable microblock pop-up
- Right-click a value, then select **Details** to view and change properties in the microblock pop-up.
- Right-click a value, then select **Global Modify** (page 30) to view and change the property in other control programs.
- Use **Search/Replace** on the **Network Points** tab to replace a term in the point address with another address.
- For the legend of status colors, see Colors and status in the i-Vu® Pro interface.
- A yellow dashed box around a value indicates the value is locked or forced.

Point types

A point name on the Properties page is followed by a code that tells you the point type. The table below describes each code.



Code	Point type
AI	Analog Input
ANI	Analog Network Input
ANI2	Analog Network Input 2
ANO	Analog Network Output
ANO2	Analog Network Output 2
AO	Analog Output
ASVI	BACnet Analog Sensed Value Input
AV	Analog Value
BAI	BACnet Analog Input
BALM	BACnet Alarm

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Code	Point type
BAO	BACnet Analog Output
BAV	BACnet Analog Value
BBI	BACnet Binary Input
BBO	BACnet Binary Output
BBV	BACnet Binary Value
BFM	Floating Motor
BI	Binary Input
BMSV	BACnet Multi-State Value
BNI	Binary Network Input
BNI2	Binary Network Input 2
BNO	Binary Network Output
BNO2	Binary Network Output 2
BO	Binary Output
BPTA	Pulse to Analog Input
BPWM	Pulse-Width Output
BRS	RS Sensor
BRSF	RS Sensor Fan
BSVI	BACnet Binary Sensed Value Input
BTLO	Timed Local Override
BTRN	Trend Log
BV	Binary Value
DI	Digital Input
DO	Digital Output
EVT	BACnet Alarm
POLLAVG	Average Analog Properties
POLLMAX	Maximum Analog Properties
POLLMIN	Minimum Analog Properties
POLLTOT	Total Analog Properties
PTA	Pulse to Analog Input
TLO	Timed Local Override

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Logic pages

The **Logic** page shows a custom control program for a programmable controller. The live data (yellow text) is updated every few seconds and when you click the **Logic** button. The control program uses exact property values for its calculations, but values are rounded to 2 decimal places when displayed on the **Logic** page.

TIP Click anywhere on the **Logic** page, then use your keyboard's Page Up, Page Down, and arrow keys to scroll through the page.

NOTE If you find an unexpected value on a **Properties** page or a **Logic** page, you can use the **Logic** page to troubleshoot.

To view a Logic page

1. Select a custom control program on the navigation tree.
2. Click **Logic**.
3. Click a microblock to view its details.

To locate a microblock, section, or label

1. Right-click the Logic page, then select **Jump To**.
2. Do one of the following:
   - On the **Microblock** or **Section** tab, select an item to have it located and highlighted.
   - On the **Label** tab, select a label to display a reduced logic page outlined in yellow that shows all instances of the label. A red box indicates an output label; a yellow box indicates an input label. Click a red or yellow box to jump to that label in the full-size logic page.

     NOTE You can also click a label on the full-size Logic page to display the reduced Logic page.

To change properties, alarms, or trends

1. Click a microblock on the equipment's **Logic** page.
2. In the microblock pop-up, click the **Properties**, **Alarms**, or **Trends** button.
3. Change properties, alarms, or trends for that microblock in the same way that you would make changes on a regular *Properties* (page 25), *Alarms* (page 88), or *Trends* (page 56) page.
4. Click **Accept**.

NOTE Right-click a value, then select **Global Modify** (page 30) to view and change the property in other control programs.

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Using a Logic page to troubleshoot

The i-Vu® Pro application monitors your system and provides feedback. If you get unexpected feedback, you can use a Logic page as a troubleshooting tool. On the Logic page, work your way backward (right to left) through the sequence in the control program to discover what caused the problem. See Microblock Reference to understand what each microblock in the sequence is doing.

Unexpected feedback	**Possible cause**
Space temperature reads excessively high or low	• The sensor has a short (or open) circuit. Verify wires are properly connected at the sensor and controller. • A sensor is missing or configured incorrectly. Open the sensor or input microblock from the Logic page to verify its configuration.
Equipment displays an unexpected color - effective setpoints are different than the programmed setpoints	**NOTE** Equipment operates using effective setpoints. Open the Setpoint microblock from the Logic page and check the following: • Hysteresis • Demand Level • Optimal Start • Timed Local Override (TLO) • Setpoint Adjust
Gaps in trend data on trend graph	Usually gaps result if network communication was disrupted or a point was temporarily disabled. If the gap is not the result of interrupted communication, send reports more frequently. From the Logic page, open the trend microblock that displayed the gap in data, then decrease the notification threshold so that it is approximately 40% of the buffer size (allocated memory size) for that microblock.
The i-Vu® Pro application is not receiving alarms from a BACnet alarm microblock	Locate the microblock on the Logic page. If the color square on the microblock is black, the alarm is disabled. To enable it: **1** Click the microblock. **2** In the microblock pop-up, click the **Alarms** button. **3** On the **Enable/Disable** tab, select **Potential alarm source**.
The equipment is on when I expect it to be off, or off when I expect it to be on	Use the Logic page to determine whether the program is sending an unexpected signal and why, or if the problem is with the physical equipment. For example, the On-Off-Auto (OOA) switch on the controller for that equipment may be locked in the On (Hand) position.
Sensor value on the Properties page does not match the reading from handheld sensor	Calibrate the sensor. On the Logic page, check to see if the output point is locked on.

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Changing multiple microblock properties

Two i-Vu® Pro features, **Global Modify** and **Global Copy**, allow you to view and change multiple microblock properties at the same time.

CAUTION Global Modify and Global Copy are convenient for making widespread changes in your system. But, because they do not take into account the operation of individual equipment, your changes could produce undesired results in your equipment or system operation. Use with caution because these features do not have an Undo function.

TIP Click to copy a microblock's reference path to the clipboard so you can paste it into another field or application.

To use Global Modify

Use the Global Modify feature to:

- View a microblock's full path, control program name, and the privileges required to change its properties.
- View or change a single property in several control programs at one time.
- View errors on Graphics and Properties pages.

1. Browse to any page that displays the property you want to view or change.
2. Do one of the following to open Global Modify:
   - **Alt+click** the property.
   - Right-click the property and select **Global Modify.**
3. Make changes to the **Control Program** field, if needed.

   NOTES

   - Use wildcards in the **Control Program** field to broaden the search.
     For example:

     `vav*` matches vav, vav**1**, vav**x**, vav**12345**

     `vav*z` matches vavz, vav**1**z, vav**x**z, vav**12345**z

     `vav*1*2` matches vav12, vav**abc**1**xyz**2

     `vav??` matches vav**11**, vav**12**, vav**zz**, but does not match vav, vav1, vav123

     `*` matches any control program
   - Click **Show Advanced** to view the location, value, and privileges associated with this property.

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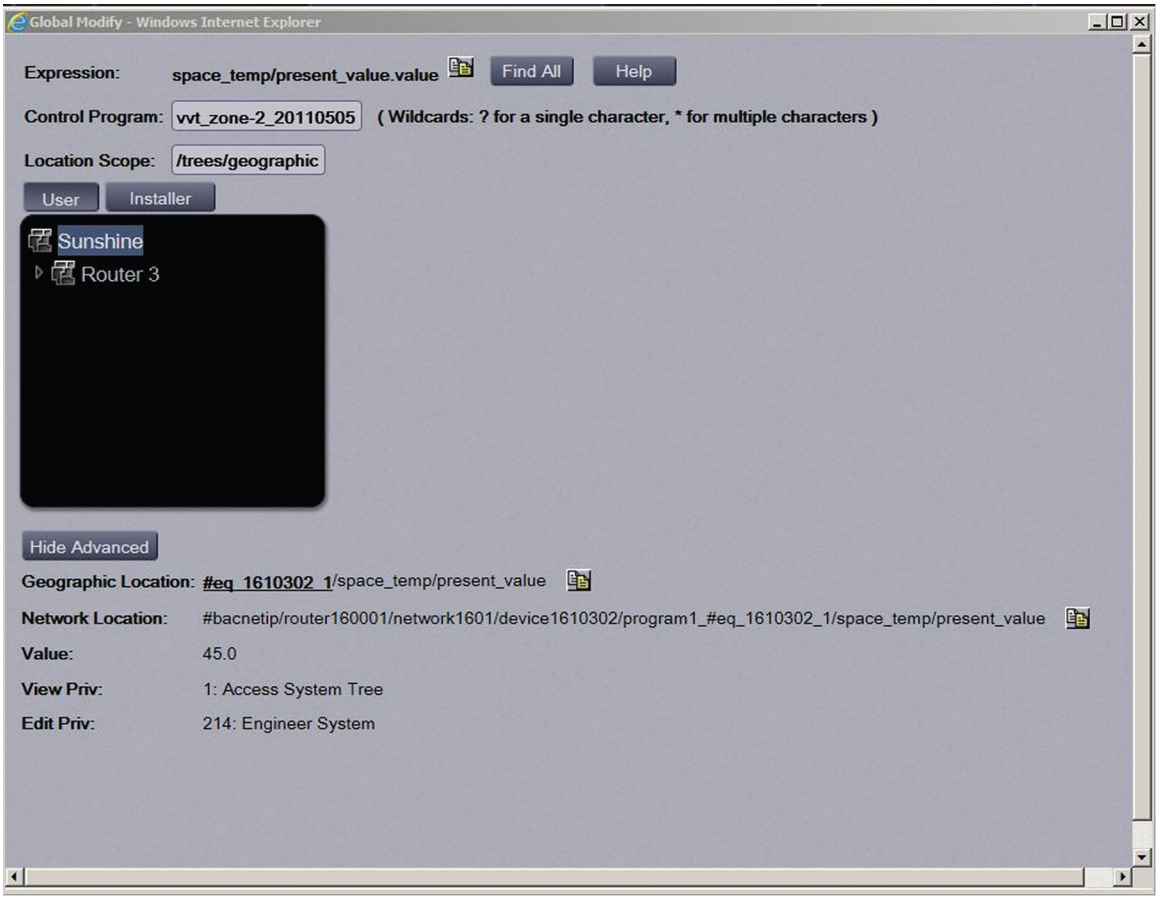

4 Select the tree item that you want to search under for every occurrence of that microblock in other control programs.

5 Click **Find All**.

6 Select the properties in the list that you want to change.

7 Do one of the following:

a) Type a **New Value** to the right of each selected item.

b) Select **Enable All**, type a new value in b, then click **Set All To**.

c) Select **Enable All**, type a new value in c, then click **Change All By**.

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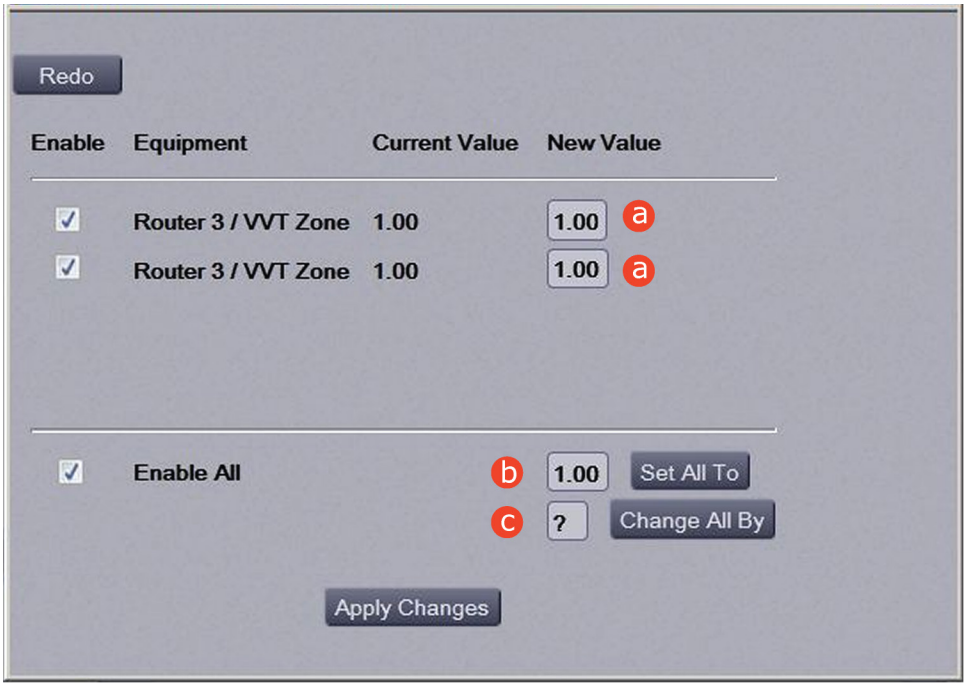

8 Click **Apply Changes**.

NOTE To modify several properties in multiple control programs at the same time, use **Global Copy**.

To use Global Copy

Use **Global Copy** to copy any or all of the following from one control program to other equipment using the same control program:

- Embedded trend graph settings
- Custom trend graphs
- Custom reports
- Other editable properties to other pieces of equipment using the same control program.

1 On the navigation tree, right-click the piece of equipment that has the properties you want to copy, then select **Copy Control Program Properties**.

2 Click **OK** when you see **This will copy this control programs properties to other control programs of the same type. Continue?**. This opens the next screen and does not lock in any changes.

3 In the **Global Copy** dialog box, select the items that you want to copy.

4 Select the area on the tree containing similar control programs that you may want to copy these properties to, then click **Search**.

All instances at that level and below are listed in the expanded lower window.

5 Check or uncheck items as needed.

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6 Do one of the following:

- Check **Skip bad values** to copy all values except a bad value (it cannot be copied because you do not have the necessary privilege, the property to be copied is undefined, etc.).
- Uncheck this field to prevent any values from being copied if a bad value is found.

7 Click **Apply Changes**, then close the **Global Copy** dialog box.

Checking controller status

On the i-Vu® Pro navigation tree, you can select a router or the system level and then click the **Devices** button to:

- *View the status of controllers* (page 33)
- View controller information such as address, model, driver, and .view files included in download
- *Download or upload to resolve a mismatch* (page 36)
- *Troubleshoot network communication* (page 206)
- *Download or upload files for Field Assistant* (page 274)

NOTES

- Use **Ctrl+click**, **Shift+click**, or the **Select All** checkbox to select multiple controllers.
- Click **Hold** to stop pending downloads or uploads. Active downloads or uploads cannot be stopped.
- Icons in the **Tasks** column indicate the following:

	Active—The i-Vu® Pro application is downloading to the controller.
	Active—The i-Vu® Pro application is uploading from the controller.
	Pending—You initiated the download, and the controller is waiting for its turn to download.
	Failed—The download failed. See *If a controller fails to download* (page 299).
	On Hold—Indicates you clicked **Hold** to stop a pending download.

- Click in the upper left-hand corner to view a log of activity on the **Devices** page in the current session. **Copy to Clipboard** lets you copy the text to paste it into another application.

Status messages

On the i-Vu® Pro navigation tree, you can select a router or the system level and select the **Devices** page to view the status of controllers. The **Status** column shows a description of the controller's current state. Hold your cursor over that description to see hover text with a more detailed description.

If multiple conditions exist, the i-Vu® Pro interface displays the message with the highest priority.

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The table below shows all possible messages. The message color indicates the following:

Black—In process
Red—An error occurred
Blue—Requires action from the user

i-Vu® Open routers/controllers

Status column message	Hover text message	Notes
Black messages:		
Downloading	The controller is downloading, communications may be disabled	
Uploading	The controller is uploading, communications may be disabled	
Pending	This controller is waiting to be processed.	
Processing Clipping	Clipping operation in progress. Do not make changes during this operation, as they may corrupt your system.	
Red messages:		
Communications Error	Cannot communicate with this controller.	
Connection Disabled	The connection for this controller has been disabled.	Occurs if someone stopped the connection.
Connection Error	The connection for this controller failed to start.	Occurs if the connection is misconstrues or failed to start.
Controller offline	The controller is offline.	This only appears for equipment controlling slave devices that it is unable to communicate with.
Download Failed	(Message depends on the cause of the failure.)	
Download Not Permitted	This controller is not permitted to download.	
Error	An unknown error has occurred.	
Missing Files	Upload failed. Server is missing the source files.	
Not Uploadable	This controller is not configured for content upload.	Occurs if you attempt to upload a controller with a pre-4.x driver.
Out of Service	This controller is out of service.	
Unsupported Controller	This controller does not support content upload.	
Upload Not Permitted	This controller is not permitted to upload.	

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Status column message	Hover text message	Notes
USB Unplugged	Cannot communicate with the controller because the USB cable is unplugged.	Applies only to the i-Vu® Standard and Plus applications.
Blue messages:		
Controller Replaced	This controller has been replaced by another controller of the same type in the field.	4.x driver only
Download All Content	Please download all content to the controller.	
Download Parameters	To download parameters, highlight row and select **Parameters** from the Download Action menu and click **Download**.	
Download Schedule	To download schedules, highlight row and select **Schedules** from the Download Action menu and click **Download**.	
Driver Parameter Mismatch	Driver parameter differences detected. Upload parameters from the controller or download parameters to the controller.	
Network Ready for Upload	To upload this network, select the router in the tree and **Find Devices**.	
Parameter Mismatch	Control program parameter differences detected. Upload parameters from the controller or download parameters to the controller.	
Program Mismatch	Content differences detected. Upload all content from the controller or download all content to the controller.	4.x driver only
Unprogrammed Controller	Applies only to a programmable controller that does not have any control programs in it.	To add control programs, click **Add Control Program**.
Upload All Content	Please upload all content from the controller.	
General messages:		
✓	This controller is ok.	
Cancelled	The last operation on this controller was cancelled	

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CCN controllers/equipment

Status column message	Hover text message	Notes
<blank>	This is a known control program from a previous discovery, but communications with it has not been attempted since the user logged in.	
✓	Successful rescan.	
Downloading	Downloading changes. Communications will resume shortly.	
New Control Program	A new controller was found at the scanned address and added to the system.	
New Version Applied	This controller's program or views have been updated with a newer version.	
Red messages:		
Communications Error	Cannot communicate with this controller.	
Download Failed	<The message is specific to the failure.>	
USB Unplugged	Cannot communicate with the controller because the USB cable is unplugged.	Applies only to the i-Vu® Standard and Plus applications.
Blue messages		
Classification Mismatch	The controller at this address was previously a Bridge routing to other controllers.	
Download All Content	Please download all content to the controller.	
Model Mismatch	The controller at this address is the wrong model.	
Rescan Required	A configuration change was made to this control program therefore a rescan is required to get the correct graphic and control logic components.	

Handling parameter mismatches

A parameter mismatch occurs when a value in a controller does not match the value in the system database. This can be a driver or control program value.

Use either of the following methods to handle mismatches in your system.

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- Method 1: Check **Always resolve parameters on mismatch** on the **System Settings** > **Communications** tab to have the i-Vu® Pro application automatically upload if a value was changed in the controller or automatically download if a value was changed in the i-Vu® Pro interface.

- Method 2: Uncheck **Always resolve parameters on mismatch** so that you can evaluate a mismatch to determine the correct value.

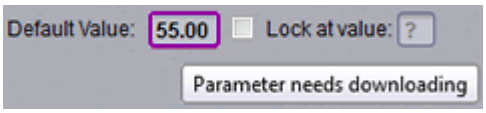
To find mismatches in your system

If your system uses Method 2, you can find mismatches in the following places:

- The **Devices** page > **Manage** tab > **Status** column will show **Parameter Mismatch.**
- The **Properties** page for a controller, driver, control program, or point will show one of the following red messages at the top of the page stating:

  Control Program parameter differences detected.
  Driver parameter differences detected.
  Parameter download required.

  The value that has a discrepancy will appear with a purple box around it. Hover your cursor over the field to see:



or

- Go to **Reports** > **Equipment** > **Parameter Mismatch**, and then click **Run** to get a report of any existing mismatches in your system.

NOTE The **Downloads** page > **Tasks** column will show **Resolve Parameters** for any mismatches that your system discovered in the 3 places listed above.

To resolve a mismatch

1 Go to one of the following:

- **Devices** page - Click the **Parameter Mismatch** link
- **Properties** page that shows one of the red messages above

2 Click one of the following:

- **Resolve** to let the i-Vu® Pro application download changes made in the i-Vu® Pro interface or upload changes made in the controller. Click the **Details** button to see what the discrepancy is and whether **Resolve** will download or upload parameters. See NOTE below.

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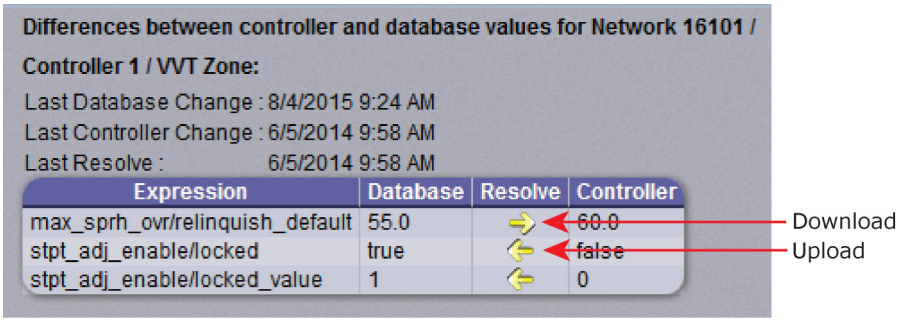

- **Upload** to upload the parameters from the controller to the i-Vu® Pro application
- **Download** to download the parameters from the i-Vu® Pro application to the controller

NOTE On the **Devices** page with **Show Control Programs** unchecked, if a controller has simultaneous mismatches in the driver and control program, clicking **Details** will show that a control program mismatch exists but it will only show details for the driver mismatch. You must go to the control program in the tree to see details of that mismatch. However, clicking **Resolve** will resolve both mismatches.

Managing setpoints

The **Setpoint** graphic shown on a standard equipment graphic indicates the base setpoint values (Occupied High/Low, Unoccupied High/Low). The i-Vu® Pro application reads these values back periodically, typically within 10 seconds. The timing can vary based on network traffic, the number of controllers in the database, and several other variables. Setpoints that are changed in the field via another user interface are displayed in the i-Vu® Pro interface as soon as they are detected.

You can, at any time, change the setpoints from i-Vu® Pro graphics by using the slider or by entering numeric values directly. Updated setpoints are transmitted to the controller when you **Accept** the changes. Setpoints can also be changed on the **Properties** page > **Control Program** tab > **Space Temperature and Setpoints**. or **Configuration** > **Setpoints**.

NOTE Power and Standard operators may only edit **Occupied/Unoccupied** and **Heating/Cooling** setpoints. They cannot edit **Demand** levels or more detailed setpoint parameters.

The various color bars indicate adherence to or deviation from the setpoint. You can change the current default settings for setpoint deviation. Select a color band on the setpoint graph to see the current setpoints in the **Heating** and **Cooling** fields. The values in this graphic are Fahrenheit. See setpoint descriptions below.

NOTE This graphic is an example only. Your setpoints may differ.

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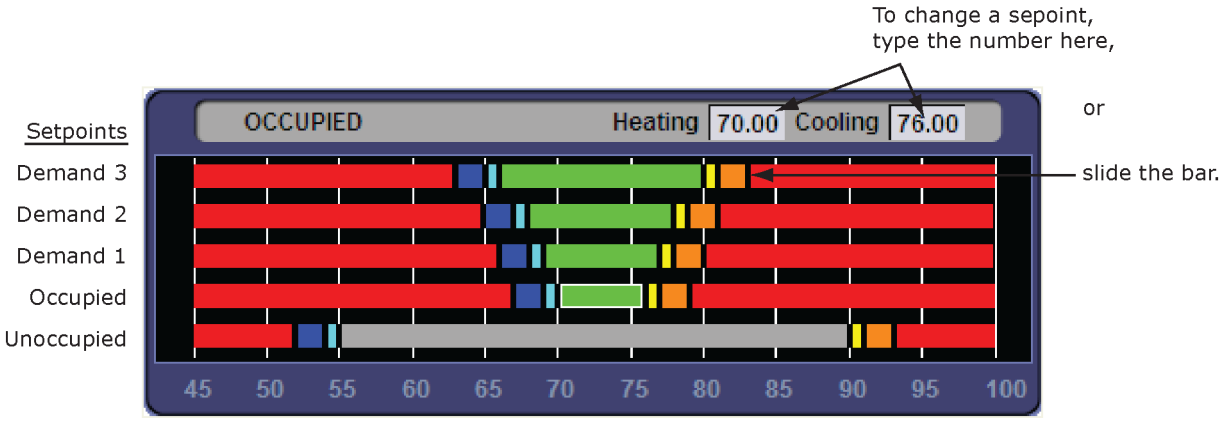

Color		Condition
	Green	Temperature is within the Occupied Low and High Setpoint
	Gray	Temperature is within the Unoccupied Low and High Setpoint
	Light Blue	Temperature is less than 2°F below the Occupied Low Setpoint
	Dark Blue	Temperature is more than 2°F below the effective Low Setpoint but less than 4°F below the effective Low Setpoint
	Yellow	Temperature is less than 2°F above the effective High Setpoint
	Orange	Temperature is more than 2°F above the effective High Setpoint but less than 4°F above the effective High Setpoint
	Red	Temperature is more than 4°F above or below the effective setpoints

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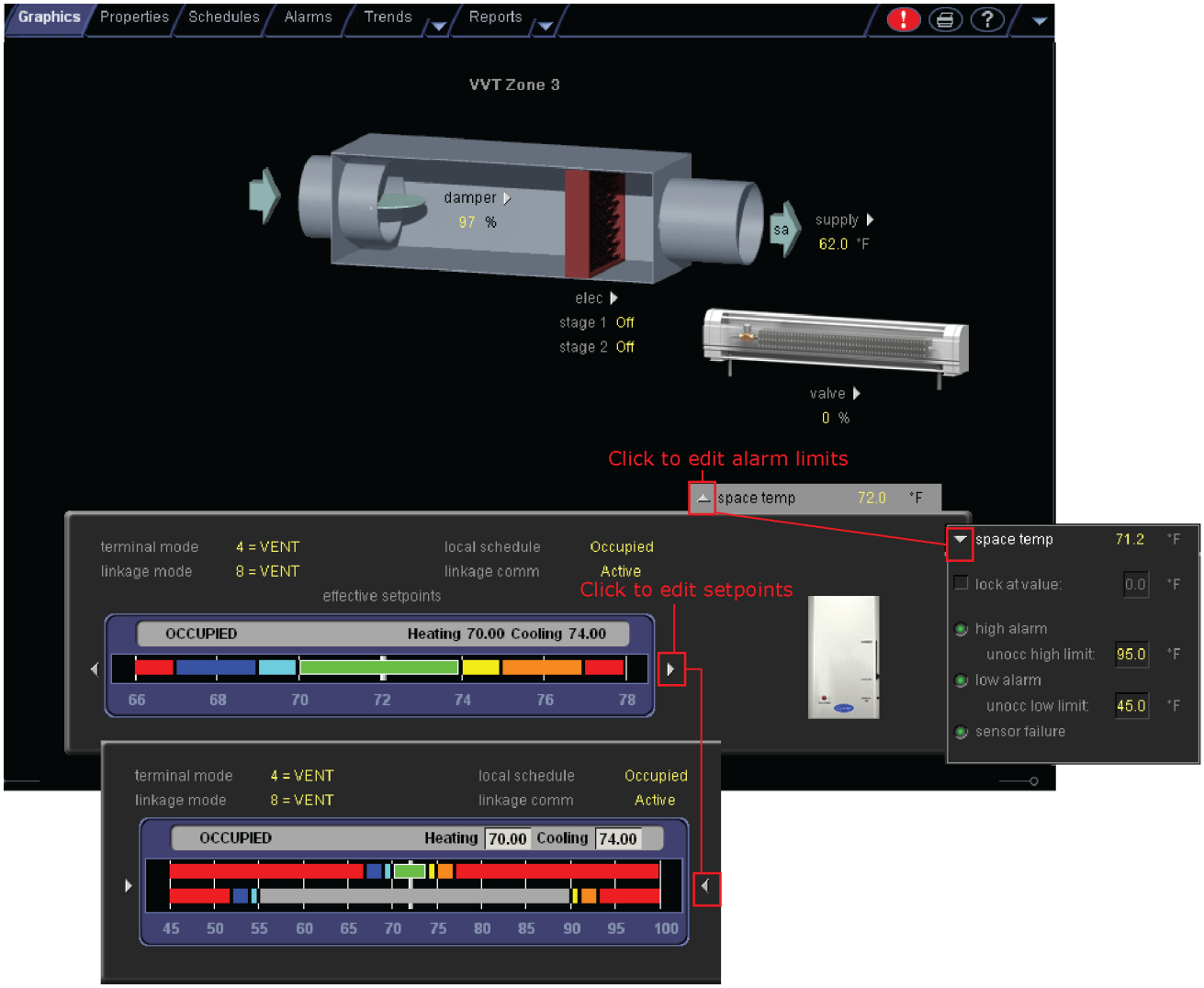

Adjust setpoints

- **Programmed setpoints** are set and changed by operators.
- **Effective setpoints** reflect the impact of other system conditions on the programmed setpoints, such as setpoint adjustments, and hysteresis. Effective setpoints control the equipment.

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To change programmed setpoints:

1 Navigate to a setpoint control in one of the following places:

- **Properties** page > **Control Program** tab > **Configuration** > **Setpoints**
- The setpoint microblock pop-up on a **Logic** page
- A **Graphics** page (Click a setpoint trend graph control to access the editable setpoint bar.)

2 Make changes on a programmed setpoint bar by either:

- Clicking and dragging the segment or the gap between segments
- Typing new values in the **Heating** and **Cooling** fields

3 Click **Accept**.

Demand Control

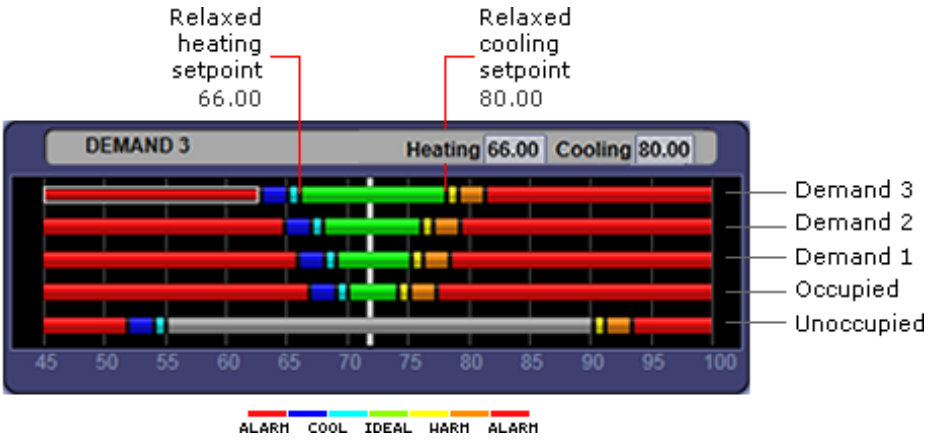
Demand Control is a cost-saving strategy that saves energy while maintaining comfort in the following ways:

- Controlling energy use to avoid peak demand, ratchet, or time of use utility charges
- Maintaining ventilation at relaxed setpoints rather than shutting down equipment (as with load shedding or duty cycling)

Before you can use Demand Control effectively, you must:

- Obtain details regarding past energy usage and peak demand, ratchet, and time of use charges from your energy provider.
- Understand the demand profiles of the zones you are controlling.

Demand Control can be customized at the zone level. For example, you may relax the setpoints in some zones, like break rooms and closets, by a few degrees, but you may not want to relax setpoints in computer rooms at all.



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To define Demand Control properties

1 On the navigation tree, select the electric meter.

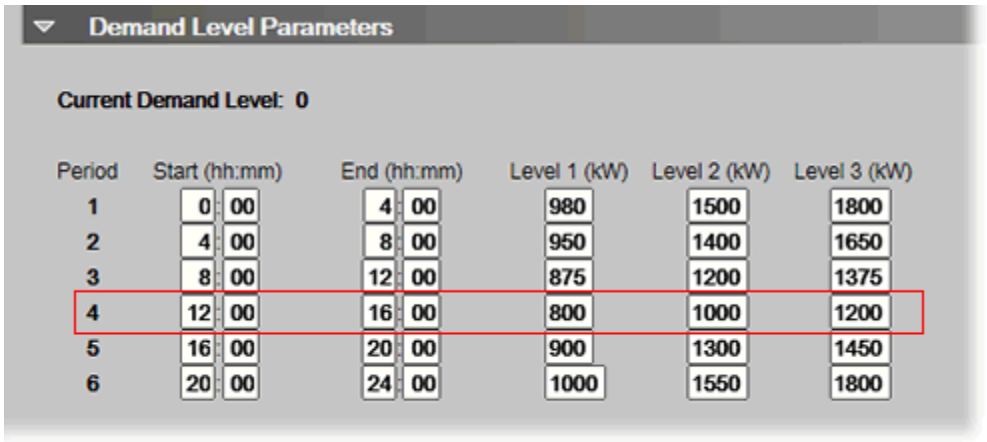
2 Select **Properties** > **Control Program** and expand the **Demand Level Parameters** section.

3 Type the **Start** and **End** time to define the time period that you want demand control to be in effect for this zone.

4 Type kilowatts per hour (kW/hr) in the **Level** columns to define the amount of power that the demand must exceed before the i-Vu® Pro system calls for a higher demand level.

NOTE Levels are defined in the electric meter control program in the Snap application. You can test the Demand Levels by locking the meter to a value.

In the example below, during Period 4, defined as 12:00 (noon) to 16:00 (4:00 p.m.), if the demand exceeds 800 kW/hr, the i-Vu® Pro system will use Demand Level 1 setpoints. If the demand exceeds 1000 kW/hr, the i-Vu® Pro system will use Demand Level 2 level setpoints and so on.



Configuring Optimal Start

Enable and configure Optimal Start on the **Properties** page > **Control Program** tab > **Configuration** > **Setpoints**. Your control program could be configured for **Optimal Start** or for both **Optimal Start** and **Optimal Start Type**.

NOTES

- The **Optimal Start** options depend on the revision date of the control program in your controller.
- Optimal Start is automatically disabled when **Properties** > **Control Program** > **Maintenance** > **Occupancy** > **BAS On/Off** is set to either **Unoccupied** or **Occupied**.

Optimal Start

Optimal Start adjusts the effective setpoints to achieve the occupied setpoints by the time scheduled occupancy begins.The Optimal Start recovery period may begin as early as 4 hours prior to occupancy. The algorithm works by moving the unoccupied setpoints toward the occupied setpoints. The rate at which the setpoints move is based on the outside air temperature, design temperatures, and capacities.

The following conditions must be true for optimal start to operate:

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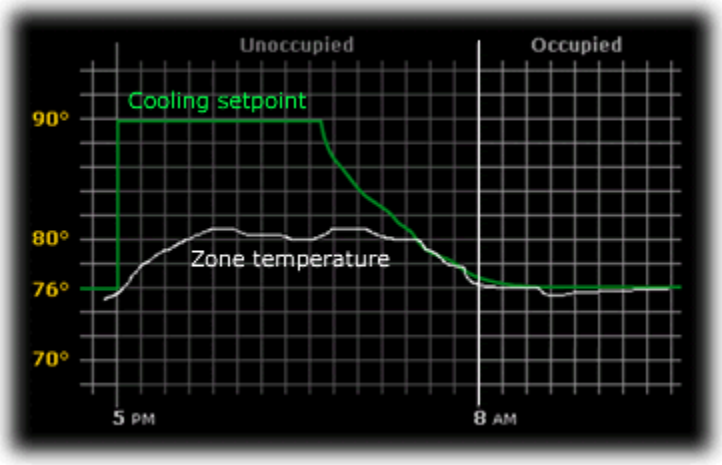
- On the **Properties** page > **Control Program** tab > **Configuration** > **Setpoints** > **Optimal Start**, the **Default Value** must be set greater than **0** and less than or equal to **4** (**0.00** disables **Optimal Start**).
- The system is unoccupied

NOTE If the Open controller does not have a valid outside air temperature, then a constant of 65° F is used. This value is not adjustable.

The actual equation that the controller uses to calculate **Optimal Start** is nonlinear. An approximation of the result is shown below.



To change **Optimal Start** settings:

1 In the navigation tree, select the equipment that you want to change.

2 Select **Properties** page > **Control Program** tab > **Configuration** > **Setpoints**.

Optimal Start Type

If you have **Optimal Start Type**, you must choose from the following:

- **None**
- **Temperature Compensated Optimal Start**
- **Learned Adaptive Optimal Start**

To select the method used to change from unoccupied to occupied setpoints:

1 In the navigation tree, select the equipment that you want to change.

2 Click **Properties** page > **Control Program** tab > **Configuration** > **Setpoints**.

3 Select option from the **Optimal Start Type** drop-down list.

4 See below to make further adjustments.

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None – The unit will not start to control to the occupied setpoints until the unit goes into an occupied mode. Setpoints do not ramp, but change immediately from unoccupied to occupied values. When you select **None**, you must set all Learning Adaptive Optimal Start transition factors, identified by their thermographic color, to 0. These are located directly above the **Effective Set Points** graph.

Temperature Compensated – The unit changes to occupied setpoints at some time prior to the occupied time, not to exceed the hours you set for **Optimal Start**. The start time is determined by the current error between space temperature and the appropriate heating or cooling setpoint. At that time, the setpoints do not ramp, but change immediately from unoccupied to occupied values. When selecting **Temperature Compensated**, you must set all Learning Adaptive Optimal Start transition factors, identified by their thermographic color, to 0. These are located directly above the **Effective Set Points** graph.

When selecting **Temp Compensated**, you can adjust the following:

- **Heat Start K factor (min/deg)** – If **Optimal Start Type** is **Temp Compensated**, this is the time in minutes per degree that the equipment starts before the occupied period when the space temperature is below the occupied heating setpoint (including any setpoint offset).
- **Cool Start K factor (min/deg)** – If **Optimal Start Type** is **Temp Compensated**, this is the time in minutes per degree that the equipment starts before the occupied period when the space temperature is above the occupied cooling setpoint (including any setpoint offset).

  NOTE The default value for the above is 15.00 and the range is 0 to 99.

Learning Adaptive Optimal Start – This function gradually adjusts the unoccupied setpoints over a specified period of time to achieve the occupied setpoint by the time scheduled occupancy begins. This learning adaptive algorithm uses the **learned heating capacity** and **learned cooling capacity** values to calculate the effective setpoints prior to the occupied start time. The algorithm calculates a learned cooling and heating capacity during the previous unoccupied time. Set the **Learning Adaptive Optimal Start** recovery period from 1 to 4 hours in **Optimal Start**. When the **Learning Adaptive Optimal Start** routine runs, adjustments are based on the color that is achieved when occupancy begins. Adjustment amounts are defined in the thermographic color fields located directly above the **Effective Setpoints** graph under **Setpoints**.

EXAMPLE The heating capacity for a zone is 5° per hour (default). When the zone becomes occupied, the zone temperature is 1° below the occupied setpoint, indicating a need for additional heat. Because the zone temperature was low by 1°, the learned heating capacity is decreased by the value entered in the **LtBlue** thermographic color field (0.0600 default). As a result, the learned heating capacity is adjusted to 4.94° for the next optimal start period. Since the algorithm has calculated that the equipment has less capacity to bring the temperature to setpoint within the configured recovery period, the setpoint adjustment begins sooner in the next unoccupied period.

To change the adjustment values in the **Learning Adaptive Optimal Start** routine:

1 In the navigation tree, select the equipment that you want to change.

2 Click **Properties** page > **Control Program** tab > **Configuration** > **Setpoints**.

3 Adjust the color fields between the Zone Setpoints graph and the **Effective Setpoints** graph.

When you determine that no further start time optimization is required, you can disable **Heating** and **Cooling Capacity** adjustments by setting the color field values to 0.0.

You can reset the learned heating and cooling capacities by entering a value into either the **Heating Capacity** or **Cooling Capacity**, located beneath the **Zone Setpoints** graph.

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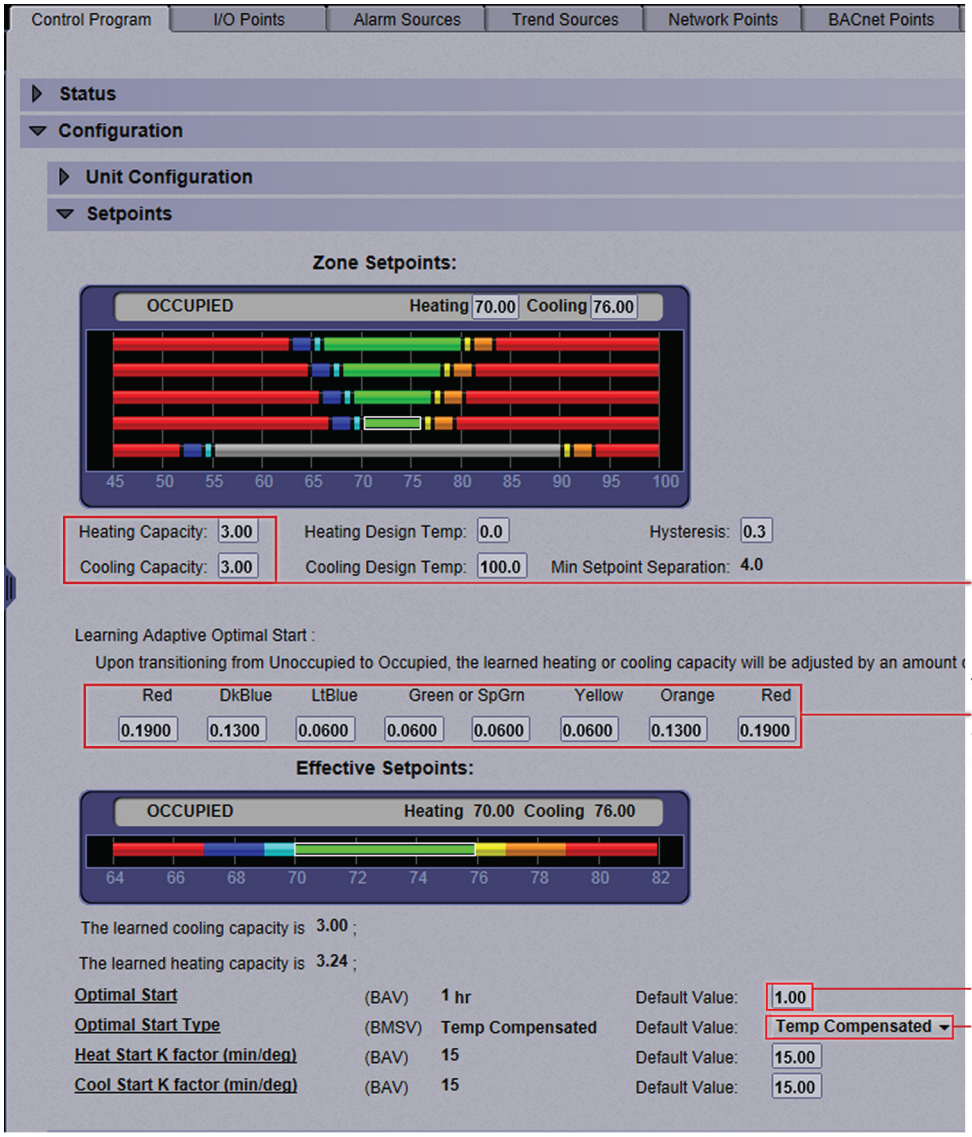

CAUTION When using **Learning Adaptive Optimal Start**, be sure that all equipment is properly maintained so that your system does not "learn" to compensate for dirty filters or loose fan belts.

Schedules

Using schedules, your equipment can maintain one set of setpoints during occupied periods to provide comfort, and it can maintain a different set of setpoints during unoccupied periods to reduce energy consumption. Schedules are an i-Vu® Pro system's most effective cost-saving strategy.

In the **User** view, you can apply a schedule to a single tree item or to a group of tree items.

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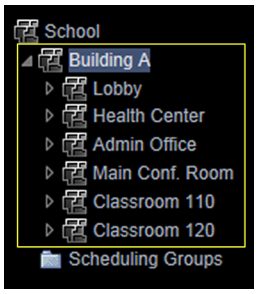

When you apply a schedule to a tree item, the schedule affects equipment at and below the area or equipment where the schedule was added.

When you apply a schedule to a schedule group, the schedule affects all pieces of equipment in the group.

For example, a school board meets every third Tuesday of the month and uses the lobby, main conference room, break room, and restrooms. You can create a schedule group to control these different areas with a single schedule.

NOTES

- When multiple schedules affect a tree item, the net result is the *Effective schedule* (page 50).
- Do not include preheating or precooling time in your schedules. *Optimal Start* (page 42), another cost-saving strategy, automatically calculates and controls precise preheating and precooling routines.
- If your system has no need to run schedules, you can turn off this feature. First, delete any existing schedules. Then go to the System Options (or System Settings) > *General tab* (page 312), and check the box **Disable Schedules feature**.

Creating and modifying schedules

To view schedules

1. Select a navigation tree item (site, area, or equipment).
2. Click **Schedules** > **View** tab.
3. Optional: Click a white **Effective** bar to view all the schedules that contribute to the resulting schedule. If the item has multiple schedules, the schedule closest to the **Effective** bar has the highest priority. You set a schedule's priority when you create the schedule.

NOTES

- When multiple schedules affect a single area or controller, the i-Vu® Pro application sorts the schedules by priority - the higher the priority, the closer the schedule is to the bar. You set a schedule's priority when you add a schedule.
- You can also view schedules on the following detailed, printable schedule reports. These reports are accessible from the **Schedules** page > **Reports** tab or from the **Reports** button drop-down menu.

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This report...	allows you to...
Schedule Instances	Find every schedule with its location that is entered at and below a selected tree item. This report can help you discover newly added and conflicting schedules.
Effective Schedules	View all equipment that may be scheduled and the net result of all schedules in effect for a selected date and time. See *Effective schedules* (page 50).

To print schedules

1 Select a navigation tree item and click **Reports** .

2 Click **Schedules** > **Schedule Instances** or **Effective Schedules**.

3 Click **Run**, then click **PDF**.

This report...	allows you to...
Schedule Instances	Find every schedule with its location that is entered at and below a selected tree item. This report can help you discover newly added and conflicting schedules.
Effective Schedules	View all equipment that may be scheduled and the net result of all schedules in effect for a selected date and time.

To apply a schedule to equipment

Schedules in the i-Vu® Pro application are typically based on zone occupancy.

1 In the User navigation tree, select the area or equipment you want to schedule.

NOTES

- To schedule all equipment in a specified area, select the area you want.
- You can schedule individual controllers from the **Installer** view, but you must be in the **User** view to schedule areas and routers

2 Click **Schedules**, then **Configure** tab.

3 Click **Add**.

4 Select a **Priority**. A schedule's priority determines whether affected zones will use occupied or unoccupied setpoints.

Select...	For...
Normal	A typical occupied period
Holiday	An unoccupied period that overrides a Normal schedule
Override	An occupied period that overrides a Holiday schedule

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5 Select a **Type**. See table below.

6 Type a schedule name in the **Description** field (50 characters maximum).

7 Enter desired values in the fields below **Description**.

8 On the graph, change a time segment's **Start** and **End** times by doing one of the following:

- Click the segment, then type the times in the **Start** and **End** fields.
- Click and drag either end of the segment or the entire segment.

9 Optional: Click **Add Time Period** to add one or more segments to the schedule. Or, select a segment and click **Delete Time Period** to delete that segment.

10 Click **Accept**.

Select this Type...	To use the schedule...
Weekly	Every week on the specified days
Date	On a single, specified date
Date Range	Between 2 specified dates
Date List	On multiple, specified dates
Wildcard	According to a repeating pattern (For example, the second Tuesday of every month)
Continuous	Continuously between specified times on 2 separate dates
Dated Weekly	Weekly between a start date and an end date (For example, the summer break in the school year)

NOTES

- To automatically download all schedules that you create or change, click > **System Options** > **My Settings** and, under **Preferences**, select **Automatically download schedules on each change**. If you want to manually download schedules, clear the **Automatically download...** field and then see *Downloading system changes to controllers* (page 296).
- When you apply a schedule to an item on the navigation tree, the schedule affects that item and all children of that item. If you do not want an item to be affected by schedules from a higher level, select **Ignore Schedules above this level** on the **Schedules** > **Configure** tab.

To apply a schedule to a group of items

You must create a group, then add members (areas, equipment, or other groups) to the group before you can apply a schedule to it.

1 On the **User** navigation tree, select **Scheduling Groups**.

Optional: If you have created folders to organize your groups, select the appropriate folder. See "To organize groups using folders" below.

2 Click **Add Group**.

3 Type a name for the new schedule group in the **Name** field.

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4 Optional: Change the default **Reference name**. A group's reference name must be unique throughout the system.

5 Click **Accept**.

6 Click **Add Members to Group**.

7 On the **Members** page, select the areas, equipment, or other groups that you want to add to the group from the tree on the right. Use **Ctrl+click**, **Shift+click**, or both to select multiple items.

8 Click **Add**.

TIP Use the **Raise** and **Lower** buttons to reorder items in the **Members** list. Changing the order is for your viewing convenience and does not affect the system.

9 Click **Accept**.

10 You will see the question **Execute download now?**. Click **OK**.

11 Click the **Schedules** button, then **Configure**.

12 Add a schedule to the group. See *To apply a schedule to equipment* (page 47).

To organize groups using folders

You can create folders and sort your groups into them to organize the Schedule Groups tree. For example, a large school system that has a group for each school may want to create an Elementary School folder, a Middle School folder, and a High School folder, and put the appropriate groups in each folder.

To create folders and add groups to them:

1 On the **User** tree, select **Scheduling Groups**.

2 Click **Add Folder**.

3 Type a name for the new folder in the **Name** field.

4 Optional: Change the default **Reference name**.

5 Click **Accept**.

6 Repeat steps 1–4 for each folder that you want to add.

7 Do one of the following to add a group to a folder:

- If you have already created the group, drag and drop it into the appropriate folder in the tree on the **Scheduling Groups** page, then click **Accept**.
- Select the folder in the tree on the **Scheduling Groups** page, then click **Add Group** to add a new group inside the folder.

NOTE You can also add a folder to a folder, or drag and drop a folder into another folder.

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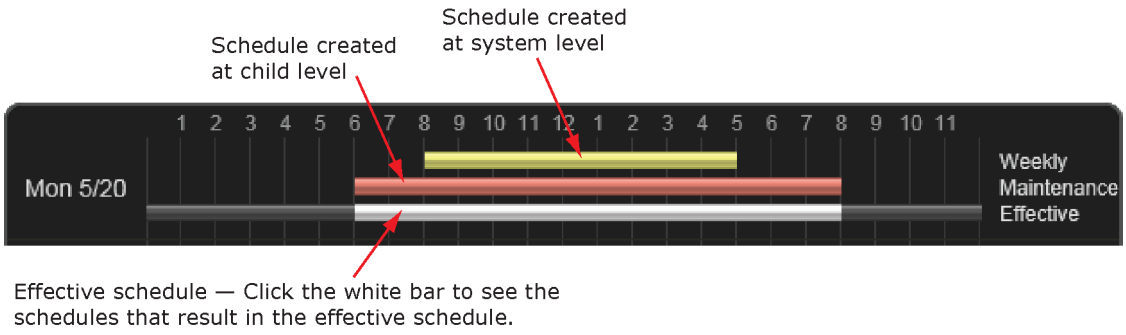
To edit or delete a schedule

1. Do one of the following:
   - On the navigation tree, select the tree item where the schedule was defined, then select **Schedules** > **Configure** tab.
   - In the **User** tree, click **Scheduling Groups**, then select the group that has the schedule you want to edit or delete.
2. Select the schedule you want to edit or delete.
3. Edit the fields you want to change or click **Delete**.
4. Click **Accept**.

NOTE Expired dated schedules are automatically deleted from the database at 3:30 AM every day. But expired schedules remain in the controller until the next time schedules are downloaded to the controller.

Effective schedules

The effective schedule that you see on the **Schedules** > **View** tab can be the result of multiple overlapping schedules.



The following schedule features can influence an item's effective schedule.

Feature	Description
Hierarchy	A schedule applied to an item on the i-Vu® Pro tree affects that item and all of its children. A child item's combined schedule could be the result of multiple schedules applied at different levels above it. To change a child item's combined schedule: • Add a schedule at the child that overrides the current schedule. See the *Priority* feature below. • Set the child to ignore the parent schedules. To do this, select the child item on the tree, then go to **Schedules** > **Configure**. Select the schedule, then click **Ignore Schedules above this level**. You can then add a different schedule for the child. Any schedule change that you make to an item affects it and all of its children.

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<table>
<tr><th>Feature</th><th>Description</th></tr>
<tr><td>Priority</td><td>You must assign one of the following priorities to every schedule.

<table>
<tr><th>Use...</th><th>For...</th></tr>
<tr><td>Normal</td><td>A typical occupied period</td></tr>
<tr><td>Holiday</td><td>An unoccupied period that overrides a Normal schedule</td></tr>
<tr><td>Override</td><td>An occupied period that overrides a Holiday time</td></tr>
</table>

EXAMPLE For a school, you define:
• A Normal schedule that has it occupied every Monday–Friday, 6 am–5 pm
• A Holiday (unoccupied) schedule for the week of Spring Break
• An Override schedule on the first day of Spring Break from 9 am–1 pm for the cafeteria only where a teacher's meeting will be held.</td></tr>
<tr><td>Type</td><td>You must assign one of the following types to every schedule.*

Weekly
Date
Date Range
Date List
Wildcard
Continuous
Dated Weekly

See To apply a schedule to equipment (page 47) for a description of each type.

EXAMPLE For a school, you define the following 3 schedules:
• Full calendar year: Normal, Weekly, Monday–Friday, 6am–5pm
• Summer months: Holiday, Continuous, 12am June 1st –11:59pm August 31st
• Work days in summer months: Override, Dated Weekly, Monday–Thursday, 9am–2pm</td></tr>
</table>

Using the **Priority** and **Type** options, you can often accomplish the combined schedule you need in several different ways. For example, the combined schedule resulting from the 3 schedules described above for **Type** could also be accomplished with the following schedules:

School year: Normal, Dated Weekly, Monday–Friday, September 1st–May 31st, 6am–5pm

Summer months: Normal, Dated Weekly, Monday–Thursday, June 1st–August 31st, 9am–2pm

Using schedule categories

Occupancy is the only default schedule category. It is a binary schedule category that allows a zone or piece of equipment to be defined as On when a space is occupied and Off when it is unoccupied.

You can add custom schedule categories to handle other conditions if the equipment's control program includes one of the following microblocks:

- Carrier Schedule
- Carrier Schedule with TLO and Override Status
- BACnet Time Clock with TLO and Override Status
- BACnet Modeled Schedule

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Creating a custom schedule category

1. Create the custom schedule category in the Snap application. See "To use custom alarm and schedule categories" in Snap Help.
2. In the Snap application, select the new category from the **Schedule Category** droplist in a the schedule microblock.
3. Create the same custom schedule category in the i-Vu® Pro interface. The **Reference Name** must be identical to the category's name in the Snap application. See "To add a custom schedule category in the i-Vu® Pro interface" below.

To add a custom schedule category in the i-Vu® Pro interface

TIP Study the default Occupancy category to understand the various properties you need to set when adding a new schedule category.

PREREQUISITES

- Add the custom schedule category in the Snap application. See "To use custom alarm and schedule categories" in Snap Help.
- In the Snap application, select the new category from the **Schedule Category** droplist in a Time Clock microblock.

1. On the **System Options** tree, click ▷ to the left of the **Categories** folder, then click **Schedule**.
2. Click **Add**.
3. Enter values or add items for the fields in each section of the page. See table below.

   NOTE The fields that you see depend on selections you made in previous sections.
4. Click **Accept**.

Field	Notes
Category Name	The name used in the i-Vu® Pro interface
Reference Name	• Must be unique in the database, be lowercase, and not contain any spaces. • This name must be identical to the name of the custom schedule category that you added in the Snap application. • Do not use **occupancy** as the reference name.
Allowed Type	Replace **Undefined** with one of the following: • **Boolean**: binary (on/off, true/false) condition • **Multi State**: list of integer-defined states. For example, 1=off, 2=on, 3=dim

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Field	Notes
Default Value	Displays what schedule value is in effect for times not specified by the schedule. To set this value, in the **Allowed Values** table, select the value that you want to use as the default, then click the **Make Default OK** button.
Allowed Values	If you selected **Boolean** above, select **True Value** or **False Value**. If you selected **Multi State**, click the **Add Value** button to create each schedule state.
Allowed Value Description	The name used in the i-Vu® Pro interface.
Pattern	Type `none`, `dark`, or `/_common/lvl5/graphics/patterns/xxx.gif`, where xxx.gif is any .gif file in the **webroot_common\lvl5\graphics\patterns** folder.
Priority Description	The name used in the i-Vu® Pro interface.
Index	Represents this priority's relative level of importance within this schedule category. The i-Vu® Pro application automatically assigns the priority index, which is zero for the first priority level. The higher the index value, the higher the priority of the schedule type relative to other schedules. BACnet limits the number of priority indices to 16.
Color	Color of the schedule bar on the **Schedules** page.
Schedule Types	The **Weekly** type is available for Index 0 only. The **Allow Wildcards** and **Partial Day** options affect all selected schedule types.
Default Schedule	The default schedule used when this category is selected. Create the schedule by adding segments for each state until every hour in the 24-hour schedule is covered by a segment. **EXCEPTION** If you selected **Partial Day** in the **Schedule Types** field, you do not have to add segments for the entire 24-hour period.

To view, edit, or delete a schedule category

1. On the **System Options** tree, click ▷ to the left of the **Categories** folder, then click **Schedule**.
2. In the table, select the category you want to edit or delete.
3. Edit the fields or click **Delete**.
4. Click **Accept**.

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i-Vu® Pro CCN schedules

There are 2 types of CCN schedules:

- 1 – 64 are local schedules that reside within the equipment
- 65 – 99 are network or global schedules, which are sent over a CCN network and received by controllers that contain network schedules

The i-Vu® Pro application supports both local and global schedules.

Most CCN equipment is shipped with the default schedule of **64**. See exceptions below.

Equipment	i-Vu® Pro's default schedule number
Comfort Controller/UC/Expansion Controllers	0
Any controllers using a custom equipment file (*.equip) created with EquipmentBuilder	0
Gen III VVT, 48/50EJ (Conquest), FSM, CSM	1
All PICs	64

CAUTION! Confirm the actual schedule numbers that are used in the controller, as they may have been changed from their programmed default settings.

In order to use i-Vu® Pro schedules, the i-Vu® Pro schedule number must match the CCN schedule number at the controller. This can be set in the i-Vu® Pro interface by selecting the equipment in the navigation tree and clicking **Schedules** > **CCN** tab. It is also accessible at the area or site level.

NOTE To reduce start-up labor on a retrofit project, existing network schedules can be used by the i-Vu® Pro application. However, switching to local schedules allows for schedule retention after a power failure and local schedule maintenance tables.

If a controller uses a different schedule number, complete the following steps.

CAUTION! Failure to follow these steps may result in unexpected equipment operation.

1 On the navigation tree, select the controller.

2 Click the **Schedules** page, then **CCN** tab.

3 Adjust the following fields:

- **Schedule number** - enter the CCN schedule number in use at the controller.
- **Override time (optional)** - enter the number of minutes of the desired override and verify that the controller override time is greater than or equal to this number
- **Override group** - enter the number of the group, if you have established one

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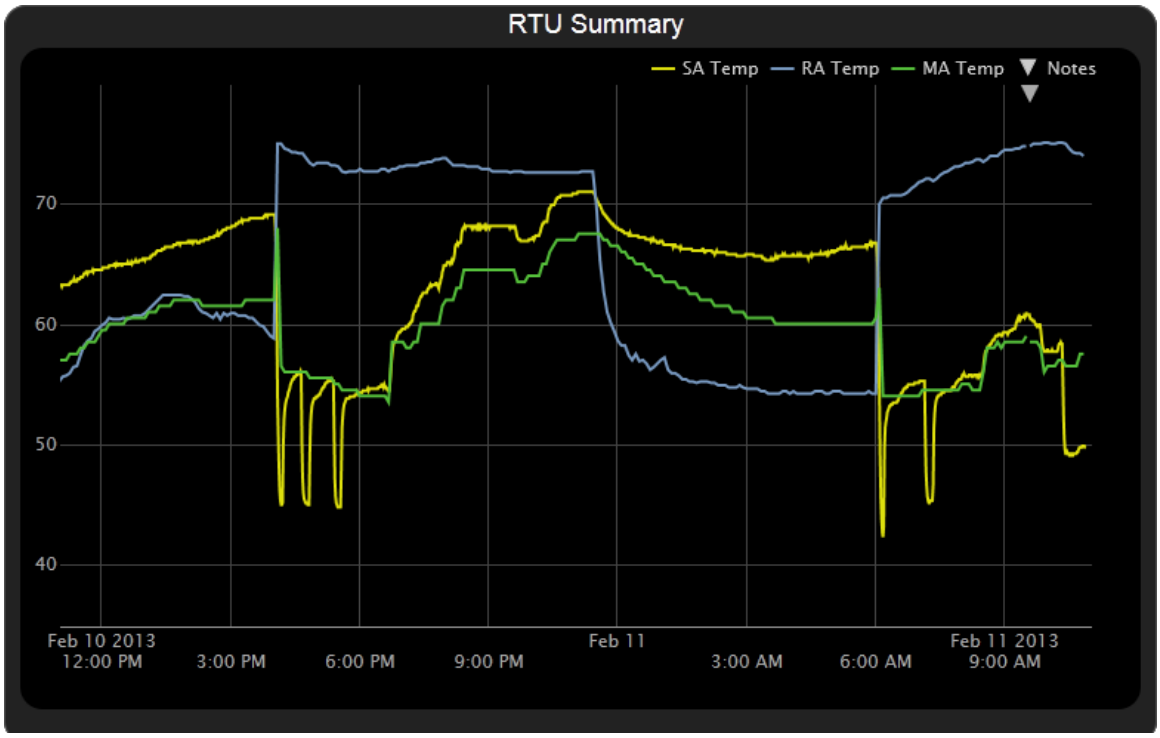
Trends

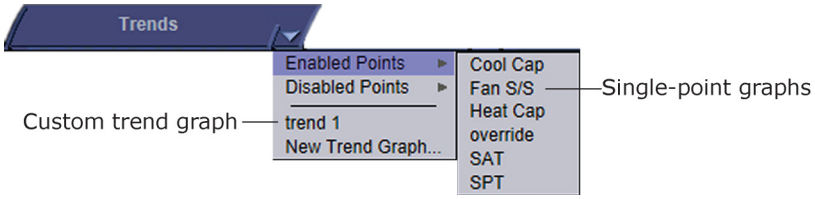
The i-Vu® Pro system can read and store equipment status values over time and then display this information in a trend graph to help you monitor the equipment's operation.



You can collect trend data for any point value in the i-Vu® Pro system. The controller reads point values at intervals that you define and then stores that data in the controller. A controller has limited memory for storing trend data, so you can set up historical trending to archive the trend data from the controller to the i-Vu® Pro database. A trend graph can display data from the controller and the database, or it can display only data stored in the database.

After you *set up the desired points for trend data collection* (page 56), you can:

- *View built-in trend graphs that show a single point* (page 58)
- *Create custom trend graphs with multiple points* (page 58)



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To collect trend data for a point

Before you can see a point's trend graph, you must enable trending for that point and then define how you want the controller to collect the point's data. This can be done in Snap or you can do it in the i-Vu® Pro interface using the instructions below.

NOTE I/O microblocks have trending capability built-in, and you enable trend logging in the I/O microblock. Any other microblock value must have a trend microblock attached in the control program, and you enable trend logging of the value in the trend microblock.

To set up a point's trending in the i-Vu® Pro interface:

1 On the navigation tree, select the equipment that has the point you want to trend.

2 Click the **Trends** button drop-down arrow, select **Disabled Points**, then select the point.

3 Click the **Enable/Disable** tab, then select **Enable Trend Log** to have the controller collect trend data.

4 Enter information in the appropriate fields. See table below.

5 Click **Accept**.

TIP You can set up all trends for a piece of equipment at once on the **Trend Sources** tab of the equipment's **Properties** page.

Field	Notes
Sample every _:_:_ (hh:mm:ss)	Records the point's value at this interval. **NOTES** • Set this field to one minute or greater. • This setting should be longer than the CCN bus poll interval. To determine the poll interval: 1. In the **Installer** tree, right-click the device polling the CCN controller, and then select **Driver Properties**. 2. Go to **Protocols** > **CCN**. 3. Scroll down to the **Program Status** heading. 4. In the first row of the table, subtract the third column value from the fourth column value to get the poll interval.
Sample on COV (change of value)	Records the point's value only when the value changes by at least the amount of the **COV Increment**. **NOTE** Use this method for a binary point or for an analog point that has infrequent changes in value.

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Field	Notes
Allocate memory for __ trend samples in the controller	The maximum number of samples that you want the controller to store. **CAUTION** Changing the value in **Allocate memory for __ trend samples in the controller** will delete all of the point's trend samples currently stored in the controller. Click the **Store Trends Now** button before changing the value to transfer the trend data from the controller to the system database. **NOTES** • Trending consumes memory in the controller. The amount of memory available depends on the type of controller. Each trended point consumes 48 bytes of memory plus 10 bytes for each trend sample. Each trend microblock consumes 416 bytes of memory plus 10 bytes for each trend sample. • Click **Reset** to delete all samples currently stored in the controller.
The above sample and memory allocation fields together define trend data storage in the controller in terms of hours. **EXAMPLE** If you set these fields so that samples are collected every 5 minutes for a maximum of 120 samples, the controller will store 600 minutes (5 x 120) or 10 hours of trend data.	
Stop When Full	Check this field to stop trend sampling when the maximum number of samples is reached.
Enable trend log at specific times only?	Collects trend data for the specific period of time you define in the **time** and **date** fields.
Enable Trend Historian	Archives trend data to the system database.
Store Trends Now	Writes all trend data in the controller to the system database without having to enable trend historian.
Every __ trend samples write to historian	Writes all trend data in the controller to the system database each time the controller collects the number of samples that you enter in this field. This number must be greater than zero and less than the number entered in the field **Allocate memory for __ trend samples in the controller**. The number of trends specified must be accumulated at least once before the historical trends can be viewed.
Trend samples accumulated since last notification	Shows the number of samples stored in the controller since data was last written to the database.
Last Record Written to Historian	Shows the number of trend samples that were last written to the database.
Keep trends for __ days	This is based on the date that the sample was read. Select the first option to use the system default that is defined on the **System Settings** > **General** tab. Select the second option to set a value for this trend only.
Delete	Deletes all trend samples stored in the database for the item selected on the navigation tree.
BACnet Configuration	The **Object Name** is a unique alphanumeric string that defines the BACnet object. Although the **Object Name** field can be edited, it is not recommended. The **Notification Class** is set to 1 to receive alarms generated by Carrier controllers.

NOTES

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- You can use *Global Copy* (page 30) to copy trend properties to other pieces of equipment that use the same control program.
- Run a *Trend Usage report* (page 97) to view trend configurations.

Viewing a built-in, single-point trend graph

1 On the navigation tree, select the equipment whose trend you want to view.

2 Click the **Trends** button drop-down arrow, select **Enabled Points**, and then select the graph you want to view.

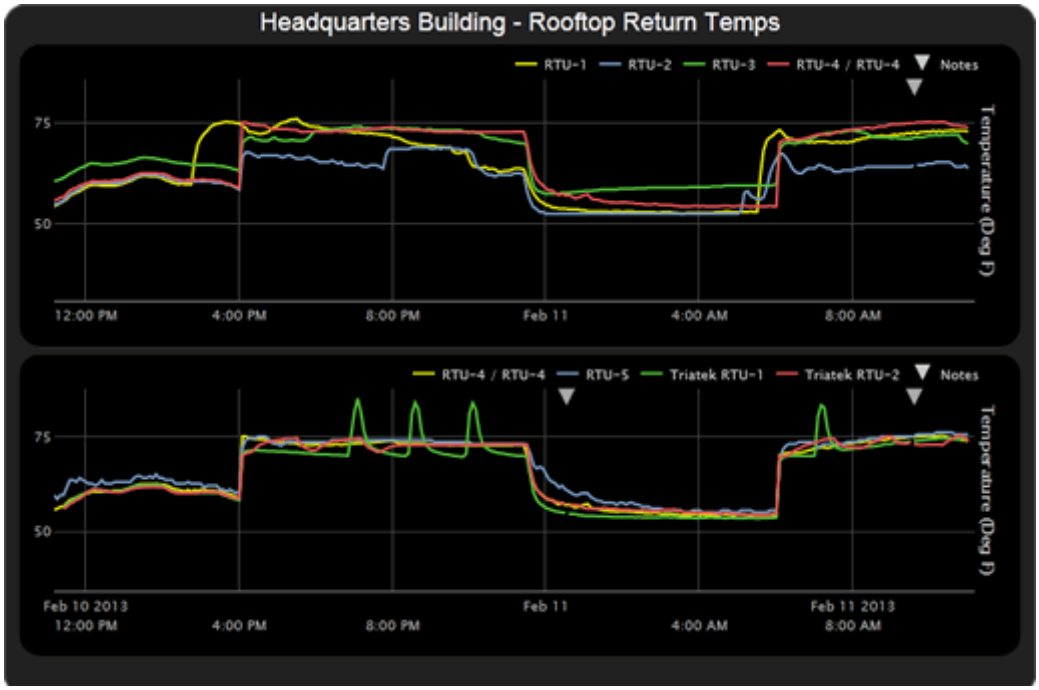
3 Select the **View** tab. See *Using trend graphs* (page 61).

NOTE On the **Configure** tab, you can:

- Enable/disable the grid.
- Set the time range for the X axis. For example, enter 7 days to see the data for the last week.
- Turn off autoscaling so that you can define a range for the Y-axis
- Type a Y-axis label that will appear on the right side of the graph.

Creating a custom trend graph

When creating a custom trend graph, you can select up to 16 points. If you select more than 4 points or points with different units, the i-Vu® Pro application splits the data into subgraphs. Each subgraph can show a maximum of 4 points with similar units.



NOTE You must enable trending for points that you want to include in the custom trend graph. See *To collect trend data for a point* (page 56).

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To create a custom trend graph

1. On the navigation tree, select the area or equipment where you want to see the graph.
2. Click the **Trends** button drop-down arrow, then select **New Trend Graph**.

   NOTE If the **Trends** button does not have a drop-down arrow, the **New Trend Graph** page is already displayed.
3. In the tree on the **New Trend Graph** page, use **Ctrl**+**click** or **Shift**+**click** to select the points (16 maximum) that you want to see on a graph.

   NOTE The tree shows only points that have trending enabled. See *To collect trend data for a point* (page 56).
4. Click **Save**.
5. Optional: If your system has trend categories defined, you can select a **Category** for this trend. For more information on trend categories, see *Adding trend categories* (page 60).
6. Type a **Name** for the graph that will appear at the top of the graph and in the **Trends** button drop-down list.
7. Click **OK**.
8. Select:
   - The **View** tab to see the custom trend graph. See *Using trend graphs* (page 61).
   - The **Configure** tab to edit the trend graph. See *To edit a custom trend graph* (page 59).

To edit a custom trend graph

1. On the navigation tree, select the area or equipment where you created the graph.
2. Select the **Trends** > **Configure** tab. On this page, you can:
   - Change the name of the custom trend graph
   - Enable/disable the grid
   - Set the time range for the X axis
   - Edit a subgraph's Y-axis label that will appear on the right side of the graph
   - Turn off autoscaling so that you can define a range for the Y-axis
   - Add/delete subgraphs (see instructions below)
   - Add/delete points (see instructions below)
   - Change a point's name on the graph
   - Change a binary point's active/inactive text on the graph
   - Click **Delete Trend Graph** to delete the entire custom trend graph

To add a subgraph to a custom trend graph

1. Click **Add** below the **Subgraphs** list.
2. Type a Y-axis label.
3. Click **Add** below the **Points** list.
4. Select a point in the **Data source** tree.

   NOTE The tree shows only points that have trending enabled. See *To collect trend data for a point* (page 56).
5. Repeat steps 3 and 4 to add up to 4 points to the subgraph.
6. Click **Accept**.

NOTE To delete a subgraph, select it in the **Subgraphs** list, click **Delete** below the list, and then click **Accept**.

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To add a point to a subgraph

1 Select the subgraph in the **Subgraphs** list.

2 Click **Add** below the **Points** list.

3 Select a point from the **Data source** tree.

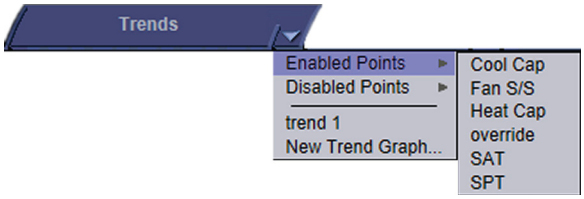
NOTE The tree shows only points that have trending enabled. See *To collect trend data for a point* (page 56).

4 Click **Accept**.

NOTE To delete a point, select the appropriate subgraph, select the point, click **Delete** below the **Points** list, and then click **Accept**.

Adding trend categories

A point trend graph is in the **Enabled** or **Disabled** category in the **Trends** button drop-down menu.



You can create additional categories for your custom trend graphs.

1 On the **System Options** tree, click ▷ to the left of **Categories**, then select **Trend**.

2 Click **Add**.

3 Type the **Category Name** and **Reference Name**.

4 Optional: Select a privilege so that only operators with that privilege can access trends in the category.

5 Click **Accept**.

NOTES

- To edit a category, select the category, make your changes, then click **Accept**.
- To delete a category, select the category, click **Delete**, then click **Accept**.

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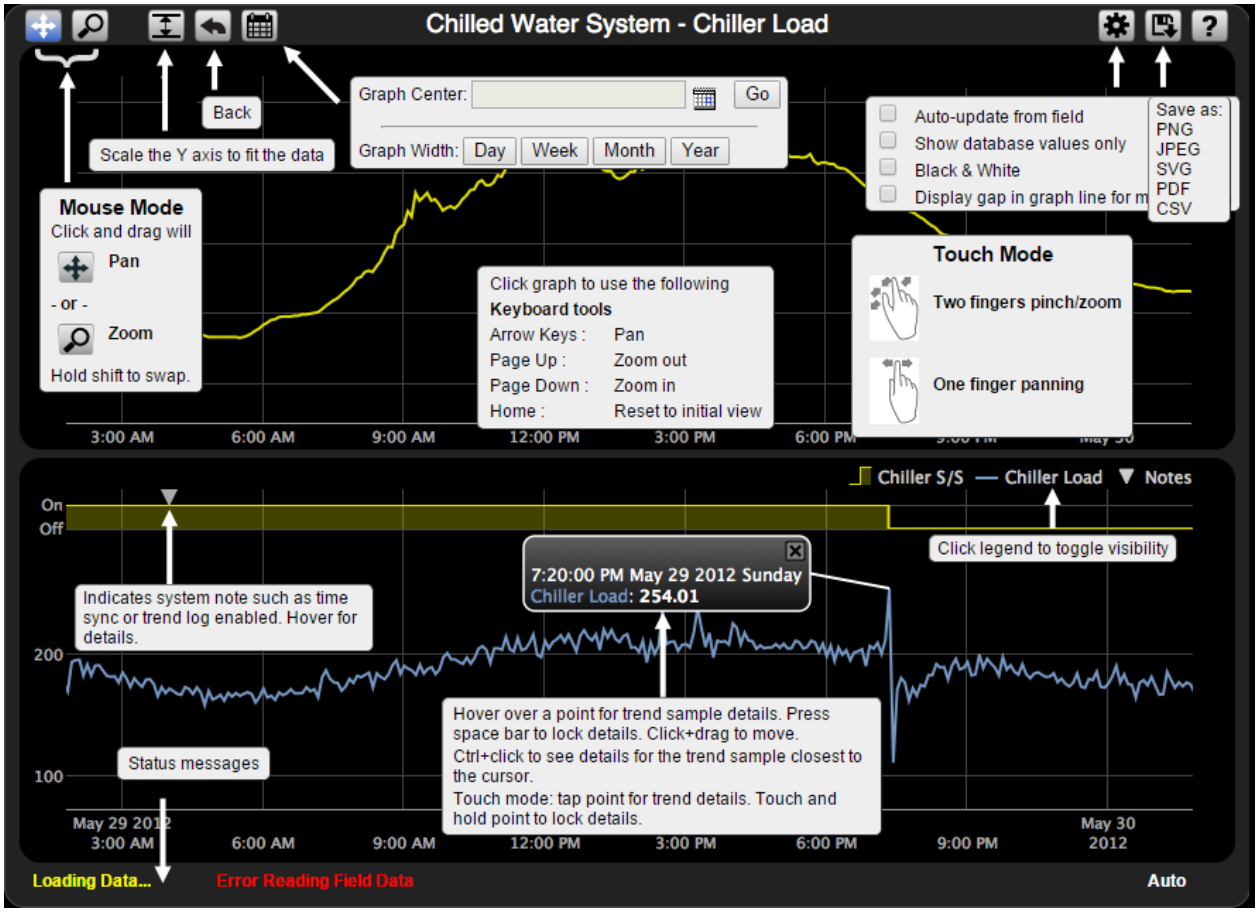
Using trend graphs



NOTES

- A gray triangle at the top of a graph indicates a note from the system. Hover your cursor on the triangle to see which of the following occurred:
  - Equipment received a time synchronization from its network router or from the i-Vu® Pro application.
  - Trend Historian has been enabled or disabled.
  - Trend Log has been enabled or disabled.
  - The trend object ID of a third-party trend source has been changed. For information only, you do not need to do anything.
- Click at the top of the i-Vu® Pro page to print the graph. You may need to set your printer's orientation to Landscape.
- Toolbar options are also accessible by right-clicking a trend graph.
- You can check **Display gap in graph line for missing data** on an individual trend graph page, or you can go to the *System Options (or System Settings) > General tab* (page 312) to set this for all future trend graphs.

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To view trend data in a spreadsheet program

You can save trend data as csv data that you can open in a spreadsheet program such as Microsoft® Excel®.

1 On the **Trends** > **View** tab, select > **Save as CSV data**.

2 Save the data (.zip file) wherever you want. The .zip file contains the following:
- A .csv file for each trend source (point). The filenames match the point names.
- A **Combined** folder containing a file with the combined data for all of the graph's trend sources.

3 Open the .csv file in a spreadsheet program.

NOTES

- You will need to convert the data in the spreadsheet's **Time** column to a readable date/time format.
- If you use Microsoft® Excel® on a Mac and the converted date shows the wrong year, do the following:
  1. In Excel, go to **File** > **Options** > **Advanced**.
  2. Scroll down to the section **When calculating this workbook**, and then uncheck **Use 1904 date system**.

Alarms

A message is sent from an alarm source to i-Vu® Pro to notify you that certain conditions exist, such as a piece of equipment that has stopped running or a temperature that is too high. When i-Vu® Pro receives an alarm, it displays information about the alarm on the **Alarms** page. i-Vu® Pro can also perform *alarm actions* (page 69) to inform personnel of the condition. An alarm source can also send a return-to-normal message when the alarm condition returns to its normal state.

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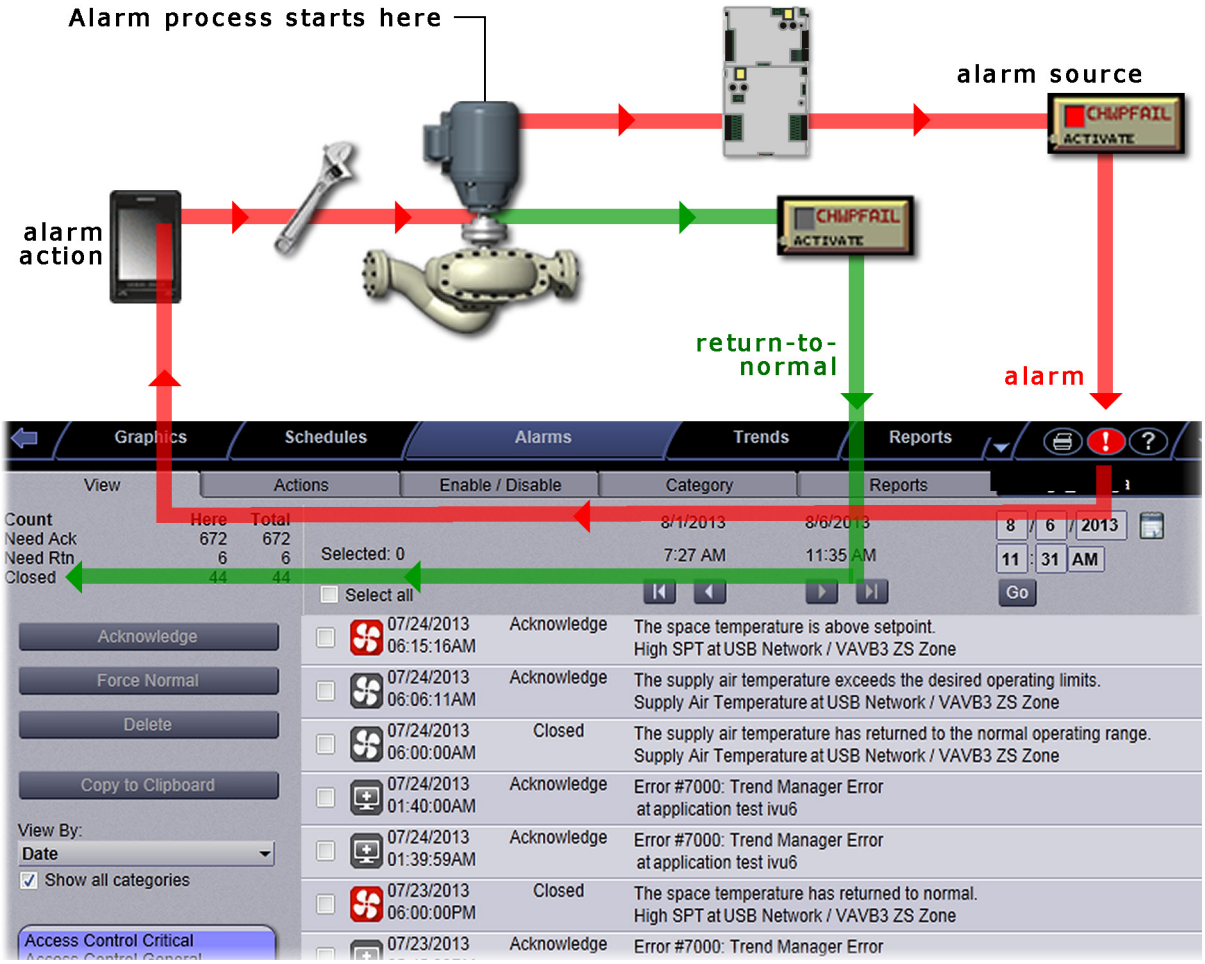

Alarm sources and the alarms they generate are assigned to categories, such as HVAC Critical or HVAC Maintenance, to help you work with related alarms.

The application engineer usually sets up alarm sources in the Snap application. In the i-Vu® Pro interface, you can:

- *View, troubleshoot, acknowledge, and delete alarms* (page 63)
- *Set up the alarm actions that the i-Vu® Pro application performs* (page 69)
- *Edit alarm sources that were set up in the Snap application or set up new alarm sources to generate alarms* (page 88)

NOTE In addition to the alarms that you set up, i-Vu® Pro has built-in system and equipment alarms.

Viewing, acknowledging, and deleting alarms

The i-Vu® Pro **Alarms** page displays alarms as they are received. If desired, an operator can set options on > **System Options** > **My Settings** tab to have the i-Vu® Pro application play an audio file when an alarm is received.

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An alarm's setup may require that it be acknowledged and/or the alarm condition returned to normal. The alarm, its return to normal, and any other alarms related to the incident are referred to as an alarm incident group. The i-Vu® Pro application closes an alarm incident group when all of the following have occurred:

- You acknowledge the alarm (if required)
- The i-Vu® Pro application receives a return-to-normal (if required)
- The i-Vu® Pro application performs all alarm actions defined for the group

You should delete alarms from your system as they are closed because large quantities of stored alarms can reduce the efficiency of your system.

NOTE The **Installer** view does not display all alarms on the system or site level, only on the router and controller level. Go to the **User** view or click the system-wide alarms button to see all of the alarms in the system.

The color of the system-wide alarms button signifies one of the following conditions:

- Red - Critical alarms need to be acknowledged.
- Yellow - Non-critical alarms need to be acknowledged.
- Gray - No alarms need to be acknowledged.

You must acknowledge alarms that have been set up to require acknowledgement. Right-click alarm message to print. To save alarm information before deleting, select **Alarms** > **Reports** tab > **Alarms** > click **Run** button.

To view alarms in the i-Vu® Pro interface

- Click at the top of the page to see all alarms in the system.

  or

- Click the **Alarms** button and then select an item on the navigation tree to see all alarms at and below that level.

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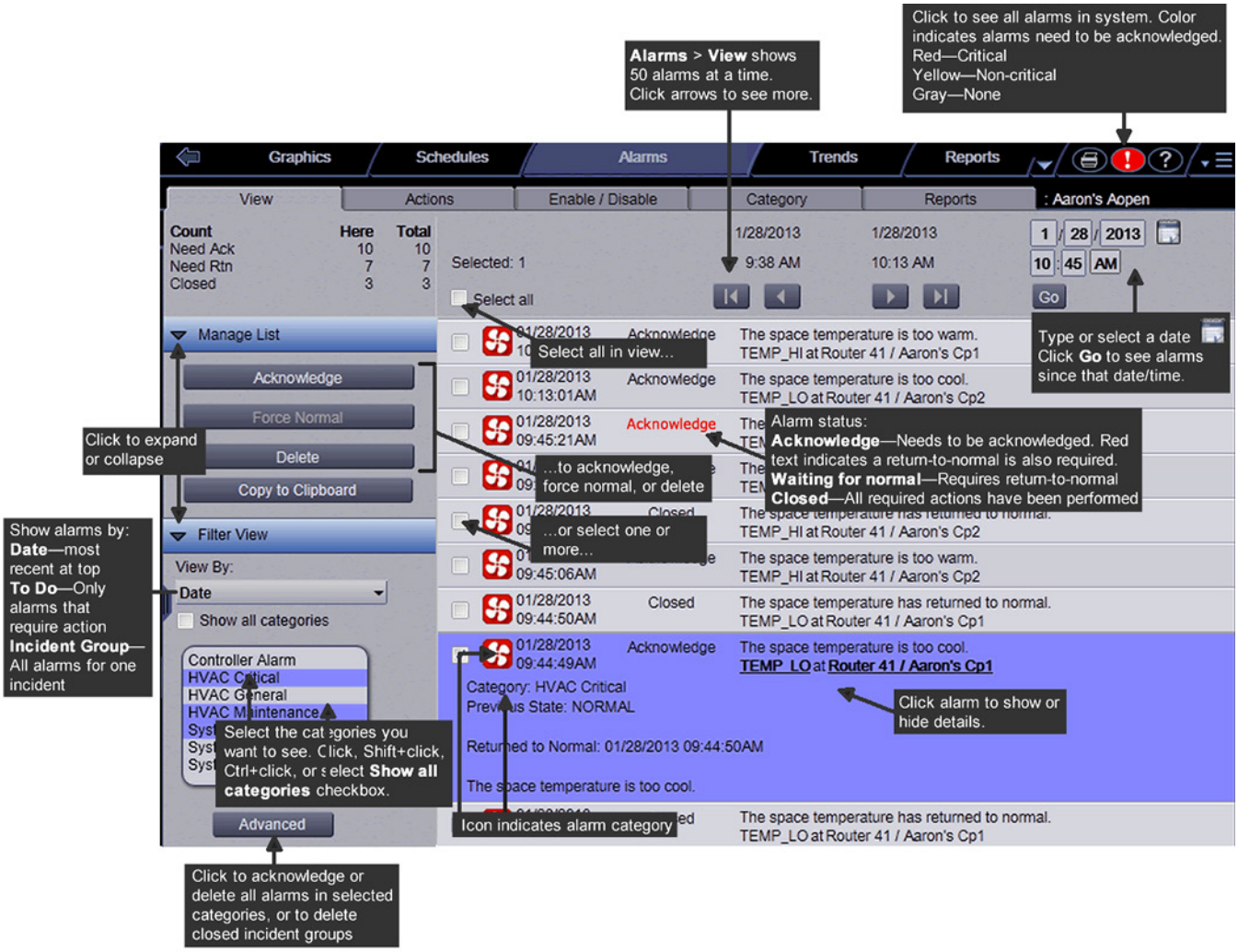

NOTES

- Alarms generated by the i-Vu® Pro application appear at the system level.
- Alarms generated by controllers appear at the system level in the **User** view.
- An alarm's details include a path to the alarm source. Each section of the path is a link to that location. For example, in the path **West TEMP LO at Router 41/Sunshine Corp**, TEMP LO links to the microblock's Properties page, and Sunshine Corp links to the Sunshine Corp West Wing graphic, TEMP-LO links to the equipment graphic.
- You may see any of the following alarms icons in i-Vu® Pro.

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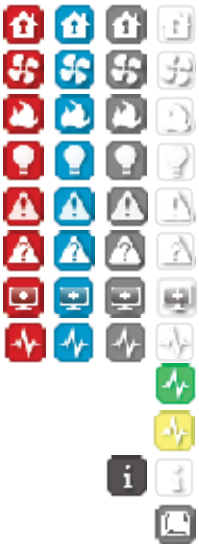
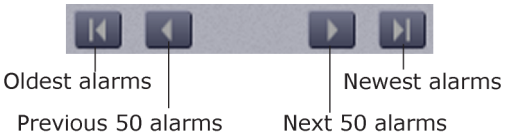
These icons...	Indicate...	Icon color indicates...
	Access control HVAC Fire system Lighting system General alarm Unknown System FDD FDD comfort FDD energy General message Controller alarm	Red = Critical Blue = Maintenance Gray = General Grayed out = Closed

To control which alarms you see

Use these tools...	To control the Alarms list
	Click the arrow buttons to display other alarms.
	Type a date and time or click to select a date. Then click **Go** to show up to 50 alarms since that date/time. When finished, click to display the 50 newest alarms or to display the oldest 50 alarms.

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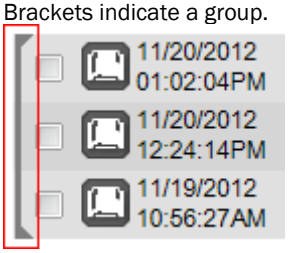
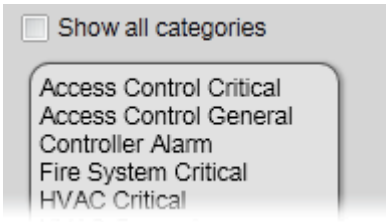
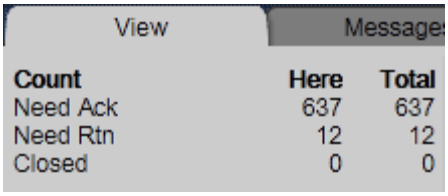
Use these tools...	To control the Alarms list
	Date–Sorts list by date/time the alarms were generated with the most recent at the top. **To Do**–Shows only alarms that require one or more actions before they are closed. **Incident Group**–Sorts alarms by incident. For example, an alarm and its return-to-normal form an incident group. Brackets indicate a group. 
	Select the alarm categories that you want to see in the alarms list. Use **Ctrl+click**, **Shift+click**, or both to select multiple categories, or check **Show all categories**.

To acknowledge alarms

You must acknowledge alarms that have been set up to require acknowledgment. An alarm shows if it needs to be acknowledged.

The table in the upper left corner of the page shows how many alarms need acknowledgment at the current location (**Here**) and in the entire system (**Total**). This table also shows how many alarms need a return-to-normal and how many are closed.



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To acknowledge an alarm

1 On the **Alarms** page > **View** tab, select the checkbox of an alarm that shows **Acknowledge**.

2 Click the **Acknowledge** button.

3 If your system requires a comment to acknowledge an alarm, enter your **System login password**, and then enter your comment in **Reason for acknowledgment**.

To acknowledge all alarms in the alarms database for selected categories

1 On the **Alarms** page > **View** tab in the left-hand column, select the categories whose alarms you want to acknowledge.

NOTE Use **Ctrl+click**, **Shift+click**, or both to select multiple categories, or select the **Select All** checkbox.

2 Click **Advanced**.

3 Click **Acknowledge All**.

4 If your system requires a comment to acknowledge an alarm, enter your **System login password**, and your comment in **Reason for acknowledgment**.

TIP Acknowledging many alarms simultaneously can take a long time. Acknowledge alarms as they occur to avoid long waits.

To delete alarms

You should delete alarms from your system as they are closed because large quantities of stored alarms can reduce the efficiency of your system. To save alarm information before deleting, select **Alarms** > **Reports** tab > **Alarms**, then click the **Run** button.

To delete an alarm

1 On the **Alarms** page > **View** tab, select an alarm's checkbox.

2 Click **Delete**.

To delete all alarms in the alarms database for selected categories

1 On the **Alarms** page > **View** tab in the left-hand column, select the categories whose alarms you want to delete.

NOTE Use **Ctrl+click**, **Shift+click**, or both to select multiple categories, or select the **Select All** checkbox.

2 Click **Advanced**.

3 Click **Delete All Acknowledged**.

To delete all closed alarm incident groups in the alarms database

An incident group is all alarms related to a particular incident. For example, an alarm and its return-to-normal form an alarm incident group. An incident group is considered closed when all alarms in the group are closed.

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1 On the **Alarms** page > **View** tab in the left-hand column, select the categories whose alarms you want to delete.

NOTE Use **Ctrl+click**, **Shift+click**, or both to select multiple categories, or select the **Select All** checkbox.

2 Click **Advanced**.

3 Click **Delete Closed Incidents**.

NOTES

- An alarm that requires acknowledgment cannot be deleted until it has been acknowledged.
- To have the i-Vu® Pro application automatically delete alarm incident groups a specified number of days after the groups close, select this option on the **System Settings** > **Scheduled Tasks** (page 317) tab.
- Also on the **System Settings** > **Scheduled Tasks** tab, you can set the i-Vu® Pro application to archive alarm information to a text file as alarms are deleted.
- An alarm source may be set up to generate an alarm and a return-to-normal. If an alarm occurs but the i-Vu® Pro application never receives the return-to-normal, you can select the alarm and then click **Force Normal** so that the alarm can be closed. **Force Normal** has no effect on the alarm condition that generated the alarm.

To receive audible notification of alarms

You can set up the i-Vu® Pro application to play an audio file on your workstation when it receives a critical or non-critical alarm.

1 On the **System Options** tree, select **My Settings**.

2 Under **Preferences**, select **Non-critical alarms** or **Critical alarms** to be notified of each type of alarm.

3 In the **Sound File** field, type the path to the sound file.

When an alarm triggers the audio file to play, you can click and then select:

- **Snooze** to temporarily stop the sound for 5 minutes
- **Silence** to stop the sound

The alarm sound is silenced until another alarm that triggers a sound is received.

Setting up alarm actions

The i-Vu® Pro application can perform alarm actions listed below to notify personnel of an alarm or to record information about the alarm. You can assign alarm actions to an alarm source, a category of alarm sources, alarm sources from a certain location, or a combination of these criteria.

The alarm actions are:

- Alarm Popup
- Print
- Run External Program
- Send Alphanumeric Page
- Send E-Mail

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- Send SNMP Trap
- Send Web Service Request
- Write Property
- Write to Database
- Write to File

See the following topics for a description of each alarm action.

To assign alarm actions to alarm sources

To assign alarm actions to multiple alarm sources

Although you can assign an alarm action to a single alarm source, you typically assign an action to multiple alarm sources at the area or equipment level. The alarm action applies to all instances of the alarm sources at the selected location and below. Click an action's **Edit** button to make any changes.

To assign an alarm action to alarm sources:

1 On the navigation tree, select the area, equipment, or controller containing the alarm sources.

2 On the **Alarms** page > **Actions** tab, follow the 3 steps on the screen.

3 Follow the 3 steps on the screen.

NOTE Use **Ctrl+click**, **Shift+click**, or both to select multiple items.

4 Click **Add**.

5 Set up the alarm action by editing the fields on the alarm action page. See the appropriate alarm action below for field descriptions.

6 Click **Accept**.

If an alarm action fails, the i-Vu® Pro application receives an alarm for the failed action.

NOTE Click **View Selected Sources** to view or change settings for each alarm.

To assign an alarm action to a single alarm source

1 On the navigation tree, select the alarm source.

2 On the **Alarms** page > **Actions** tab, click the drop-down arrow, then select an alarm action.

3 Click **Add**.

4 Set up the alarm action by editing the fields on the alarm action page. See the appropriate alarm action below for field descriptions.

5 Click **OK**.

Alarm Popup

The **Alarm Popup** alarm action pops up a message on any computer with a Windows operating system that is running the i-Vu® Pro Alarm Notification Client application.

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Field	Notes
To Operator **To Group**	Select individual operators or operator groups who should receive alarm notification. **NOTE** When using location-dependent security, users only receive alarms for locations they are allowed to access.
Generate alarm if delivery fails	Check this field to generate a System Info alarm if the popup recipient is not currently running the Alarm Notification Client application.
Message text	Use punctuation, spaces, or returns to format the text. To add live data to the text, select *field codes* (page 92) from the **Append Field Code** list.
Append Field Code	Add *field codes* (page 92) to the message text if desired.
Perform Action	By default, the i-Vu® Pro application performs an alarm action when the alarm source generates an alarm **and** when it returns to normal. Under **Perform Action**, you can choose to run the alarm action: • Only when the alarm source generates an alarm **or** when it returns to normal. • After a specified amount of time if the alarm has not been acknowledged or has not returned to normal. Use this option for alarm escalation. • If the alarm occurs during the occupied hours defined for a schedule group or run if the alarm occurs during the unoccupied hours defined for a schedule group. EXAMPLE To have one alarm action performed during work hours and a different alarm action performed after work hours: 1. Create a *schedule group* (page 48), but do not assign members to it. 2. Create a schedule for the group. Set the occupied hours to be the same as the work hours. 3. Create the alarm action that is to be performed during work hours. Under **Perform Action**, select **If schedule group <your new group> is Occupied**. 4. Create the alarm action that is to be performed after work hours. Under **Perform Action**, select **If schedule group <your new group> is Unoccupied**.

Using the Alarm Notification Client application

The Alarm Notification Client application must be running on each client computer (Windows only) that should receive popup notifications. Keep the application minimized to the right side of the Windows task bar. The window will pop up with a message when an alarm occurs.

Select an alarm message, then click to open the i-Vu® Pro interface displaying the piece of equipment that generated the alarm. A grayed out alarm indicates that it was acknowledged in the i-Vu® Pro interface.

If the Alarm Notification Client is set up to play a continuous alarm sound, you can silence an alarm by clicking **Silence!**, by pressing **Ctrl+S**, or by acknowledging the alarm in the i-Vu® Pro interface.

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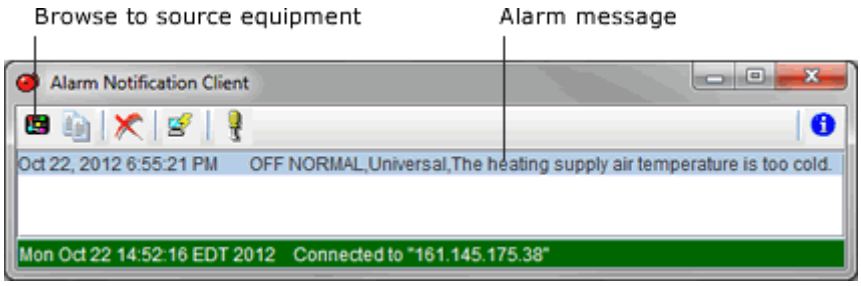

Button	Notes
	Opens the i-Vu® Pro interface displaying the equipment that generated the alarm. **NOTES** • If i-Vu Pro Server is to use https (SSL), you must do the following to enable communication between the server and Alarm Notification Client. In SiteBuilder, go to **Configure** > **Preferences** > **Web Server**. For **Enabled Web Server Ports**, select **Both HTTP and SSL** or **SSL only**. In the Server Connection field described below, enter the number of the SSL port. • If i-Vu Pro Server is v6.0 and an Alarm Notification Client is an earlier version, you will have to log in when you click .
	Copies the selected alarm information to the clipboard.
	Removes the alarm information from the alarm popup list. Removing items from this list has no effect on the alarms list in the i-Vu® Pro interface.
	View information about the server connection.
	On this tab... / **You define...**
	Server Connection — The i-Vu® Pro server and port, and the i-Vu® Pro operator name and password **NOTES** • The default port is TCP 47806. If you change this, you must also change the **Port** field in the i-Vu® Pro System Settings. See "To set up the i-Vu Pro Server application to support Alarm Popup clients" below. • You can use an IPv6 Server address in the **Server** field. In the i-Vu® Pro interface, in **System Settings** > **General** tab > **Alarms**, you can restrict access to the IPv6 address.
	Browse To — The i-Vu® Pro page that you want to see first when browsing to the equipment
	Notification Sounds • If you want to hear a sound when an alarm occurs • Which sound you want to hear for each type of alarm. **NOTE** A **Connection Failure** occurs when the Alarm Notification Client loses communication with the i-Vu Pro Server application. • Whether you want the sound to continue until silenced **NOTE** If multiple types of alarms occur simultaneously, the application plays the sound of the most critical alarm (Connection Failure first, then Critical, then Normal).

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To set up the i-Vu Pro Server application to support Alarm Popup clients

1 On the **System Options** tree, select **System Settings**.

2 On the **General** tab, select **Enable support for Alarm Notification Clients to connect to this server**.

3 If the server has more than one network interface adapter, type in the **Restrict to IP Address** field the IP address that the Alarm Notification Client application will connect to. You must specify the same IP address in the **Server** field in the Alarm Notification Client.

4 Use the default port or specify a different port. You must specify the same port in the **Port** field in the Alarm Notification Client.

5 Click **Accept**.

NOTE If the Alarm Notification Client application is not on the local network and will access i-Vu® Pro alarms through a NAT router, you must port forward the TCP port you defined in step 4 above.

To install the Alarm Notification Client application

Follow the steps below on each client computer that should receive alarm popups.

PREREQUISITE Enable support for Alarm Popup client in System Settings. See above topic.

1 On the System Options tree, click **Client Installs**.

2 Select **Alarm Notification Client**.

3 Click **Run**, then follow the on-screen instructions to install the Alarm Notification Client application. After you click **Done**, the application starts automatically.

4 In the **Settings** dialog box, enter appropriate values. You can also click to open this box. See the table above for a description of each setting.

NOTE You can lock the **Settings** so that a user cannot edit them. See *To lock a client's Settings feature* below.

5 Click **OK**.

6 Minimize the Alarm Notification Client window.

To lock a client's Settings feature

To prevent a user from editing the **Settings** :

1 Right-click **Alarm Notification Client** in the Windows **Start** menu.

2 Select **Properties**.

3 On the **Shortcut** tab, type `-lockconfig` at the end of the **Target** path.

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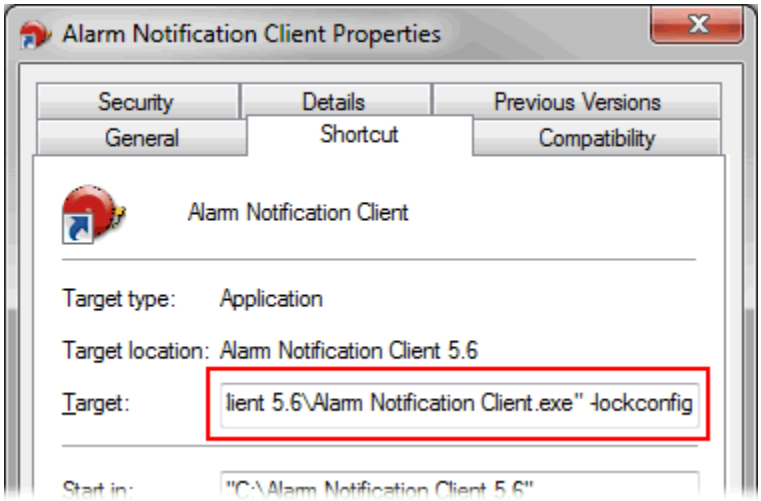

Print

The **Print** alarm action prints alarm information.

Field	Notes
Text Printing	Select to use the i-Vu® Pro server's local dot-matrix printer. Text Printing will not print to a network printer. In the **Printer Name** field, type the computer port that the printer is connected to. In the **Line Width** field, type the number of characters to be printed per line. Prints multiple alarms per page.
Graphics Printing	Select to use the i-Vu® Pro server's default printer (local or network printer). Prints one alarm per page to the i-Vu® Pro server's default printer.
Text to Print	Use punctuation, spaces, or returns after the entries to format the text. To add live data to the text, select *field codes* (page 94) from the **Append Field Code** list.

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Field	Notes
Perform Action	By default, the i-Vu® Pro application performs an alarm action when the alarm source generates an alarm **and** when it returns to normal. Under **Perform Action**, you can choose to run the alarm action: • Only when the alarm source generates an alarm **or** when it returns to normal. • After a specified amount of time if the alarm has not been acknowledged or has not returned to normal. Use this option for alarm escalation. • If the alarm occurs during the occupied hours defined for a schedule group or run if the alarm occurs during the unoccupied hours defined for a schedule group. EXAMPLE To have one alarm action performed during work hours and a different alarm action performed after work hours: 1. Create a *schedule group* (page 48), but do not assign members to it. 2. Create a schedule for the group. Set the occupied hours to be the same as the work hours. 3. Create the alarm action that is to be performed during work hours. Under **Perform Action**, select **If schedule group <your new group> is Occupied**. 4. Create the alarm action that is to be performed after work hours. Under **Perform Action**, select **If schedule group <your new group> is Unoccupied**.

Run External Program

The **Run External Program** alarm action starts a program or batch file on the server.

NOTE You must be running i-Vu Pro Design Server to set up this alarm action.

Field	Notes
Command Line	The path of the executable file on the i-Vu® Pro server followed by the path of the output file. **EXAMPLE**: `c:\windows\notepad.exe c:\i-Vu Pro\webroot\alarms.txt`
Append Field Code	Add *field codes* (page 92) to the **Command Line** field. **EXAMPLE**: c:\reports\run_report.bat $Generation_time$$To_State$ This starts a batch file on the server and uses the alarm's generation time and state as values.
Synchronize	Tells the i-Vu® Pro application to wait for the external program to finish running before initiating the next **Run External Program** alarm action.

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Field	Notes
Perform Action	By default, the i-Vu® Pro application performs an alarm action when the alarm source generates an alarm **and** when it returns to normal. Under **Perform Action**, you can choose to run the alarm action: • Only when the alarm source generates an alarm **or** when it returns to normal. • After a specified amount of time if the alarm has not been acknowledged or has not returned to normal. Use this option for alarm escalation. • If the alarm occurs during the occupied hours defined for a schedule group or run if the alarm occurs during the unoccupied hours defined for a schedule group. EXAMPLE To have one alarm action performed during work hours and a different alarm action performed after work hours: 1. Create a *schedule group* (page 48), but do not assign members to it. 2. Create a schedule for the group. Set the occupied hours to be the same as the work hours. 3. Create the alarm action that is to be performed during work hours. Under **Perform Action**, select **If schedule group <your new group> is Occupied**. 4. Create the alarm action that is to be performed after work hours. Under **PerformAction**, select **If schedule group <your new group> is Unoccupied**.

Send Alphanumeric Page

The **Send Alphanumeric Page** alarm action sends a page to one or more alphanumeric pagers or sends text messages to cell phones. The pager or phone must be able to accept e-mail.

Field	Notes
To	Type the address(es) that you want to send the alarm to. To enter multiple addresses, type a space or press **Enter** after each address.
From	Enter a valid address if required by your mailserver.
Mail Host	The mailserver's address. This can be an IP address or a system name, such as mail.mycompany.com.
Mail Host Port	Change this field if using a port other than the default port 25.
Mail Host Security Options	Select the type of security the mailserver uses. • **Cleartext** – Uses the SMTP protocol to send as clear text over TCP/IP • **Secure SSL** – Uses SSL, a communication protocol that provides data encryption • **Secure TLS** – Uses TLS, but does not begin encryption until the i-Vu® Pro application issues STARTTLS command
Specify Mail User For Mail Host Authentication	Select if your mailserver requires a username and password.

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Field	Notes
Send mail as MIME attachment	Select if your mailserver allows only MIME attachments.
Message Text	Use punctuation, spaces, or returns to format the text. To add live data to the text, select *field code*s (page 92) from the **Append Field Code** list.

Perform Action	By default, the i-Vu® Pro application performs an alarm action when the alarm source generates an alarm **and** when it returns to normal. Under **Perform Action**, you can choose to run the alarm action: • Only when the alarm source generates an alarm **or** when it returns to normal. • After a specified amount of time if the alarm has not been acknowledged or has not returned to normal. Use this option for alarm escalation. • If the alarm occurs during the occupied hours defined for a schedule group or run if the alarm occurs during the unoccupied hours defined for a schedule group. EXAMPLE To have one alarm action performed during work hours and a different alarm action performed after work hours: 1. Create a *schedule group* (page 48), but do not assign members to it. 2. Create a schedule for the group. Set the occupied hours to be the same as the work hours. 3. Create the alarm action that is to be performed during work hours. Under **Perform Action**, select **If schedule group <your new group> is Occupied**. 4. Create the alarm action that is to be performed after work hours. Under **Perform Action**, select **If schedule group <your new group> is Unoccupied**.

NOTE You should not assign this alarm action to frequently-occurring alarms as this may cause problems on your network or the Internet.

To secure mailserver communication using SSL or TLS

Before the i-Vu® Pro application sends an email using SSL or TLS, it requests an SSL certificate from the mailserver. If the certificate that the i-Vu® Pro application receives is in its list of trusted certificates, it sends the email. If the certificate is not in the list, the i-Vu® Pro application generates a system alarm indicating that the email alarm action failed. If this occurs, you will need to add the mailserver's certificate to the i-Vu® Pro application's list of trusted certificates.

1 Get a copy of the certificate file from the mailserver. Ask your Network Administrator for help.

2 Put the file on the i-Vu® Pro server.

3 On the i-Vu® Pro server, click the Windows® **Start** button.

4 In the **Search programs and files** field, type the following command:

```
C:\i-VuPro<x.x>\bin\java\jre\bin\keytool.exe -import -trustcacerts -alias
smtpserver -keystore webserver\keystores\certkeys -file <file_path>
```

replacing:
`<x.x>` with the system's version number
`<file_path>` with the full path and file name of the certificate file

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5 The information for the smtpserver key is displayed and you are prompted to trust this certificate. Type `yes`.

NOTE If your mailserver is using SSL or TLS, the i-Vu® Pro server is running antivirus software, and the email alarm action fails because it cannot find an SSL certificate, do one of the following:

- Disable scanning of outgoing SMTP traffic in the antivirus software. See your antivirus software's Help for assistance.
- Obtain the antivirus software's SSL certificate and install it on the i-Vu® Pro server using the above procedure.

To set up a dial-up networking connection

The i-Vu® Pro application can use a dial-up internet connection through a modem to deliver e-mail for the Send E-mail or Send Alphanumeric Page alarm action.

To set up the dial-up connection:

1 Set up your modem to dial out to your Internet Service Provider. See your modem documentation.

2 On the i-Vu® Pro server, open Internet Explorer®.

3 Select **Tools** or > **Internet Options**.

4 On the **Connections** tab, click **Setup**.

5 Follow the instructions in the wizard. See Windows Help for assistance.

6 In a text editor such as Windows Notepad, open **I-VuProx.x\webroot\<system>\ system.properties**.

7 At the end of the file, type the following line:

```
repactions.connection.name=<name of connection>
```

where <name of connection> is the ISP name you entered in the wizard in step 2.

8 Open Internet Explorer, then select **Tools** > **Internet Options** > **Connections** tab.

9 If the box under **Dial-up and Virtual Private Network settings** shows more than one connection, select the connection that you just created, then click **Set Default**.

10 Select **Always dial my default connection**.

Send E-mail

The **Send E-mail** alarm action sends a message to one or more e-mail accounts. The alarm action can also run a report and attach it to the e-mail as a PDF, HTML, or XLS file.

Field	Notes
To and **CC**	Type the address(es) that you want to send the alarm to. To enter multiple addresses, type a space or press **Enter** after each address.
Subject	Enter the text that you want to appear on the Subject line of the email. The subject can include *field codes* (page 92).

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Field	Notes
Use default email server configuration	Check this field to have this alarm action use the email server configuration settings defined on the **System Settings** > **General** tab. Uncheck to enter settings specific to this alarm action.
From	Enter a valid address if required by your mailserver.
Mail Host	The mailserver's address. This can be an IP address or a system name, such as mail.mycompany.com.
Mail Host Port	Change this field if using a port other than the default port 25.
Mail Host Security Options	Select the type of security the mailserver uses. • **Cleartext (SMTP)** – Uses the SMTP protocol to send as clear text over TCP/IP • **Secure SSL (SMTP with SSL)** – Uses SSL, a communication protocol that provides data encryption • **Secure TLS (STARTTLS)** – Uses TLS, but does not begin encryption until the i-Vu® Pro application issues STARTTLS command
Specify Mail User For Mail Host Authentication	Select if your mailserver requires a username and password.
Send mail as MIME attachment	Select if your mailserver allows only MIME attachments.
Message Text	Use punctuation, spaces, or returns to format the text. To add live data to the text, select *field codes* (page 92) from the **Append Field Code** list.

Attach Report	Select to attach a report to the e-mail, then select the **Report** and the **Format**. The attached report will include the date and time. For example, **Alarm Sources 2017 Jan 01 1230**. **NOTE** The **Report Name** field shows a custom report only if it is accessible at the current level. **Run as** shows the name and login name of the operator creating the alarm action. The report will be run using the privileges and report options of this operator. **TIP** You may want to create a new operator with limited privileges for this purpose.

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Perform Action	By default, the i-Vu® Pro application performs an alarm action when the alarm source generates an alarm **and** when it returns to normal. Under **Perform Action**, you can choose to run the alarm action: • Only when the alarm source generates an alarm **or** when it returns to normal. • After a specified amount of time if the alarm has not been acknowledged or has not returned to normal. Use this option for alarm escalation. • If the alarm occurs during the occupied hours defined for a schedule group or run if the alarm occurs during the unoccupied hours defined for a schedule group. EXAMPLE To have one alarm action performed during work hours and a different alarm action performed after work hours: 1. Create a *schedule group* (page 48), but do not assign members to it. 2. Create a schedule for the group. Set the occupied hours to be the same as the work hours. 3. Create the alarm action that is to be performed during work hours. Under **Perform Action**, select **If schedule group <your new group> is Occupied**. 4. Create the alarm action that is to be performed after work hours. Under **PerformAction**, select **If schedule group <your new group> is Unoccupied**.

NOTE You should not assign this alarm action to frequently-occurring alarms as this may cause problems on your network or the Internet.

To secure mailserver communication using SSL or TLS

Before the i-Vu® Pro application sends an email using SSL or TLS, it requests an SSL certificate from the mailserver. If the certificate that the i-Vu® Pro application receives is in its list of trusted certificates, it sends the email. If the certificate is not in the list, the i-Vu® Pro application generates a system alarm indicating that the email alarm action failed. If this occurs, you will need to add the mailserver's certificate to the i-Vu® Pro application's list of trusted certificates.

1 Get a copy of the certificate file from the mailserver. Ask your Network Administrator for help.

2 Put the file on the i-Vu® Pro server.

3 On the i-Vu® Pro server, click the Windows® **Start** button.

4 In the **Search programs and files** field, type the following command:

```
C:\i-VuPro<x.x>\bin\java\jre\bin\keytool.exe -import -trustcacerts -alias
smtpserver -keystore webserver\keystores\certkeys -file <file_path>
```

replacing:
`<x.x>` with the system's version number
`<file_path>` with the full path and file name of the certificate file

5 The information for the smtpserver key is displayed and you are prompted to trust this certificate. Type `yes`.

NOTE If your mailserver is using SSL or TLS, the i-Vu® Pro server is running antivirus software, and the email alarm action fails because it cannot find an SSL certificate, do one of the following:

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- Disable scanning of outgoing SMTP traffic in the antivirus software. See your antivirus software's Help for assistance.
- Obtain the antivirus software's SSL certificate and install it on the i-Vu® Pro server using the above procedure.

To set up a dial-up networking connection

The i-Vu® Pro application can use a dial-up internet connection through a modem to deliver e-mail for the Send E-mail or Send Alphanumeric Page alarm action.

To set up the dial-up connection:

1 Set up your modem to dial out to your Internet Service Provider. See your modem documentation.

2 On the i-Vu® Pro server, open Internet Explorer®.

3 Select **Tools** or > **Internet Options**.

4 On the **Connections** tab, click **Setup**.

5 Follow the instructions in the wizard. See Windows Help for assistance.

6 In a text editor such as Windows Notepad, open **I-VuProx.x\webroot\<system>\ system.properties**.

7 At the end of the file, type the following line:

```
repactions.connection.name=<name of connection>
```

where <name of connection> is the ISP name you entered in the wizard in step 2.

8 Open Internet Explorer, then select **Tools** > **Internet Options** > **Connections** tab.

9 If the box under **Dial-up and Virtual Private Network settings** shows more than one connection, select the connection that you just created, then click **Set Default**.

10 Select **Always dial my default connection**.

Send SNMP Trap

The **Send SNMP Trap** alarm action sends an SNMP trap in response to receiving an alarm. Traps contain the text created in the **Text to send as the SNMP Trap** field in the alarm action dialog box. You can configure up to five SNMP servers to receive traps.

NOTES

- The i-Vu® Pro application supports SNMP v1.
- Each SNMP server you want to receive these traps must have SNMP monitoring equipment installed. If problems arise with your SNMP connection or receiving traps, contact your IS department.
- This alarm action uses Port 162 to send SNMP traps. To use a different port, open **I-VuProx.x\webroot\<system_name>\system.properties** in a text editor such as Notepad. In the line **#snmp.trap.port = 162**, delete **#** at the beginning of the line and change 162 to the port you want to use. If you make this change while the i-Vu® Pro Server application is running, you must restart it to have the change take effect.

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Field	Notes
Network Address*	The network address of the SNMP server receiving the SNMP trap.
Community Name*	The community name that the SNMP server belongs to.
Comment	The physical location of the SNMP server. This field is optional.
Trap number*	If the network administrator has configured trap numbers, type a unique number from 1 to 127. **NOTE** The same trap number is used for all messages from this alarm action.
Text to send as the SNMP Trap	255 character limit. Type punctuation, spaces, or returns after the entries to format the message. You can customize this text by selecting *field codes* (page 92) from the **Append Field Code** list.
Perform Action	By default, the i-Vu® Pro application performs an alarm action when the alarm source generates an alarm **and** when it returns to normal. Under **Perform Action**, you can choose to run the alarm action: • Only when the alarm source generates an alarm **or** when it returns to normal. • After a specified amount of time if the alarm has not been acknowledged or has not returned to normal. Use this option for alarm escalation. • If the alarm occurs during the occupied hours defined for a schedule group or run if the alarm occurs during the unoccupied hours defined for a schedule group. EXAMPLE To have one alarm action performed during work hours and a different alarm action performed after work hours: 1. Create a *schedule group* (page 48), but do not assign members to it. 2. Create a schedule for the group. Set the occupied hours to be the same as the work hours. 3. Create the alarm action that is to be performed during work hours. Under **Perform Action**, select **If schedule group <your new group> is Occupied**. 4. Create the alarm action that is to be performed after work hours. Under **Perform Action**, select **If schedule group <your new group> is Unoccupied**.

* Ask your network administrator for this information.

Send Web Service Request

The **Web Service Request** alarm action sends a web service request to a third-party server when an alarm event occurs. For example, the i-Vu® Pro application could send a request to a work order system so it could create a work order for someone to respond to the alarm condition.

Field	Notes
Destination Address	The URL of the server that will receive the request. Example: https://192.168.168.102/workorder/bas
Web Service Action	Select the type of web service request required by the target server: GET or POST

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Field	Notes
Content Type	If you selected POST in the previous field, select the format required by the target server: `Application/json` or `/x-www-form-urlencoded`
Web Service Request Parameters	Optional–Create a parameter for each piece of information that the target server requires. You should be able to find information about required parameters in the target server's documentation.
Parameter Name	Enter a name for the parameter. For example, Parm1 or Date. Click **Add Parameter**.
Value	Text required for the parameter. To add live data to the request, select a *field code* (page 92) from the **Append Field** list.
Perform Action	By default, the i-Vu® Pro application performs an alarm action when the alarm source generates an alarm **and** when it returns to normal. Under **Perform Action**, you can choose to run the alarm action: • Only when the alarm source generates an alarm **or** when it returns to normal. • After a specified amount of time if the alarm has not been acknowledged or has not returned to normal. Use this option for alarm escalation. • If the alarm occurs during the occupied hours defined for a schedule group or run if the alarm occurs during the unoccupied hours defined for a schedule group. EXAMPLE To have one alarm action performed during work hours and a different alarm action performed after work hours: 1. Create a *schedule group* (page 48), but do not assign members to it. 2. Create a schedule for the group. Set the occupied hours to be the same as the work hours. 3. Create the alarm action that is to be performed during work hours. Under **Perform Action**, select **If schedule group <your new group> is Occupied**. 4. Create the alarm action that is to be performed after work hours. Under **PerformAction**, select **If schedule group <your new group> is Unoccupied**.

Write Property

The **Write Property** alarm action writes a specified value to a BACnet property. You typically set up 2 alarm actions, the first writes a value when the alarm occurs and the other writes a value when the return-to-normal occurs.

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Field	Notes
Expression	Type the path to the target property. To get the path, right-click the property on a **Properties** page, then select **Global Modify**. The **Geographic Location** field in the **Advanced** section shows the path. Click to copy it. **NOTES** • A BACnet Parameter microblock's present value cannot be written to directly. However, you can change the present value by writing to the relinquish_default property, or to the priority_array/priority16 property. For example, change `#rtu-1/vfd_ovrde/present_value` to `#rtu-1/vfd_ovrde/relinquish_default`, or `#rtu-1/vfd_ovrde/priority_array/priority16`. • Do not use a BACnet address in this field.
Value to Write	Type the value you want to write to the microblock property. Type `0` or `1` for a binary property.
Append field code to value	Select *field codes* (page 92) to add this information to the **Value to Write** field.
Perform Action	By default, the i-Vu® Pro application performs an alarm action when the alarm source generates an alarm **and** when it returns to normal. Under **Perform Action**, you can choose to run the alarm action: • Only when the alarm source generates an alarm **or** when it returns to normal. • After a specified amount of time if the alarm has not been acknowledged or has not returned to normal. Use this option for alarm escalation. • If the alarm occurs during the occupied hours defined for a schedule group or run if the alarm occurs during the unoccupied hours defined for a schedule group. EXAMPLE To have one alarm action performed during work hours and a different alarm action performed after work hours: 1. Create a *schedule group* (page 48), but do not assign members to it. 2. Create a schedule for the group. Set the occupied hours to be the same as the work hours. 3. Create the alarm action that is to be performed during work hours. Under **Perform Action**, select **If schedule group <your new group> is Occupied**. 4. Create the alarm action that is to be performed after work hours. Under **Perform Action**, select **If schedule group <your new group> is Unoccupied**.

Write to Database

The **Write to Database** alarm action stores alarm information in a table in the i-Vu® Pro alarm database or in a custom database. Third-party applications can access the alarm information for building maintenance management or alarm analysis. For example, an application can perform actions such as triggering a stored procedure or running a report.

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Writing to the i-Vu® Pro alarm database

When you add the **Write to Database** alarm action, by default the i-Vu® Pro application writes alarm information to the **write_db_ra** table in the i-Vu® Pro alarm database. The following table describes the information that is written to the database and gives the column name and data type you will need in order to access the alarm information from a third-party application.

Description	Column Name	Data type
Alarm generation time	EVENT_TIME_	Datestamp
Path to the alarm source Example: #slm/m073	SOURCE_PATH_	String
Display name path to the alarm source Example: Atlanta Office/R&D Facility/Second Floor/VAV 2-1/Zone Temp	DISPLAY_NAME_	String
Alarm state Example: OFF NORMAL, LOW LIMIT, HIGH LIMIT	EVENT_STATE_	String
Alarm text as defined in the **Text to write to the database** field on the alarm action page. You can add live data to the text by selecting *field codes* (page 92) from the **Append Field Code list**.	RA_TEXT_	String

Perform Action

By default, the i-Vu® Pro application performs an alarm action when the alarm source generates an alarm **and** when it returns to normal. Under **Perform Action**, you can choose to run the alarm action:

- Only when the alarm source generates an alarm **or** when it returns to normal.
- After a specified amount of time if the alarm has not been acknowledged or has not returned to normal. Use this option for alarm escalation.
- If the alarm occurs during the occupied hours defined for a schedule group or run if the alarm occurs during the unoccupied hours defined for a schedule group.
  EXAMPLE To have one alarm action performed during work hours and a different alarm action performed after work hours:
  1. Create a *schedule group* (page 48), but do not assign members to it.
  2. Create a schedule for the group. Set the occupied hours to be the same as the work hours.
  3. Create the alarm action that is to be performed during work hours. Under **Perform Action**, select **If schedule group <your new group> is Occupied**.
  4. Create the alarm action that is to be performed after work hours. Under **Perform Action**, select **If schedule group <your new group> is Unoccupied**.

NOTES

- To keep the database table from growing too large, you must delete old entries using a third-party database application. You cannot view, edit, or delete entries in the i-Vu® Pro interface.
- If your system uses an Access or Derby database, you cannot open the database in a third-party application while the i-Vu® Pro or SiteBuilder application is running.

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Writing to a custom database

The i-Vu® Pro application can write alarm information to the following types of custom databases. The custom database does not have to be the same type as the i-Vu® Pro database.

- SQL Server
- MySQL
- PostgreSQL

You may create a table in an existing third-party database or create a new database.

Using your database management tool, create a table in your custom database that includes fields for each alarm field code to be written to the table. Each field length in the table should be as long as the longest value to be written to that field.

To set up writing to a custom database instead of the i-Vu® Pro alarm database, check **Specify Custom Database** on the Alarms page **Actions** tab, then enter information in the remaining fields. See table below.

Field	Notes	
Text to write to the database	The text is made up of *field codes* (page 92) that add live data to the text. You can select additional field codes from the **Append Field Code** list. **NOTE** To write the text in this field to the custom database, you must include the Report Text field code ($report_text$) in the **Database Insert String** field described below.	
Database Connect String	**For database type...**	**The connect string format is...**
	SQL Server	jdbc:odbc:<*odbc_alias*>
	MySQL	jdbc:mysql://<*host*>:<*port*>/<*instance*>
	PostgreSQL	jdbc:postgresql://<*host*>:<*port*>/<*instance*>
Database Login and Password	The login and password to connect to the database.	
Database Insert String	Use the following format: Insert into <TABLE_NAME> (<column1_name>, <column2_name> ...) values (<$field_code1$>, <$field_code2$>, ...) Example: Insert into i-Vu Pro_ALARMS (TIME_, LOCATION_, TO_STATE_, TEXT_) values ($generation_time$, $location_path$, to_state, $report_text$) **NOTES** • You can add *field codes* (page 92) to the Insert String using the **Append Field Code** list. • If you add a timestamp type field code (for example, $generation_time$), you should have the data go into a timestamp data type field in the custom database. Otherwise, you must use *field code formatting* (page 92) to format the time. • You can add only one Database Insert String per alarm action.	

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Field	Notes
Perform Action	By default, the i-Vu® Pro application performs an alarm action when the alarm source generates an alarm **and** when it returns to normal. Under **Perform Action**, you can choose to run the alarm action: • Only when the alarm source generates an alarm **or** when it returns to normal. • After a specified amount of time if the alarm has not been acknowledged or has not returned to normal. Use this option for alarm escalation. • If the alarm occurs during the occupied hours defined for a schedule group or run if the alarm occurs during the unoccupied hours defined for a schedule group. EXAMPLE To have one alarm action performed during work hours and a different alarm action performed after work hours: 1. Create a *schedule group* (page 48), but do not assign members to it. 2. Create a schedule for the group. Set the occupied hours to be the same as the work hours. 3. Create the alarm action that is to be performed during work hours. Under **Perform Action**, select **If schedule group <your new group> is Occupied**. 4. Create the alarm action that is to be performed after work hours. Under **Perform Action**, select **If schedule group <your new group> is Unoccupied**.

Write to File

The **Write to File** alarm action can do either of the following:

- Record alarm information in a standard ASCII text file that you can view and edit using a text editor such as Windows® Notepad.
- Write a report to a file.

Field	Notes
File Name	Path name for the file you want to write to such as **c:\i-Vu Prox.x\webroot\alarms.txt**. • If you do not specify a path, the file is written to the system folder. • If you type a path that does not exist, the i-Vu® Pro application will create the necessary folders. • You can write to one of the following: - a file on the server - a networked computer if you map the network drive. Use the drive mapping in the path from the server to the computer. • The path name may contain *field codes* (page 92).

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Field	Notes
Write alarm data	Select to record alarm information in a text file. Select **Append** to add new alarm information to the end of the file instead of writing over existing data. **NOTE** Because you can append new alarm information to the end of the file, this file can become very large. You must back up and delete this file frequently if you are using this alarm action with many alarms. In the field **Text to write to the file**, enter the information you want to record for an alarm. Use punctuation, spaces, or returns to format the text. To add live data to the text, select *field codes* (page 92) from the **Append Field Code** list.
Write a Report	Select to write a report to a file, then select the **Report** and the **Format**. **NOTE** The **Report Name** field shows a custom report only if it is accessible at the current level. **Run as** shows the name and login name of the operator creating the alarm action. The report will be run using the privileges and report options of this operator. **TIP** You may want to create a new operator with limited privileges for this purpose.
Perform Action	By default, the i-Vu® Pro application performs an alarm action when the alarm source generates an alarm **and** when it returns to normal. Under **Perform Action**, you can choose to run the alarm action: • Only when the alarm source generates an alarm **or** when it returns to normal. • After a specified amount of time if the alarm has not been acknowledged or has not returned to normal. Use this option for alarm escalation. • If the alarm occurs during the occupied hours defined for a schedule group or run if the alarm occurs during the unoccupied hours defined for a schedule group. EXAMPLE To have one alarm action performed during work hours and a different alarm action performed after work hours: 1. Create a *schedule group* (page 48), but do not assign members to it. 2. Create a schedule for the group. Set the occupied hours to be the same as the work hours. 3. Create the alarm action that is to be performed during work hours. Under **Perform Action**, select **If schedule group <your new group> is Occupied**. 4. Create the alarm action that is to be performed after work hours. Under **PerformAction**, select **If schedule group <your new group> is Unoccupied**.

Setting up an alarm source in the i-Vu® Pro interface

In the i-Vu® Pro interface you can:

- Edit an alarm source's settings or set up a new alarm source to generate alarms.
- Select **Properties** page > **Alarm Sources** tab to set up all alarms associated with a particular piece of equipment
- Simulate an alarm to test its setup.

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To set up, edit, or disable alarm sources

To set up, edit, or disable a single alarm source

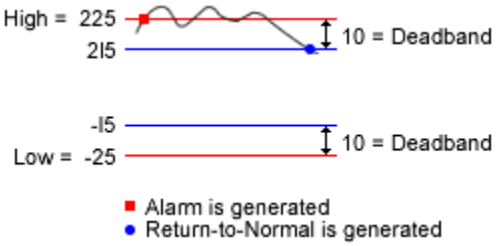
1 On the navigation tree, select the control program.

2 Click **Alarms**, then select the **Enable/Disable** tab.

3 Make changes to the fields as needed. The fields can vary for different types of alarm sources. See table below.

4 Click **Accept**.

TIP To set up all the alarms for a piece of equipment at once, click **Properties**, then select **Alarm Sources**.

Field	Notes
Potential alarm source	Check to enable the alarm source to generate alarms. Uncheck to disable the alarm source.
Alarm enabled	Check to have the alarm source generate an alarm when the specified conditions occur. • For a binary input, enter the conditions for generating an alarm. • For an analog input, type the low and high limits that, when exceeded, will generate an alarm. **Deadband** The amount inside the normal range by which an alarm condition must return before a return-to-normal notification is generated. **EXAMPLE**  **NOTE** If the **Status** checkbox is selected, the alarm condition currently exists.
Return to Normal	Check to have the alarm source generate a return-to-normal when the alarm condition returns to a normal state.
Alarm requires acknowledgement	Check to have the i-Vu® Pro application require that an operator acknowledge the alarm.
Return requires acknowledgement	Check to have the i-Vu® Pro application require that an operator acknowledge the return-to-normal.
Classified as critical	This property determines the color of the system-wide alarm button when the alarm comes in. = Critical = Non-critical

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Field	Notes
Event State	The current state of the alarm source can be: • Normal—value is normal • Off normal—the value is not normal (binary only) • Fault—the alarm source microblock may be misconfigured • High Limit—the value exceeds the normal range (analog only) • Low Limit—the value is below the normal range (analog only)
BACnet Configuration: **Dial on alarm**	N/A
Notification Class	Do not change this field.

To set up, edit, or disable multiple alarm sources simultaneously

1 On the navigation tree, select the area, equipment, or controller containing the alarm sources.

2 Click **Alarms**, then select the **Enable/Disable** tab.

3 In step **1**, select the categories that contain the alarm sources.

NOTE In step **1** and step **2**, **Ctrl+click**, **Shift+click**, or both to select multiple items, or select the **Select All** checkbox.

4 In step **2**, select the alarm sources.

5 Make appropriate changes in step **3**.

6 Click **Accept**.

NOTE Click **View Selected Sources** to view or change settings for each alarm.

To simulate an alarm

To test the setup of an alarm source and its *alarm actions* (page 69), you can simulate an alarm or its return-to-normal.

1 On the navigation tree, select the alarm source whose alarm you want to simulate.

2 Click **Properties** > **Alarm Sources** tab.

3 Click on an alarm point that is labeled as (BALM) or (CALM) and is enabled as a Potential Alarm Source (fifth column from the left).

4 In the dialog box that opens, select **Alarms** and then the **Enable/Disable** tab.

5 Check **Enable** next to **Alarm** or **Return to Normal**.

6 Click **Simulate** next to **Alarm** or **Return to Normal**.

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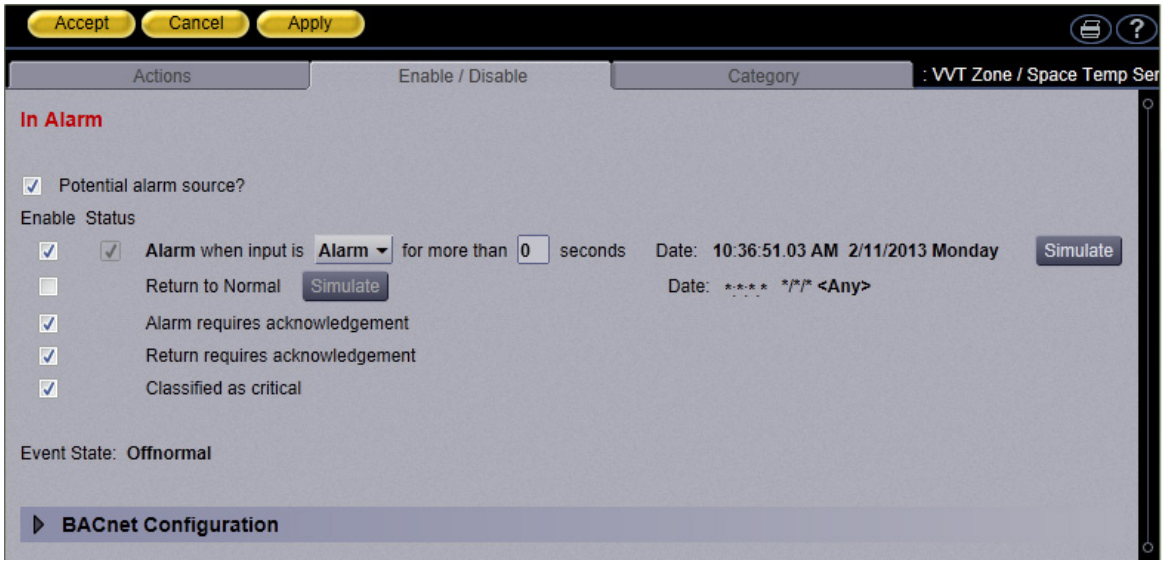
7 Click **Accept**.



8 Select the controller on the navigation tree, then select the **Alarms** > **View** tab to see the alarm.

To view all instances of an alarm source

To find all instances of an alarm source at and below a selected area:

1 On the navigation tree, select an area.

2 Click **Alarms** and select the **Actions**, **Enable/Disable**, or **Category** tab.

3 Select an alarm source from the list in step **2**.

4 Click **View Selected Sources**.

NOTE You may be able to change settings that relate to the tab you selected.

Alarm categories

Alarm categories sort related alarm sources and their alarms into groups such as HVAC Critical and Access Control General. Alarm categories let you:

- *View, acknowledge, or delete selected categories of alarms* (page 63) received by the i-Vu® Pro application
- *Assign alarm actions* (page 69) to selected categories of alarm sources
- *Set up alarm sources* (page 88) in selected categories

Each alarm source is assigned to an alarm category in either the Snap application or in the i-Vu® Pro interface.

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To assign alarm sources to a category in the i-Vu® Pro interface

1 On the navigation tree, select the area, equipment, or controller containing the alarm sources.

2 Click **Alarms**, then select the **Category** tab.

3 In step **1**, select the category that currently contains the alarm sources.

NOTE In step **1** and step **2**, **Ctrl+click**, **Shift+click**, or both to select multiple items, or check **Select All**.

4 In step **2**, select the alarm sources whose category you want to change.

5 In step **3**, select a category from the drop-down list, then click **Change**.

6 Click **Accept**.

Edit alarm messages

To edit the message for an alarm source

1 On the navigation tree, select the controller.

2 Select **Properties** > **Alarm Sources** tab and double-click the underlined name of point to open the microblock popup.

3 In the dialog, select **Alarms** > **Messages** tab.

NOTE **Sample Alarm Message** and **Sample Return Message** show the messages as they are currently defined.

4 Enter the edited message you want to appear in the field for **Alarm** or **Return**. You can add live data to the text by selecting *field codes* (page 92) from the **Append Field Code** list.

5 Click **Accept**.

Using field codes

Use field codes to insert live data into:

- The message on an alarm action
- Text displayed on the **Alarms** page > **View** tab
- Alarm information archived to a text file when an alarm is deleted

You can customize the setup of each of these items by appending field codes. For example, to have the message in an alarm action include the device that generated the alarm, append the Device field code to the action's message.

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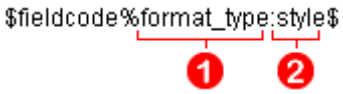
Formatting field codes

You can type a formatting command after a field code to format the field code in one of the following 3 ways:

- Format a number field code (Example: ##.##)
- Format a date/time field code (Example: MM/dd/yyyy hh:mm:ss)
- Left, right, or center align a field code and set the field width

A formatting command must have the following syntax:



Use the table below to determine the format_type and style for a formatting command.

	1 format_type	2 style	Example
To format a number	N	The actual formatting, such as ##.##. The basic format uses the pound sign (#) to represent a number. For more information, search the Internet for "customizing number formats with java".	To always round a setpoint value to two digits to the right of the decimal, the field code is: $setpoint_value%N:##.##$ For example, 78.9935 becomes 78.99.
To format date/time	D	The actual formatting, such as MM/dd/yyyy hh:mm:ss. For more information, search the Internet for "customizing date time formats with java".	To show the date and time when an alarm is generated in a format like 03/15/2004 10:50:43, the field code is: $generation_time%D:MM/dd/yyyy hh:mm:ss$
To set alignment and field width	L for left align R for right align C for center align	Indicate the field width by number of characters.	To left align the name of the device that generated the alarm and set the field width to 15 characters, the field code is: $device%L:15$

Using multiple formatting commands

You can type multiple formatting commands for a field code. For example, you can format a number and then set the alignment and field width. The syntax for multiple formatting commands is:

$fieldcode%format_type1:style%format_type2:style$

EXAMPLE To format the alarm date and time, center it and set the field at 20 characters, the field code is: $generation_time%D:MM/dd/yyyy hh:mm:ss%C:20$

NOTE You must enter the date/time or number formatting command before the alignment/field width command.

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Field Codes

Field Code Name	Field Code	Description
Acknowledge Operator	$acknowledge_operator$	The operator who acknowledged the alarm. **EXAMPLE** John Doe
Acknowledge Time	$acknowledge_time$	The time when the operator acknowledged the alarm. **EXAMPLE** Nov 12, 2012 6:46:31 PM
Alarm Category	$alarm_category$	The alarm category that the alarm is assigned to. **EXAMPLE** HVAC Critical
Alarm Priority	$alarm_priority$	The priority number associated with the alarm's priority (Off-Normal, Fault, or Normal) on the controller's **Driver** > **Notification Class** page.
Alarm Type	$alarm_type$	The alarm type of the alarm source. **EXAMPLE** CHANGE OF STATE
Character	c	A single ASCII character. Often used for form feeds and other printer escape sequences. **EXAMPLE** $C:65$ displays A
Command Value	$command_value$	The commanded value from the alarm source. Valid only for alarm type COMMAND FAILURE. **EXAMPLE** 3
Control Program	$equipment$	The display name of the equipment where the alarm came from. **EXAMPLE** Chiller
Controller	$device$	The display name of the device where the alarm came from. **EXAMPLE** UPC Open
Dead Band	$deadband$	The deadband value from the alarm source. Valid only for alarm type OUT-OF-RANGE. **EXAMPLE** 5
Deletion Operator	$deletion_operator$	The operator who deleted the alarm. **EXAMPLE** John Doe
Deletion Time	$deletion_time$	The time the alarm was deleted. **EXAMPLE** Nov 12, 2012 6:46:31 PM
Error Limit	$error_limit$	The error limit, from the alarm source. Valid only for alarm type FLOATING LIMIT. **EXAMPLE** 90
Event Values	$event_values$	Returns a string of alarm values associated with the alarm.
Exceeded Limit	$exceeded_limit$	The exceeded limit value from the alarm source. Valid only for alarm type OUT-OF-RANGE. **EXAMPLE** 90
Exceeding Value	$exceeding_value$	The exceeding value from the alarm source. Valid only for alarm type OUT-OF-RANGE. **EXAMPLE** 91

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Field Code Name	Field Code	Description
Fault	$fault$	The status of the fault condition from the alarm source. **EXAMPLE** True or false
Field Message	$field_message$	Text generated in the alarm by the controller.
Feedback Value	$feedback_value$	The feedback value from the alarm source. Valid only for alarm type COMMAND FAILURE. **EXAMPLE** 10
From State	$from_state$	The previous state of the alarm source. **EXAMPLES** NORMAL, FAULT, OFF NORMAL, HIGH LIMIT, LOW LIMIT
Generation Operator	$generation_operator$	The operator who forced the alarm to return to normal. **EXAMPLE** John Doe
Generation Time	$generation_time$	The time in the controller when the alarm was generated. **EXAMPLE** Nov 12, 2012 6:35:18 PM
In Alarm	in_alarm	The in alarm status from the alarm source. **EXAMPLE** True or false
Incident Closed Time	$incident_closed_time$	The time the alarm's entire incident group closed. **EXAMPLE** Nov 12, 2012 6:46:31 PM
Location Path	$location_path$	Displays the path display names from root to source. **EXAMPLE** Building B / Basement / VAV AHU B / SSP_STOP
Long Message	$long_message$	The formatted alarm long text displayed by double-clicking the alarm on the Alarms page.
Message Details	$message_details$	The message details displayed on the Alarms page **View** tab.
Message Prefix	$message_prefix$	The message prefix displayed on the Alarms page **View** tab.
Message Text	$message_text$	The message text displayed on the Alarms page **View** tab.
New State	new_state	The status of new state from the alarm source. Valid only for alarm type CHANGE OF STATE. **EXAMPLE** Alarm, Fault
New Value	new_value	The new value from the alarm source. Valid only for alarm type CHANGE OF VALUE. **EXAMPLE** 70
Notification Class	$notification_class$	The notification class assigned denotes how the received alarm was generated. For example, if set to 1, the alarm would typically be sent to i-Vu® Pro by Carrier controllers.
Object ID	$object_ID$	Object ID of the alarm source. **EXAMPLE** 5:26
Out of Service	$out_of_service$	The status of 'out of service' from the alarm source. **EXAMPLE** True or false

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Field Code Name	Field Code	Description
Overridden	$overridden$	The status of 'overridden' from the alarm source. **EXAMPLE** True or false
Program ID	$program_id$	The address of the control program that generated the alarm. BACnet program address format: device ID, program number **EXAMPLE** 2423101,1
Receive Time	$receive_time$	The time at the workstation when the alarm was received. **EXAMPLE** Nov 12, 2012 6:46:31 PM
Recipient Device ID	$device_id$	The device ID of the device where the alarm came from. **EXAMPLE** 8:2423101
Reference Path	$reference_path$	Path to alarm source. Available in all alarm actions. **EXAMPLE** #e_b_vav_ahu_b/ssp_stop
Reference Value	$reference_value$	The 'reference value' from the alarm source. Valid only for alarm type FLOATING LIMIT. **EXAMPLE** 83
Referenced Bitstring	$referenced_bitstring$	The value of the 'referenced bitstring' value from the alarm source. Valid only for alarm type CHANGE OF BITSTRING. **EXAMPLE** 1011011101101
RTN Time	RTN_time	The time when the alarm returned to normal. **EXAMPLE** Nov 12, 2012 6:46:31 PM
Setpoint Value	$setpoint_value$	The 'setpoint value' from the alarm source. Valid only for alarm type FLOATING LIMIT. **EXAMPLE** 72
Short Message	$short_message$	The formatted alarm short text.
Site	$site$	The display name of the site the alarm came from. **EXAMPLE** Kennesaw
Source	$source$	The display name of the alarm source microblock that generated the alarm. **EXAMPLE** SAT_HI
Source description	$source:description$	The Description field of the alarm source microblock that generated the alarm. **EXAMPLE** High Cooling Supply Air Temp
Source Path	$source:<path>$	Substitute <path> with the path to the value your want to display. See *Defining i-Vu® Pro paths* (page 179). **Example to add text value**: $source:~equipment.display-name$ **NOTE** You can use *Global Modify* (page 30) to get the path.
System Directory	$system_dir$	i-Vu® Pro only: The system folder name. **EXAMPLE** c:\<i-Vu_Pro_>x.x\webroot\ world_corporation
To State	to_state	The current state of the alarm source. **EXAMPLES** NORMAL, FAULT, OFF NORMAL, HIGH LIMIT, LOW LIMIT

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Reports

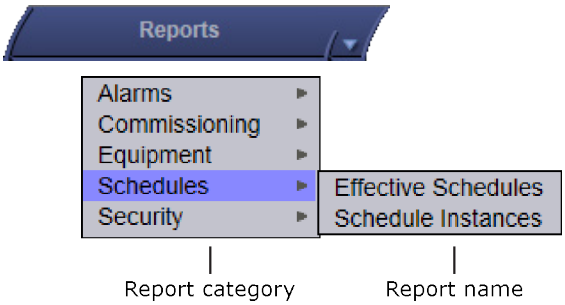
Use i-Vu® Pro reports to monitor and troubleshoot your system. Your i-Vu® Pro license and/or edition determines which of the following things you can do in the i-Vu® Pro interface. You can:

- Run preconfigured reports
- Run custom reports
- Schedule reports
- Create custom reports

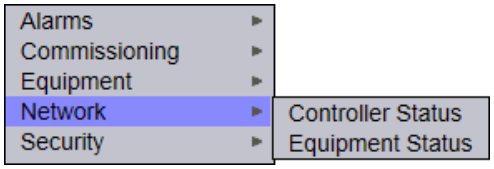
Preconfigured reports

The preconfigured reports shown in the **Reports** button drop-down list vary depending on which tree you selected.

In the **User** tree:



In the **Installer** tree:



A preconfigured report shows data for the selected tree item and all of its children.

This preconfigured report...	allows you to...
Alarms	
Alarm Actions	Create a summary of the information configured on the *Alarms* > *Actions* (page 69) tab.
Alarm Sources	Create a summary of potential alarm sources as configured on the *Alarms* > *Enable/Disable* (page 88) tab.
Alarms	View, sort, and filter the information on the *Alarms View* (page 63) tab.
Commissioning	
Equipment Checkout	View the information on the **Equipment Checkout** tab of the equipment's **Properties** page during commissioning. Also, find equipment that has not been fully commissioned.

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This preconfigured report...	allows you to...
Test & Balance	View the damper calibration parameters. Run this report after performing Test and Balance to upload all calibrations and resolve parameter mismatches. • Running the report at the equipment level of the navigation tree uploads to that location • Running the report at the system or router level will upload to all equipment that contain one or more airflow microblocks. **CAUTION!** After performing Test and Balance, you **must** run the Test and Balance report to upload the values from the controller to the i-Vu® Pro application. You will lose all your calibrations if you download to the controller before running this report.
Equipment	
Locked Values	Find all locked points and locked values. **NOTE** Locks in the Airflow microblock are not reported.
Network IO	Verify the programming and status of all network points—especially useful for commissioning controllers used for third-party integration.
Parameter Mismatch	Discover where your system has parameter mismatches that need to be resolved.
Point List	View the details of all points. Verify that all points have been checked out during commissioning. Also, create custom lists for other contractors. For example, create a list of BACnet IDs.
Trend Usage	Creates a summary of the information configured on the *Trends* > *Enable/Disable* (page 56) tab.
Schedules	
Effective Schedules	View all equipment that may be scheduled and the net result of all schedules in effect for a selected date and time.
Schedule Instances	Find every schedule with its location that is entered at and below a selected tree item. This report can help you discover newly added and conflicting schedules.
Security	**NOTE** You must have the Advanced Security package to run these reports.

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This preconfigured report...	allows you to...
Location Audit Log	View chronological lists of changes, the operators that made them, and the reasons for the changes. This report includes changes such as property edits, downloads, driver changes, and view changes. Select the **Options** tab to choose whether to show the changes made by All Operators, System, Installer, or specific operators. You can show administration, system, and schedule group changes.
System Audit Log	View chronological lists of system-wide changes, the operators that made them, and the reasons for the changes. This report includes changes such as any change made on the tree, login/logout, login failures, and scheduled processes like deleting expired trends. Select the **Options** tab to choose whether to show the changes made by All Operators, System, Installer, or specific operators.
Network	
Controller Status	Discover network communication problems (shown as purple squares on the report) that need troubleshooting. The report also shows boot and driver version, download information, and if controller has 4.x or later driver, the report shows the serial number and Local Access port status.
Equipment Status	Display the thermographic color, status, and prime variable of each control program.

To run a preconfigured report

1. Select an item on the navigation tree.
2. Click the **Reports** button drop-down arrow, then select a report.
3. On the **Options** tab, define the layout and content of the report.

   NOTES

   - Changing the size and orientation of the printed page also changes the report layout on the **View** tab.
   - To create a CSV (Comma Separated Values) file after you run the report, select **Support CSV text format**. See *To create a report PDF, XLS, or CSV file* (page 144).
   - The current operator's report options are saved so that when that operator logs in again, the same options are used.
4. Click **Run**.

NOTE i-Vu® Plus and Pro only - Click **Schedule** to schedule the report to run on a recurring basis. See *Scheduling reports* (page 145).

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To run an ad hoc report

Follow these steps to run a single ad hoc version of an Alarms, Life Sciences, or Security report.

1 Click the **Reports** drop-down arrow, and then select the report that you want to schedule.

- **Alarms** > **Alarms**
- **Life Sciences***
  - **MKT**
  - **Trend Value**
  - **Out of Range**
- **Security Reports**
  - **Location Audit Log**
  - **System Audit Log**

2 Go to the **Options** tab.

3 In the **Ad Hoc Report** section, select the time span of the report.

Date range option	Description
Unrestricted	The report contains all data for the entire duration of available dates.
Continuous Data (Date)	The report contains all data occurring between the specified Start and End dates.
Continuous Data (Date and Time)	The report contains only the data occurring between the specified Start Date and Time and End Date and Time.
Shift Report*	The report contains only the data occurring between the specified Shift Start and End Times within the specified date range.

4 For Life Sciences* reports, select any of the following options.

Report	Option	Description
MKT Out of Range Trend Value	Choose trend sources	You can select your trend sources: i. For a Trend Value report, click **Select Trends**. For an MKT or Out of Range report, skip to the next step. ii. Under **Trend Sources**, click **Choose Trends**, and then select your sources. iii. To limit the report to specific locations, check only the locations desired. Clicking **Refresh** checks any boxes that have been unchecked. **NOTE** To calculate Mean Kinetic Temperature on the MKT and Out of Range reports, all trend samples should be in Celsius.
Out of Range	Out of range parameters	See *To configure Out of Range reports with Semantics* (page 104) for a complete description.

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Report	Option	Description
Trend Value	Custom reporting interval	You can choose a custom reporting interval. If you do not select a custom interval, every sample value in the database for the defined time range will appear on the report. i. Check **Report by custom interval**. ii. Enter the interval and select the interval type (Hours, Minutes, Seconds).
Trend Value	Min/Max	Adds a "Range" header to the top of each trend column in the report for which **Min/Max** is checked. Values outside the **Min/Max** range appear as bold. i. Check **Min/Max**. ii. Enter the **Min Value** and **Max Value**.
Trend Value	Min/Max Change Multiple Values	To set multiple **Min/Max** values at once: i. **Alt + click** a **Min/Max** value. ii. Check **Enable** next to the trends you want to modify. iii. Enter the desired value in **New Value**. iv. Click **Apply Changes**. To modify all **Min/Max** values: i. Check **Enable All**. ii. Enter the desired value and click **Set All To**. iii. Alternately, enter the amount you want to modify the value by, and click **Change All By**. The value changes by that amount every time you click. iv. Click **Apply Changes**.

5. Click **Accept**, and then click **Run**.

For Alarms or Security reports, changes made here affect ad hoc report settings for the selected report in all locations. Life Sciences settings are specific to each location.

* These options may be limited to a specific license or optional package. See *i-Vu® Pro editions and optional packages* (page 4) for more information.

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To configure scheduled Alarms, Security, and Life Sciences reports

The following reports have additional scheduling options available. Scheduling these reports without configuring schedule options results in an error; see **View History** in *To manage scheduled reports* (page 146).

- **Alarms** > **Alarms**
- **Life Sciences***
  - **MKT**
  - **Trend Value**
  - **Out of Range**
- **Security Reports**
  - **Location Audit Log**
  - **System Audit Log**

1 Go to the **Options** tab, open **Scheduled Report**, and check **Enable schedule options for this location**.

2 Select the time span of the report.

Date range option	Description
Continuous Data (Date)	The report contains all data occurring between the specified Start and End dates.
Continuous Data (Date and Time)	The report contains only the data occurring between the specified Start Date and Time and End Date and Time.
Shift Report*	The report contains only the data occurring between the specified Shift Start and End Times within the specified date range.

3 Select the number of Days, Weeks, Months, Quarters, or Years the report will contain.

NOTES

- The use of "previous": Selecting "previous week" returns data for the previous full calendar week, Sunday through Saturday. Select "previous 7 days" to see the most recent week of data. For example, selecting "previous 7 days" on a Wednesday returns data from last Wednesday through the current Tuesday.
- Checking **include current** causes the report to contain data for the most recent iteration of the report. For example, a report for the previous week with the **include current** option checked contains only the data for the current week, even if it is not a complete week. In order to get the last week *and* the current week, it would be necessary to specify the previous 2 weeks.

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4 For Life Sciences* reports, select any of the following options.

Report	Option	Description
MKT Out of Range Trend Value	Choose trend sources	You can select your trend sources: i. For a Trend Value report, click **Select Trends**. For an MKT or Out of Range report, skip to the next step. ii. Under **Trend Sources**, click **Choose Trends**, and then select your sources. iii. To limit the report to specific locations, check only the locations desired. Clicking **Refresh** checks any boxes that have been unchecked. **NOTE** To calculate Mean Kinetic Temperature on the MKT and Out of Range reports, all trend samples should be in Celsius.
Out of Range	Out of range parameters	See *To configure Out of Range reports with Semantics* (page 104) for a complete description.
Trend Value	Custom reporting interval	You can choose a custom reporting interval. If you do not select a custom interval, every sample value in the database for the defined time range will appear on the report. i. Check **Report by custom interval**. ii. Enter the interval and select the interval type (Hours, Minutes, Seconds).
Trend Value	Min/Max	Adds a "Range" header to the top of each trend column in the report for which **Min/Max** is checked. Values outside the **Min/Max** range appear as bold. i. Check **Min/Max**. ii. Enter the **Min Value** and **Max Value**.
Trend Value	Min/Max Change Multiple Values	To set multiple **Min/Max** values at once: i. **Alt + click** a **Min/Max** value. ii. Check **Enable** next to the trends you want to modify. iii. Enter the desired value in **New Value**. iv. Click **Apply Changes**. To modify all **Min/Max** values: i. Check **Enable All**. ii. Enter the desired value and click **Set All To**. iii. Alternately, enter the amount you want to modify the value by, and click **Change All By**. The value changes by that amount every time you click. iv. Click **Apply Changes**.

5. Click **Accept**.

NOTE Changes made here affect the selected scheduled report in the current location only.

* These options may be limited to a specific license or optional package. See *i-Vu® Pro editions and optional packages* (page 4) for more information.

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To configure Out of Range reports with Semantics

An Out of Range (OoR) report calculates the number of occurrences and the duration that selected trends deviated outside configured min/max values over a selected time period. Follow the instructions below to configure OoR reports using *Semantics* (page 152) tagging.

- Only a single probe per .equipment file should be included in an OoR report.
- Each trend included in the OoR report must be associated with a set of semantic tags representing the high and low range values, and the time (in minutes) after which a diversion outside the range is considered an out of range incident.
- The location the tags are defined depends upon the organization of your equipment, and the uniformity of how out of range values are used throughout the system.

OoR Report Tags

Marker tags

For each trend in your report an OoR marker tag must be assigned. All OoR marker tags must start with "oor". Four value tags must be associated with the OoR marker tag by name; for example, if the marker is `oor_cooler`, the associated value tags would be `oor_cooler_low`, `oor_cooler_high`, `oor_cooler_low_delay`, and `oor_cooler_high_delay`.

Value tags

Below are the four value tags that need to be defined for each trend in your report.

Parameter	Definition
Low	Lowest acceptable value
High	Highest acceptable value
Low delay	Time (in minutes) the trend must be below the Low value to be considered out of range
High delay	Time (in minutes) the trend must be above the High value to be considered out of range

Semantic tags can be assigned at any level in the tree. A full set of four value tags must be used for each trend source's designated OoR marker tag, but the value tags do not have to be at the same location in the tree. For example, when Delay values can be used more generically than range values, the delay values may be defined higher in the tree than the High and Low values.

For each trend source in the report, the program searches for the first OoR marker tag, starting at the microblock level and moving upward. Once the marker tag is found, the system searches for the associated value tags, starting at the microblock level for each of the four value tags.

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Built-in tags

The table below contains the built-in tags that are provided with the Life Sciences license.

ID	Display Name	Type
oor	Oor	Marker
oor_high	Oor High	Value
oor_low	Oor Low	Value
oor_high_delay	Oor High Delay	Value
oor_low_delay	Oor Low Delay	Value

Custom tags

Custom tags must start with "oor"; for example, if you create marker `oorfreezer`, the associated value tags would be `oorfreezer_low`, `oorfreezer_high`, `oorfreezer_low_delay`, and `oorfreezer_high_delay`. If the `oorfreezer` marker tag was identified for a trend source, the system must find all four `oorfreezer_*` value tags.

NOTES

- Any of these tags can be assigned by the customer at any level in the tree. They can also be assigned using a reference name rule.
- It is possible to use a mixture of built-in and custom OoR marker tags. The OoR marker tag closest to the trend point is the one that is used.
- If no OoR marker tags are assigned, the built-in “oor” marker tag is assumed by default. The system searches for the associated value tags, starting at the microblock level for each of the four built-in “oor” value tags.
- Only a single OoR marker tag can be used at a single location.

Custom reports

Custom reports are managed through the i-Vu® Pro Report Manager that shows a list of all custom reports in your system. In the Report Manager, you can:

- *Create a new custom report* (page 106)
- *Copy an existing report as a starting point for a new report* (page 106)
- Edit or delete an existing report
- *Export report(s) to a file so that it can be imported into another system* (page 127)

A custom report can provide data for a *data table* (page 129), *chart* (page 133), or *color map* (page 137) on a Graphics page.

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NOTES

- A custom report may appear in the Report Manager but not appear in the Reports button menu because its only purpose may be to provide data to an item on a Graphics page.
- To support upgraded systems, you can still create and access *legacy (v6.5 and earlier) custom reports* (page 147). These reports appear only in the **Reports** button drop-down menu, but not in the Reports Manager.

Creating a custom report

NOTE If you have an i-Vu® Pro 5 or i-Vu® Pro 32 system, you cannot create or edit custom reports.

1 Click the **Reports** drop-down arrow, and then select **Report Manager**.

2 Click **Add**.

TIPS

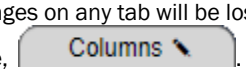
- To save time when making a report that is similar to an existing report, select the existing report in the Report Manager, and then click **Copy**. The Report Editor opens the new report so that you can make changes.
- Click on the **Display Name** or **ID** heading in the Report Manager to sort the column.

3 Enter information on the following Report Editor tabs until you have created the report.

- Type tab
- *Columns tab* (page 110)
- *Variables tab* (page 121)
- *Where tab* (page 122)
- Options tab
- *Output tab* (page 123)

NOTES

- As you create your report, you can use the **Preview** section on each tab to check your work. See *To preview a report* (page 126).
- After you create the report, you can go to any item in the tree where the report is accessible, and run it. See *To run a custom report* (page 126).
- A report can have a maximum of 50 columns and 1000 rows.

CAUTION As you move from tab to tab in the Report Editor, click **Apply** to save your changes on a tab. If you click **Cancel** on a tab, all unsaved changes on any tab will be lost. Tabs that have unsaved changes have a pencil icon beside the tab name. For example, 

.

Type tab

1 Enter the necessary information about the report you are creating. See table below.

2 Click **Accept** or **Apply**.

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Field	Notes	
Display name	The name that will appear in the **Reports** button drop-down list.	
ID	A unique ID for the report (letters, numbers, underscores, and hyphens only; no spaces or special characters).	
Show in Reports menu	By default, the report name will appear directly in the **Reports** button drop-down list, not in a category. You can: • Check this box and then select a category for the report. See *To organize custom reports by category* (page 128). • Uncheck this box so that this report does not appear in the **Reports** button drop-down list. For example, you could uncheck this box if the report will provide data to a Graphics page but does not provide valuable information as a stand-alone report.	
Primary column	Select the type of information that you want the report to be based on. **NOTE** If you change your initial selection, click **Change** to have your new selection take effect.	
	Select...	**Then...**
	Control Programs	Do one or both of the following to create the list of control programs. The primary column will list the equipment that use those control programs. • Enter a control program name, and then click **Add**. You can use wildcards. See the help text to the right of this field. • Select from the list of existing control programs.
	Locations	Do one or both of the following to create the list of locations that will appear on each row in the primary column: • Select locations in the **User** or **Installer** tree. • Enter a location name, and then click **Add**.
	Reference Names	Enter a reference name and then click **Add**. You can use wildcards. See the help text to the right of this field. Add more reference names, if desired, to build a list of reference names. The primary column will list the locations that have the reference names. Select the type(s) of reference names that you added.

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Field	Notes	
	Tag Names	To create the list based on tagged locations for each row in the primary column of the report: **1** Click to the left in the list of system tags to add that tag to the **Tag Names** table. **NOTE** To combine several tags for a single location, keep clicking next to each tag you want. **2** Click **Add** to assign the selected tag(s) to the list of tag names to use for a location. **3** Check the type(s) of locations (**Area**, **Equipment**, **Microblock**) that you want in the column. **4** Click **Apply**. The locations selected for the report will be those that match any row of tag names. For example, to get a report of locations tagged **Chilled Water** and **Hot Water**: **1** Click next to **Chilled**. **2** Click next to **Water**. **3** Click **Add**. **4** Click next to **Hot**. **5** Click next to **Water**. **6** Click **Add**.

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Field	Notes	
	Date Range	Choose one of the following: • **Previous**: A specified number of previous days, weeks, months, quarters, or years. You can choose to include the current time period. • **From date**: A specified number of days, weeks, months, quarters, or years starting at a specific date (yyyy/mm/dd). **NOTE** You can enter a value or variable name in the fields for these 2 options. If you enter a variable, it must be defined on the *Variables tab* (page 121). **Frequency**: If you choose **Months** or **Days** in the **Previous** or **From date** fields, you can choose how often the data is to be reported. For example, if you choose a frequency of **Every 15 minutes**, the primary column could look similar to the following: **Date Range format in report**: Type the date format that you want to see in the report. See *Date formats* (page 109) for a list of supported formats.
	Existing Report	Select an existing report from the drop-down list or enter a report name in the text field. The existing report will be embedded in the new report so that you can add columns to it. Any changes to the existing report will also be reflected in the new report.
	Color Map	Select this option to show colors on a Graphics page. For example, you could have a campus map where each building would show green for good energy usage or red for high energy usage. See *To produce a color map* (page 137).
Hide Primary column in report	Check to have this column not appear in the report.	
Primary column header	If you do not hide the Primary column, type the header that you want to appear at the top of this column.	

Date formats

If your **Primary column** is a **Date Range**, use the following information to enter a format in the **Date Range format in report** field.

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For	Type...	Example
Year	yyyy yy	2017 17
Month	MMMM MMM MM	September Sep 9
Week in year	w	27
Week in month	W	2
Day in year	D	189
Day in month	d	12
Day of week in month	F	2 (2nd Thursday in June)
Day name	EEEE E	Tuesday Tue
Day number in week	u	1 (Monday), 2 (Tuesday), etc.

Examples of combinations:

yyyy-MM-dd = 2017-06-02
MMMM yy = June 17
MMM/yyyy = Jun/2017
MM/dd/yy D = 06/02/17 153

NOTES

- To include a single quote, type two single quotes. Example: MMM "yy = Jun '17
- To include static text, enclose it in single quotes. Example: 'Year' yyyy = Year 2017
- For more information on date formats, search the Internet for "java simple date format".

Columns tab

The Primary column for a table is defined on the **Type** tab. You define the remaining columns on the **Columns** tab. To define the columns in your report, you can:

- *Add each individual column* (page 110)
- *Copy an existing column* (page 113)
- *Replicate a column (Trend Data only)* (page 113)

To add a column

1 Click **Add**.

2 Enter or select options in the first four fields that appear. See table below.

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3 Select an option in the **Column data is from** field. See the gray rows in the table below for a description of the options.

NOTE If you change your initial selection, click **Change** to have your new selection take effect.

4 Select or enter information for the option you chose in step 1. See table below.

5 Click **Accept** or **Apply**.

Field	Notes	
The following four fields are common to all of the options from step 1 above.		
Display name	The name that will be shown in the report as the column's header.	
ID	A unique ID for the column (letters, numbers, underscores, and hyphens only; no spaces or special characters).	
Render data as	**Value**	Shows a value in the report.
	Hidden	Hides the column in the report. The column's data can be used to produce a value for another cell.
	Color	Uses the column's value to determine a color on a *color map* (page 137). Set the **Column data is from** field to **Expression** or **Function**, and then enter the appropriate information that returns a color value.
	Icon	Shows an icon to indicate a certain condition. Set the **Column data is from** field to **Expression**, and then enter an expression that says what icon filename to show for a particular condition. You can use the icons included with your system or you can create custom icons. See *Icons* (page 120) for more information.
Column format	Lets you define the column's alignment, width, and format of digits. **NOTE Column format** does not apply if you select **Hidden** or **Color** in the **Render data as** field.	

The following fields are based on your selection in the **Column data is from** field.	
Path	The column's output will be based on a path to a value in the i-Vu® Pro system.
Path	Enter the path to the value you want. See *Defining i-Vu® Pro paths* (page 179).
Show value as text	Check to have the value reported as text instead of its numerical value. For example, show the word On instead of 1.
Expression	The column's output will be based on the result of an *expression* (page 113).
Trend Data	The column's output will be based on a value calculated from a range of trend data.

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Field	Notes	
Trend path	Do one of the following: • Click the **Select Trend Path** button to choose the trended point. Typically, you want the full (absolute) path, but if needed, you can choose to get the relative path. • Type the path to the trend that you want the report to pull data from. See *Defining i-Vu® Pro paths* (page 179).	
Operation	Select the type of value or calculation that you want the column to show. See *Operations* (page 119) for a description of each option.	
Interval sample	If the selected operation allows, you can choose how to handle the first and last sample of the time period. For example, **Include start time / exclude end time**.	
Database trends only	Check to include only trends saved in the database, not those in the controller.	
Show time of sample	Check to include the time of the sample in the column.	
Time range	**From primary column**	You can use this option if the report's primary column is a date range.
	From column	You use this option if your report began with an embedded external report that has a column containing date ranges.
	Value	A time period specified by entering a **Start date** and **End date**.
	Past	Enter a number of days, weeks, months, quarters, and years in the past. You can select whether or not to include the current time period.
	NOTE You can use a *variable* (page 121) for a **Time range** count or date field. The variable must be defined on the **Variables** tab.	

Function	The column's output will be based on the value or manipulation of the value from another column.
Input column	The column that you want to perform a function on.
Function	Select an option in the drop-down list. See *Functions* (page 117).
Arguments	A statement that contains the criteria of the function. See *Functions* (page 117) for argument formats and examples. **NOTE** You can use a *variable* (page 121) name in the argument. The variable must be defined on the **Variables** tab.

+/- Date Range	The column's output will be based on the date range you choose.
Adjust by	Adjusts the data by this many days, weeks, months, quarters, or years. Enter a value or variable name.
From column	Enter the Column ID of the date range you want to adjust. To adjust the primary date range, leave this field blank.

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NOTES

- To delete a column, select the column in the table at the top of the page, then click **Delete**.
- To change the order of the columns, select a column and then click or to move the column.

To copy a column

1 Select the column you want to copy in the table at the top of the **Columns** tab.

2 Click the **Copy** button.

3 Change the column's fields as needed. See field descriptions in *To add a column* (page 110).

NOTE The column's ID is incremented by 1.

To replicate a Trend Data column

When you have defined all the criteria for a trend column, you can quickly reproduce that column for other trend sources.

1 Select the column in the table at the top of the **Columns** tab.

2 Click the **Replicate Column** button.

3 Select whether you want the Trend Path for the new columns to be the full (absolute) path or the relative path. Typically, you will leave this set on **Full path**. See *Defining i-Vu® Pro paths* (page 179).

4 In the left column, select a location.

5 The right column displays all trend sources at or below the selected location. Select the trend sources that you want. A column will be added for each instance of the selected trend sources at or below the selected location.

6 Repeat steps 4 and 5 for any additional locations and points that you want in you report.

7 Click **Apply**.

8 Click **Close**.

9 Change each column's fields as needed. See field descriptions in *To add a column* (page 110).

Expressions

On the Report Editor's **Columns** tab, you can specify that a column's data is from an expression. i-Vu® Pro expressions are similar to expressions used in spreadsheet programs. The most basic expression is a math calculation, but an expression can also manipulate text.

An expression generally consists of at least one item in dollar signs and an operator. See table below. The item in dollar signs can be:

- Another column's ID
- A path to an item in your system or a semantic tag
- A variable defined on the Report Editor's **Variables** tab

Static text in an expression must be enclosed with quotes (either single or double quotes can be used). Any item that results in text should also be enclosed with quotes. This example shows both situations: 'Filter is ' + '$filter_status$'

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Example of a simple expression to compute the average value of min_temp and max_temp columns
Expression: (min_temp + max_temp) / 2

To verify that the expression you entered is formatted correctly, click **Check Syntax**. The result appears to the right of the button. The first error's numerical position in the expression appears and the error is highlighted.
NOTE The result of checking an expression with a variable may not be accurate since variables can be used in such a wide variety of ways.

Operators

An operator defines how each piece of an expression is to be handled. The following table lists operators that can be used in expressions.

Operators that return true/false (1/0)		
<	Less than	Compares numeric data. Returns true if the value to the left of the operator is smaller than the value to the right.
>	Greater than	Compares numeric data. Returns true if the value to the left of the operator is larger than the value to the right.
<=	Less than or equal to	Compares numeric data. Returns true if the value to the left of the operator is smaller than or equal to the value to the right.
>=	Greater than or equal to	Compares numeric data. Returns true if the value to the left of the operator is larger than or equal to the value to the right.
!	Not	Evaluates the expression and returns the opposite. Example: !$zone_temp$ > 72 If zone_temp is greater than 72, the expression is false. If zone_temp is not greater than 72, the expression is true.
==	Equal to	Compares data. Returns true if the value on both sides of the operator are equal.
!=	Not equal to	Compares data. Returns true if the value to the left of the operator does not match the value to the right.
&&	And	Combines expressions. Returns true if the expressions on both sides of && result in true.
||	Or	Combines expressions. Returns true if the expression on either side or both sides of the operator results in true.
Operators that return a numeric value		
+	Add	Adds numeric data, expressions, or values. **NOTE** You can use this operator to concatenate mixed numbers and strings. Example: 1 + 'alpha' returns "1alpha".
-	Subtract	Subtracts numeric data, expressions, or values.
*	Multiply	Multiplies numeric data, expressions, or values.
^	Power	To the power of. Example: 2^3 (returns 8)
/	Divide	Divides numeric data, expressions, or values.

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%	Modulus	Finds the remainder in the division of numeric data, expressions, or values.
Other operators		
( )	Parentheses	Use to nest expressions. Operations in parentheses are evaluated before those outside parentheses.
if		Syntax: if (expression, true value, false value) Expression is evaluated and if 1/true, the true value is returned, otherwise the false value is returned
?	Ternary	Syntax: <condition> ? <expression to execute if the condition is true> : <expression to execute if the condition is false> This operator can be used as an alternative to an if statement. Example: 1 == 2 ? 'true' : 'false'
#	Comment	Use to make the characters in the line after this operator a comment

NOTE If no operator is present in an expression, "+" is assumed. Example: "1 2 3" returns "6", and "a b c" returns "abc".

Combining expressions

Example 1:
Expression: $zone_temp$ < 60 || $zone_temp$ > 75
Translation: True if the current zone temperature is less than 60 or greater than 75

Example 2:
Expression: ! ($ai1/locked$ || $ai1/present_value$ > 100)
Translation: True if ai1 is not locked and al's present value is not greater than 100

Example 3:
Expression: if ($zone_temp$ < 60 || $zone_temp$ > 75, 'out of range', 'good')
Translation: If zone temperature is less than 60 or greater than 75, show out of range. Otherwise, show good.

Math functions

Function	Description
abs (a)	Returns the absolute value of a value.
acos (a)	Returns the arc cosine of a value; the returned angle is in the range 0.0 through pi.
asin (a)	Returns the arc sine of a value; the returned angle is in the range -pi/2 through pi/2.
atan (a)	Returns the arc tangent of a value; the returned angle is in the range -pi/2 through pi/2.
atan2 (y, x)	Returns the angle theta from the conversion of rectangular coordinates (x, y) to polar coordinates (r, theta).
cbrt (a)	Returns the cube root of a value.

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Function	Description
ceil (a)	Returns the smallest (closest to negative infinity) value that is greater than or equal to the argument and is equal to a mathematical integer.
cos (a)	Returns the trigonometric cosine of an angle.
exp (a)	Returns Euler's number e raised to the power of a value.
floor (a)	Returns the largest (closest to positive infinity) value that is less than or equal to the argument and is equal to a mathematical integer.
hypot (x, y)	Returns sqrt(x^2 +y^2) without intermediate overflow or underflow.
IEEEremainder (f1, f2)	Computes the remainder operation on two arguments as prescribed by the IEEE 754 standard.
log (a)	Returns the natural logarithm (base e) of a value.
log10 (a)	Returns the base 10 logarithm of a value.
max (a, b)	Returns the greater of two values.
min (a, b)	Returns the smaller of two values.
pow (a, b)	Returns the value of the first argument raised to the power of the second argument.
random ()	Returns a value with a positive sign, greater than or equal to 0.0 and less than 1.0.
rint (a)	Returns the value that is closest in value to the argument and is equal to a mathematical integer.
round (a)	Returns the closest long to the argument, with ties rounding to positive infinity.
sin (a)	Returns the trigonometric sine of an angle.
signum (float f)	Returns the signum function of the argument; zero if the argument is zero, 1.0f if the argument is greater than zero, -1.0f if the argument is less than zero.
sqrt (a)	Returns the correctly rounded positive square root of a value.
tan (a)	Returns the trigonometric tangent of an angle.
toDegrees (angrad)	Converts an angle measured in radians to an approximately equivalent angle measured in degrees.
toRadians (angdeg)	Converts an angle measured in degrees to an approximately equivalent angle measured in radians.

Text functions

Function	Description
char (code)	Returns a single character string for the given Unicode character code. For example, char(36) will create the string "$".
charAT (s, pos)	Returns the character and the position.
compareTo (s1, s2)	Compares two strings. <0 if s1 <s2, 0 if s1 == s2, >0 if s1 > s2

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Function	Description
compartToIgnoreCase (s1, s2)	Compares two strings ignoring case. <0 if s1 <s2, 0 if s1 == s2, >0 if s1 > s2
concat (s1, s2, ...)	Concatenates the two or more strings together. Same as "s1 + s2 + "
dateDiff (s1, s2)	Returns the difference between two dates, in days. Parameters may be date variables or strings of format 'yyyy/mm/dd'
endsWith (s1, s2)	Returns "1" if s1 ends with the string s2, else "0".
equals (s1, s2)	Returns "1" if strings are equal, else "0".
equalsIgnoreCase (s1, s2)	Returns "1" if strings are equal ignoring case, else "0".
indexOf (s1, s2, start)	Returns the index (position) of the first occurrence of the second string in the first string after "start" position. Use 0 to start from beginning of string. It returns -1 if S2 is not found.
lastIndexOf (s1, s2)	Returns the index (position) of the last occurrence of the seconds string in the first string. It returns -1 if S2 is not found.
length (s1)	Returns the length of the strings.
newline() or \n	Inserts a return.
now (s1)	Returns the current time and accepts one time-format string based on "Java SimpleDateFormat". If the string is empty, the default system date and time format is used. Examples: ○ "" → 08/28/2020 8:56:59 AM ○ "EEEE" → "Friday" ○ "MM/dd/yyyy" → 08/28/2020 ○ "h:mm a" → 8:56 AM ○ "hh:mm a" → 08:56 AM
replace (s1, s2, s3)	Replaces all occurrences in "s1" of "s2" with "s3".
startsWith (s1, s2)	Returns 1" if s1 starts with s2.
substring (s1, i2, i2)	Returns subset from string s1 starting at index i1 to index i2. (i2 must be >= i1)
toLowerCase (s)	Converts string to lower case.
toUpperCase (s)	Converts string to upper case.
trim (s)	Removes white space from the beginning and end of the string.
\	Used to escape operator characters by placing it before the operator. Example: 'Cost is \$' +$cost$' returns "Cost is $10.99".

Functions

On the Report Editor's **Columns** tab, you can specify that a column's data comes from one of the following functions that returns another column's value or manipulation of that value.

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Function	Description
Valid Column	Returns true/false if input column is valid
Default Value	Returns the column's value if it is a valid value, otherwise returns the argument.
Format	Formats a value using Java String format function. For more information, search the Internet for "string format with java 8".
Format Duration	Formats a trend duration value. Argument formats: %d%, %h%, %m%, %s% (clock based) %D%, %H%, %M%, %S% (total count rounded down) Example 1: %ddd% days %hh%:%mm% = 003 days 13:50 Example 2: %M% min = 283 min
Convert Values to Text	Converts a number to a text value. Argument format: Define a set of comma separated statements. Format of each statement: lower limit=value Example 1: 0=F,60=D,70=C,80=B,90=A,100=A+ Example 2: F,60=D,70=C,80=B,90=A,100=A+ (first bucket is default for anything below second bucket's value) Example 3: Cold,68=Perfect,75=Warm Example 4: 65=Cold,68=Perfect,74=Perfect,75=Warm,76=Warm
Convert Integer to Text	Converts an integer value to text. If no match, value is empty. Argument format: Comma separated list of statements. Format of each statement: #=text Example: 0=Zero,1=One,2=Two,3=Oops
Convert Text to Integer	Converts text to an integer value. Matching is case insensitive. Argument format: Comma separated list of statements. Format of each statement: text=# Use * to match any letters. Example 1: Off=0,On=1 -or- off=0 -or- OFF=0 Example 2: a*=1,b*=2 a=1 -or- APPLE=1 B=2 -or- Book=2
Convert to Color	Attempts to convert an ALC color value (0 to 15) to a color for a color map.
Color Gradient	Converts a defined minimum and maximum number each to a color. It then maps numbers between minimum and maximum to colors to form a gradient. Format: min,max,color1,color2 Example 1: 1, 10, red, blue Example 2: 1, 10, #FF0000, #0000FF

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Function	Description
Date Range Start	Formats the START date/time of a Date Range. Examples: yyyy/MM/dd hh:mm = 2017/07/04 11:30 hh:mm:ss = 08:35:16 For more information, search the Internet for "customizing date time formats with java".
Date Range End	Formats the END date /time of a Date Range. Examples: yyyy/MM/dd hh:mm = 2017/07/04 11:30 hh:mm:ss = 08:35:16 For more information, search the Internet for "customizing date time formats with java".
Ordinal Value	Converts a text enumeration to its integer value when possible.
Location Tags	Lists all of the semantic tags assigned to the location in each row. Enter `location` for the **Input column ID** to create a simple report that shows all of the tags for the locations.
Regular Expression	Finds a piece of text from a larger text body. Example: Finds a piece of text in a modstat. For more information, search the Internet for "regular expression patterns with java 8".

Operations

On the Report Editor's **Columns** tab, you can specify that a column's data comes from trend data. You can then specify one of the following operations be performed on the trend data.

This operation...	Shows the following for the specified time range
Average Value	The average value.
Count All Trend Records	Number of trend records collected (includes items such as time changes and enabling/disabling the trend log).
Count Trend Samples Only	Number of times the trend value was read.
First Value w/Time	The first trend sample and the time it was read.
Last Value w/Time	The last trend sample and the time it was read.
Maximum Value w/Time	The largest value and the time it was read.
Minimum Value w/Time	The smallest value and the time it was read.
Aggregate Consumption	Total consumption for meter trend data. This operation makes appropriate calculations for meters that reset to 0.
Sum of Values	The total of all trend values.

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This operation...	Shows the following for the specified time range
% Time in Range	You can enter 3 types of arguments to determine the percentage of time that the trend value was: • One or more single values. Format: A comma separated list of values Example: Enter 1,2,3,4 to get the percentage of time that the trend value was 1, 2, 3, or 4. • Between two values Format: A single statement or a comma separate list of statements Example 1: Enter the statement 65:75 to get the percentage of time that the trend value was 65 to 75. Example 2: Enter the statement 28:30,38:40,48:50 to get the percentage of time that the trend value was 28 to 30, 38 to 40, or 48 to 50. • Not a specified value or between two values Format: !(value) Example 1: Enter !10 to get the percentage of time that the trend value was not 10. Example 2: Enter !28:30,38:40 to get the percentage of time that the trend value was not 28 to 30 or 38 to 40.

Icons

You can design a report to show icons to indicate certain conditions. You can use the icons included with your system or create custom icons. On the Report Editor's **Columns** tab:

1 Set **Column data is from** field to **Expression**.

2 Set **Render data as** field to **Icon**.

3 Enter an **Expression** that contains the icon's file name. See the table below for the file names of icons included with your system, or see "Custom icons" below.

Included icons

Color	On	Off	Animated .gif that flashes on and off
Red	light_on_red.png	light_off_red.png	light_alarm_red.gif
Blue	light_on_blue.png	light_off_blue.png	light_alarm_blue.gif
Light blue	light_on_ltblue.png	light_off_ltblue.png	light_alarm_ltblue.gif

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Color	On	Off	Animated .gif that flashes on and off
Green	light_on_green.png	light_off_green.png	light_alarm_green.gif
Yellow	light_on_yellow.png	light_off_yellow.png	light_alarm_yellow.gif
Magenta	light_on_magenta.png	light_off_magenta.png	light_alarm_magenta.gif
Orange	light_on_orange.png	light_off_orange.png	light_alarm_orange.gif
White	light_on_white.png	light_off_white.png	light_alarm_white.gif

Custom icons

If you choose to use a custom icon, put the icon in one of the following places:

- In **i-Vu ProX.X\webroot**<system name>**\tables**. Put only the icon's file name in the expression.
- Anywhere under the **webroot** folder. Put the full path from the **webroot** folder in the expression. Example: /_common/lvl5/skin/graphics/type/area.gif.

Variables tab

You can enter a variable in a Report Editor field so that you can edit that field when you run the report. For example, if you create a Date Range report for the previous 4 months, you can put a variable named number_of_months in the field instead of a 4. When you run the report, you can change the variable value to 12 to show the previous 12 months.

1 Click **Add** to create a new variable.

2 Enter the variable's criteria. See table below.

3 Click **Accept** or **Apply**.

Field	Notes	
ID	This ID is what you will insert in a report field that you want to be able to change when you run the report. (Use letters, numbers, underscores, and hyphens only; no spaces or special characters).	
Type	Select an option from the drop-down list, and then enter a **Value**.	
	Type	**Value**
	String	A text phrase. Can contain letters, numbers, and special characters.
	Number	Can contain any number in any format.

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Field	Notes	
	Date	Format is yyyy/mm/dd.
	Time	Format is hh:mm:ss.
User editable **Display name**	Check to let a user edit the variable's value when they run the report. Enter a **Display name** for the variable that will appear on the page where you run the report.	

NOTE The table at the top of the **Variables** tab shows the variables that you defined. Their order in this table is how they will appear in on the page where you run the report. To change the order on the **Variables** tab, select a variable in the table and then click or .

Where tab

1 Click the drop-down list for **This report can be accessed from**, and then select an option.

2 Click **Define Where**.

3 Select or enter information for the option you chose. See table below.

4 Click **Accept** or **Apply**.

Field	Notes
Anywhere	The report can be run from anywhere in the system.
Control Programs	Do one or both of the following: • Type a control program name, and then click **Add**. **NOTE** You can use wildcards. See the examples in the i-Vu® Pro interface. • Select existing control program(s) from the list.
Location Types	Select the type(s) of locations where you want the report to be available.
Locations	Select location(s) on the trees, or type a location name in the text box.

Options tab

1 Click the drop-down list to the left of the **Add** button, and select an option.

2 Click **Add**.

3 Select or enter information for the option you chose. See table below.

4 Click **Accept** or **Apply**.

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Field	Notes
Show Max/Min/Avg/Total	Check the appropriate boxes to show the maximum value, minimum value, average, standard deviation, or total at the bottom of the columns. Enter the Column ID of the column that you want labels to be in.
Show first ___rows	Enter the maximum number of rows to be displayed when the report is previewed or run. This does not include the Max/Min/Avg/Total rows. **NOTE** You can enter a value or variable name in this field. If you enter a variable, it must be defined on the **Variables** tab.
Sort column	Sorts the specified column(s) from A to Z or 1 to ... Example of comma separated list of column IDs: date_range, kw_usage, normalizer Check **Reverse Sort** to sort Z to A, ... to 1.
Filter rows	Select I**nclude row when** or **Exclude row when** a specified column (ID) equals a specified value.

Date Range	KW Usage	Normalizer
Sep 13, 2017	743.1	1263.2
Sep 14, 2017	785.7	1335.7
Sep 15, 2017	823.1	1399.3
Average	784.0	1332.8
Total	2352.0	3998.3

NOTE You can use multiple options for your report, but be aware that they will be processed in the order that appear in the table at the top of the **Options** page. For example, if your first option is to **Show the first** 10 **rows** and your second option is **Filter rows**, only the 10 rows will be filtered. To change the order of processing, select an option in the table and then click or .

Output tab

On this tab, you can define the criteria for a report PDF or a chart on a graphic.

1 Select or enter information as needed. See table below.

2 Click **Accept** or **Apply**.

Field	Notes
PDF Output	
Page orientation	Select **Portrait** or **Landscape** .
Page size	Select the page size that you want for a pdf.
Ignore page width	If the report exceeds the width of the selected **Page size**, select to ignore that width and show all columns in the online PDF.
Font size	You can adjust the font size for the report's body.
Title font size	You can adjust the font size for the report's title.

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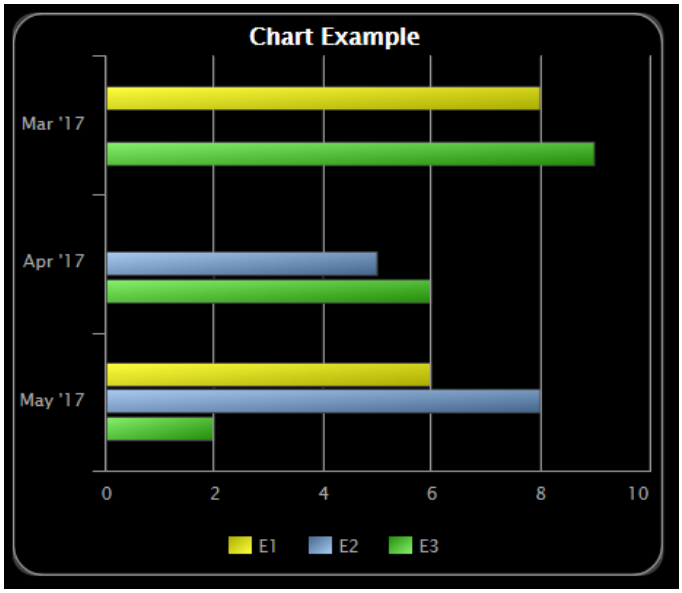
Field	Notes
Chart	These fields apply if you add a Chart control to a graphic in ViewBuilder. See *To produce a chart* (page 133).
Axis label	For a Horizontal Bar Chart, this label will appear below the X axis. For a Vertical Bar Chart or Line Chart, this label will appear to the left of the Y axis.
Data series	A column or row of numbers that are plotted in the chart. **Example:** For this report... A horizontal bar chart will look like this... **By column**

Date Range	E1	E2	E3
Mar '17	8.0	0.0	9.0
Apr '17	0.0	5.0	6.0
May '17	6.0	8.0	2.0



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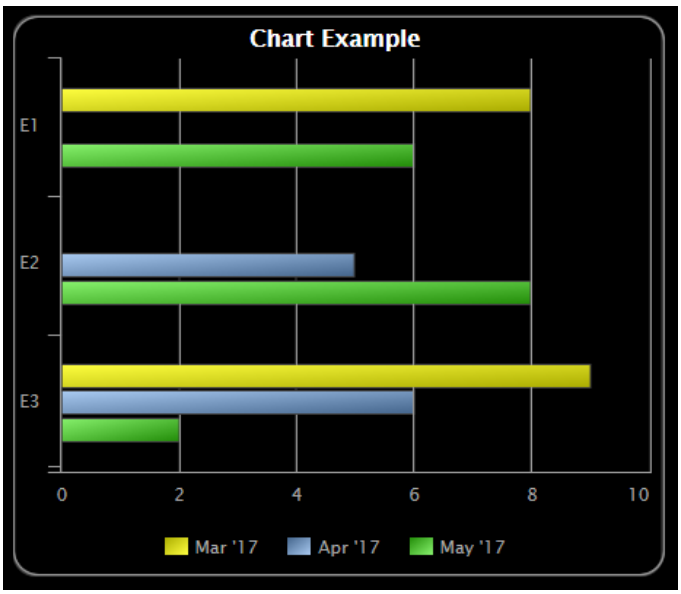
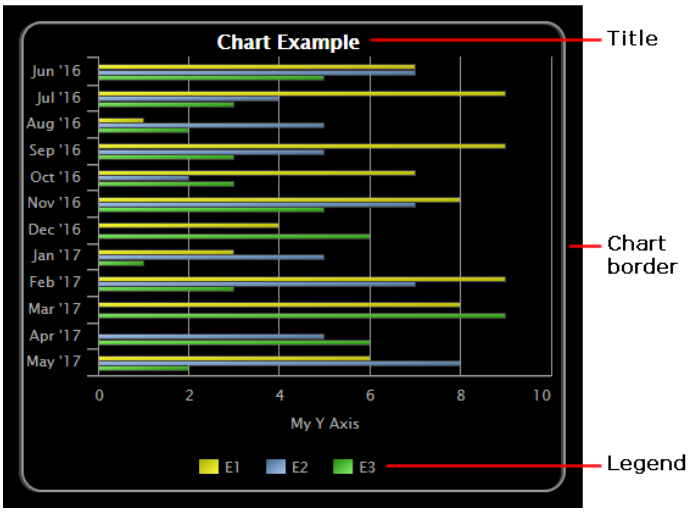
Field	Notes
	By row  **NOTE** Pie charts show only one data series.
Show title **Show legend** **Show chart border**	
Graphics Refresh	A chart or data table control will refresh its report data every time you visit the Graphics page or at the following refresh rates while the Graphics page is displayed. **If the report's primary column is...** / **Default refresh rate is...** A **Date Range** with a **Frequency** of **Hourly** or **Every 15 minutes** — Every 5 minutes Any other **Date Range** — 0 (never refreshes) Anything else — Every 30 seconds

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Field	Notes
Use custom refresh rate	Check this field to change the refresh rate. If your chart or data table shows a lot of data, refreshing frequently could slow down your system. If most of the data is historical data that does not change, you may want to set a longer refresh time.
Reset to defaults	Click **Reset** to return all fields on the **Output** tab to their original settings.

To preview a report

At the bottom of every tab in the Report Editor is a **Preview** section so that you can check your work. Click **Show** to see the report. If you make changes to the report, click **Refresh** to update the preview.

You have the following options when previewing the report:

Show all columns	Includes columns defined as hidden and a column with additional information about the Primary column.
Show Column ID	Each column header shows the display name and column ID.
Show Debug Information	Gives information for troubleshooting a report.

NOTES

- If the preview shows Error, hover your cursor over the word to see a description of the error.
- If the preview shows ?, this indicates there is no data.

To run a custom report

1. Select an item on the navigation tree where the report you want to run is accessible.
2. Click the **Reports** button drop-down arrow, and then select the report.
3. Optional: If the report was designed with *variables* (page 121), you can change the variables' values at the top of the page.

   NOTE Click **Reset** if you want to change the variables back to the value that was assigned when the report was created.
4. Click **Run**.

NOTES

- A ? in the report indicates there is no data.
- Click **Edit** to change the report's design. See *Creating a custom report* (page 106) for field descriptions.
- Click **Schedule** to schedule the report to run on a recurring basis. See *Scheduling reports* (page 145).

To edit or delete a custom report

NOTE If you have an i-Vu® Pro 5 or i-Vu® Pro 32 system, you cannot create or edit custom reports.

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1 Click the **Reports** button drop-down arrow, and then select **Report Manager**.

TIP Click on the **Display Name** or **ID** heading to sort the column.

2 Select the report, and then do one of the following:

- Click **Edit** to open the Report Editor, make changes as needed, then click **Accept**. See *Creating a custom report* (page 106) for field descriptions.
  NOTE You can also double-click a report to open it in the Report Editor.
- Click **Delete**, then click **OK**.

To export or import a custom report

You can export one or more reports from one system, copy them to another system, and then import the reports into the i-Vu® Pro interface.

To export reports

1 Click the **Reports** drop-down arrow, and then select **Report Manager**.

2 Click **Export**.

3 Select the checkbox(es) for the report(s) that you want to export, or check **Select All**.

4 Click **Export**.

NOTE A single report is exported as a .table file. Multiple reports are exported as a .zip file.

TIP In the Report Manager or Export Report window, you can click on the **Display Name** or **ID** heading to sort the column.

To import reports

1 Copy the .table or .zip file to the computer where you are importing them.

2 In the i-Vu® Pro interface, click the **Reports** drop-down arrow, and then select **Report Manager**.

3 Click **Import**.

4 Browse to the file that you are importing.

5 If a report ID that you are importing matches an existing report ID, select how you want to handle the situation:

Rename	Rename the report that you are importing.
Replace	Replace the existing report with the report you are importing.
Skip	Do not import the report with the duplicate name.

6 Click **Import**.

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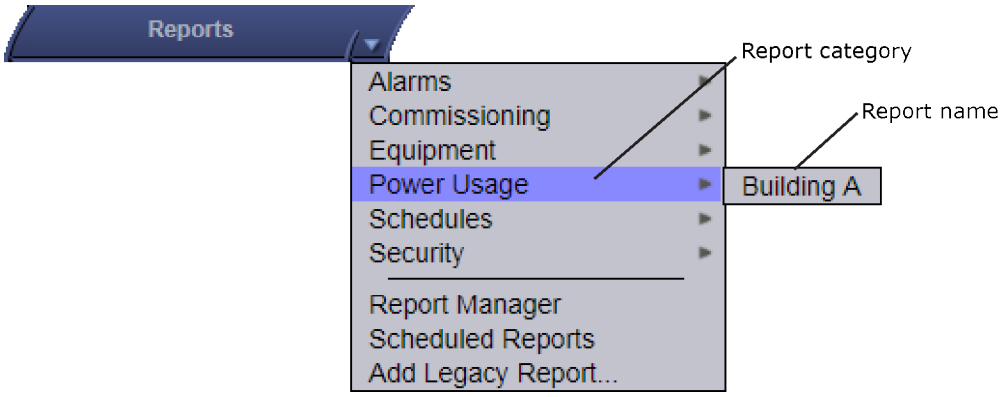
To organize custom reports by category

When you create a custom report, you can assign it to a category so that the report appears in the category in the **Reports** button drop-down list.



To create a report category

1 In **System Options**, click ▷ to the left of the **Categories** folder, then click **Report**.

2 Click **Add**.

3 Type the **Category Name** and **Reference Name**.

4 Select a privilege so that only operators with that privilege can access reports in the category.

5 Click **Accept**.

NOTES

- To edit a category, select the category, make your changes, then click **Accept**.
- To delete a category, select the category, click **Delete**, then click **Accept**.

Using a custom report as the source for a Graphics page

A i-Vu® Pro custom report can be the data source for the following items on a Graphics page:

- A data table
- A value
- A chart
- A color map

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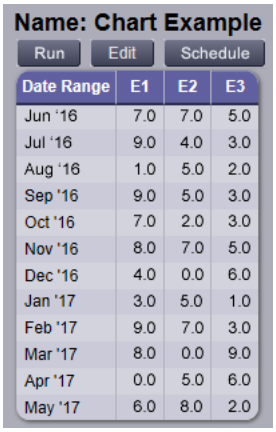
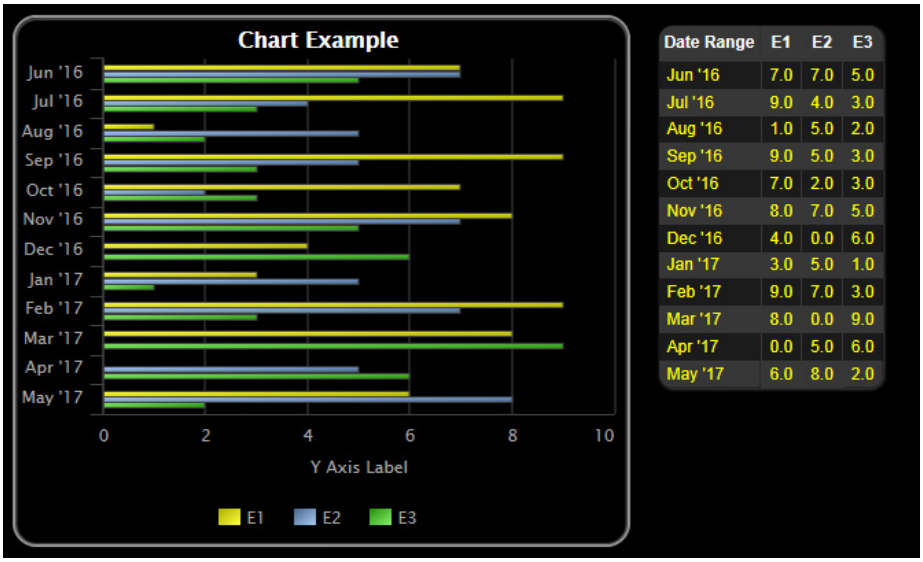
For example, this report...



Date Range	E1	E2	E3
Jun '16	7.0	7.0	5.0
Jul '16	9.0	4.0	3.0
Aug '16	1.0	5.0	2.0
Sep '16	9.0	5.0	3.0
Oct '16	7.0	2.0	3.0
Nov '16	8.0	7.0	5.0
Dec '16	4.0	0.0	6.0
Jan '17	3.0	5.0	1.0
Feb '17	9.0	7.0	3.0
Mar '17	8.0	0.0	9.0
Apr '17	0.0	5.0	6.0
May '17	6.0	8.0	2.0

...supplies data to the chart and data table on this graphic



Date Range	E1	E2	E3
Jun '16	7.0	7.0	5.0
Jul '16	9.0	4.0	3.0
Aug '16	1.0	5.0	2.0
Sep '16	9.0	5.0	3.0
Oct '16	7.0	2.0	3.0
Nov '16	8.0	7.0	5.0
Dec '16	4.0	0.0	6.0
Jan '17	3.0	5.0	1.0
Feb '17	9.0	7.0	3.0
Mar '17	8.0	0.0	9.0
Apr '17	0.0	5.0	6.0
May '17	6.0	8.0	2.0

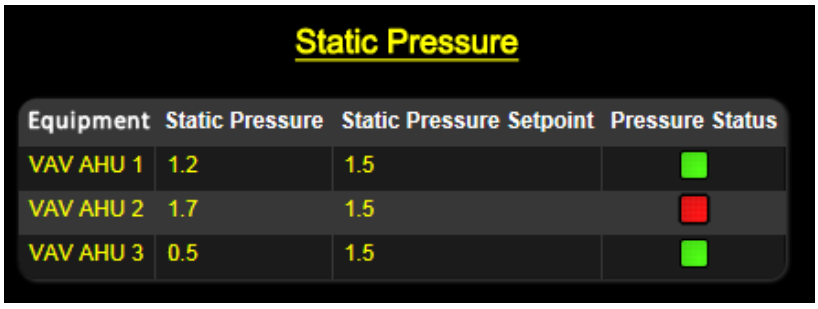
When the graphic is viewed in Time-Lapse:

- The data in a data table or chart will not change.
- A color map will ignore report data and show thermographic colors.

Note You can modify custom report *variables* (page 121) directly from a graphic in i-Vu® Pro by clicking the button.

To produce a data table

To produce a data table like the example below, first create the report in the i-Vu® Pro interface and then create the corresponding graphic in ViewBuilder.



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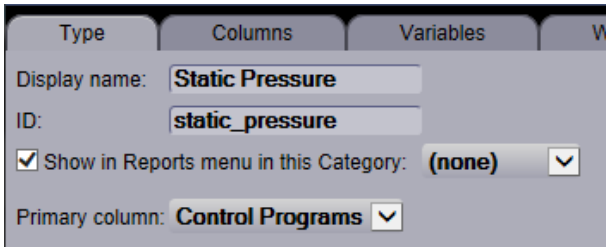
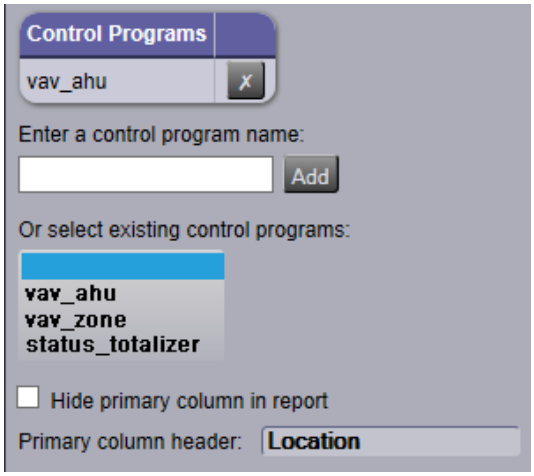
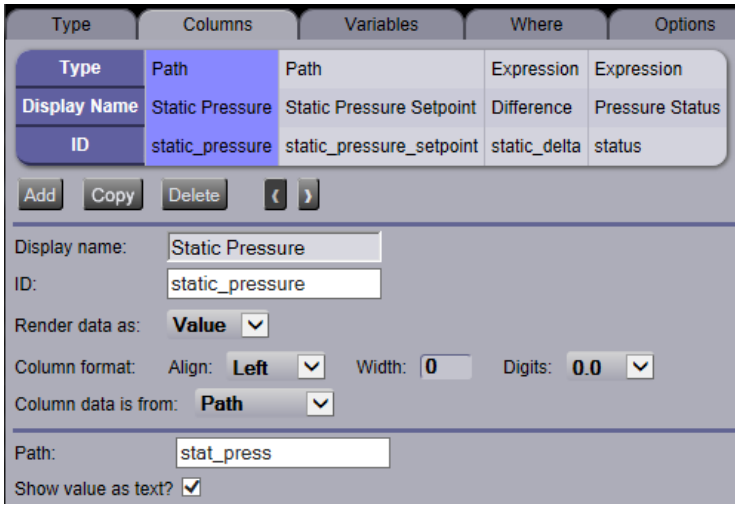
To create the report in the i-Vu® Pro interface

Instructions	Example
1. Click the **Reports** drop-down arrow, and then select **Report Manager**. 2. Click **Add**. 3. On the Report Editor's **Type** tab, type a **Display name** and **ID** for the report. 4. In the **Primary column** field, select the type of information that you want the report to be based on (**Control Programs** in this example). 5. On the Type tab, enter the criteria for the option that you selected in step 4. 6. In the **Primary column header** field, enter the heading that you want for that column (**Equipment** in this example). 7. Define each column in the report on the *Columns tab* (page 110). See the examples on the right. 8. Define any other information you may want, and then click **Accept**.	  

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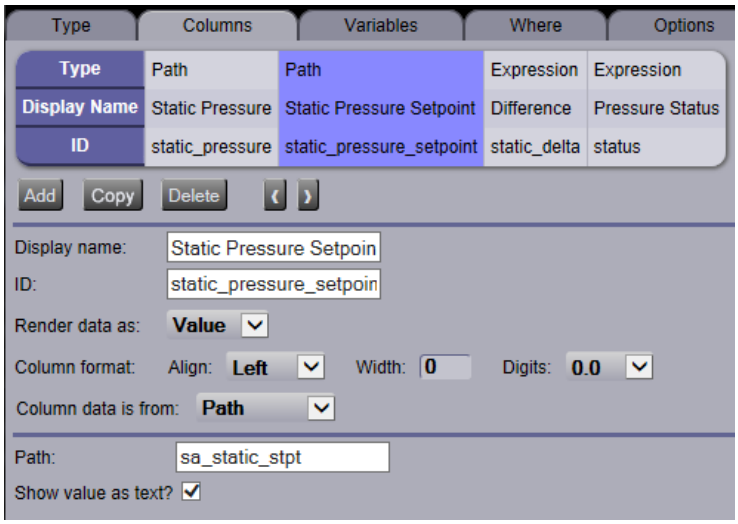
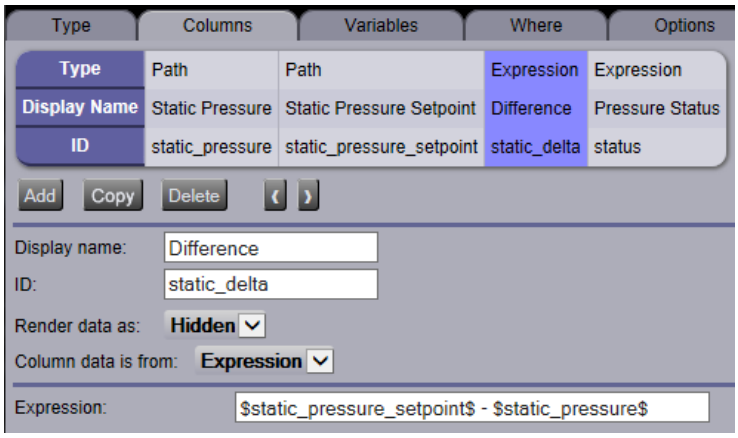
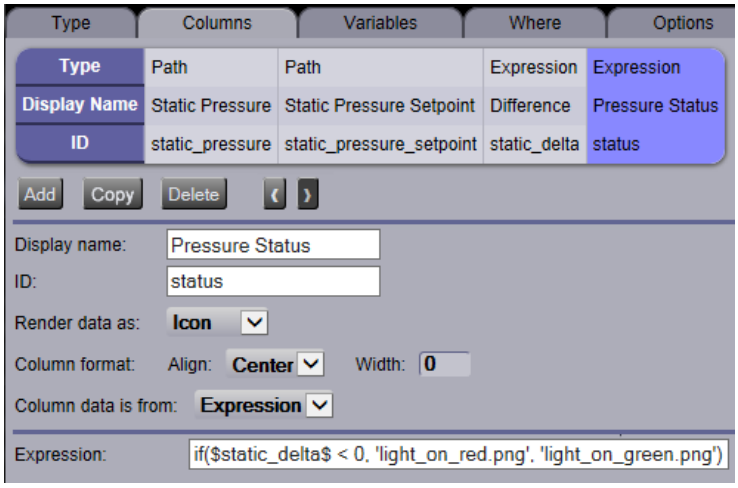
Instructions	Example
	  

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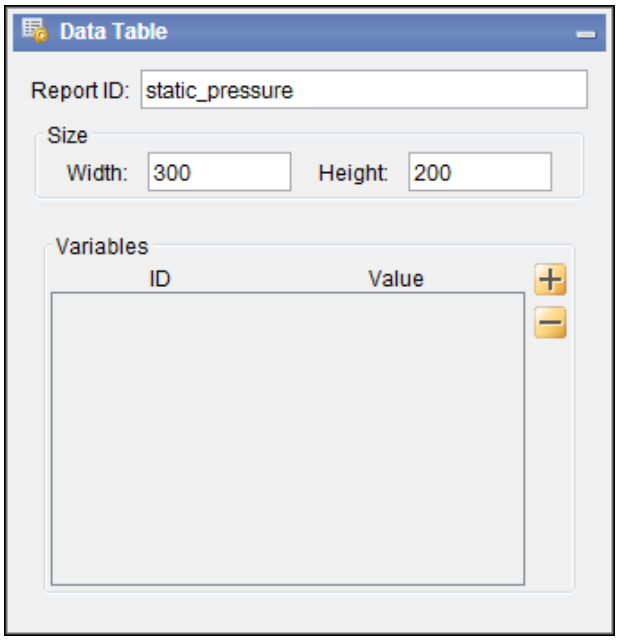
To create the graphic in ViewBuilder

Instructions	Example
1. Select **File** > **New** > **Graphic**, and then click **OK.** 2. Click the **Add Control** tab in the **Tools** window. 3. Click the **Data Table** control and then click in the workspace. 4. In the Properties window, enter the **Report ID** exactly as it appears in the i-Vu® Pro Report Editor. 5. Resize the control so that it is at least the size that the table will be in the i-Vu® Pro interface. To resize, enter a specific size in the Properties window or drag the handles on the control. **NOTE** If the table is cut off when you view the graphic in the i-Vu® Pro interface, increase the size of the data table control in ViewBuilder. 6. If you defined variables in the Report Editor and you want to use a different default value for the Data Table, click in the Properties window, type the variable's ID (from the Report Editor), and then type the new default value. **NOTE** To have the data table show data for a location other than the graphic's location, add a variable and type `location` in the **ID** column. Type the path to the location in the **Value** column. 7. Save the graphic.	

To reference a value in a data table

To reference the value of a cell in a data table, use one of these expressions:

```
CELL::table ID,column ID,column ID=value
CELL::table ID,column ID,numerical position in the column
```

NOTE The numerical position in the column can be positive if counting for the top or negative if coming from the bottom.

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Examples

To reference the value of 17.02 in the table below called "sample_table", below are a few ways you can reference the value:

```
CELL::sample_table,c1,location=#e8
CELL::sample_table,c1,ref=#e8
CELL::sample_table,c1,3
CELL::sample_table,c1,-5
```

Location Path location	Location location_name	RefName ref	Col1 c1	Col2 c2	C1 > C2*10 c1_v_c2
#e6	E6	#e6	20.24	4.06	0
#e7	E7	#e7	43.96	0.25	1
#e8	E8	#e8	17.02	7.15	0
#e9	E9	#e9	60.78	6.16	0
#e10	E10	#e10	80.66	4.20	1
	Average		44.53	4.36	
	Total		222.67	21.82	

To produce a chart

To produce a bar chart like the example below, first create the report in the i-Vu® Pro interface and then create the corresponding graphic in ViewBuilder.

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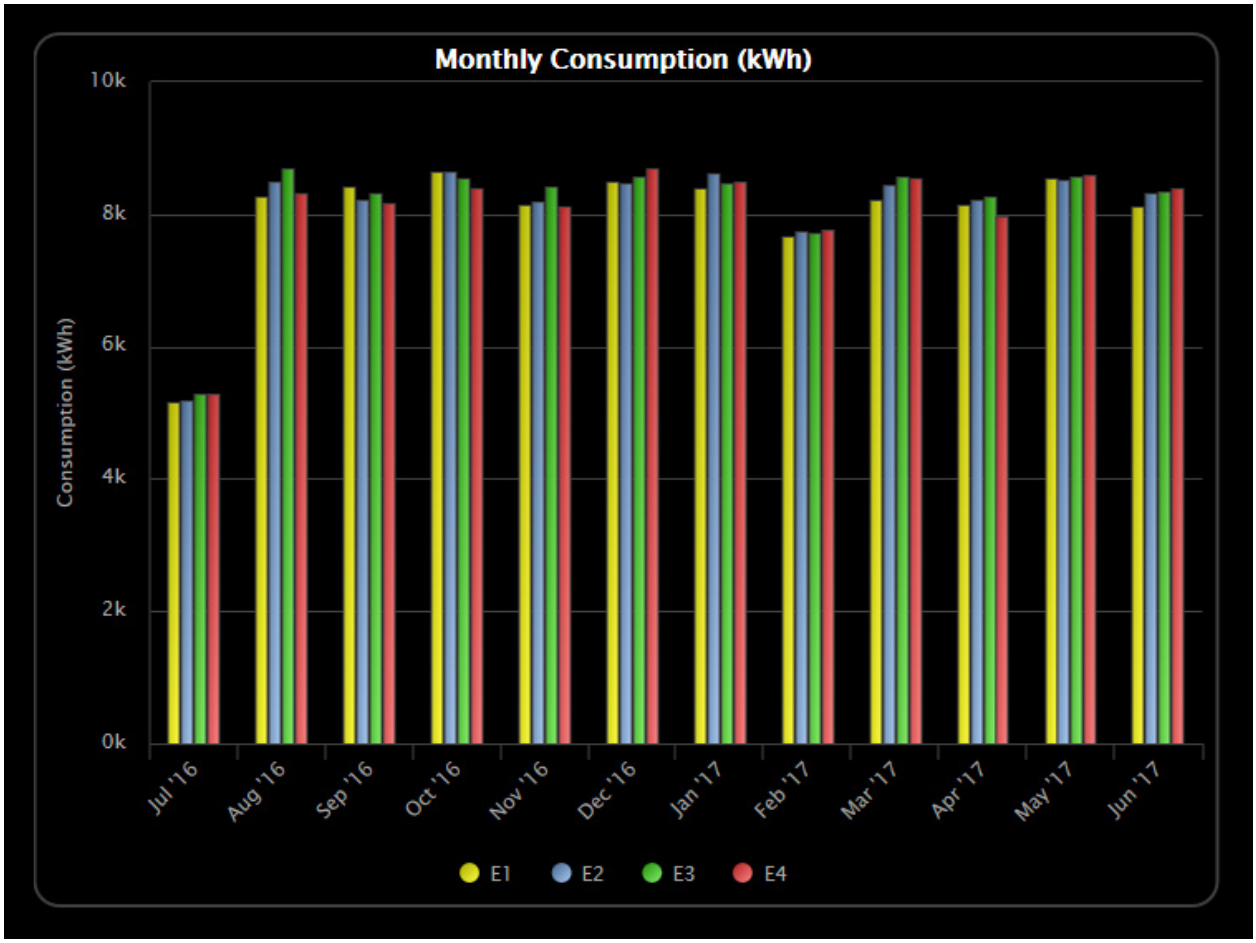

NOTE When a chart that is based on a report is displayed on a Graphics page, you can hover over various points on the chart to see values. You can also click on each item in the legend to turn that information on and off. See "*Using a custom report as the source for a Graphics page* (page 128)" in i-Vu® Pro Help for more information on a chart.

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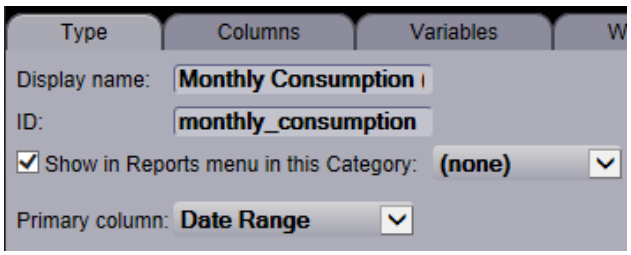
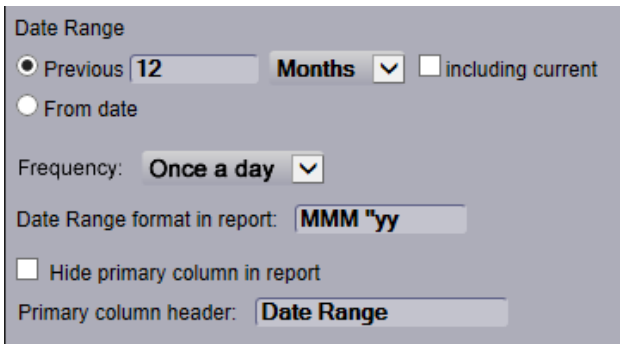
To create the report in the i-Vu® Pro interface

Instructions	Example
1. Click the **Reports** drop-down arrow, and then select **Report Manager**. 2. Click **Add**. 3. On the Report Editor's **Type** tab, type a **Display name** and **ID** for the report. 4. In the **Primary column** field, select the type of information that you want to report based on (**Date Range** in this example). 5. On the Type tab, enter the criteria for the option that you selected in step 4. 6. In the **Primary column header** field, enter the heading that you want for that column (**Date Range** in this example).	 

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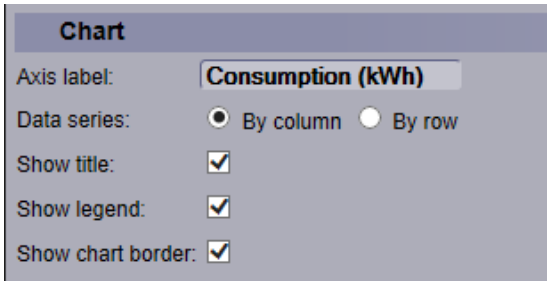
Instructions	Example
7. Define each column in the report on the *Columns tab* (page 110). **NOTE** In the example to the right, all four columns have the same criteria.	
8. Define the **Chart** options on the *Output tab* (page 123). 9. Define any other information you may want, and then click **Accept**.	

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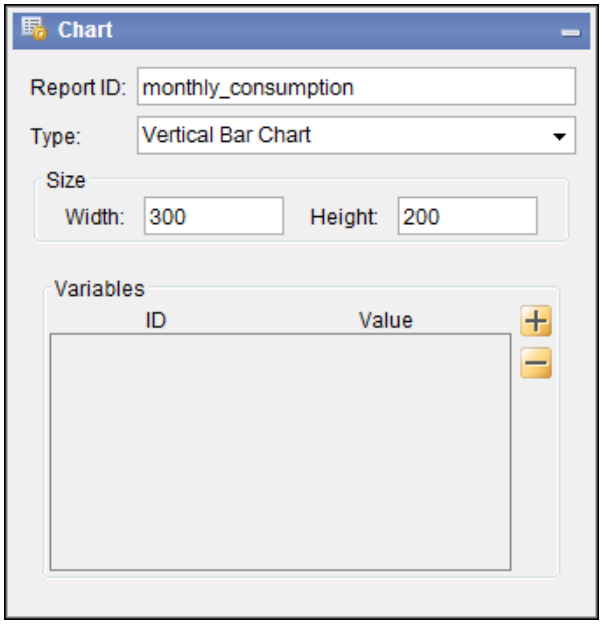
To create the graphic in ViewBuilder

Instructions	Example
1. Select **File** > **New** > **Graphic**, and then click **OK.** 2. Click the **Add Control** tab in the **Tools** window. 3. Click the **Chart** control and then click in the workspace. 4. In the Properties window, enter the **Report ID** exactly as it appears in the i-Vu® Pro Report Editor. 5. Select the **Type** of chart you want. 6. Resize the control so that it is at least the size that the chart will be in the i-Vu® Pro interface. To resize, enter a specific size in the Properties window or drag the handles on the control. **NOTE** If the chart is cut off when you view the graphic in the i-Vu® Pro interface, increase the size of the chart control in ViewBuilder. 7. If you defined variables in the Report Editor and you want to use a different default value for the chart, click in the Properties window, type the variable's ID (from the Report Editor), and then type the new default value. **NOTE** To have the chart show data for a location other than the graphic's location, add a variable and type `location` in the **ID** column. Type the path to the location in the **Value** column. 8. Save the graphic.	

To produce a color map

A Graphics page color map shows specified colors for various conditions that are defined in an i-Vu® Pro report. For example, a floorplan could show the percentage of time each zone is occupied. See image below.

NOTE For this type of color map, the control program must have a means of trending occupancy.

A color map can also have an option that lets a user switch between different kinds of information. For example, in the image below, a user could click on the **MTD kWh** drop-down list and select **YTD kWh**.

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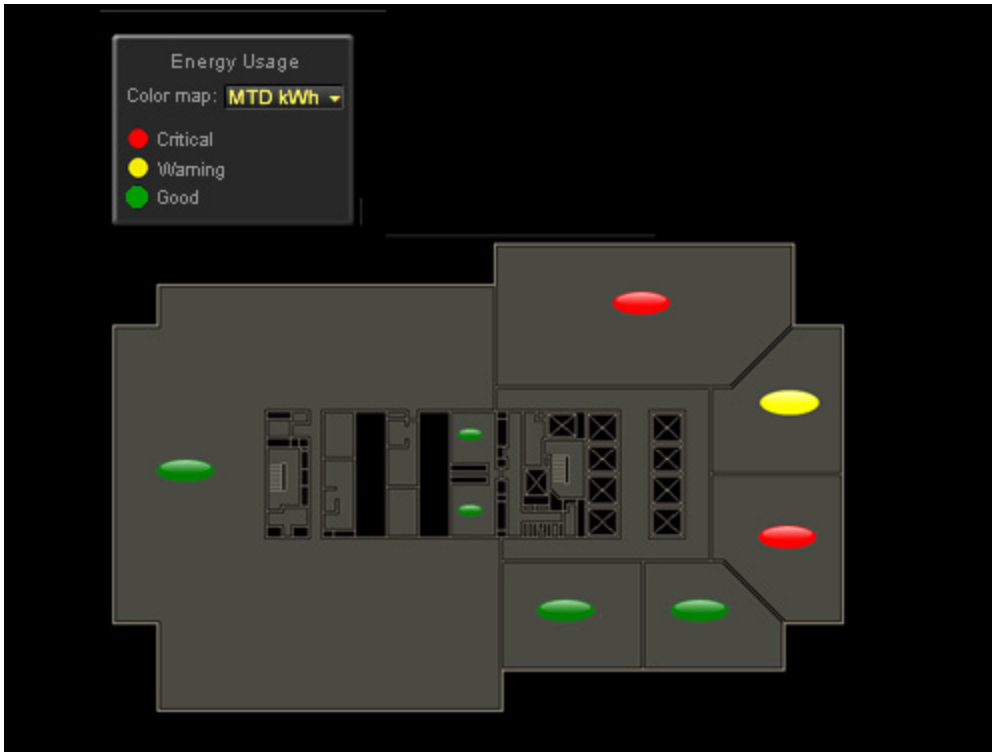

To produce a color map:

1 Create the graphic in ViewBuilder.

2 Create the corresponding report in the i-Vu® Pro interface.

3 Edit the graphic to add information specific to the i-Vu® Pro report.

See instructions below.

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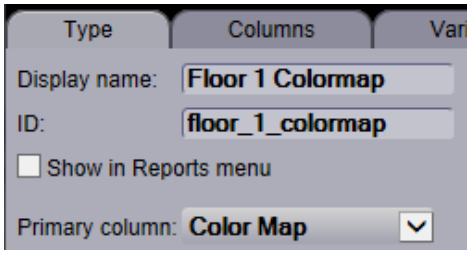
Create the graphic in ViewBuilder

Instructions	Example
1. Add an image (floorplan, campus map, etc.) to the graphic, and then double-click the image to open the **Associations** window. 2. Associate each item on your image (zone, building, etc.). See "Associating zones on a floorplan to equipment" in ViewBuilder Help. **NOTE** The **Variable Color** checkbox in the Associations window must be checked. 3. Click **Save and Close**.	

Create the report in the i-Vu® Pro interface

Instructions	Example
1. Click the **Reports** drop-down arrow, and then select **Report Manager**. 2. Click **Add**. 3. On the Report Editor's **Type** tab, type a **Display name** and **ID** for the report. 4. Uncheck **Show in Reports menu**. 5. In the **Primary column** field, select **Color Map**.	

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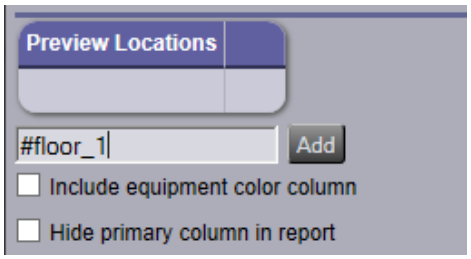
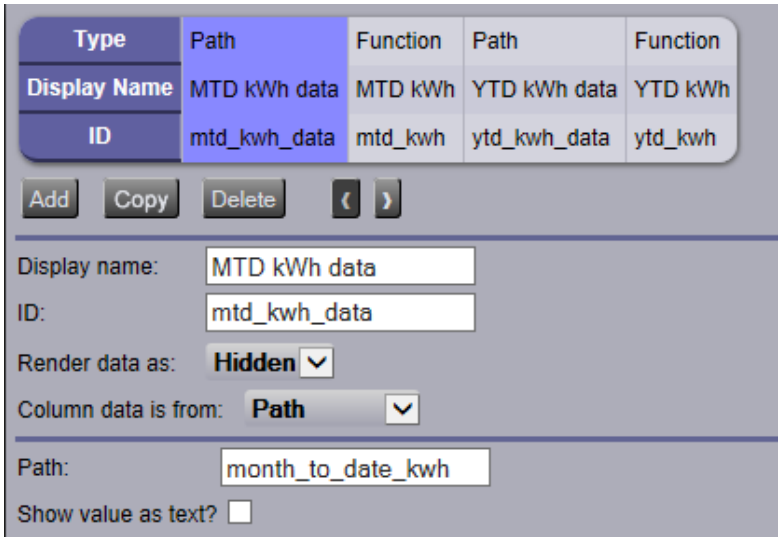
Instructions	Example
6. Type a location in your system so that you can preview the report (**#floor_1** in the example). This location is only for testing your entries in the Report Editor. Associations to actual locations in the system will be made in ViewBuilder. **NOTE** You can add more than one location if you want to see more in the preview. 7. Click **Add**. 8. Optional: Select **Include equipment color column** if you want to automatically include a column for i-Vu® Pro equipment colors. **NOTE** You can see this column in the **Preview** section if you check **Show all columns**.	
8. Define each column in the report on the *Columns tab* (page 110). See examples of the first two columns on the right.	

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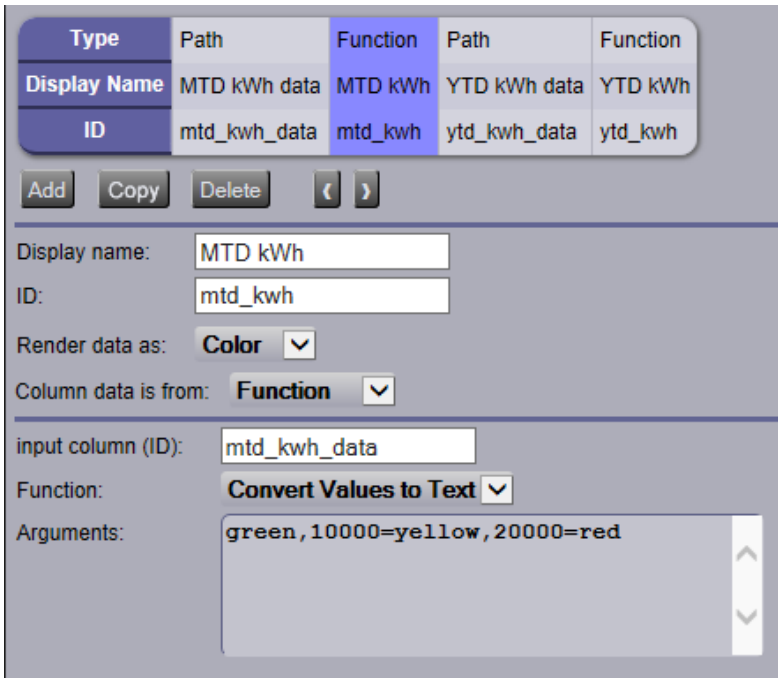
Instructions	Example
A color map can retrieve color information only from a column that has the **Render data as** field set to **Color**. 9. Define any other information needed on the Report Editor tabs, and then click **Accept**.	

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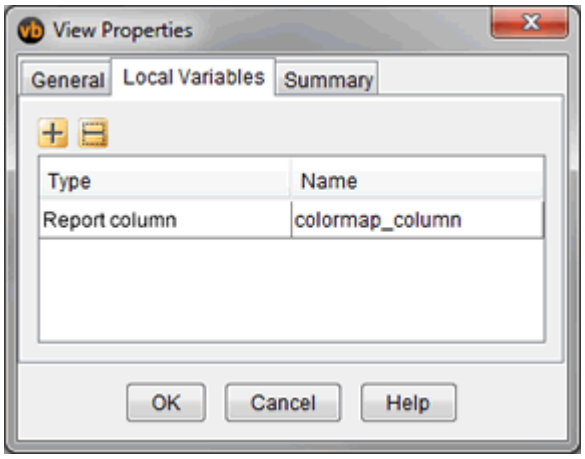
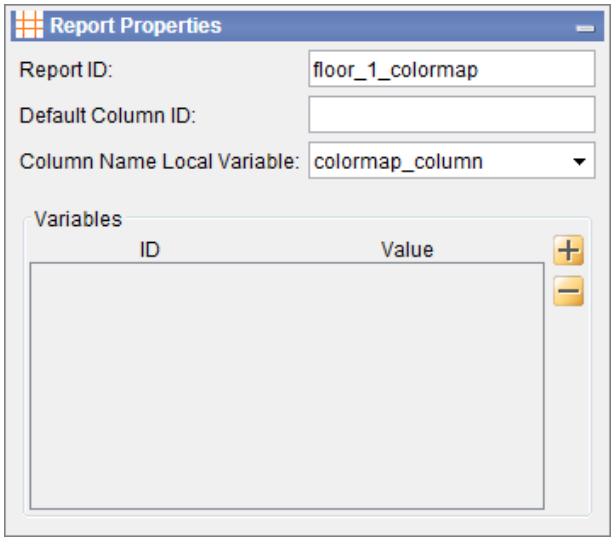
Edit the graphic in ViewBuilder to add report information

Instructions	Example
Follow steps 1 through 5 if the colormap will show information from more than one report column. If not, skip to step 6. 1. Select **Configure** > **View Properties**. 2. On the **Local Variables** tab, click . 3. Double-click **Boolean** in the **Type** column, and then select **Report column** in the drop-down list. 4. Double-click **variable** in the **Name** column, and then replace **variable** with **colormap_column**. **NOTE** If the Graphic has multiple images that will pull data from different reports, add one variable called **colormap_column1**, another called **colormap_column2**, etc. 5. Click **OK**. 6. Double-click the image to open the **Associations** window. 7. Click , and then enter the following information: • **Report ID**: Get the report ID from the i-Vu® Pro Report Editor. • **Default Column ID**: This is the column whose color is displayed when the graphic first appears. Get the Column ID from the i-Vu® Pro Report Editor. Leave blank if the graphic will pull data from only one report column. • **Column Name Local Variable**: Type the name of the variable that you created in step 5 above. Leave blank if the graphic will pull data from only one report column.	 

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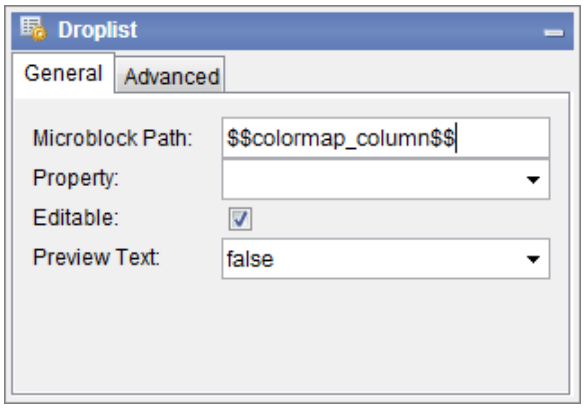
Instructions	Example
8. If a report uses a variable and you want the colormap to use a different default value than what is defined in the i-Vu® Pro Report Editor, click in the **Report Properties** window, type the variable's ID (defined in the Report Editor), and then type the new default value. 9. If the colormap will show information from more than one report column, add a control (droplist or radio buttons) that will allow the user to select the information they want to see. 10. In the **Microblock Path** field, enter the local variable that you defined in step 4, enclosing it in $$. 11. Finish the graphic and then test it in the i-Vu® Pro interface.	

Troubleshooting custom reports

- If a Graphics page contains a chart, data table, or color map that is retrieving information from a very large report, the graphic may be slow to load or refresh. You can do the following to improve this condition:
  - Verify that your system follows the recommendations in i-*Vu® Pro v8.0 client, server, operating system, and database requirements*.
  - Reduce the size of the report by redefining the primary column criteria on the Report Editor's **Type** tab.
  - Filter the report to show only a portion of the information. You can filter the report on the Report Editor's **Options** tab.
  - Increase the refresh time (default is 30 seconds). If the chart, data table, or color map is based on information that changes infrequently, increase the refresh rate or set it to 0 to turn off refreshing. You can adjust the refresh rate on the Report Editor's **Options** tab.
  - Reduce the number of controls on the graphic that are pulling data from different reports.
- If an **Invalid Report Definitions** section appears at the bottom of the Report Manager page, one of the following has occurred:
  - The report's file or file name has been manually manipulated, invalidating the report's digital signature. Contact Technical Support to resolve this problem.
  - The report is set up to have an add-on supply content for the report, but the add-on has not been installed in the i-Vu® Pro interface. Install the add-on to resolve this problem.

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To create a PDF, XLS, or CSV file

These reports...	Can be output as...	Notes
v7.0 and later custom reports	• A PDF file • A CSV file	
Preconfigured reports and v6.5 and earlier custom reports	• A PDF file • An XLS file • A CSV file	For a v6.5 and earlier CVS file, you must enable **Support CSV text format** on the **Reports** > **Options** tab before you run the report.

To output a file:

1 Run a report.

2 Click **PDF**, **XLS**, or **CSV** to download the file.

NOTE To create a CSV file when using Safari, see instructions below.

To create a CSV file when using Safari

1 Run a report.

2 Click **CSV**. A pop-up displays the results.

3 Select **File** > **Save As**.

4 In the **Format** field, select **Page Source**.

5 Add the .csv extension to the file name.

6 Select the save location in the **Where** field.

7 Click **Save**.

8 Close the popup.

NOTE If you need a digitally signed PDF to comply with 21 CFR Part 11, open the PDF in a program that supports digital signing such as the Adobe® Acrobat® application, then sign the PDF. The i-Vu® Pro application does not support digital signing because 21 CFR Part 11 requires that the signature be added manually, not through an automated process.

To add a custom logo to reports

Users with *Administrator privileges* (page 157) can add a custom logo to the report header of PDF and XLS reports.*

*Requires the **Advanced Reporting package**

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To add a custom logo to your reports:

1 Click > **System Options** > **Report Settings**.

2 Click **Choose File**, and select your logo file. The logo must be a JPEG or PNG of less than 2 MB in size.

3 Click **Upload**. A preview of the logo appears to the right. You can review the preview to ensure the correct file was uploaded.

TIPS

- For best results, use a transparent or white background on your logo.
- The logo is resized to fit within a 100 x 100 pixel area. We recommend that you upload a logo of this size or larger.

Scheduling reports

You can schedule a report so that it runs on a recurring basis. The report is saved as a file (PDF, CSV, or XLS), and you can choose to have it automatically emailed to someone.

NOTE You can also use the following alarm actions to run a report:

- The *Send E-mail alarm action* (page 78) can run any i-Vu® Pro report and attach it to the email.
- The *Write to File alarm action* (page 87) can run any i-Vu® Pro report and save it as a file.

For both alarm actions, the report can be a PDF, HTML, XLS, or CSV file.

To schedule a report

1 Click the **Reports** drop-down arrow, and then select the report that you want to schedule.

2 Click the **Schedule** button.

3 Enter the information in each field.

Fields	Notes
Description	Enter a brief description of the report or how this schedule will be used.
Operator	The report will be run based on the selected operator's privileges.
Run report	Define when the report will run by selecting options in the drop-down lists.
At __:__ __	Enter the time of day that you want the report to run.
Save report as	v7.0 and later reports can be output as a PDF or CSV file. Preconfigured reports and v6.5 reports can also be output as an XLS file. Select the type of report file that you want. **NOTE** See *Output tab* (page 123) for a description of the PDF options that are available in the Report Editor.

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Fields	Notes
Keep latest	Enter the number of files and Schedule History entries that you want to keep for this report. As a new file or entry is saved, the oldest one is deleted.
Email report	Enter the information needed to email the report each time it runs. **NOTE** For the i-Vu® Pro application to email a report, you must define the Email Server configuration on the **System Settings** > General tab.

4 Click **Accept**.

NOTE The following reports have additional scheduling options available. Scheduling these reports without configuring schedule options results in an error; see **View History** in *To manage scheduled reports* (page 146).

- **Alarms** > **Alarms**
- **Security** > **Location Audit Log**
- **Security** > **System Audit Log**

See *To configure scheduled Alarms and Security Reports* (page 102).

To manage scheduled reports

Click the **Reports** drop-down arrow, and then select **Scheduled Reports**. The table shows any report that was scheduled on the report's page.*

Select a schedule and then click...	To...
Edit	Change the report's schedule in the Schedule Editor. **NOTE** You can also double-click a schedule in the table to open the Schedule Editor.
View History	See when the report ran. Click **PDF**, **CSV**, or **XLS** in the **Results** column to download the report that was produced. **NOTE** The XLS option is not available for v7.0 custom reports.
Delete	Remove the schedule. This removes its history and all associated files.

* You can also access this table by going to **System Options** and selecting **Scheduled Reports**.

If a report fails

The table below will show a red X and a system alarm will be generated.

Select the schedule in the table above, and then click **View History**. Hold the cursor over the word **Failure** to see hover text describing what failed.

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To add an e-signature to scheduled reports

Electronic signatures uploaded for use within the system are intended to be the legally binding equivalent of traditional handwritten signatures. To add an e-signature to a scheduled report, you must have the correct *privileges* (page 157), and an *e-signature file and password* (page 311, page 163) in the system. The signature appears on the last page of the report PDF.

1 Click the **Reports** drop-down arrow, and then select **Scheduled Reports**.*

2 Select a schedule and then click **View History**.

3 Click **Add Signature** in the **Checked By** or **Approved By** column, as required.
NOTE Once an **Approved By** signature is added to the report, you can no longer add a **Checked By** signature.

4 Enter your system password in **Password**.

5 Enter your e-signature password in **E-signature Password**.

6 Enter your comments in **Comments**.

To remove e-signatures from a scheduled report

1 Click the **Reports** drop-down arrow, and then select **Scheduled Reports**.*

2 Select a schedule and then click **View History**.

3 Click **Remove signatures** to remove all **Checked By** and **Approved By** signatures from the report.

* You can also access this table by going to the **System Configuration** tree and selecting **Scheduled Reports**.

Working with legacy (v6.5 and earlier) custom reports

Although i-Vu® Pro v7.0 has a new method of creating and managing reports, you can still create or edit the following reports that were available in i-Vu® Pro v6.5 and earlier systems. These reports will be accessible from the **Reports** button drop-down list, but not the Report Manager.

This report...	allows you to...
Equipment Summary	View the following information for equipment at or below the location where the report was created: • Color • Active alarm • Locked values • Current value of selected points • Combined schedule See *To create an Equipment Summary report* (page 148).
Equipment Values	Compare point information. See *To create an Equipment Values report* (page 148).
Trend Samples	View trend values for a particular time frame. See *To create an Trend Samples report* (page 150).

NOTE You can schedule a report to run on a recurring basis. See *Scheduling reports* (page 145).

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To create an Equipment Summary report

An **Equipment Summary** report can provide the following information for equipment at or below the location where the report is created.

- Color
- Active alarm
- Locked values
- Current value of selected points
- Combined schedule

To create an Equipment Summary report:

1 On the navigation tree, select the location where you want to view the report.

2 Click the **Reports** button drop-down arrow, then select **Add Legacy Report**.

3 Select **Equipment Summary**.

4 Optional: Select a **Category**.

NOTE The **Category** field is visible only if you have defined report categories. See *To organize custom reports* (page 128).

5 Type a name for the report.

6 Click **Create**.

7 Define the **Title**, **Page Size** and orientation, and the **Maximum number of rows**.

8 Check or uncheck the **Optional Sections** checkboxes as needed.

9 Optional: Check **Include only specific control programs at or below this location**, then type the names of the control programs.

10 Select **Available Points** that you want to include in the report. Use **Ctrl+click**, **Shift+click**, or both to select multiple items.

11 Click **Add**.

12 Click **Accept**.

13 Click **Run**.

NOTE To run this report later, go to the location where the report was created. Click the **Reports** button drop-down arrow, select the report, then click **Run**.

To create an Equipment Values report

Equipment Values report allows you to compare point information.

To create an Equipment Values report:

1 On the navigation tree, select the location where you want to view the report.

2 Click the **Reports** button drop-down arrow, then select **Add Legacy Report**.

3 Select **Equipment Values**.

4 Optional: Select a **Category**.

NOTE The **Category** drop-down list is only visible if you have defined report categories. See *To organize custom reports* (page 128).

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5 Type a name for the report.

6 Click **Create**.

7 On the tree in the **Rows** section, select the pieces of equipment you want to view in the report. (Use **Ctrl+click**, **Shift+click**, or both to select multiple items.) Then click **Add**.

8 Optional: Check **Highlight alternate rows** to make the report easier to analyze.

9 Click **Next** or ▶ next to **Columns**.

10 Verify or change the report **Title**, **Page units** of measure for defining column widths, and **Outer border** characteristics.

11 Select a column in the report preview.

NOTE The selected column is light blue.

12 Under **Column Header**, define how you want the column header to look.

13 Under **Column Data**, define the data you want in the column and how you want it to look. See table below.

NOTE Select **General** from the **Format** drop-down list unless you want to define the number of places to the right of the decimal point for the displayed value.

14 Optional: Use the **Add**, **Delete**, and arrow buttons below the report preview to manipulate the columns.

15 Optional: Click ▶ next to **Page** to change the page size and orientation.

NOTE Changing the size and orientation of the printed page also changes the report layout on the **View** tab.

16 Click **Accept**.

17 Click **Run**.

NOTE To run this report later, go to the location where the report was created. Click the **Reports** button drop-down arrow, select the report, then click **Run**.

Type of Column Data		
Point	Displays point data in the column.	
	Display	Select the property to show in this column.
	Data is named differently in some control programs	Select this checkbox if similar points have different names in different control programs. Then add each of the names to the **Name to use** list. For example, if a point is named Zone Temp in one control program and Zone Temperature in different control program, add both names to the list.
	Point to use	Select the name of the point to show in the column.
Trend Sample	**Display**	Select **First**, **Minimum**, **Maximum**, or **Last** recorded trend value.
	Data is named differently in some control programs	Select this checkbox if similar points have different names in different control programs. Then add each of the names to the **Name to use** list. For example, if a point is named Zone Temp in one control program and Zone Temperature in different control program, add both names to the list.
	Trend to use	Select the name of the point to show in the column.

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Type of Column Data		
	Set	Click to have all columns in the report use the same time range.
	Time Range	Select the time range to run the report for.
Trend Calculation	**Display**	Select the type of calculation to show in the column, **Average** or **Total**.
	Data is named differently in some control programs	Select this checkbox if similar points have different names in different control programs. Then add each of the names to the **Name to use** list. For example, if a point is named Zone Temp in one control program and Zone Temperature in different control program, add both names to the list.
	Trend to use	Select the name of the point to show in the column.
	Set	Click to have all columns in the report use the same time range.
	Time Range	Select the time range to run the report for.
Control Program	**Display**	Select **Color**, **Display Name**, **Display Path**, **Notes**, **Prime Variable**, or **Reference Name** to show in the column.
Expression	**Data is named differently in some control programs**	Select this checkbox if similar points have different names in different control programs. Then add each of the names to the **Name to use** list. For example, if a point is named Zone Temp in one control program and Zone Temperature in different control program, add both names to the list.
	Expression	Type the path relative to the current control program. The path must return a string value. See *Defining i-Vu® Pro paths* (page 179) for more information on paths. To display the **Notes** on an equipment's **Properties** page, type `.notations` in this field.

To create a Trend Samples report

A **Trend Samples** report provides trend values for a particular time frame.

To create a Trend Samples report:

1 On the navigation tree, select the location where you want to view the report.

2 Select the **Reports** button drop-down arrow, then select **Add Legacy Report**.

3 Select **Trend Samples**.

4 Optional: Select a **Category**.

NOTE The **Category** drop-down list is only visible if you have defined report categories. See *To organize custom reports* (page 128).

5 Type a name for the report.

6 Click **Create**.

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7 Select a **Time Range** from the drop-down list, then refine that option by selecting an option from the drop-down list(s) to the right.

8 Define the trend data.

NOTES

- **Calculate values for missing samples** calculates a value based on the 2 closest values to the time interval.
- **Find the closest sample** displays the value closest to the time interval selected.

9 Optional: Check **Highlight alternate rows** to make the report easier to analyze.

10 Click **Next** or ▶ next to **Columns**.

11 Verify or change the report **Title**, **Page units** of measure for defining column widths, and **Outer border** characteristics.

12 Select a column in the report preview.

NOTE The selected column is light purple.

13 Under **Column Header**, define how you want the column header to look.

14 Under **Column Data**, select the source of the trend data and how you want the data to look.

NOTE Select **General** from the **Format** drop-down list unless you want to define the number of places to the right of the decimal point for the displayed value.

15 Optional: Use the **Add**, **Delete**, and arrow buttons below the report preview to manipulate the columns.

16 Optional: Click ▶ next to **Page** to change the page size and orientation.

NOTE Changing the size and orientation of the printed page also changes the report layout on the **View** tab.

17 Click **Accept**.

18 Click **Run**.

NOTE To run this report later, go to the location where the report was created. Click the **Reports** button drop-down arrow, select the report, then click **Run**.

To save a v6.5 or earlier custom report's design

You can save the design of an Equipment Values report or a Trend Samples report for reuse in another location. Or, you can create a library of different report designs to pull from as needed.

To save a report's design

1 Create the *Equipment Values* (page 148) or *Trend Samples* (page 150) report.

2 On the **Reports** > **Design** tab, click the **Save Report Design** button.

NOTE The .reportdesign file includes the report name. If you save multiple report designs in your system, each of those reports must have a unique name.

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To use the report design at a different location in the system

1 Select the location in the navigation tree.

2 Select **Reports** > **Add Legacy Report**.

3 In step **1**, select **Report design**, then select the report name in the drop-down list.

4 In step **2**, type a report **Name**.

5 In step **3**, click **Create**.

To edit or delete a v6.5 or earlier custom report

1 Select the item on the navigation tree where the report was created.

2 Click the **Reports** button drop-down arrow, then select the report you want to edit or delete.

3 Do one of the following on the **Design** tab:

- Edit the report, then click **Accept**.
- Click the **Delete Report** button, then click **OK**.

Semantic tagging

Semantics tags and rules are included in the i-Vu® Pro v8.0 application to apply semantic meaning to locations in the system. You can use the tags that are included or create custom tags. You can assign tags to locations manually or by rules that are included or your custom rules. Once assigned, the locations can be selected by their semantic tags to use in reports, graphics, and ACxelerate™ Automated Commissioning Tool.

The **Built-in** and **Haystack** tags are included in the i-Vu® Pro v8.0 application and you cannot alter or delete them. The **Built-in** rules cannot be modified but you can disable them. You can create custom tags and rules as needed.

The two kinds of tags are **Marker** and **Value**. The key difference is that **Value** tags also have a string value associated with them. You assign a **Value** tag to a location and specify the value. Value tags assigned by a rule have the same value assigned to each location.

On the **User** tree > **Properties** > **Tags** tab, you can:

- Assign tags manually to a selected location
- View tags that are assigned by a rule or manually for a location
- View any microblocks underneath an equipment location that have been tagged by a rule

On the > **System Options** tree > **Semantics**, you can:

- Search, add, delete, import, and export custom tags
- Search, enable, and disable the **Built-in Rules**
- Search, add, delete, edit, import, and export **Custom Rules**

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You can also use semantic tagging:

- In **Reports** > **Report Manager**, to create custom reports.
- In ViewBuilder, in place of microblock reference names for a path on a graphic.
- In the ACxelerate™ Automated Commissioning Tool

To manually assign tags to a location or equipment

Tags are typically assigned using rules. The only way to assign a tag to a microblock is through a rule.

You can manually assign tags to an individual location area or equipment location from the navigation tree.

When selecting an equipment (control program) in the **User** or **Installer** tree > **Properties** > **Tags** tab, all tags currently assigned to that equipment are displayed. There may also be a **Microblock Tags** table to display the tags that are assigned from the **Built-in** or **Custom** rules.

Use the **Search Tag/ID:** field to find one or more specific tags. Type a word or phrase that is included in the **Tag** or the **ID** column of the tag(s) you want to isolate in the table. For example, "cool". Click the **Show All** button to return to viewing the entire list.

1. On the **User** tree, select a location and go to **Properties**, or select an equipment on the **User** or **Installer** tree and go to the **Properties** > **Tags** tab.
2. Click to expand the **Assign Tags** table. See column descriptions below.

   NOTE Click in any column heading to arrange the order of the tags alphabetically by that column. Click again to reverse the order.
3. Click to the left of a tag in the **Assign Tags** table to assign it to your selection in the tree.

   NOTES
   - You can assign an unlimited number of tags to a selection
   - You can assign a tag to more than one selection
   - To remove an assigned tag, click in the **Assigned Tags** table.
4. Click **Accept** when finished assigning tags.
5. Select another location or equipment in the navigation tree and repeat the above steps until finished.

Assign Tags table

Column	
	Click to add the tag to a location in the **User** tree or equipment in the **User** or **Installer** tree.
Tag	Semantic tag name **NOTE** Tags beginning with **ACx** are available for the ACxelerate™ Automated Commissioning Tool to use.
ID	Reference name

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Column	
Value Tag	Displays a check mark for an item with a value. For example, the square feet in an area.
Namespace	• **Built-in** - created specifically for the i-Vu® Pro v8.0 application • **Haystack** - an industry standard • **Custom** - created by the user
Description	An understandable explanation of the tag

To add, delete, import, or export custom tags

The **System Options** tree > **Semantics** > **Tags** tab is for viewing and managing custom tags. Every tag in your system is included in the table.

Use the **Search Tag/ID:** field to find one or more specific tags. Type a word or phrase that is included in the **Tag** or the **ID** column of the tag(s) you want to isolate in the table. For example, "cool". Click the **Show All** button to return to viewing the entire list.

To add a custom tag

1 Click on the **> System Options** tree > **Semantics** > **Tags** tab.

2 Click **Add** and enter the following information:

In this field...	enter the...
Display Name	Semantic tag name - no limits or special rules for characters
ID	Reference name - (letters, numbers, underscores, and underscores only; no spaces or special characters)
Description	An understandable explanation of the tag
Value	Click the checkbox if the tag has a value

3 Click **Accept**.

To delete a custom tag

1 Select a custom tag in the **Tags** table by clicking anywhere in the tag's row.

NOTES

- Use the **Search Tag/ID:** to easily locate a tag
- You cannot delete **Built-in** and **Haystack** tags

2 Click **Delete** to remove the tag.

3 Click **Accept**.

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To import or export custom tags

- Click **Import Custom**, click in the **Choose File** field to browse to and select a .csv file you have saved from another i-Vu® Pro system. Click **Import**.
- Click **Export Custom** to create a .csv file that you can import into another i-Vu® Pro system.

To add, delete, import, or export rules

Rules govern the semantic tags that are assigned to a location-based Reference Name or Equipment Name. To view and manage the **Custom Rules** and the **Built-in Rules**, go to the **System Options** tree and select **Semantics**.

To search for specific tags in rules, built-in or custom, enter a word or words from the **Tag Name** in the **Search Tags:** field.

Built-in Rules

All of the **Built-in Rules** are included in the i-Vu® Pro application and all of them assign tags based on a microblock's **Reference Name**. On the **System Options** tree, select **Semantics** > **Built-in Rules** tab. All **Built-in Rules** are enabled by default. Uncheck the **Enabled** checkbox to disable. They cannot be deleted or modified.

Custom rules

The i-Vu® Pro v8.0 application does not come equipped with custom rules. You can create your own or import them from another i-Vu® Pro system. You can also enable, disable, delete, or export them.

To import or export

- Click **Import**, click in the **Choose File** field to browse to and select a .csv file you have saved from another i-Vu® Pro system. Click **Import**.
- Click **Export** to create a .csv file that you can import into another i-Vu® Pro system.

To add a new custom rule

1 Click > **System Options** and select **Semantics** > **Custom Rules** tab.

2 Click the **Add** button and follow the table below:

Rule	Enter a description.
Enabled	Enabled by default. Uncheck to disable.
Type	Select: **Control Program Name Matches** for control programs **NOTE** Using the control program names can save time by finding groups of equipment. or **Reference Name Matches** for matching the reference name of any location in the areas, equipment, or microblocks.

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Name(s)	Enter the **Control Program Names** or **Reference Names**. **NOTE** To locate a name, go to the navigation tree, select the area or control program, right-click, and select **Configure**. **Control Program Name Matches** Use **?** (to match one letter) and ***** (to match any letters) for matching names. Separate additional names with a comma and no spaces. **Reference Name Matches** Use **?** (to match one letter) and ***** (to match any letters) for matching names. You can match a partial path using **/**. For example, "vav*/zone_temp". Separate additional names with a comma and no spaces.

3 To assign a tag from the **Available Tags** table, click once anywhere in a row and it is immediately added to the **Assigned Tags** table.

NOTE To narrow the list of tags, in the **Search** field, type a word or phrase that is included in the **Tag** name or the **ID** field (visible on the **Tags** tab).

4 Continue to add as many tags as necessary for that rule.

5 Click **Accept**.

To delete or modify tags in an existing custom rule

1 Select a rule in the **Rules** table by clicking anywhere in the row.

2 Click the **Delete** button to remove the rule.

3 To assign a tag, see step 3 above.

4 To remove an assigned tag, click in the **Assigned Tags** table.

Operator access

Privileges control which parts of the i-Vu® Pro system an operator can access. Privileges also control what an operator can do and what he can change.

To set up operator access to your system:

1 Log in to the i-Vu® Pro application as the Administrator. See *Operators and operator groups* (page 161).

2 Define privilege sets by job function. See *Privilege sets* (page 157).

3 Enter each operator in the system by assigning him privilege sets and entering settings that apply only to him. If you need to assign the same privilege set to multiple operators, you can create an operator group and assign the privilege set to the group. See *Operators and operator groups* (page 161).

See *My Settings page* (page 311, page 163) to change the operator's settings .

To access the i-Vu® Pro interface, an operator must enter his user name and password. See the *advanced password policy* (page 169) to change the rules for passwords.

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Restricting operator access

To restrict access to your system, you can:

- Restrict an operator's privileges
- Use *location-dependent operator access* (page 165)
- Change a microblock's **Editing Privilege** from **Preset** to a specific privilege. The microblock's properties will be editable only by an operator that has that privilege.

  CAUTION Each microblock property has a default Editing Privilege (represented by the **Preset** option) that is appropriate for that property. Changing **Preset** to a specific privilege changes every property in the microblock to the same privilege which may produce undesirable results.

Privilege sets

A privilege set is a group of one or more *privileges* (page 157). The Administrator creates privilege sets and assigns them to operators and operator groups.

Privileges

This privilege...	allows an operator to...
Installer	• Add, edit, and delete operators, operator groups, and privilege sets. • Update the i-Vu® Pro system with service packs and patches. • Register the i-Vu® Pro software. • Enable and set up advanced security features such as *location-dependent operator access* (page 165) and the *advanced password policy* (page 169). • Add and remove i-Vu® Pro add-ons.

This Access privilege...	allows an operator to access (but not edit)...
Access System Tree	the Installer view pages.
Access Control Program Items	tables in the navigation tree or Properties pages.
Access Scheduling Groups	pages in the User view navigation tree for Schedule Groups.
Access System Options Items	under > **System Options**.
Access Alarms	alarms.
Access Logic Pages	**Logic** pages.

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This Parameter privilege...	allows an operator to edit properties such as...
Edit Setpoint Parameters	occupied and unoccupied heating and cooling setpoints.
Edit Setpoint Tuning Parameters	demand level setpoint offsets, color band offsets, heating and cooling capacities and design temperatures, color hysteresis, and learning adaptive optimal start capacity adjustment values.
Edit Tuning Parameters	gains, limits, trip points, hysteresis, color bandwidths, design temperatures, and optimal start/stop.
Edit Manual Override Parameters	locks on input, output, and network points.
Edit Point Setup Parameters	point number, type, range, and network source and destination.
Edit Restricted Parameters	properties the installer restricted with this privilege.
Edit Category Assignments	Alarm, Graphic, Trend, and Report category assignments.
Edit History Value Reset	elapsed active time and history resets, and runtime hours.
Edit Trend Parameters	enable trend logging, log intervals, and log start/stop times.
Edit Calibration Parameters	point calibration offsets.
Edit Hardware Controller Parameters	module driver properties.
Edit Critical Configuration	critical properties the installer protected with this privilege.
Edit Area Name	area display names.
Edit Control Program Name	equipment display names.
Edit Alarm Configuration	enabling/disabling alarms and editing alarm messages, actions, categories, and templates.
Edit Status Display Tables	tables available under Status.
Edit Maintenance Tables	tables available under Maintenance.
Edit User Config Tables	tables available under User Config.
Edit Service Config Tables	tables available under Service Config.
Edit Setpoint Tables	tables available under Setpoint.
Edit Time Schedule data Tables	tables available under Time Schedule.

This Functional privilege...	allows an operator to...
Manage Alarm Messages and Actions	add, edit, and delete alarm messages and actions.
Maintain System Parameters	edit all properties on the System Options pages.
Maintain Schedules	add, edit, delete, and download schedules.
Maintain Schedule Group Members	add, edit, and delete schedule groups.
Maintain Categories	add, edit, and delete categories.
Acknowledge Non-Critical Alarms	acknowledge all non-critical alarms.
Acknowledge Critical Alarms	acknowledge all critical alarms.

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This Functional privilege...	allows an operator to...
Force Normal Non-Critical Alarms	force non-critical alarms to return to normal.
Force Normal Critical Alarms	force critical alarms to return to normal.
Delete Non-Critical Alarms	delete non-critical alarms.
Delete Critical Alarms	delete critical alarms.
Execute Audit Log Report	run the **Location Audit Log** and **System Audit Log** reports.
Download Controllers	mark equipment for download and initiate a download.
System Shutdown	issue the Shutdown manual command that shuts down i-Vu® Pro Server.
Engineer System	• log in and make database changes in SiteBuilder. • use the copy, notify, reload, and revert manual commands. • access the navigation tree right-click menus in i-Vu® Pro. • add text in the **Notes** field on an equipment's Properties page. • set Device Passwords in SiteBuilder, or the i-Vu® Pro interface, to restrict access to the controller setup pages through the Service Port (applies only to routers with the drv_gen5 driver)
Access Commissioning Tools	access: • Equipment Checkout • Airflow Configuration • Trend, Report, and Graphic categories that require this privilege • Discovery tool
Maintain Graphs and Reports	add, edit, and delete trend graphs and reports.
Maintain Connections	edit **Connections** page properties.
Remote File Management	access files using a WebDAV utility.
Remote Data Access-SOAP	retrieve i-Vu® Pro data through an Enterprise Data Exchange (SOAP) application.
Do not audit changes made using SOAP (Web services)	not have his SOAP (Web services) changes recorded in the Audit Log.
Manual Commands/Console Operations	access the manual command dialog box and issue basic manual commands.
Manual Commands/File IO	execute manual commands that access the server's file system.
Manual Commands/Adv Network	execute manual commands that directly access network communications.
Manual Commands/Unrestricted	execute manual commands that bypass all safeguards and may cause unpredictable results if used incorrectly.
Change My Settings	edit preferences on operator's **My Settings** page.

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This Digital Signature* privilege...	allows an operator to...
Checked By	Add their e-signature to a scheduled report PDF verifying that they checked the report.
Approved By	Add their e-signature to a scheduled report PDF verifying that they approved the report.
Delete Signature	Delete all e-signatures from a scheduled report PDF.

To create a custom privilege

You can assign a privilege to a Graphic, Property, Trend, or Report category so that only operators with that privilege can access the category. You assign a category privilege on the page where you create or edit categories.

If all the other privileges are too widely used to accomplish the results you want, you can assign one of the five Access User Category privileges to the operator(s) and category.

For example, your system has 2 graphics categories, HVAC and Lighting/Security. You want HVAC technicians to see only the HVAC graphics and security personnel to see only the Lighting/Security graphics. To do this:

Assign...	To...	Results
Access User Category 1	HVAC graphics category and HVAC technicians only	The security personnel cannot see the HVAC graphics because they do not have Access User Category 1.
Access User Category 2	Lighting/Security Graphics category and Security personnel only	The HVAC technicians cannot see the Lighting/Security graphics because they do not have Access User Category 2.

To add or edit a privilege set

1. On the **System Options** tree, select **Privilege Sets**.
2. Click **Add** to create a new privilege set, or select a privilege set to edit.
3. Type the **Name** and **Reference Name** for the privilege set.
4. Check each *privilege* (page 157) that you want to include in the privilege set.
5. Click **Accept**.

CAUTION Include all required access privileges in a privilege set. For example, if you add **Acknowledge Non-Critical Alarms** to a privilege set, also add **Access Alarms** to that privilege set.

TIP (Location-independent security only) To create a privilege set that is similar to an existing set, select the existing set, then click **Add**. The privileges that are initially selected are identical to those of the existing set.

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To delete a privilege set

1. On the **System Options** tree, select **Privilege Sets**.
2. Select the privilege set to be deleted.
3. Click **Delete**.
4. Click **OK**.
5. Click **Accept**.

Operators and operator groups

When you create a new system in SiteBuilder, you assign a login name and password to the administrator operator. This administrator operator sets up each operator in the i-Vu® Pro interface by entering the necessary settings and assigning one or more *privilege sets* (page 157) to the operator.

NOTES

- The **Installer** privilege set has more privileges than the **Administrator** privilege set and is necessary for commissioning equipment.
- For security purposes, do not use `Administrator` or `Installer` as the actual **Login Name**.

Operator groups give you the ability to assign privilege sets to a group of operators instead of the individual operators. Operator groups are useful if you have multiple operators who need the same privilege set or you have positions with high turnover rates. You can assign an operator to a group when you enter the operator or when you create the operator group.

CAUTION Passwords can be forgotten. To ensure access to the i-Vu® Pro administrative functions, assign the Installer or Administrator privilege set to at least 2 operators.

To add or edit an operator

1. On the **System Options** tree, select **Operators**.
2. Click **Add** to enter a new operator, or select an operator to edit his settings.
3. Enter information on this page as needed. See table below.
4. Click **Accept**.

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Field	Notes
Login Name	The name the operator must type to log in to the system. This name must be unique within the system. Login names of deleted operators cannot be reused.
Change password	Enable this field, then type the current and new password and then confirm. Limit is minimum of 8 and maximum 40 characters of any type. **NOTE** An operator can change his password on the *My Settings page* (page 311, page 163), unless they have the Guest System-wide Privilege Set.
Force User to Change Password at login?	Forces the operator to change his password immediately after his next login. **NOTE** Use this field with the **Change Password** field to create a temporary password that the operator must change after his next login.
Exempt From Password Policy	If **Use advanced password policy** is enabled on the **System Settings** > **Security tab** (page 315), select this option if you do not want the policy to apply to this operator.
Ready to e-sign	This checkbox indicates the operator can e-sign documents. It only appears checked when **E-signature file uploaded** and **Signing privileges granted** are checked. • **E-signature file uploaded** indicates the operator has *uploaded a valid e-signature file* (page 311, page 163). • **Signing privileges granted** indicates the operator has *e-signature signing permissions* (page 157). **NOTE** These checkboxes are read only.
Logoff options	If **Log off operators after __ of inactivity** is enabled on the **System Settings** > **Security tab** (page 315), select one of the 3 logoff options.
Personal Information	You can enter contact information for this operator. **NOTE** An operator can enter contact information on the *My Settings page* (page 311, page 163).
Starting Location and **Starting Page**	The i-Vu® Pro location and page that will be displayed after the operator logs in.
System-wide Privilege Sets	Select the privilege set(s) that you want to assign to the operator. The **Effective System-wide Privileges** list show which privileges the operator will have. **NOTES** • Click **Show current privileges only** to see only the selected privilege sets and privileges. • A grayed out privilege set with a group name beside it indicates the operator is inheriting that privilege set from the group.

TIP To test the settings and privileges that you gave to an operator, you can open a second browser session on your computer and log in as the operator. For instructions on opening a second session in the browser you are using, see *Setting up i-Vu® Pro client devices and web browsers* (page 306).

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To delete an operator

1. On the **System Options** tree, select **Operators**.
2. Select the operator.
3. Click **Delete**.
4. Click **Accept**.

To add or edit an operator group

1. On the **System Options** tree, select **Operator Groups**.
2. Click **Add** to create a new operator group, or select an operator group to edit it.
3. Type the **Display Name** and **Reference Name** for the operator group.
4. Under **Members**, select the operators and/or groups that you want to add to the new group.
5. Under **Privilege Sets**, select the *privilege sets* (page 157) that you want to assign to the new group.

   NOTE To see what privileges are included in a privilege set, go to the **Privilege Sets** page and then select the privilege set in the table.
6. Click **Accept**.

TIP Every operator is automatically a member of a permanent default group called **Everybody**. You can assign privilege sets to this group.

To delete an operator group

1. On the **System Options** tree, select **Operator Groups**.
2. Select the operator group.
3. Click **Delete**.
4. Click **Accept**.

CAUTION When you delete an operator group, its individual members lose the privilege sets that were assigned to the group.

To change My Settings

On the **My Settings** page, you can change settings, such as your:

- Password
- Viewing preferences
- E-signature file
- Contact information

NOTE The System Administrator can also change these settings on the **Operators** page.

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To change your settings:

1 Click > **System Options** > **My Settings**.

2 Make changes on the **Settings** or **Contact Info** tab. See table below.

3 Click **Accept**.

Field	Notes
Change password	Enable this field, then type your current and new password and then confirm. Limit is minimum of 8 and maximum 40 characters of any type.
Starting Location and **Starting Page**	The i-Vu® Pro location and page that will be displayed after you log in. **NOTE** You must click **Apply** first if you have entered any other changes.
Language	The language and formatting conventions you want to see in the i-Vu® Pro interface. **NOTES** • If you will be using a language other than English, see *Setting up your system for non-English languages* (page 331) for additional requirements. • If support for your selected language is removed in SiteBuilder, the i-Vu® Pro application will automatically assign the System language to you.
Automatically collapse trees	Expands only one tree branch at a time.
Automatically download schedules on each change	Select to automatically download all new schedules that you create and schedules that you change.
Play sound at browser when server receives	Check **Non-critical alarms** or **Critical alarms** if you want the system to audibly notify you when that type of alarm is received. You can specify a different sound file. • Edge®, Firefox®, and Safari® support .wav, .mp3, or .au files. • Google™ Chrome™ supports .wav or .mp3 files. 1 Put your file in the **webroot_common\lvl5\sounds** folder. 2 In the **Sound File** field, replace **normal_alarm.wav** or **critical_alarm.wav** with the name of your sound file. **NOTE** You can put your sound file anywhere under the **i-VuProx.x** folder, but you must change the path in the **Sound File** field.
E-signature File	An e-signature file is required to add an e-signature to Scheduled Reports. 1 Click **Choose File** and select your e-signature file. 2 Click **Upload**.

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Advanced security

Location-dependent operator access

You can set up operator access to your system to be location-dependent. This type of operator access lets you assign privileges to an operator only at locations in the system where he needs them. For example, you could assign an operator mechanic privileges in one building in a system, view-only privileges in another building, and no privileges in a third building.

i-Vu® Pro systems default to location-independent operator access in which an operator's privileges apply throughout the system. You should understand this type of operator access before switching to location-dependent. See *Operator access* (page 156) for more information on location-independent operator access.

To switch to location-dependent access

CAUTIONS

- Create a backup of your system before you begin. Switching to location-dependent operator access changes the configuration of operators and privilege sets. If you need to revert to location-independent operator access, your previous configuration cannot be automatically restored.
- If you change the policy after you create and assign privilege sets to operators, you may need to reconfigure your operators' privileges.

To switch to location-dependent operator access:

1 On the **System Options** tree, select **System Settings**.

2 On the **Security** tab under **Security Policy**, click **Change Policy**.

3 Follow the on-screen instructions.

System-wide privileges and privilege sets

When using location-dependent operator access, privileges are either system-wide or local.

System-wide privileges allow an operator to perform functions throughout the entire system, such as performing a system shutdown.

You assign System-wide Privilege Sets to system-wide privilege sets and local privileges to local privilege sets. Use the following table in planning which privileges to assign to a privilege set. For a description of each privilege, see *Privileges* (page 157).

Check **Show current privileges only**.

System-wide Privilege Sets	Effective System-wide Privileges

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System-wide Privilege Sets	Effective System-wide Privileges
Administrator Guest Installer Power User Standard User	**Access privileges** Access System Tree Access Control Program Items Access Scheduling Groups Access System Options Items Access Alarms Access Logic Pages
	Functional Privileges Manage Alarm Messages and Actions Maintain System Parameters Maintain Schedules Maintain Schedule Group Members Maintain Categories Acknowledge Non-Critical Alarms Acknowledge Critical Alarms Force Normal Non-Critical Alarms Force Normal Critical Alarms Delete Non-Critical Alarms Delete Critical Alarms Execute Audit Log Report Download Controllers System Shutdown Engineer System Access Commissioning Tools Maintain Graphs and Reports Maintain Connections Remote File Management Remote Data Access-SOAP Do not audit changes made using SOAP Manual Commands/Console Operations Manual Commands/File IO Manual Commands/Adv Network Manual Commands/Unrestricted Change My Settings
	Parameter Privileges Edit Setpoint Parameters Edit Setpoint Tuning Parameters Edit Tuning Parameters Edit Manual Override Parameters Edit Point Setup Parameters Edit Restricted Parameters Edit Category Assignments Edit History Value Reset Edit Trend Parameters

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System-wide Privilege Sets	Effective System-wide Privileges
	Edit Calibration Parameters Edit Hardware Controller Parameters Edit Area Name Edit Control Program Name Edit Alarm Configuration Edit Status Display Tables Edit Maintenance Tables Edit User Config Tables Edit Service Config Tables Edit Setpoint Tables Edit Time Schedule Data Tables

NOTES

- For an operator to add, edit, or delete schedule groups, he must have the system-wide privilege Maintain Schedule Group Members. He must also have the local privileges Access System Tree and Maintain Schedules at each location that is a member of the schedule group.
- If you switch to location-dependent operator access in a system that has operators and privileges set up, the i-Vu® Pro application splits any existing privilege set containing local and system-wide privileges into 2 separate privilege sets - one local and one system-wide. Operators' system-wide privilege sets still apply throughout the system. The operators' local privilege sets are automatically assigned at the system level. You can then reassign the local privilege sets to the operators at the locations where they need them.

To add a privilege set

Adding a privilege set using location-dependent operator access is the same as using location-independent operator access except that you must select whether you are adding a system-wide or local privilege set. See *Privilege sets* (page 157).

To assign privilege sets to an operator

Assign a **system-wide** privilege set to an operator on the Operators page in the same way you would assign privilege sets in a system using location-independent operator access. See *Operators and Operator Groups* (page 161).

Assign a **local** privilege set to an operator at locations on the navigation tree where he needs the privileges.

1. Select a location on the navigation tree.
2. Click **Privileges**.
3. On the **Configure** tab, click **Add**.
4. Select the operator or operator group.
5. Click **OK**.
6. Select the privilege set(s) that you want the operator to have.
7. Click **Accept**.

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To delete a local privilege set assignment

1 On the navigation tree, select the location where the assignment was made.

2 Click **Privileges**.

3 Select the assignment under **Privilege Set Assignments at this Level**.

4 Click **Delete**.

5 Click **Accept**.

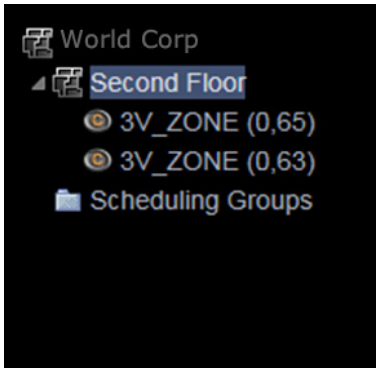
Restricting access in the system

Restricting an operator's access to areas of the system

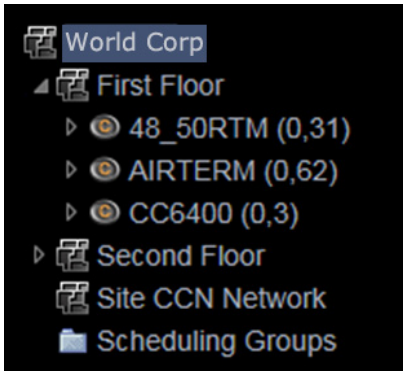
You can give an operator access to only a specific area of the system. All other areas will be either grayed out or not visible when the operator logs in to the i-Vu® Pro interface.

EXAMPLE Assigning an operator the Access System Tree privilege for the Second Floor area only allows that operator to see the Second Floor area and the controllers beneath that area. The First Floor or any other areas are grayed out or not visible.

Restricted access



Full system access



Restricting all operator access to a location

To remove all operators' local privileges from a location so that you can assign access only to a specific operator(s), navigate to the location, select **Privileges**, then uncheck **Inherit security privileges from above this level**.

Security Assignments Report

A Security Assignments Report shows an operator's local and system-wide privileges and privilege sets at a specific location.

1 Select the location on the navigation tree.

2 Click the **Reports** button drop-down arrow, then select **Security** > **Security Assignments**.

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3 On the **Options** tab, select an operator.

4 Click **Run**.

Recording reasons for edits (21 CFR Part 11)

The i-Vu® Pro application provides support for 21 CFR Part 11. With this feature enabled, the i-Vu® Pro application can require an operator to record a reason for changing an equipment property, or acknowledging an alarm, before it accepts the change. The i-Vu® Pro Audit Log report then displays the operator's name and the recorded reason for making the change.

To set up equipment to require reasons for changes

1 On the i-Vu® Pro navigation tree, right-click the equipment, then select **Configure**.

2 Check **Require operator to record any changes to control program**. **(Audit logging must be enabled.)**

NOTE In order to enable this feature to record changes, you must also enable **Alarm requires acknowledgment** and/or **Return requires acknowledgment** on the **Alarms** > **Enable/Disable** tab.

3 Click **Accept**.

NOTE You can also turn this setting on in SiteBuilder in the equipment's properties dialog box.

To view reasons for changing equipment properties

1 On the i-Vu® Pro tree, select a piece of equipment that requires reasons for change.

2 Click the **Reports** button drop-down arrow, select **Security** > **Location Audit Log** or **System Audit Log.**

3 On the **Options** tab under **Display the following columns**, check **Reason**.

4 Click **Run**.

Advanced password policy

You can set up an i-Vu® Pro password policy to meet your security needs.

1 On the **System Options** tree, select **System Settings**.

2 On the **Security** tab under **Operators**, enter information in the fields described below.

NOTE See *System Settings* (page 312) for information on all the other fields.

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Field	Notes
Use advanced password policy	Enable this field to put restrictions on passwords. An operator's login name and password must be different when this policy is enabled. After you change the password policy, any operator whose password doesn't meet the new requirements will not be locked out of the system, but will be prompted to create a new password.
Passwords must contain	You can specify how many characters and which of the following types of characters a password must contain: • Numbers • Special characters—any keyboard character that is not a number or letter. • Letters—uppercase, lowercase, or both.
Cannot be changed more than once every __ days.	Enter a number to limit how often users can change their passwords. When set to 0, users can change them as often as they want.
May not be reused until __ different passwords are used.	Enter a number between 1 and 20. Enter 0 to reuse passwords without a delay.
Expire after __ days	Enable to set the number of days an operator can use his password before the system requires him to change it. Enter a number between 1 and 999.
Force expiration	Click this button to force every user's password to expire. Each user will be prompted to change their password when they next attempt to log in to the i-Vu® Pro interface.

Advanced topics and features

Manual commands

To run a manual command:

1 Click and then select **Manual Command**.

2 Type the manual command in the dialog box, then click **OK**.

TIP **Ctrl+M** also opens the dialog box.

You must have the Installer or Admin role to access the manual commands dialog box. Some commands are restricted to the Installer role only.

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Command	Description
addon	Opens a dialog box where you can upload, start, stop, or remove an add-on program.
autopilot location	Displays the full path for the current location. You can copy and paste the path into **Enter custom autopilot location** of the Autopilot add-on user interface. See the *Autopilot User Guide* for details.
bacnet bind show	Shows the selected device's current BACnet bindings.
bacnet bind clear	Clears the selected device's BACnet bindings so that they can be rediscovered.
bacnet showindex	Displays all files (file name, size, date) downloaded to the selected controller.
bbmd commands:	You must have the Installer Role to run bbmd commands.
bbmd read <IP address>	Reads the BBMD table of the controller at the given IP address. For example, to display the BBMD table in the BACnet device router at IP address 154.16.12.101, type: `bbmd read 154.16.12.101`
bbmd update <network number>	Selects BBMDs on the specified network and marks them for download. If no network is entered at the end of the command, all networks in the system are scanned. For example, if the network number is 888, type: `bbmd update 888`
bbmd view <network number>	Views the list of BBMDs that have been selected for the network number at the end of the command. Assumes the update has been run. For example: `bbmd view 888`

bbmd write <table file> <IP address>	Writes the BBMD table into the controller at the given IPV4 address. See *To set up BBMDs through the i-Vu® Pro interface* (page 200).
	For example, to write the BBMD table in dallasbbmd.bdt into the BACnet device router at IP address 154.16.12.101, type:
	`bbmd write dallasbbmd.bdt 154.16.12.101`
	To write the BBMD table to an IP device underneath a BACnet SC router, you must include the downstream bacnet IP network number before the target IP address:
	`bbmd write dallasbbmd.bdt 2401:154.16.12.101`
	If using a UDP port other than 47808 you must specify that port after the target IP address as well:
	`bbmd write dallasbbmd.bdt 2401:154.16.12.101:47809`

bbmd writeaddresses <addresses> <destination address>	Writes the BBMD table with the included IP addresses, "<addr1;addr2;addr3>", into the BACnet device at the given IPV4 address, [<destaddress>]. For example, to write the BBMD table with 3 IP addresses into the BACnet device with IP address 192.168.10.25, type: `bbmd writeaddresses "192.168.20.1;192.168.30.25;10.10.2.36" 192.168.10.25`

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Command	Description
bbmd clear <IP address>	Clears the BBMD for the specified controller. For example: `bbmd clear 154.16.12.101`
bbmd dump <network> <file>	Writes to a file the BBMD from the specified controller. For example: `bbmd dump 888 dallasbbmd.bdt`
checkurls	**1** Finds all network point exp: expressions for the selected item on the navigation tree. **2** Converts the exp: expressions to bacnet:// equivalent expressions that the controllers use. **3** Compares the equivalent bacnet:// expressions to the bacnet:// expressions currently downloaded in the controllers. **4** Displays any mismatches.
checkurls -p	Does the same as checkurls, then adds any mismatches to the download queue as parameter downloads.
checkurls -v	Does the same as checkurls, but displays the exp: and bacnet:// expressions for all network points that were checked.
commstat	Gives a complete set of diagnostic information for all defined connections as well as information regarding all modems in the system.
copy	Displays a global copy utility that allows you to selectively copy trend graphs, custom reports and all editable properties from the selected equipment to other equipment in the system with the same control program. See *To use Global Copy* (page 32).
download commands:	Each of these commands performs an immediate download to a controller for the selected control program, device, or driver.
download m	Downloads all content, including parameters, schedules, and BBMDs (if applicable).
download p	Downloads parameters only.
download s	Downloads schedules only.
go commands:	

go <refname or path>	Goes to the point in the system that is referenced.
	For example:
	`go #oa_conditions`
	or
	`go vav_1/m28`

go ~network	Takes you to the network the selected object's controller is associated to.
go -logicpopup <refname>	Goes to the microblock pop-up for the microblock that is referenced. You must run this command from the microblock's equipment on the navigation tree. For example: `go -logicpopup rs`

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Command	Description
go <device ID>	Goes to a device on the navigation tree. For example, to go to device 301205 referenced in a dead module alarm, type: `go 301205`
go <device ID>/<object ID>	Goes to a device and object on the navigation tree. For example: `go 300550/AI:3`
go <object ID>	Goes to an object for the current device on the navigation tree. For example, if a module alarm reports a control program Locked I/O Alarm and references an error in program 11, click the link to go to the device, then go to the object by typing: `go PRG:11`
localhost	Shows the IP address of the i-Vu® Pro web server
logoffuser	Logs off a user (without warning the user). Type a `whoson` manual command to view the IDs of logged in operators, then type `logoffuser x`, where x is the user's ID.
markdownload commands:	These commands place the controller for the selected tree item on the list to download at a later time. The download list can be viewed at the System level on the **Downloads** page.
markdownload	Marks for an All Content download, that includes parameters, schedules, and BBMDs (if applicable).
markdownload p	Marks for a Parameters download.
markdownload s	Marks for a Schedules download.
memory	Shows the amount of server memory allocated for the i-Vu® Pro application and the amount being used.
memory -free	Releases unused server memory, then shows the i-Vu® Pro memory usage before and after the release.
modstat commands:	These commands display a *Modstat* (page 208) report. **NOTE** It is not necessary to download a controller before running a Modstat on it. Binding takes place when you run the modstat.
modstat	Displays status of the controller at the current location, including: • Hardware components of the device • Software components of the device • Error conditions that may exist in the device • Date and time the device is using

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Command	Description
modstat 8:<device instance number>	Displays status for a specific controller in the IP network using the controller's ID. Your location in the system does not have to be the controller you are querying. For example: `modstat 8:489202`

modstat mac:<network number>,<media type>: <mac address>	Displays a Modstat for a specific controller in the system using the controller's MAC address. Network number is the number of the network this controller is on; media type is the type of network the controller is on; MAC address can be either the controller address or the IP address and depends on the controller's media type.
	
	Media types allowed are:
	• bacnet/ip or b
	• ms/tp or m
	• ethernet or e
	
	For example:
	`modstat mac:48161,arcnet:2`
	or
	`modstat mac:888,bacnet/ip: 172.16.101.119`

notify	Sends a message to all operators currently logged in to the system. For example, "The server is going to shut down in 5 minutes. Please log off." To run this command, type: `notify <your message>`. The message must use only alphanumeric characters. You must have the Installer role to run this command.
paramupload	Uploads parameters (editable properties) to the i-Vu® Pro application from the equipment or driver at the current location and below. If you want to upload editable properties for all equipment under a particular router, navigate to the router or the network on the navigation tree. You must have the Installer role to run this command.
ping	Ping to verify communication between IP devices. You cannot ping devices on non-IP networks. To run this command type: `ping <hostname>` where <hostname> is the IP address or device name. For example: `ping 192.168.168.1` (will ping the IP address 4 times)
rebootserver	Restarts the i-Vu® Pro application. You must log back in to the i-Vu® Pro interface if you want to continue. You must have the Admin or Installer role to run this command.
rebuild	Rebuilds a Properties page. If you make changes to control program property text in the Snap application, navigate to a control program in the i-Vu® Pro tree, and then run this command to see your changes.
reload	Reloads a control program. Use if you make changes to control program in the Snap application. Reloading updates all instances of the control program throughout the system and marks the controller(s) for download. The i-Vu® Pro application determines the type of download based on what changed in the control program. You must have the Installer role to run this command.

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Command	Description
restartmodule	Restarts the current controller. You must have the Installer role to run this command.
rnet here	Overrides the address configuration of the Rnet host controller to allow a subsequent All Content or Parameters download. Run this command if you experience communication problems with the controller because the controller's network number does not agree with SiteBuilder's network number. Run this command from a control program, device or driver.
revert	Resets the selected driver or control program to its default values.
setdefault	Sets the current page as the default view for the selected action button and the selected tree location. You must have the Installer role to run this command.
shutdown	Shuts down the i-Vu Pro Server application. This stops communication between the server and the client, but does not close any open i-Vu® Pro pages. You must have the Admin or Installer role (System Shutdown privilege) to run this command.
sreview	Provides a Security Report that displays critical security compliance in your i-Vu® Pro system. This includes: **Web Server** • SSL Mode: on or off or both • TLS in use: true or false (only displayed if SSL Mode is on) • TLS protocols: version number (only displayed if SSL Mode is on) • Allow unsigned add-ons: true or false • Allow SOAP over HTTP: true or false • Reads X-Forwarded-For Header: true or false **Certificate** • Self-signed certificate in use: true or false • Certificate issued by: Distinguished Name of the certificate signer • Certificate expired: true or false • Certificate not yet valid: true or false • Certificate expires: date and time the certificate becomes invalid **Email** • Secure SMTP enabled on email server: true or false **Passwords** • Password policy enforced: true or false **Software Updates** • Latest cumulative update applied: none or date You must have the Installer role to run this command.

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Command	Description
storetrends	Uploads trend data from the controller(s) to the database for all equipment at and below the selected item on the navigation tree. This command stores trend data for points that have Trend Historian enabled.
timesync	Synchronizes the time on all controllers at the current location and below to the time on the server. Run this command only from a location on the navigation tree. You must have the Installer role to run this command. **NOTE** For CCN networks, executing a timesync on a controller sends the timesync to its Gateway, and all the controllers under that Gateway.
updatedriver commands:	You must have the Installer role to run this command.
updatedriver	Updates the selected controller to the latest version of its driver.
updatedriver net	Updates the selected controller to the latest version of its driver and any other controllers on the same network that use that driver.
updatedriver all	Updates the selected controller to the latest version of its driver and all other controllers in the system that use that driver.
whereami	Displays the full path for the current location and gives the display and reference names of the action button, category, instance and tab. If the selected tree location differs from the location shown in the action pane (for example, a point trend page), whereami returns information on both locations. Use this command when you create links in ViewBuilder.
whoson	Shows the list of users currently logged in to the i-Vu® Pro system, the IP addresses from where they are logged on, what kind of interface they are using (for example, lvl5 for a web browser on a computer), and how long it has been since they have actively interfaced with the i-Vu® Pro system.
zap	Restarts the current controller. You must have the Installer role to run this command.

Using DEBUG MODE

DEBUG MODE saves considerable time when troubleshooting custom control programs for programmable controllers. Typical operating mode in the i-Vu® Pro application always downloads full source, which is time-consuming. While operating in DEBUG MODE, Full Source is kept in the database and is not downloaded to the controller.

CAUTION Never leave your i-Vu® Pro system without unchecking DEBUG MODE first and then downloading all content. The source files are not in the controller until you complete both steps.

To use DEBUG MODE

1. Select the custom control program in the navigation tree and either double-click it or right-click and select **Configure**.
2. Check **DEBUG MODE**.
3. Download the new or edited control program. See *Working with control programs* (page 239).

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4 Before logging out or switching to a different controller, select the control program in the navigation tree and either double-click it or right-click and select **Configure**.

5 Uncheck **DEBUG MODE**.

6 Download All Content from the **Downloads** page, **Devices** page > **Manage** tab, or any page that has a **Download** button.

System database maintenance

You should perform the following system maintenance on a regular basis.

To back up a system

The type of database your system uses determines the method you use to back up the system.

CAUTION Do Not use SiteBuilder's Replicate feature to back up your database.

For Apache Derby or SQL Server Express

1 Shut down the SiteBuilder and i-Vu Pro Server applications.

2 In the **i-Vu_Pro_x.x\webroot** folder, copy your system folder.

3 Paste the copy to a new location.

TIP Zip the copy before transporting it over a network or to a USB drive.

For MySQL, MS SQL Server, or PostGreSQL

1 Follow the instructions above to copy your system folder in **i-Vu_Pro_x.x\webroot.**

2 Use the database management system's backup method. See *To safely shut down the i-Vu® Pro application for database server* (page 178) maintenance before doing any maintenance on your database server.

To compact and defragment

In a new i-Vu® Pro system, the records in a database are contiguous. As records are added, deleted, and modified, the records become scattered in the database. This condition, called fragmentation, can slow down system performance and increase the database size. Compact the database to correct this situation.

The files on the server's hard drive can also become fragmented. Defragment the hard drive to correct this situation.

You should compact and defragment on a regular schedule such as once a month. But, you may need to do these more often, depending on how often the data or files change.

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NOTE Compacting a database may take several minutes to several hours, depending on its size.

TIP To minimize the effects of fragmentation, you should maintain at least 20% free disk space on the server.

Compacting the database

The following databases are compacted dynamically—compacting occurs in the background when a database is open.

- MySQL
- MS SQL Server
- MS SQL Server Express
- PostGreSQL

To compact a Derby database:

1. Shut down the SiteBuilder and i-Vu® Pro Server applications.
2. Open a Windows command prompt application and type `cd c:\i-Vu_Pro_x.x`, replacing x.x with your system version number.
3. Click **Enter**.
4. Type `"Derby Compression Tool.exe" <system name>`.
5. Click **Enter**.
6. When compacting finishes, close the command window.

Defragmenting the server's hard drive

For all database types, use a defragmentation utility such as Windows Disk Defragmenter or Norton SystemWorks.

NOTE If you are using a single computer as both the i-Vu® Pro server and the client, you must defragment the disk more often than the disk of a dedicated server—especially if people access the Internet from this computer.

To minimize the database size

The larger a database is, the less responsive it may become. Deleting closed alarm incident groups, expired schedules, and expired historical trends on a regular basis will reduce the database size. You can set up your i-Vu® Pro application to automatically delete these. See "System Settings > *Scheduled Tasks tab* (page 317)" in i-Vu® Pro Help.

To safely shut down the i-Vu® Pro application for database server maintenance

Occasionally, the database server is shut down for maintenance or backups. If this is done without shutting down the i-Vu® Pro Server first, the database may get locked and the i-Vu® Pro application may not be able to reconnect.

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1 Shut down the i-Vu® Pro application.

2 Shut down the database server.

3 Perform the maintenance or repair needed on the server.

4 Restart the database server.

5 Restart the i-Vu® Pro application.

To unlock a database

1 In SiteBuilder, click **File** > **Open** and **Select Database** to open your site. The following message appears **The database appears to be in use by another application ..... Do you want to override the lock?**"

2 Click **Yes** to override the lock.

3 Log in to the site.

4 Exit SiteBuilder.

5 Start the i-Vu® Pro Service.

Defining i-Vu® Pro paths

A path tells the i-Vu® Pro application the route through the system hierarchy to an item in the system. For example, a path tells the i-Vu® Pro application where to find a microblock property value to display on a graphic or where to jump to when the operator clicks a link on a graphic.

You can use semantic tags as part of the path. See *Using semantic tags in a path* (page 183).

In ViewBuilder, you use paths in:

- Controls
- Links
- Conditional expressions

In i-Vu® Pro, you use paths in :

- The `source` *field code* (page 92) in alarm actions and messages
- An *Equipment Values report* (page 148)
- The `go` *manual command* (page 170)

You can do one of the following to get the path:

- In ViewBuilder, let ViewBuilder write the path.
- In the i-Vu® Pro interface, *determine the path yourself* (page 181).

A path consists of the reference name of each tree item included in the path, separated by a forward slash (/). For example, first_floor/zone_1/rs.

A path can be *absolute* (page 180) or *relative* (page 180).

i-Vu® Pro paths are based on parent-child hierarchy. In the tree below, the Lobby is a child of First Floor, and First Floor is a child of Atlanta R&D Facility. Conversely, Atlanta R&D Facility is the parent of First Floor, which is the parent of Lobby.

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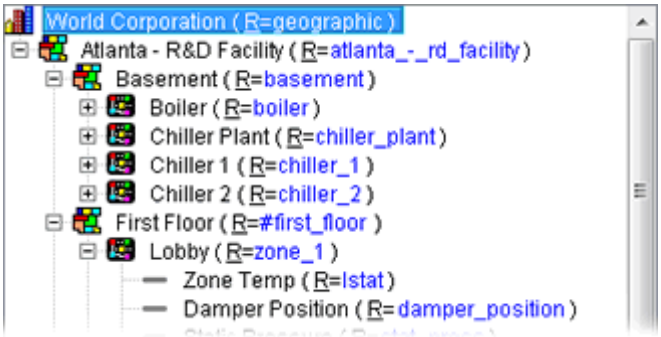
A system in the i-Vu® Pro interface:

Same system in SiteBuilder showing reference names in blue:



Absolute path

An absolute path begins at a specific point in the system hierarchy and is followed by the children below it down to the object or property of interest. An absolute path can begin with either of the following:

- A global reference name—a reference name that is unique within the entire system and begins with a # sign. **EXAMPLE** If OA Conditions has a global reference name of #oa_conditions, the absolute path to OA Conditions is simply **#oa_conditions**. The absolute path to any child of OA Conditions, such as OA Temperature, begins with #oa_conditions. For example, **#oa_conditions/oa_temp**.
- The top of the i-Vu® Pro tree.

Relative path

A relative path is useful for items such as graphics or alarm messages that you will reuse in multiple i-Vu® Pro locations because the path is relative to the item that contains the path.

A relative path going down the tree

A relative path going down the tree begins with the reference name of the item below the location where the path is used. Examples using the system shown above:

- To display the Lobby's zone temperature on the Lobby's graphic, the path is **rs**.
- To display the Lobby's zone temperature on the Atlanta-R&D Facility graphic, the path is **first_floor/zone_1/rs**.

A relative path going up the tree

A relative path going up the tree begins with a ~ followed by one of the options below:

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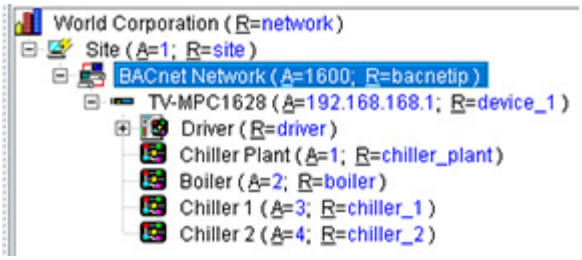
Use...	To go...	Examples using the system shown above
~parent	Up one level	1 To put a link on the Lobby graphic that goes to the First Floor graphic, the path is **~parent**. 2 To put a link on the Lobby graphic that goes to the Atlanta R&D Facility (up 2 levels), the path is **~parent/~parent**. 3 To display the Lobby's zone temperature on the Boiler graphic, the path is **~parent/~parent/ first_floor/zone_1/rs/present_value**.
~equipment	To the microblock's control program	To display the Lobby zone temperature in a High Temp alarm message, the path is **~equipment/rs/present_value**.
~device	From a control program to its device	To show the device name on an equipment graphic, use **~device.display-name**.
~instance(#)	To sibling equipment within a multi-equipment device	See the system shown below. To display the Boiler Plant outdoor air temperature on the Chiller Plant graphic, the path is **~instance(2)/oat/present_value**. 

Determining a path or microblock property

A path tells the i-Vu® Pro application the route through the system hierarchy to an item in the system. Paths are used in graphics, links, alarm messages, alarm actions, network microblock address, and other items.

To get the path to an area, equipment, or microblock

In the i-Vu® Pro interface, right-click the item on the tree, then select **Copy Path**. Paste the path where you need it.

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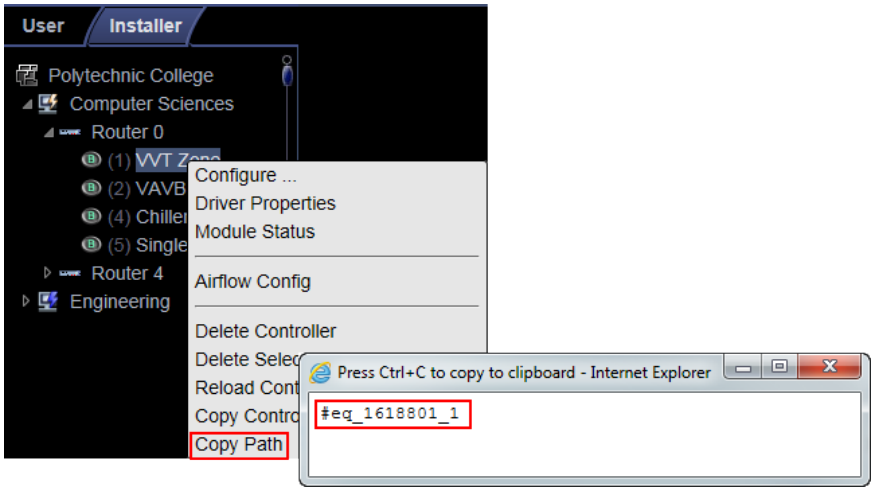

To get the path to a microblock property value

1 In the i-Vu® Pro interface, right-click the value, then select **Global Modify**.

2 Click **Show Advanced** to see the full path to the property value.

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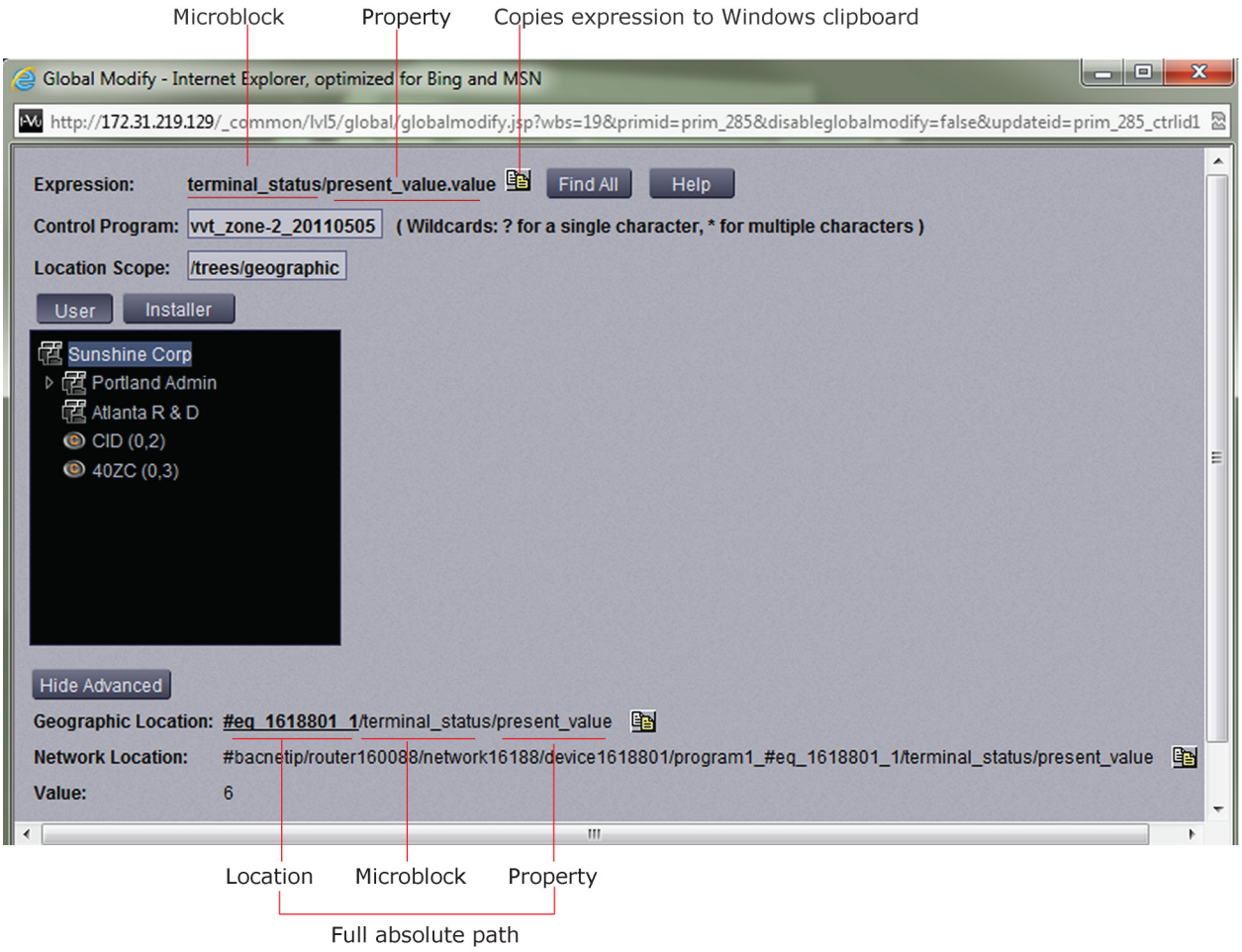

Using semantic tags in a path

You can use a semantic tag in place of a reference name in paths. Follow the conventions in the table below to use them in the i-Vu® Pro v8.0 interface to set up custom reports and, in ViewBuilder, to use on graphics. See "*Semantic tagging* (page 152)" in i-Vu® Pro Help for details on assigning tags and the rules governing them.

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Function	Description
Specify a semantic tag	A tag is always preceded by "@" to differentiate it from a reference name.
Use multiple tags	"|" for ANY "&" for ALL **Examples** • @tag1|tag2|tag3 - find the first child tagged "tag1" OR "tag2" OR "tag3" (ANY tag) • @tag1&tag2&tag3 - find the first child tagged "tag1" AND "tag2" AND "tag3" (must have ALL tags) **NOTE** You cannot mix "|" and "&" in the same tag list.
Search up	Search from the current location and up by prefixing the tag with "@up:". **Example** @up:tag1&tag2 - search up the tree, including the current location for a location with "tag1" AND tag2"
Search down	Search from the current location and down by prefixing the tag with with "@down:". This returns the first matching location. **Example** @down:tag1&tag2 - search down the tree, INCLUDING the current location for tags with "tag1" AND tag2"
Get a value	Value tags can be used like an attribute. Use the "@" tag name where an attribute would be specified. **NOTE** Like all attributes, you must precede the name with a period to obtain a value. **Examples** • #floor1.@area • To search up for a location with an Area tag and get the Area tag value: @up:area.@area

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Setting up and configuring a i-Vu® Pro system

Setting up networks

Setting up IP network communication

To set up an IP network:

1 Set the controllers' IP addresses. See:
Setting Open device IP addresses (page 185)
Setting i-Vu® XT or TruVu™ device IP addresses (page 192)

2 *Set up a BACnet/IP connection in the i-Vu® Pro interface* (page 195)

3 *Test the server-to-client connections* (page 198)

4 *Test the server-to-controller connections* (page 199)

5 *Set up BACnet Broadcast Management Devices if an IP router is used.* (page 200)

NOTE The i-Vu® Pro server name must be less than 15 characters and must not contain hyphens or underscores.

Setting Open device IP addresses

For the i-Vu® Pro server to communicate with Carrier controllers on the IP network, the i-Vu® Pro server and each controller must have the following:

- IP address (unique and static)
- Subnet mask
- Default gateway address, if your system has a default gateway (IP router)

You can use one of the following IP addressing methods for the i-Vu® Pro system.

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Use...	If...
DHCP addressing (page 186) (requires v6.0 or later controller drivers)	The IP network uses a DHCP server for IP addressing
Custom addressing (page 188)	The answer to any of the following questions is yes and you do not have a DHCP server. • Will the system share a facility's existing IP data network? • Will it have 199 or more Carrier IP devices, or 254 or more devices with static IP addresses? • Will it be connected to the Internet? • Will it have at least one device located on the other side of an IP router? • Will it have any third-party controllers?
Default addressing (page 191)	The answer to all of the above questions is no.

To set an Open device's DHCP IP address

PREREQUISITES

- A computer with a USB port
- A USB Link cable
  NOTE The USB Link driver is installed with i-Vu® Pro v5.1 or later systems. Please refer to the Silicon Labs website and search "CP210x USB to UART Bridge VCP Drivers" for the most current device drivers. Install the driver before you connect the USB Link to your computer

CAUTION If multiple controllers share power but polarity was not maintained when they were wired, the difference between the controller's ground and the computer's AC power ground could damage the USB Link and the controller. If you are not sure of the wiring polarity, use a USB isolator between the computer and the USB Link. Purchase a USB isolator online from a third-party manufacturer.

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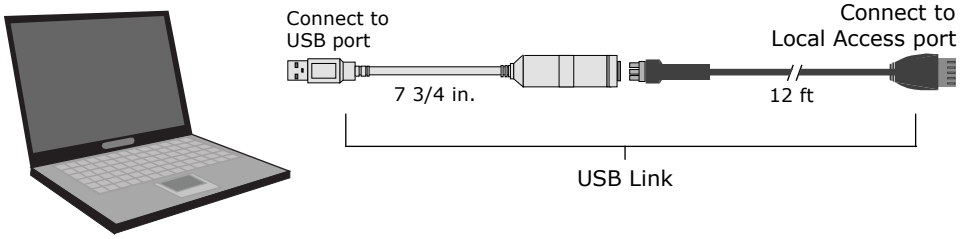
1 Connect the laptop to the controller or sensor using the appropriate USB Link cable(s).



NOTE If using a USB isolator, plug the isolator into your computer's USB port, and then plug the USB Link cable into the isolator.

2 i-Vu® Open Router or i-Vu® Open Link only: Turn off the router's power, set its **Router Config Mode** DIP switch to ON, then turn its power on again.

3 In SiteBuilder, set your **Configure** > **Preferences** > **Connections** tab settings.

Field	Value
Port	The laptop's Com port number that the USB Link is connected to.
Baud Rate	115200
Data Bits	8
Parity	None
Stop Bits	1

4 On the **Network** tree, double-click the controller.

5 On the **Address** tab, click **Module Status**.

6 Note the controller's **Ethernet MAC address**.

7 i-Vu® Open Router or i-Vu® Open Link only: When finished, turn off the controller's power, set its **Router Config Mode** DIP switch to **OFF** to restore normal functionality to the **Local Access** port, then turn the power on again.

8 Give the Ethernet MAC address to your DHCP network administrator and request that he reserve a static IP address for that MAC address.

9 Get from him the reserved IP address, subnet mask, and default gateway address for your router.

10 Repeat steps 1 and 2.

11 i-Vu® Open Router or i-Vu® Open Link only: Set the **DHCP/Assigned** DIP switch to **DHCP**.

12 Repeat steps 3 and 4.

13 On the **Address** tab, select **Specify a custom or DHCP IP Address**.

14 Type the **IP Address**, **Subnet Mask**, and **Default Gateway Address** that the DHCP network administrator gave you.

15 Click **Download Address**.

16 i-Vu® Open Router or i-Vu® Open Link only: Turn off the router's power, set its **Router Config Mode** DIP switch to ON, then turn its power on again.

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To set the Open device's custom IP address

If your system's IP addresses are assigned by the network administrator, you can connect a laptop to a controller's Local Access Port and then use either of the following methods to set the controller's custom IP address so that the i-Vu® Pro server can communicate with it.

- *Set the custom IP address in SiteBuilder* (page 188)
- *Set the custom IP address using PuTTY* (page 189)

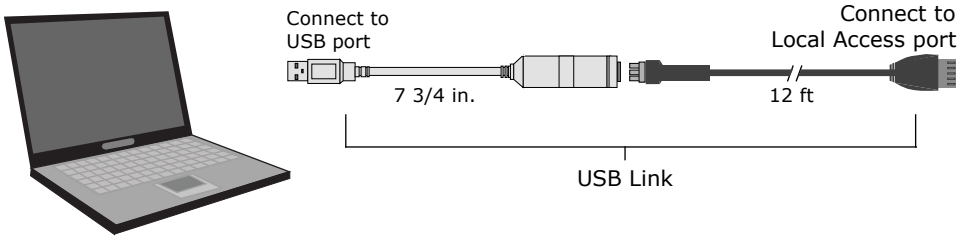
To set a controller's custom IP address in SiteBuilder

PREREQUISITES

- A computer with a USB port
- A USB Link cable
  NOTE The USB Link driver is installed with i-Vu® Pro v5 or later systems. Please refer to the Silicon Labs website and search "CP210x USB to UART Bridge VCP Drivers" for the most current device drivers. Install the driver before you connect the USB Link to your computer.

CAUTION If multiple controllers share power but polarity was not maintained when they were wired, the difference between the controller's ground and the computer's AC power ground could damage the USB Link and the controller. If you are not sure of the wiring polarity, use a USB isolator between the computer and the USB Link. Purchase a USB isolator online from a third-party manufacturer.

1 Connect the computer to the controller using the USB Link cable(s).



NOTE If using a USB isolator, plug the isolator into your computer's USB port, and then plug the USB Link cable into the isolator.

2 i-Vu® Open Router or i-Vu® Open Link only: Turn off the router's power, set its **Router Config Mode** DIP switch to ON, then turn its power on again. Set the router's **IP Address** DIP switch to **Assigned**.

3 In SiteBuilder, set your **Configure** > **Preferences**, **Connections** tab settings.

Field	Value
Port	The laptop's Com port number that the USB Link is connected to.
Baud Rate	115200
Data Bits	8
Parity	None
Stop Bits	1

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4 Click **OK**.

5 In the **Network** tree, double-click the controller.

6 On the **Address** tab, select **Specify a custom or DHCP IP Address**.

7 Type the **IP Address**, **Subnet Mask**, and **Default Gateway Address**.

8 Click **Download Address**.

9 When the download is complete, click **Module Status** in the same dialog box to verify the controller's address.

10 i-Vu® Open Router or i-Vu® Open Link only: Turn off the router's power, set its **Router Config Mode** DIP switch to ON, then turn its power on again.

To set a controller's custom IP address using PuTTY

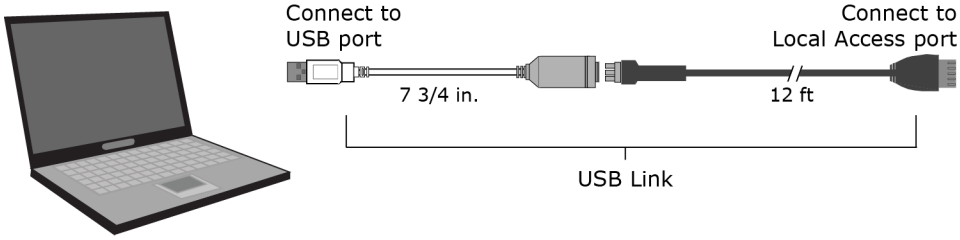
PREREQUISITES

- A computer with a USB port
- A USB Link cable
  NOTE The USB Link driver is installed with i-Vu® Pro v5 or later systems. Please refer to the Silicon Labs website and search "CP210x USB to UART Bridge VCP Drivers" for the most current device drivers. Install the driver before you connect the USB Link to your computer.

CAUTION If multiple controllers share power but polarity was not maintained when they were wired, the difference between the controller's ground and the computer's AC power ground could damage the USB Link and the controller. If you are not sure of the wiring polarity, use a USB isolator between the computer and the USB Link. Purchase a USB isolator online from a third-party manufacturer.

1 Download and install PuTTY from the *PuTTY website* (*http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html*).

2 Connect the laptop to the local access port of the controller, ZS sensor, or an SPT sensor using the USB Link cable(s).



NOTE If using a USB isolator, plug the isolator into your computer's USB port, and then plug the USB Link cable into the isolator.

3 i-Vu® Open Router or i-Vu® Open Link only: Turn off the router's power, set its **Router Config Mode** DIP switch to ON, then turn its power on again. Set the router's **IP Address** DIP switch to **Assigned**.

4 Start PuTTY.

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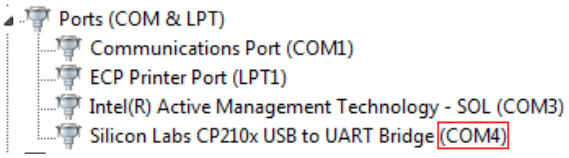
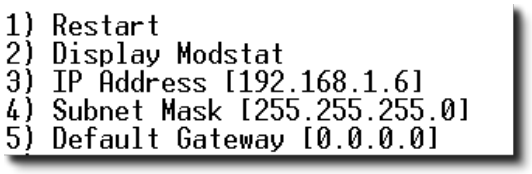
5 Under **Category** > **Connection**, select **Serial**.

6 Under **Options controlling local serial lines**, enter the following settings:

Field	Value
Serial line to connect to	Replace X with the computer's port number that the USB Link cable is connected to. **NOTE** To find the port number, select **Start** > **Control Panel** > **System** > **Device Manager** > **Ports (Com & LPT)**. The COM port number is beside **Silicon Labs CP210x USB to UART Bridge**. 
Speed (baud)	115200
Data Bits	8
Stop Bits	1
Parity	None
Flow Control	None

7 Click **Open**. A window similar to the one below appears.



8 If you changed a value, type `1`, then press **Enter** to restart the controller.

9 Type the number of the address field, then press **Enter**.

10 Type the new address, then press **Enter**.

11 Type `1`, then press **Enter** to restart the controller.

12 Close PuTTY.

13 i-Vu® Open Router or i-Vu® Open Link only: Turn off the router's power, set its **Router Config Mode** DIP switch to ON, then turn its power on again.

To remotely change a controller's custom IP address

Steps 1 through 5 below change the IP address in the controller. Steps 6 through 10 change it in the system database. Communication with the controller will be disrupted until all steps are performed.

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1 On the i-Vu® Pro Installer navigation tree, right-click a router and select **Driver Properties** > **BACnet Router Properties** page.

2 Under **IP Configuration**, check **Enable IP configuration changeover**.

NOTE The field **Allow remote management of IP configuration** is for future use.

3 In the **Next** column, type the new **IP Address**, **Subnet Mask**, and **Default Gateway Address**. Type the **UDP Port** that your server is using to communicate to all controllers.

NOTE You must enter values in all 4 fields, even if the values will not change.

4 Do one of the following.

Set the **Changeover timeout** field to...	The router will use the **Next** settings...
0:00	As soon as the router can communicate with the **Next Default Gateway Address**.
A specific length of time	As soon as the router can communicate with the **Next Default Gateway Address,** or when the timeout expires, whichever occurs first.

5 Click **Accept**.

6 On the **System Options** tree, select **Connections**.

7 On the **Configure** tab, select the **BACnet/IP Connection**, then click **Disconnect**.

8 On the navigation tree, go to the controller's **Properties** page.

9 Make the necessary changes in the **Address** and **Subnet mask** fields.

10 Click **Accept**.

11 On the **System Options** tree, select **Connections**.

12 On the **Configure** tab, select the **BACnet/IP Connection**, then click **Start**.

13 On the navigation tree, go to the router's **Properties** page, then click **Module Status** to verify communication.

To set the Open device's default IP address

NOTES

- If you want to use the default IP addressing but a DHCP server exists, follow the instructions in *To set a controller's custom IP address* (page 188), and enter the default addresses listed in step 2 below.
- A network using default addressing does not have a default gateway (IP router).

1 If wired for power, turn off the controller's power.

NOTE The controller only reads the rotary switch positions during power up or upon reset.

2 i-Vu® Open Router or i-Vu® Open Link only: Set the **DHCP/Assigned** DIP switch to the **Assigned** position to use the following IP networking parameters.

IP address = 192.168.168.**x**
where **x** is the controller address you will set in steps 3 and 4.

Subnet mask = 255.255.255.0

Default gateway address = 192.168.168.254

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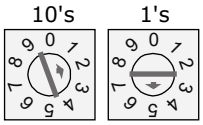
3 Using the rotary switches, set the controller's address to match the **Address** in the controller's properties dialog box in SiteBuilder. Set the **Tens** (**10's**) switch to the tens digit of the address, and set the **Ones** (**1's**) switch to the ones digit.

EXAMPLE Setting the switches as shown in the figures below produces an IP address of 192.168.168.25.



4 On SiteBuilder's **Network** tree, double-click the controller.

5 On the **Address** tab, select **Use Default IP Address**.

6 In the **Address (Dial Setting on Device)** field, type the value of **x**.

7 Click **OK**.

NOTE The default address is an intranet address. Data packets from this address are not routable to the Internet.

Setting i-Vu® XT or TruVu™ device (drv_fwex driver) IPv4 addresses

See the device's *Installation and Start-up Guide* for details.

For the i-Vu® Pro server to communicate with Carrier controllers on the IP network, the i-Vu® Pro server and each controller must have the following:

- IP address (unique on the IP network)
- Subnet mask
- Default gateway address, if your system has a default gateway (IP router)

Use one of the IP addressing schemes described below with the associated instructions that follow.

Use a...	If...
DHCP IP Address generated by a DHCP server	The IP network uses a DHCP server for IP addressing
Custom Static IP Address from your network administrator	You do not use a DHCP server and the answer to any of the following questions is yes. Will the i-Vu® Pro system: • Share a facility's existing IP data network? • Have 254 or more devices with static IP addresses? • Be connected to the Internet? • Have at least one device located on the other side of an IP router? • Have any third-party IP devices?
Default IP Address that your system creates	The answer to all of the above questions is no.

NOTE Carefully plan your addressing scheme to avoid duplicating addresses. If third-party devices are integrated into the system, make sure your addresses do not conflict with their addresses.

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To set the IP address in the controller setup pages

You must define the i-Vu® XT or TruVu™ device's IP address in the controller setup pages. Defining it in the controller setup pages sets the IP address in the controller. To open the controller setup pages, connect to the Service Port.

The **Service Port** on i-Vu® XT or TruVu™ controllers could be either an Ethernet or USB port. Also, the information shown on the controller setup pages is specific to the controller. See the controller's *Installation and Start-up Guide* for details on connecting the controller's Service Port to a laptop and on using the controller setup pages.

1. Connect the controller's Service Port to your laptop as specified in the *Installation and Start-up Guide.*
2. Turn off the computer's Wi-Fi if it is on.
3. If your computer uses a static IP address, use the following settings:
   - Address: 169.254.1.x, where x is 2 to 7
   - Subnet Mask: 255.255.255.248
   - Default Gateway: 169.254.1.1

   If it uses a DHCP address, leave the address as it is.
4. Open a web browser on the computer.
5. Navigate to http://local.access or http://169.254.1.1 to see the Service Port controller setup pages.

To set a DHCP IP address

1. On the controller setup pages **Modstat** tab, find the controller's **Ethernet MAC address** and write it down.
2. On the **Ports** tab under **IP Port**, select **DHCP**.
3. Click **Save**.
4. Write down the **IP Address**.
5. Give the DHCP network administrator the IP address and Ethernet MAC address and ask him to reserve that IP address for the controller so that it always receives the same IP address from the DHCP server.

To set a custom IP address

1. Obtain the IP address, subnet mask, and default gateway address for the controller from the facility network administrator.
2. On the controller setup pages **Ports** tab under **IP Port**, select **Custom Static**.
3. Enter the **IP Address**, **Subnet Mask**, and **Default Gateway** addresses given to you by the network administrator.
4. Click **Save**.

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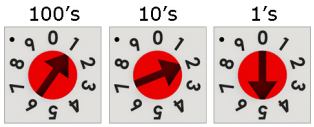
To set a default IP address

Default IP addressing assigns the following to the controller:

- IP address = 192.168.168.**x**
  where **x** is the setting on the rotary switches in the range from 1 to 253
- Subnet Mask = 255.255.255.0
- Default Gateway = 192.168.168.254

1 Set the controller's three rotary switches to a unique address on the network. Set the left rotary switch to the hundreds digit, the middle switch to the tens digit, and the right switch to the ones digit.
EXAMPLE The switches below are set to 125.



2 On the controller setup pages **Ports** tab under **IP Port**, select **Default IP Address**.

3 Click **Save**.

NOTE The default address is an intranet address. Data packets from this address are not routable to the Internet.

To remotely change an i-Vu® XT or TruVu™ device's custom IP address

Steps 1 through 5 below change the IP address in the controller. Steps 6 through 10 change it in the system database. Communication with the controller will be disrupted until all steps are performed.

1 On the i-Vu® Pro navigation tree, right-click a router and select **Driver Properties** > **BACnet Router Properties** page.

2 Under **IP Configuration**, select **Enable IP configuration changeover**.

3 In the **Next** column, type the new **IP Address**, **Subnet Mask**, and **Default Gateway Address**. Type the **UDP Port** that your server is using to communicate to all controllers.

NOTE You must enter values in all 4 fields, even if the values will not change.

4 Do one of the following.

Set the **Changeover timeout** field to...	To have the controller use the **Next** settings...
0:00	As soon as the controller can communicate with the **Next Default Gateway Address**.
A specific length of time	As soon as the controller can communicate with the **Next Default Gateway Address,** or when the timeout expires, whichever occurs first.

5 Click **Accept**.

6 On the **System Options** tree, select **Connections**.

7 On the **Configure** tab, select the **BACnet/IP Connection**, then click **Stop**.

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8 On the navigation tree, go to the controller's **Properties** page.

9 Make the necessary changes in the **Address**, **Subnet mask**, and **Default Gateway** fields.

10 Click **Accept**.

11 On the **System Options** tree, select **Connections**.

12 On the **Configure** tab, select the **BACnet/IP Connection**, then click **Start**.

13 On the navigation tree, go to the controller's **Properties** page, then click **Module Status** to verify communication with the controller.

To set up a BACnet/IP connection in the i-Vu® Pro interface

Using a BACnet/IP connection and an Ethernet Network Interface Card, the i-Vu® Pro server can speak BACnet/IP over an Ethernet network.

1 On the **System Options** tree, select **Connections**.

2 On the **Configure** tab, select **BACnet/IP Connection**.

3 If the **Status** column shows:

- **Connected**, click **Disconnect**.
- **Stopped** or **Design Mode**, go to step 4.

4 Set up the fields as needed for that connection. See tables below.

5 Click **Accept**.

6 If running the i-Vu Pro Server (not i-Vu Pro Design Server) application, select the **BACnet/IP Connection**, then click **Start**.

Field or button	Notes
Server IP Address	Type the server's IP address. The IP address and subnet mask must also be set on the server's network connections page. **NOTE** If the server has more than 1 NIC, use the IP address of the interface connected to the controllers.
Server IP Subnet Mask	• For default IP addressing, type `255.255.255.0`. • For custom IP addressing, type the subnet mask provided by the facility network administrator.
BACnet Port	Type `47808` unless you need to communicate with a third-party device using a different port for BACnet communication or your IT administrator specified a different port.
Disable Field Alarms	Select if you do not want to retain incoming alarms on this connection. Typically this box might be checked during start-up then cleared for normal operation.
Poll Interval	How often the i-Vu® Pro application checks the communication status of the peer caching router. If it cannot communicate with the router, the i-Vu® Pro application generates a Dead Module Timeout alarm.

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Field or button	Notes
Foreign Device	If the i-Vu® Pro server is on an IP network segment that does not have an Carrier controller serving as a BBMD, select **Force Registration**. See *Setting up BBMDs* (page 200).
Register with Device	If you selected **Force Registration** in the previous field, select the BBMD on a remote IP network from which the i-Vu® Pro server will receive BACnet/IP broadcasts.
Network Node	Specify which network the i-Vu® Pro server is physically connected to. This is used to specify which BACnet/IP network the i-Vu® Pro server is on if there are multiple BACnet/IP network nodes with different network numbers in your system.

Tuning Parameters	Notes
Comm Timeout	Amount of time, in milliseconds, that is allowed before retrying a transmission on the network if a required acknowledgement is not received.
Comm Attempts	The number of times to try a transmission on the network.
Do Sync	Amount of time, in milliseconds, allowed for the i-Vu® Pro application to complete a communication task such as downloading to a controller or reading trends from a controller.
Register FD Interval	Amount of time, in seconds, that is allowed before the i-Vu® Pro application notifies a BBMD that the i-Vu® Pro server is a foreign device to that BBMD. If the re-registration does not occur within this time, the BBMD will delete the i-Vu® Pro server from its list.

To set up a BACnet/IPv6 connection in the i-Vu® Pro interface

Using a BACnet/IPv6 connection and an Ethernet Network Interface Card, the i-Vu® Pro server can speak BACnet/IPv6 over an Ethernet network.

1. On the **System Options** tree, select **Connections**.
2. On the **Configure** tab, select **BACnet/IPv6 Connection**.
3. If the **Status** column shows:
   - **Connected**, click **Disconnect**.
   - **Stopped** or **Design Mode**, go to step 4.
4. Set up the fields as needed for that connection. See tables below.
5. Click **Accept**.
6. If running the i-Vu Pro Server (not i-Vu Pro Design Server) application, select the **BACnet/IPv6 Connection**, then click **Start**.

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Field or button	Notes
Server IPv6 Address	Type the server's IPv6 address. The IPv6 address and subnet mask must also be set on the server's network connections page. **NOTE** If the server has more than 1 NIC, use the IP address of the interface connected to the controllers.
Prefix Length	Value set between 10 and 127 to define the number of leftmost bits identifying the network portion of the address.
BACnet Port	Type `47809` unless you need to communicate with a third-party device using a different port for BACnet communication or your IT administrator specified a different port.
IPv6 Multicast Address	Used for broadcasts on an IPv6 network using SLAAC. Defined by the building network administrator.
IPv6 Multicast Port	The port that the controller will use for BACnet IPv6 communication broadcasts. This port should be the same as the BACnet Port.
Disable Field Alarms	Select if you do not want to retain incoming alarms on this connection. Typically this box might be checked during start-up then cleared for normal operation.
Poll Interval	How often the i-Vu® Pro application checks the communication status of the peer caching router. If it cannot communicate with the router, the i-Vu® Pro application generates a Dead Module Timeout alarm.
Foreign Device	If the i-Vu® Pro server is on an IPv6 network segment that does not have an Carrier controller serving as a BBMD, select **Force Registration**. See *Setting up BBMDs* (page 200).
Register with Device	If you selected **Force Registration** in the previous field, select the BBMD on a remote IPv6 network from which the i-Vu® Pro server will receive BACnet/IPv6 broadcasts.
Primary BBMD	If you selected **Force Registration** in the previous field, select the primary BBMD.
Backup BBMD if primary fails	To have a backup in case the first BBMD fails, select another BBMD.
Network Node	Specify which network the i-Vu® Pro server is physically connected to. This is used to specify which BACnet/IPv6 network the i-Vu® Pro server is on if there are multiple BACnet/IPv6 network nodes with different network numbers in your system.

Tuning Parameters	Notes
Comm Timeout	Amount of time, in milliseconds, that is allowed before retrying a transmission on the network if a required acknowledgment is not received.
Comm Attempts	The number of times to try a transmission on the network.
Do Sync	Amount of time, in milliseconds, allowed for the i-Vu® Pro application to complete a communication task such as downloading to a controller or reading trends from a controller.

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To set up a BACnet/IP Service Port connection in the i-Vu® Pro interface

You can connect to the Service Port to access your network through the i-Vu® Pro application.

The **Service Port** on i-Vu® XT or TruVu™ controllers could be either an Ethernet or USB port. Also, the information shown on the controller setup pages is specific to the controller. See the controller's *Installation and Start-up Guide* for details on connecting the controller's Service Port to a laptop and on using the controller setup pages.

1 Connect the controller's Service Port to your laptop as specified in the *Installation and Start-up Guide.*

2 Turn off the computer's Wi-Fi if it is on.

3 If your computer uses a static IP address, use the following settings:

- Address: 169.254.1.x, where x is 2 to 7
- Subnet Mask: 255.255.255.248
- Default Gateway: 169.254.1.1

4 If it uses a DHCP address, leave the address as it is.

5 Open a web browser on the computer and open your i-Vu® Pro application.

6 In the i-Vu® Pro interface, Click > select **System Options,** and open **Connections.**

7 On the **Properties** page > **Configure** tab, Select **BACnet/IP Service Port Connection** from the drop-down list and click **Add**.

8 If needed, enter the **Service Port Network Number** as follows:

- **0** - the i-Vu® Pro will communicate only with the computer or
- **1** to **65534** - the i-Vu® Pro's network number for network communication
- **65535** - searches for an available network number from 65531 to 65534. If any of these numbers are not available, you will have to assign a network number and enter it.

9 Click **Apply**.

10 On the right of the page, in the **Networks using selected connection** table, click the checkbox next to the network you want to connect to.

11 Click **Apply**.

12 Click the **Start** button. The status changes to **Connected**.

NOTE If an error message appears, make sure the COM port you selected is not in use. For example, PuTTY may be open and is holding the port open.

13 Click **Close**.

Testing the server-to-client connections

After making sure that the Ethernet cabling has been set up properly, make sure you can ping the server from each client computer. Then test the HTTP connection by running i-Vu Pro Design Server.

To ping the server from each client

Use the Ping utility from each client computer to test its low-level IP communication with the i-Vu® Pro server.

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PREREQUISITES

- An IP network connection between your server and client computers
- A solid Link light and a flickering LAN light on the i-Vu® Pro client computers and the Network Interface Card (NIC) of the i-Vu® Pro server. If either device indicates it is not on the network, see *Troubleshooting the Ethernet connections* (page 206)

After the link and the LAN lights on the server's NIC and on the client are lighting properly, ping the i-Vu® Pro server from each client machine.

1 At the Command Prompt, type the following command: `ping xxx.xxx.xxx.xxx [Enter]`, where `xxx.xxx.xxx.xxx` is the IP address of the device you are pinging.

The reply should indicate that a device with address xxx.xxx.xxx.xxx is present and passing IP packets on the network.

EXAMPLE For a device with an IP address of 192.168.168.100, type the following:
`ping 192.168.168.100`

TIP To continuously ping a device, type the following command: `ping xxx.xxx.xxx.xxx -t`. Press **Ctrl**+**C** to stop the ping command.

2 If you receive the reply **Request timed out** or you do not receive a reply, contact the facility's network administrator to check the NIC, the hub's settings, and the IP configuration settings. You do not have a valid IP connection between the 2 devices.

To test the HTTP connection

i-Vu Pro Design Server does not attempt communication with field hardware, so you can isolate client-to-server issues from server-to-field issues.

1 Click **Start** > **All Programs** > **i-VuPro x.x** > **i-Vu Pro Design Server**.

2 From each client computer, start the web browser, then type the IP address of the server in the **Address** field.

If the i-Vu® Pro login screen does not appear, contact the facility's network administrator.

Testing the server-to-controller connections

If the system is running, go to **Driver Properties** > **Devices** page from different levels of the navigation tree to view the status of your communication networks and controllers. If you detect a networking problem with an Ethernet connection, see *Troubleshooting an Ethernet connection* (page 206).

After making sure that the Ethernet cabling has been set up properly, use the Ping utility from the i-Vu® Pro server to test its low-level IP communication with each controller on the IP network, then obtain a *Modstat* (page 208) from each controller to ensure its BACnet communication with the i-Vu® Pro server.

To ping a controller on the IP network from the i-Vu® Pro server

Use the Ping utility to test low-level IP connections between the server and each controller on the IP network.

PREREQUISITES

- An IP network connection between the server and the Carrier controller.
- A solid link light and a flickering LAN light on the Carrier controller and the i-Vu® Pro server's Network Interface Card (NIC). See *Troubleshooting an Ethernet connection* (page 206).

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After the link and LAN lights on the server's NIC and on the controller are lighting properly, ping each controller from the i-Vu® Pro server.

1 At the Command Prompt, type the following command: `ping xxx.xxx.xxx.xxx [Enter]`, where `xxx.xxx.xxx.xxx` is the IP address of the device you are pinging.

The reply should indicate that a device with address xxx.xxx.xxx.xxx is present and passing IP packets on the network.

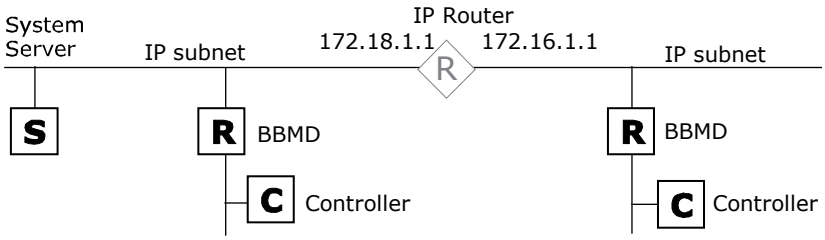
EXAMPLE For a device with an IP address of 192.168.168.100, type the following:
`ping 192.168.168.100`

TIP To continuously ping a device, type the following command: `ping xxx.xxx.xxx.xxx -t`. Press **Ctrl**+**C** to stop the ping command.

2 If you receive the reply **Request timed out** or you do not receive a reply, contact the facility's network administrator to check the NIC, the hub's settings, and the IP configuration settings. You do not have a valid IP connection between the 2 devices.

Setting up BACnet Broadcast Management Devices (BBMDs)

To minimize network communications, IP routers do not pass on broadcasts that they receive. If your system has controllers on different IP subnets separated by an IP router, you must set up a BACnet router on each IP subnet as a BACnet Broadcast Management Device (BBMD). A BBMD passes BACnet/IP broadcasts across the IP router to other BBMDs.



NOTE A BACnet SC router cannot be a BBMD device. Ensure that at least one of your downstream BACnet IP devices is the assigned BBMD, and is on the same subnet and the Gig E port connection for the BACnet SC router.

To set up BBMDs, use the appropriate method in the table below.

If your i-Vu® Pro system has...	Use this method
100 or less IP subnets with:* • No third-party BACnet routers • Authority from your customer to manage all Carrier and third-party BBMDs on the network • Third-party BACnet routers that support BBMD writes from the network	Let SiteBuilder automatically configure your BBMDs. **NOTE** This is not supported in a i-Vu® XT or TruVu™ router with the drv_gen5 driver

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If your i-Vu® Pro system has...	Use this method
Any of the following: • More than 100 IP subnets * • Third-party BBMDs that you do not have authority to manage • Third-party BBMDs that use a non-standard port for BACnet communications • IP devices underneath a BACnet SC router	Set up custom BBMDs through the i-Vu® Pro interface or using the BBMD Configuration Tool.

* If your system has only i-Vu® XT or TruVu™ routers, this number changes from 100 to 500.

NOTE If the i-Vu® Pro server is on an IP subnet without an Carrier BACnet router, register the server as a foreign device. See *To set up the i-Vu® Pro server as a foreign device* (page 205).

To set up BBMDs in SiteBuilder

As you add each Carrier BACnet router to an IP network on the **Network** tree, check **Automatically Configure My BBMDs** on the **Address** tab. SiteBuilder automatically selects a router in each IP subnet as the BBMD and sets up BBMD tables appropriately.

To see which BACnet routers SiteBuilder assigned as BBMDs, select **View** > **Display** > **BBMD**. BBMDs show **B=assigned** on the **Network** tree.

To override SiteBuilder's BBMD selection, right-click a different BACnet router on the same IP subnet, then select **Force to BBMD**.

NOTE If you are managing 3rd party BBMDs, you must add every 3rd party device that could be a BBMD as a 3rd party device router in SiteBuilder.

To set up BBMDs through the i-Vu® Pro interface

If the BBMD controller has the drv_gen5 driver, using this feature only installs the BBMD table in the network that is set as the home network. We recommend using the Driver/controller setup pages to set up BBMD tables. For instructions, see the next section *To set up BBMDs through the i-Vu® Pro interface for i-Vu® XT or TruVu™ controllers (drv_gen5 driver)* (page 200).

1 Make a list of the IP addresses for every controller that will function as a BBMD in your system.

CAUTION Multiple BBMDs on an IP subnet disrupt BACnet communications. Define only one BBMD on either side of each IP router in your system.

2 In Notepad, type the list putting each IP address on a separate line. (Open routers support up to 100 IP addresses per .bdt file; i-Vu® XT or TruVu™ routers support up to 500.)

NOTE If you must communicate with a third-party router that does not use the BACnet/IP port 47808 (0xbac0), you must include the hexadecimal port number in the IP address. For example, `172.168.23.67:0xe78a`

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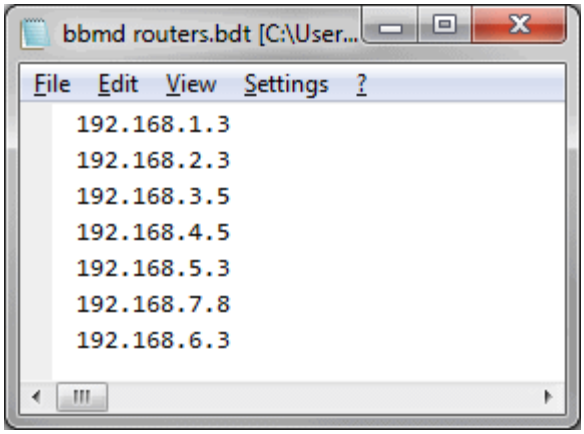


3 Save the file in the **webroot**<system_name> folder with a .bdt extension instead of .txt.

4 On the i-Vu® Pro navigation tree, select one of the Carrier controllers that will function as a BBMD.

5 To check if the controller has an existing BBMD table, click and select **Manual Command**.

6 In the manual command field, type: `bbmd read x.x.x.x`
where x.x.x.x is the IP address of the controller you are on.

7 Click **OK**.

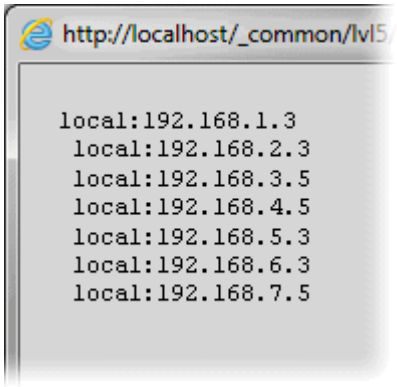
8 If the Broadcast Distribution Table contains IP addresses that are not in your .bdt file, add them to your .bdt file.

9 Click and select **Manual Command**.

10 In the manual command field, type: `bbmd write filename.bdt x.x.x.x`
where `filename.bdt` is the .bdt file in the **webroot**<system_name> folder
and `x.x.x.x` is the IP address of the controller you are on.

11 Click **OK**.

12 Issue another bbmd read command to verify that the .bdt file was written correctly.



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To set up BBMDs through the i-Vu® Pro interface for i-Vu® XT or TruVu™ controllers (drv_gen5 driver)

1 In the i-Vu® Pro interface, in the navigation tree, select one of the Carrier controllers with the drv_gen5 driver that will function as a BBMD.

2 Click **Driver** > **Properties** page.

3 On the **Configuration** > **Gig-E Port** tab.

4 Select the network to import a BBMD to and click **Import BBMD**.

5 Save the file to a convenient location on your computer.

6 Click the file and a confirmation message appears.

7 Repeat steps 4 to 6 for any other networks you need to import a BBMD file to.

Address formatting

- An IPv4 address with optionally space-delimited subnet mask

  ```
  ip address:port subnetmask
  ```

- An IPv6 address with default port

  ```
  ip address
  ```

- An IPv6 address with specified port

  NOTE This is standard IPv6 notation where the address is surrounded by brackets followed by a colon and the port.

  ```
  [ip address]:port
  ```

- A host name address with optionally space-delimited subnet mask.

  NOTE The host name must be within quotes

  ```
  "host name":port subnetmask
  ```

To set up BBMDs using the BBMD Configuration Tool

This utility is not supported for a controller with a drv_gen5 driver.

Before you begin, do the following:

- Set up the IP address, subnet mask, default gateway, and network numbers for the i-Vu® Pro server and each Carrier controller on the IP network.
- The **BBMD Configuration Tool** is available on the i-Vu® Tech Tools USB drive or go to http://www.hvacpartners.com.

1 Make a list of the IP addresses for every controller that will function as a BBMD in your system.

CAUTION Multiple BBMDs on an IP subnet disrupt BACnet communications. Define only one BBMD on either side of each IP router in your system.

2 In Notepad, type the list putting each IP address on a separate line. (Open routers support up to 100 IP addresses per file; i-Vu® XT or TruVu™ routers support up to 500.)

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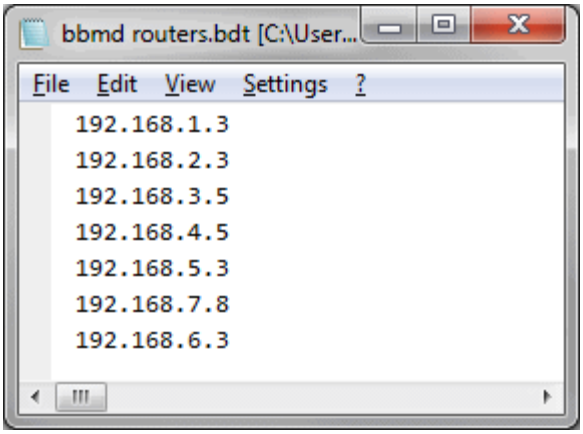
NOTE If you must communicate with a third-party router that does not use the BACnet/IP port 47808 (0xbac0), you must include the hexadecimal port number in the IP address. For example, `172.168.23.67:0xe78a`



3 Save the file to your folder of choice or the **webroot**\<system_name> folder. Use a .bdt, .bbmd, or .text extension instead of .txt.

4 Open the BBMD Configuration Tool.

5 In the **IP Address or Host Name** field, type the IP address of an Carrier controller that functions as the BBMD (BACnet Broadcast Management Device) for its subnet.

6 Click the Broadcast Distribution Table **Read** button to see if the controller has an existing BBMD table. The information found is displayed in the bottom half of the window.

7 If the Broadcast Distribution Table contains IP addresses that are not in the file you created in steps 2 and 3, add them to your file.

8 Verify that the same controller IP address is still in the **IP Address or Host Name** field.

9 Click the Broadcast Distribution Table **Browse** button, then select the file that you created in steps 2 and 3.

10 Click the Broadcast Distribution Table **Write** button to send the information to the controller.

11 Click **Read** again to verify that the new file was written to the Carrier controller.

12 Repeat steps 5 through 11 for each Carrier controller that will function as a BBMD in your system.

```
Read Broadcast Distribution Table
81 02 00 04
----------
192.168.1.3:
Read Broadcast Distribution Table Ack
192.168.1.3:47808 255.255.255.255
192.168.2.3:47808 255.255.255.255
192.168.3.5:47808 255.255.255.255
192.168.4.5:47808 255.255.255.255
192.168.5.3:47808 255.255.255.255
192.168.7.8:47808 255.255.255.255
192.168.6.3:47808 255.255.255.255
81 03 00 4A C0 A8 01 03 BA C0 FF FF FF FF C0 A8
02 03 BA C0 FF FF FF FF C0 A8 03 05 BA C0 FF FF
FF FF C0 A8 04 05 BA C0 FF FF FF FF C0 A8 05 03
BA C0 FF FF FF FF C0 A8 07 08 BA C0 FF FF FF FF
C0 A8 06 03 BA C0 FF FF FF FF
----------
```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To set up the i-Vu® Pro server as a foreign device

If the i-Vu® Pro server is on an IP subnet without an Carrier BACnet router, register the server as a foreign device to a BBMD in the system. That BBMD will then forward BACnet broadcasts to the server. Register the server with the BBMD that will have the fastest response time. Response time is affected by distance and network complexity.

1 Click > **System Options** > **Connections**.

2 On the **Configure** tab, select **BACnet/IP Connection**.

3 If the **Status** column shows:

- **Connected**, click **Disconnect**.
- **Stopped** or **Design Mode**, go to step 4.

4 Type the i-Vu® Pro server's IP address in the **IP Address** field. (172.18.64.37, in the example above.)

NOTE If you have more than one network interface card, type the address that connects to the controller network.

5 Type the i-Vu® Pro server's subnet mask in the **IP Subnet Mask** field. (255.255.0.0, in the example above.)

6 Select **Force Registration** from the **Foreign Device** drop-down list.

7 Select the BBMD in the **Primary BBMD** field.

8 To have a backup in case the first BBMD fails, select another BBMD in the **Backup BBMD if primary fails** field.

9 Click ▶ next to **Tuning Parameters**.

10 Keep the 600-second default value in the **Register FD Interval** field.

NOTE If the re-registration does not occur within this time, the BBMD will delete the i-Vu® Pro server from its list.

11 Click **OK**.

12 If running i-Vu® Pro Server (not i-Vu® Pro Design Server), select the **BACnet/IP Connection**, then click **Start**.

If your system does not have any BBMDs

Follow the steps below to create pseudo BBMDs so that you can register the server.

1 In the SiteBuilder application, double-click each BACnet router and check **Automatically Configure My BBMDs** on the **Address** tab.

2 In the i-Vu® Pro application, select any location on the navigation tree.

3 Run the manual command `bbmd update` to create a blank .bdt table in every router and mark them for download.

4 Download parameters to the routers.

5 Follow the steps above to register the i-Vu® Pro server as a foreign device to one of the routers.

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Troubleshooting networks

If a controller is not communicating, click the router on the i-Vu® Pro navigation tree, then click **Devices**. This page shows the communication status of all controllers on the network. If all controllers on the network are not communicating, you have a network problem. Begin moving up the tree, checking communication status at each level to determine the starting point of the communications problems.

Troubleshooting an IP/Ethernet connection

Normal condition

Most Ethernet devices have link lights that indicate connectivity. If the Ethernet cable is terminated correctly, the link lights at each port (server, Carrier controller, and hub or switch) will be lit. A controller's LAN lights will flicker, indicating Ethernet data packet activity.

Problem

If the Ethernet connection is not wired correctly, you may experience the following symptoms:

- Link light is off
- LAN light remains off

Possible cause	Solution
The physical integrity of the cable or connectors is compromised.	If a known good cable results in a normal condition, replace the cable.
An improper connection type is used.	• Use a crossover cable to connect two IP devices without a hub. • Use a straight-through cable to connect an IP device to a hub.
A cable is plugged into a hub's uplink port.	Use a different port. **NOTE** Many hubs and switches share the first or last port with the uplink port. Other hubs have an uplink switch or button. If you need to use the first port, make sure that the hub or switch is set up correctly (usually a small switch on the back or bottom of the device) and that the first port is not shared with the uplink connection.
The devices are not on the same IP network.	Change one of the IP addresses or install an IP router. **TIP** To determine whether the devices are on the same network, use the Subnet calculator below.
A NIC is installed incorrectly.	If you are unable to ping the host's IP address from the host computer, reinstall the NIC, checking for correct drivers.
Faulty hardware: NIC, hub, switch, or Carrier controller	The diagnosis may be the same as the solution: replace the faulty hardware.

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NOTES

- After checking these possible causes, if you are unable to get a link or LAN light on an Carrier controller, contact Carrier Control Systems Support.
- When troubleshooting an Ethernet connection, Carrier Control Systems Support may request that you provide network diagnostics information from the **System Options** tree > **Connections** > **Statistics** tab.

Troubleshooting an ARCNET connection

Problem

Intermittent communication over an ARCNET network may cause the following symptoms:

- i-Vu® Pro graphics or properties pages intermittently display actual values then question marks.
- You can obtain a *Modstat* (page 208) from a controller, but a download fails.

Possible cause

The i-Vu® Pro communication timeout settings are not sufficient for your network configuration.

Solution

Increase your communication timeout settings.

1 On the **System Options** tree, select **Connections**.

2 On the **Configure** tab, select your **BACnet/ARCNET Connection**.

3 Click ▶ next to **Tuning Parameters**.

4 Double the values in the **Comm Timeout** and **Comm Attempts** fields.

5 Click **Accept**.

NOTE If changing these values does not fix your intermittent communication, contact Carrier Control Systems Support.

Troubleshooting BACnet bindings

Every controller has a Device Binding Table that contains all Device IDs that the controller communicates with and the network address of each device. This typically includes the Device ID of the BACnet Alarm Recipient. If Network Address Translation (NAT) is enabled in SiteBuilder, the alarm recipient is omitted.

If the i-Vu® Pro application is not receiving alarms/trends or if a point's value is incorrect, you can view this table to see where the controller is looking for its data.

1 On the i-Vu® Pro navigation tree, select the router that has incorrect or missing data.

2 On the **Properties** page, click **Show Bindings**.

EXAMPLE: If a controller has been sending alarm/trend data to Device 169999, but someone changed the BACnet Alarm Recipient field in SiteBuilder to 169996 and did not download parameters, the following information will be displayed at the bottom of the Device Binding Table:

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```
*** No binding for event recipient DEV:169999
*** Will not be able to deliver alarms/trend notifications
*** Alarms should be delivered to DEV:169996
```

Using a Modstat to troubleshoot your system

A Modstat (Module Status) provides information about a controller and verifies proper network communication with the controller.

To obtain a Modstat

You can get a controller's ModStat in the following places:

- Open device—In the i-Vu® Pro or SiteBuilder application
- i-Vu® XT or TruVu™ device—In the i-Vu® Pro application or the controller's setup pages

In the i-Vu® Pro application

Use one of the following methods:

- Right-click a router or controller on the navigation tree, then select **Module Status**.
- Select a router on the navigation tree. On the **Properties** page, click **Module Status**.

NOTE You cannot get a Modstat if running i-Vu Pro Design Server because it cannot communicate with controllers.

In the SiteBuilder application (Open device only)

1 Use a USB Link Kit to connect your computer to the controller's **Local Access** port. See *To connect to a device's Local Access port* (page 212).

2 In SiteBuilder, select **Configure** > **Preferences**.

3 On the **Connections** tab, select the computer **Port** that the USB Link Kit cable is connected to, and **Baud Rate** to the Rnet port at 115200.

4 Right-click the controller in SiteBuilder's **Network** tree, then select **Module Status**.

In the controller's setup pages (i-Vu® XT or TruVu™ device only)

The **Service Port** on i-Vu® XT or TruVu™ controllers could be either an Ethernet or USB port. Also, the information shown on the controller setup pages is specific to the controller. See the controller's *Installation and Start-up Guide* for details on connecting the controller's Service Port to a laptop and on using the controller setup pages.

1 Connect the controller's Service Port to your laptop as specified in the *Installation and Start-up Guide.*

2 Turn off the computer's Wi-Fi if it is on.

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3 If your computer uses a static IP address, use the following settings:
   - Address: 169.254.1.x, where x is 2 to 7
   - Subnet Mask: 255.255.255.248
   - Default Gateway: 169.254.1.1
4 If it uses a DHCP address, leave the address as it is.
5 Open a web browser on the computer.
6 Navigate to http://local.access or http://169.254.1.1 to see the Service Port controller setup pages.

Modstat field descriptions

NOTE Modstats vary for different types of controllers. The list below describes all information that could appear on any Modstat. If a description differs between different generations of controllers, the generation is noted.

Field	Description
Date/Time	Date and time the Modstat was run
CM	The controller's rotary switch address (MAC address)
Model Name	Identifies the Product Type
Device Instance	A unique ID assigned to the controller
Driver built	When the driver was built
Downloaded by	When and where the last download was performed
Application Software Version	The name of the first control program that is downloaded
Flash Archive Status	Shows the validity, date, and time of the most recent archive of parameters and status to the controller's permanent flash memory. The archive takes place once a day.
# PRGs initialized # PRGs running	If applicable, the number of control programs that were downloaded vs. the number that are running. If these numbers are not the same, the controller has a problem such as lack of memory.
Firmware sections in flash memory	The name, version, and date of the driver
Reset Counters:	Open device: The number of times each of the following events have occurred since the last time the controller was formatted. i-Vu® XT or TruVu™ device: The number of times each of the following events have occurred since the last time the controller was commanded to clear the reset counters. See **NOTE** below this table.
Power failures	Interruption of incoming power
Brownouts	Low-level incoming power
Commanded boots	Includes commands issued from the i-Vu® Pro interface such as the zap manual command, plus commands issued during a memory download.

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Field	Description
System errors	Error in the controller's firmware or hardware
Watchdog timeouts	Watchdog is firmware that monitors the firmware for normal operation. If watchdog detects a problem, it restarts the firmware.
S/W Watchdog timeouts	Watchdog is firmware that monitors the application firmware for normal operation. If the watchdog firmware detects a problem, it restarts the application firmware.
H/W Watchdog timeouts	H/W Watchdog will restart the controller if it detects a severe problem with the controller's operating system
System status	Gives the current status of the controller's operation.
Network status	Gives the current status of the controller's networks.
System error message history	Open device: High-severity errors since the last memory download or format. Shows the first 5 and last 5 messages. i-Vu® XT or TruVu™ device: High-severity errors since the last memory download. Shows the most recent 10 messages. See **NOTE** below this table.
Warning message history	Open device: Low-severity errors and warning messages since the last memory download or format. Shows the first 5 and last 5 messages. i-Vu® XT or TruVu™ device: Low-severity errors and warning messages since the last memory download. Shows the most recent 10 messages. See **NOTE** below this table.
Information message history	Open device: Information-only messages since the last memory download or format. Shows the first 5 and last 5 messages. i-Vu® XT or TruVu™ device: Information-only messages since the last memory download. Shows the most recent 10 messages. See **NOTE** below this table.
Manifest revision	Firmware revision
Installed bundles	Components of the firmware
ARC156 reconfigurations during the last hour	An ARCNET network normally reconfigures itself when a controller is added to or taken off the network. The **Total** field indicates the number of reconfigurations in the last hour. **Initiated by this node** indicates the number of reconfigurations initiated by this controller. Typical sources of the problem could be this controller, the controller with the next lower rotary switch address, any controller located on the network between these two controllers, or the wiring between these controllers. An excessive number in these fields indicates a problem with the network.
BACnet comm errors in the last 7 days	BACnet communication errors usually indicating dropped packets caused by high traffic on network.

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Field	Description
Core (or Main) and Base board hardware	Gives the following information about the controller's boards: • Type and board numbers that are used internally by Carrier. • The manufacture date and serial number. • Open device only: The core board's RAM and Flash memory. RAM is used for driver and control program executables. Flash memory is used for firmware and file storage. See **Flash storage size** below.
Number of BACnet objects	The number of BACnet objects that were created in the device and the number of those objects that are network visible.
Largest free heap space	Size of the largest piece of unused dynamic memory
Database size	Open device: Size of the controller's memory designated for running programs. Database memory is used for control program parameters, status and history; trends, schedules, and alarms; and driver parameters, status and history. i-Vu® XT or TruVu™ device: Size of the controller's memory.
Flash storage size	The size of the flash memory that is not used by the firmware. This memory is used for file storage and archiving.
Archive storage size	The amount of flash memory remaining for archival after files are downloaded.
File storage size	The size of all files (control programs, graphics, driver, etc.) downloaded to the controller. How much information is in these files depends on whether the controller's **Download source files** option is selected in SiteBuilder or i-Vu® Pro.
Raw physical switches	The readings used to test the DIP or rotary switches
Network Information	Open device: The various network addresses for a controller installed on an Ethernet. The **Current** and **Assigned** addresses will be the same unless: • The Assigned addresses were changed in PuTTY. • The controller's **DHCP/Assigned** DIP switch was moved to the **DHCP** position after the Assigned addresses were defined in SiteBuilder. • The **Enable IP configuration changeover** on the **BACnet Router Properties** page is being implemented. i-Vu® XT or TruVu™ device: The various network addresses for the controller. The **Current** and **Assigned** addresses will be the same unless the **Enable IP configuration changeover** on the **BACnet Router Properties** page is being implemented.
Route Information	BACnet networks that a router is currently routing traffic to. The list changes as BACnet routers are added or removed from the system.
Ethernet statistics	Diagnostic counters directly related to the ethernet communications hardware.

NOTE i-Vu® XT or TruVu™ device only—If you want to clear the Reset counters and the three message history fields, click the **Clear Counts/Logs** button on the controller's **Properties** page in the i-Vu® Pro application or in the i-Vu® XT or TruVu™ device's setup pages that you access through the Service Port.

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Communicating locally with Open devices

You can connect locally to controllers and some sensors to commission, start up, or troubleshoot equipment, or download to controllers. Use a local connection in any of the following situations:

- The entire network is not yet functional.
- The permanent i-Vu® Pro server is not operating.
- The server is operating, but you don't have a convenient IP connection.

To make a local connection, use a USB Link to connect a laptop running either the:

- i-Vu® Pro application - Requires a copy of the system database and that you set up a Local Access connection in the i-Vu® Pro interface.
- Field Assistant application - Use this option if more than one person is starting up the system. See Field Assistant Help for more information.

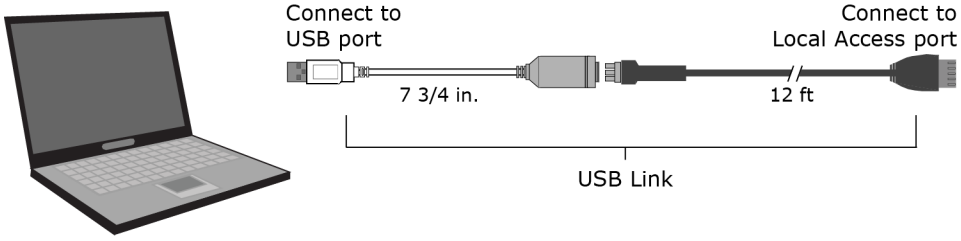
To connect to a device's Local Access port

PREREQUISITES

- A computer with a USB port
- A USB Link cable
  NOTE The USB Link driver is installed with i-Vu® Pro v5.1 or later systems. Please refer to the Silicon Labs website and search "CP210x USB to UART Bridge VCP Drivers" for the most current device drivers. Install the driver before you connect the USB Link to your computer

CAUTION If multiple controllers share power but polarity was not maintained when they were wired, the difference between the controller's ground and the computer's AC power ground could damage the USB Link and the controller. If you are not sure of the wiring polarity, use a USB isolator between the computer and the USB Link. Purchase a USB isolator online from a third-party manufacturer.

1 Connect the computer to the local access port of the controller, ZS sensor, or an SPT sensor using the USB Link cable(s).



NOTE If using a USB isolator, plug the isolator into your computer's USB port, and then plug the USB Link cable into the isolator.

2 i-Vu® Open Router or i-Vu® Open Link only: Turn off the router's power, set its **Router Config Mode** DIP switch to ON, then turn its power on again.

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3 In SiteBuilder, set your **Configure** > **Preferences** > **Connections** tab settings.

To communicate with...	Set switch to...
The i-Vu® Pro application	Off
PuTTY or HyperTerminal	On
SiteBuilder to set a custom IP address	On

4 When you are through communicating with the Local Access port, be sure to return the **Router Config Mode** DIP switch to its original setting.

NOTES

- Using a Local Access port does not interrupt the delivery of alarm and trend notifications to the controller's specified BACnet Alarm Recipient.
- You cannot use a Local Access port to set up BBMDs because Local Access connections do not communicate using BACnet/IP.
- A router must be present to receive colors from the controller network.

To set up a Local Access connection

To set up communication between the i-Vu® Proapplication on your laptop and the controller:

1 Click and select **System Options** > **Connections**.

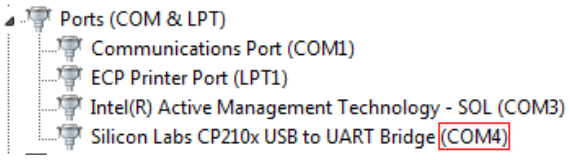
2 On the **Configure** tab, click **Add**.

3 From the **Type** drop-down list, select **BACnet/Rnet Local Access Connection**.

4 Optional: Edit the **Description**.

5 Type the computer's **Port** number that the USB cable is connected to.

NOTE To find the port number, plug the USB cable into the computer's USB port, then select **Start** > **Control Panel** > **System** > **Device Manager** > **Ports (Com & LPT)**. The COM port number is beside **Silicon Labs CP210x USB to UART Bridge**.



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6 Set the **Baud** rate.

Local Access port	Baud Rate
5-pin	115200

7 On the right of the page, in the **Networks using selected connection** table, click the checkbox next to the network you want to connect to.

8 Click **Accept**.

9 Click the **Start** button.

NOTE If an error message appears, make sure the COM port you selected is not in use. For example, PuTTY may be open and is holding the port open.

10 If using the 5-pin Local Access port, on the navigation tree, select the controller that you are connected to.

11 Click and select **Manual Command**.

12 Type `rnet here` in the dialog box, then click **OK**.

13 On the **Properties** page, click **Module Status**. If a *Modstat* (page 208) report appears, the i-Vu® Pro application is communicating with the controller.

Troubleshooting a Local Access connection

Inability to communicate over a Local Access connection may cause the following symptoms:

- Question marks on i-Vu® Pro **Properties** pages and **Graphics** pages
- Cannot obtain a Modstat from the connected controller
- Controller Status report displays purple for a connected BACnet/IP controller
- Cannot download to connected controller
- A message says Local Access is disabled or unable to connect.
- No controllers found in i-Vu® Pro

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Possible cause	Solution
Network number in SiteBuilder does not match the number found in the controller	Use the `rnet here` manual command to force the local device to accept the next download applied. **1** Click , then select **Manual Command**. **2** In the manual command field, type `rnet here`. **3** Download Parameters or All Content to the controller to which you are connected. **4** On the i-Vu® Pro navigation tree, select the controller. **5** On the **Properties** page, click **Module Status** to verify communication with the controller.
i-Vu® Pro communication timeout settings are not sufficient for your network configuration.	Increase your communication timeout settings. **1** On the **System Options** tree, select **Connections**. **2** On the **Configure** tab, select **BACnet/Rnet Connection**. **3** Click the plus sign (+) next to **Tuning Parameters**. **4** Double the values in the **Comm Timeout** and **Comm Attempts** fields. **NOTE** If changing these values does not fix your intermittent communication, contact Carrier Control Systems Support.
Selected COM port is in use	Shut down other applications such as PuTTY that may be running and holding the port open.
Baud rates are inconsistent	Verify that the **Silicon Labs CP210x USB to UART Bridge** and the i-Vu® Pro application are using the baud rate used by the controller.

Communicating locally with i-Vu® XT or TruVu™ devices

You can connect a laptop to the i-Vu® XT or TruVu™ device's:

- **Service port** to set up the controller's address, ports, protocols, baud rates, or to communicate with the i-Vu® Pro application
- **Rnet port** to commission, download, and troubleshoot equipment through i-Vu® Pro or Field Assistant

To communicate with the i-Vu® XT or TruVu™ device's Service Port

You can communicate with the i-Vu® XT or TruVu™ device's setup pages through a web browser to:

- View the controller's Module Status report
- View/change controller and network settings
- Set up ports, protocols, and baud rates
- Communicate with the i-Vu® Pro application (See *To set up a BACnet/IP Service Port connection in the i-Vu® Pro interface* (page 198)
- Troubleshoot

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The Service Port on i-Vu® XT or TruVu™ controllers could be either an Ethernet or USB port. Also, the information shown on the controller setup pages is specific to the controller. See the controller's *Installation and Start-up Guide* for details on connecting the controller's Service Port to a laptop and on using the controller setup pages.

You can set a **Device Password** in the i-Vu® Pro interface at the site level to control access to the Service Port setup pages for controllers that have the drv_gen5 driver. See *To set up site properties* (page 320).

To communicate locally through the i-Vu® XT or TruVu™ device's Rnet port

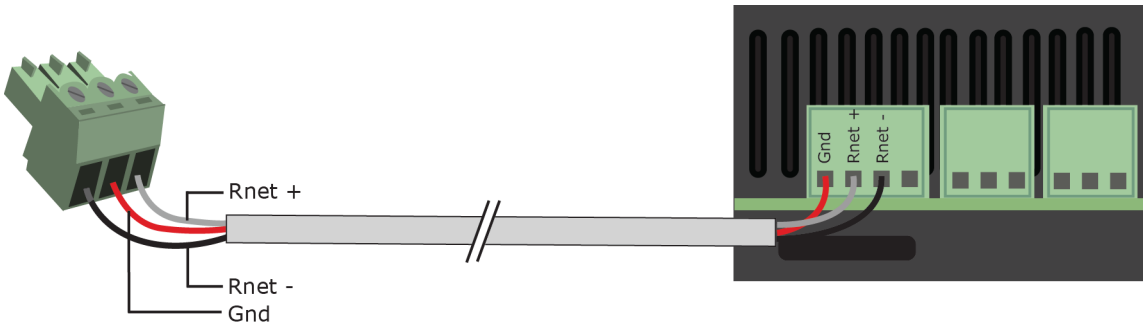
You can connect a computer to the i-Vu® XT or TruVu™ device's **Rnet** port to commission, download, and troubleshoot equipment through the i-Vu® Pro application or Field Assistant.

PREREQUISITES

- A computer with a USB port
- A USB Link cable
  NOTES
  - The USB Link driver is installed with i-Vu® Pro v5.1 or later systems. Please refer to the Silicon Labs website and search "CP210x USB to UART Bridge VCP Drivers" for the most current device drivers. Install the driver before you connect the USB Link to your computer
  - You will use only the portion of the USB Link that has the USB connector.

  CAUTION If multiple controllers share power but polarity was not maintained when they were wired, the difference between the controller's ground and the computer's AC power ground could damage the USB Link and the controller. If you are not sure of the wiring polarity, use a USB isolator between the computer and the USB Link. Purchase a USB isolator online from a third-party manufacturer.
- A 3-pin screw terminal connector and 3-wire cable

1 Connect one end of a piece of 3-wire cable to the 3-pin connector.



2 Connect the other end of the 3-wire cable to the i-Vu® Pro's **Rnet** port as shown in the drawing above in step 1.

Connect the 3-pin connector to the portion of the USB Link shown in the drawing below, then connect the USB connector to the computer.

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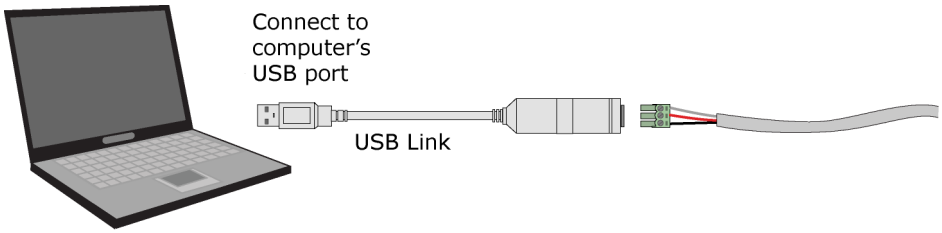


NOTE If using a USB isolator, plug the isolator into your computer's USB port, and then plug the USB Link cable into the isolator.

To set up a BACnet/Rnet connection in the i-Vu® Pro interface

To set up communication between the i-Vu® Proapplication on your laptop and the controller:

1 Click and select **System Options** > **Connections**.

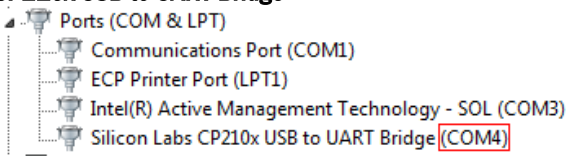
2 On the **Configure** tab, click **Add**.

3 From the **Type** drop-down list, select **BACnet/Rnet Local Access Connection**.

4 Optional: Edit the **Description**.

5 Type the computer's **Port** number that the USB cable is connected to.

NOTE To find the port number, plug the USB cable into the computer's USB port, then select **Start** > **Control Panel** > **System** > **Device Manager** > **Ports (Com & LPT)**. The COM port number is beside **Silicon Labs CP210x USB to UART Bridge**.



6 Set the **Baud** rate.

Local Access port	Baud Rate
5-pin	115200

7 On the right of the page, in the **Networks using selected connection** table, click the checkbox next to the network you want to connect to.

8 Click **Accept**.

9 Click the **Start** button.

NOTE If an error message appears, make sure the COM port you selected is not in use. For example, PuTTY may be open and is holding the port open.

10 If using the 5-pin Local Access port, on the **Network** tree, select the controller that you are connected to.

11 Click , then select **Manual Command**.

12 Type `rnet here` in the dialog box, then click **OK**.

13 On the **Properties** page, click **Module Status**. If a *Modstat* (page 208) report appears, the i-Vu® Pro application is communicating with the controller.

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Troubleshooting an Rnet connection

Inability to communicate over a Local Access connection may cause the following symptoms:

- Question marks on i-Vu® Pro **Properties** pages and **Graphics** pages
- Cannot obtain a Modstat from the connected controller
- Controller Status report displays purple for a connected BACnet/IP controller
- Cannot download to connected controller
- A message says Local Access is disabled or unable to connect.
- No controllers found in i-Vu® Pro

Possible cause	Solution
Network number in SiteBuilder does not match the number found in the controller	Use the `rnet here` manual command to force the local device to accept the next download applied. **1** Click , then select **Manual Command**. **2** In the manual command field, type `rnet here`. **3** Download Parameters or All Content to the controller to which you are connected. **4** On the i-Vu® Pro navigation tree, select the controller. **5** On the **Properties** page, click **Module Status** to verify communication with the controller.
i-Vu® Pro communication timeout settings are not sufficient for your network configuration.	Increase your communication timeout settings. **1** On the **System Options** tree, select **Connections**. **2** On the **Configure** tab, select **BACnet/Rnet Connection**. **3** Click the plus sign (+) next to **Tuning Parameters**. **4** Double the values in the **Comm Timeout** and **Comm Attempts** fields. **NOTE** If changing these values does not fix your intermittent communication, contact Carrier Control Systems Support.
Selected COM port is in use	Shut down other applications such as PuTTY that may be running and holding the port open.
Baud rates are inconsistent	Verify that the **Silicon Labs CP210x USB to UART Bridge** and the i-Vu® Pro application are using the baud rate used by the controller.

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Setting up BACnet/SC network communication

To set up a BACnet/SC network:

1 Set the controllers' IP addresses. See *Setting i-Vu® XT or TruVu™ controller IP addresses for BACnet/SC* (page 219).

2 Set up a BACnet/SC connection in the i-Vu® Pro interface.

Setting i-Vu® XT or TruVu™ device IP addresses for BACnet/SC

See the device's *Installation and Start-up Guide* for details.

To communicate on the IP network, each controller must have the following:

- IP address (unique on the IP network)
- Subnet mask
- Default gateway address (IP router)

Use one of the IP addressing schemes described below with the associated instructions that follow.

Use a...	If...
DHCP IP Address generated by a DHCP server	The IP network uses a DHCP server for IP addressing
Custom Static IP Address from your network administrator	You do not use a DHCP server and the answer to any of the following questions is yes. Will the i-Vu® Pro system: • Share a facility's existing IP data network? • Have 254 or more devices with static IP addresses? • Be connected to the Internet? • Have at least one device located on the other side of an IP router? • Have any third-party IP devices?
Default IP Address that your system creates	The answer to all of the above questions is no.

NOTE Carefully plan your addressing scheme to avoid duplicating addresses. If third-party devices are integrated into the system, make sure your addresses do not conflict with their addresses.

To set the IP address in the controller setup pages

You must define the i-Vu® XT or TruVu™ device's IP address in the controller setup pages. See the device's *Installation and Start-up Guide* for details.

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To set a DHCP IP address

1 On the controller setup pages **Modstat** tab, find the controller's **Ethernet MAC address** and write it down.

2 In the **Primary BACnet/IP section** on the **Gig-E Port** tab under **Configuration**, select DHCP for the **Address Mode**.

3 Write down the **Address** that was obtained through DHCP.

4 Give the DHCP network administrator the IP address and Ethernet MAC address and ask him to reserve that IP address for the controller so that it always receives the same IP address from the DHCP server.

To set a custom IP address

1 Obtain the IP address, subnet mask, and default gateway address for the controller from the facility network administrator.

2 On the controller setup pages **Ports** tab under **IP Port**, select **Custom Static**.

3 Enter the **IP Address**, **Subnet Mask**, and **Default Gateway** addresses that the network administrator gave you.

4 Click **Save**.

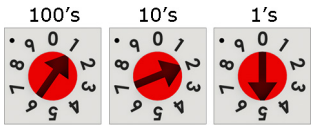
To set a default IP address

Default IP addressing assigns the following to the controller:

- IP address = 192.168.168.**x**
  where **x** is the setting on the rotary switches in the range from 1 to 253
- Subnet Mask = 255.255.255.0

Default Gateway = 192.168.168.254

1 Set the controller's three rotary switches to a unique address on the network. Set the left rotary switch to the hundreds digit, the middle switch to the tens digit, and the right switch to the ones digit.
EXAMPLE The switches below are set to 125.



2 On the controller setup pages in the **Primary BACnet/IP** section on the **Gig-E Port** tab under **Configuration**, select **Default IP Address** for the **Address Mode**.

To set up a BACnet/SC connection in the i-Vu® Pro interface

Using a BACnet/SC connection and an Ethernet Network Interface Card, the i-Vu® Pro server can communicate using BACnet/SC over an Ethernet network.

1 In the i-Vu® Pro interface, click > select **System Options**, and open **Connections**.

2 On the **Properties** page > **Configure** tab, select **BACnet Secure Connect Connection** from the drop-down list and click **Add**.

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3 If the **Status** column shows:

- **Connected**, click **Disconnect** and proceed to the next step below.
- **Stopped** or **Design Mode**, go to the next step below.

4 Set up the fields as needed for that connection. See the tables below.

5 Set up *Certificates for BACnet/SC* (page 222).

6 Under **Networks using selected connection**, select the BACnet/SC network.

7 Click **Apply**.

8 If running the i-Vu Pro Server (and not the i-Vu Pro *Design* Server) application, select the **BACnet Secure Connect Connection**, then click **Start**.

9 Click **Accept**.

Field or button	Notes
Primary Hub URI	The web address i-Vu® Pro uses to connect to the Primary Hub.
Primary Hub Management URL	The web address used to access the Primary Hub's management user interface.
Failover Hub URI	The web address i-Vu® Pro uses to connect to the Failover Hub in the event the Primary Hub is unavailable.
Failover Hub Management URL	The web address used to access the Failover Hub's management user interface.
Network Node	Specify which network the i-Vu® Pro server is physically connected to. This is used to specify which ARCNET network the ARCNET card is connected to, and which BACnet/IP or BACnet/SC network the i-Vu® Pro server is on if there are multiple BACnet/IP or BACnet/SC network nodes with different network numbers in your system.
Tuning Parameters	**Notes**
Comm Timeout (in milliseconds)	Amount of time, in milliseconds, allowed before retrying a transmission on the network if a required acknowledgment is not received.
Comm Attempts	The number of times to try a transmission on the network.
Do Sync (in milliseconds)	Amount of time, in milliseconds, allowed for the i-Vu® Pro application to complete a communication task such as downloading to a controller or reading trends from a controller.
Minimum Reconnect Time	Minimum amount of time, in seconds, allowed before retrying a connection to the Hub. Increases with each failure until Maximum Reconnect Time is reached.
Maximum Reconnect Time	Maximum amount of time, in seconds, allowed before retrying a connection to the Hub.
Connection Wait Timeout	Amount of time, in seconds, allowed for the Hub to reply to a connection request.
Disconnect Wait Timeout	Amount of time, in seconds, allowed for the Hub to reply to a disconnect request.
Initiating Heartbeat Interval	How frequently, in seconds, a device that is idle sends a heartbeat to the Hub.
Accepting Heartbeat Interval	Amount of time, in seconds, the Hub waits to receive a heartbeat before disconnecting.

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To create or replace a BACnet/SC device's operational certificate

Every device on the BACnet/SC network includes a user interface where the operational certificates are managed. The procedure to create or replace a device's operational certificate is outlined below and is the same for all devices.

Device Type	Certificate management tab
BACnet/SC Hub	Connections > BACnet/SC Port
i-Vu® Pro interface	Connections > Configure tab > Manage Certificates
i-Vu® XT or TruVu™ router	Connections > BACnet/SC Port

1 **Create Keystore:** If a keystore has not yet been created, update the five Certificate Name fields (Name, Organization, City, State, Country) as desired, then click **Create Keystore**.

2 **Create Certificate Signing Request (CSR):** Update the five certificate Name fields (Name, Organization, City, State, Country) as desired, then click **Download CSR**. A .csr file will be created and downloaded to your PC.

3 **Sign the CSR:** Send the .csr file to be signed by the manager of the BACnet/SC network's signing CA. If you are using self-signed certificates, see *To sign a Certificate Signing Request using Keystore Explorer* (page 236).

4 **Upload the CSR response:** When you receive the CSR response file, click **Upload** and select the .cer response file. The Certificate Authority will be added to the certificate table, and the operational certificate's information and expiration date will be updated.

To renew an expiring operational certificate

1 On the **System Configuration** tree, select **Connections**.

2 On the **Configure** tab, select the BACnet/SC connection, and then click **Manage Certificates**.

3 Update any fields if needed.

Field or button	Notes
Name	Certificate name
Department	Department name
Organization	Organization name
City	Organization city
State	Organization state
Country	Organization country

4 Click **Download CSR** to generate a Certificate Signing Request (CSR) and download as a .csr file.

5 Sign the operational certificate with the BACnet/SC network's Certificate Authority using the downloaded CSR file. Keystore Explorer is one option for signing the certificate.

6 Click **Upload** to upload the CSR response file or new Trust Certificate - supports .pem, .cer, or .p7r.

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To replace a BACnet/SC network's Certificate Authority

If a Certificate Authority (CA) is expiring or has been compromised, every BACnet/SC device on the network must get an updated operational certificate signed by a new CA. In order to do this without losing connectivity to existing devices, you must load the new CA onto every device before removing the old CA from any device.

1 Create a new CA. If you are using self-signed certificates, see step **13** in *To create a BACnet/SC Certificate Authority using Keystore Explorer* (page 235).

2 On each device, add the new CA to the device by uploading the .cer file created in step **1**.

IMPORTANT Do not move on to step **3** until this has been done on every device on the network.

3 On each device, update the operational certificate by having it signed by the new CA and uploading the newly signed certificate to the device. You can use the device's original .csr file or create a new one. After uploading the newly signed certificate, check the certificate table to validate that the operational certificate's issuer now matches the description of the new CA that was uploaded in step **2**. See *To create or replace a BACnet/SC device's operational certificate* (page 222).

IMPORTANT Do not move on to step **4** until this has been done on every device on the network.

4 On each device, remove the old CA by clicking **Delete** beside it in the certificate table.

To monitor certificate expiration

BACnet/SC Certificate Expiration alarms will trigger whenever a BACnet/SC certificate in the i-Vu® Pro application or on the BACnet/SC Hub will expire within configured thresholds. See *Scheduled Tasks tab* (page 317) to configure these thresholds. When a certificate is within the warning threshold, the alarm repeats once per week. If a certificate is within the critical threshold, the alarm repeats every day and every operator will get a pop-up message when they log in.

TIPS:

- Create alarm actions to receive an email when a system error or system critical alarm is triggered.
- To turn off the login pop-up, click **Run Now** on scheduled task after resolving critical certificate problem.

Network security

Your i-Vu® Pro building automation system's controllers and server should be as secure as possible. However, achieving this security can be challenging because of the complexities of networks, firewalls, and virtual private networks (VPN's). Two means for increasing the security of your system are:

- While the i-Vu® Pro server was designed to be secure, BACnet is an open protocol that can pose risks for the controllers. The most secure system is one that is completely isolated from the Internet, but that is not always possible. The v6-02 or later drivers for Carrier controllers with Ethernet capability have a BACnet firewall feature that allows you to restrict communication with the controller to all private IP addresses and/or to a whitelist of IP addresses that you define. To set this up, go to the navigation tree > right-click the router > **Driver Properties** > **Bacnet Firewall**. Follow the instructions in the interface.
- You should use TLS (HTTPS, not HTTP) to secure the client device that you are using to connect to the i-Vu® Pro server. See *What is TLS (HTTPS)?* (page 224) for instructions on setting up TLS.

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For information on secure network configurations, options, and best practices, see the following documents on the Carrier support website.

- *Security Best Practices*
- *Security Letter*

What is TLS (HTTPS)?

The i-Vu® Pro application supports Transport Layer Security (TLS), a secure protocol used for transmitting private information over the Internet using HTTPS.
NOTE TLS is a more recent version of Secure Sockets Layer (SSL).

TLS uses a method called public-key cryptography to provide:

- Client/server authentication before transmitting data.
- Strong encryption of all data before it is transmitted over the TLS connection and decryption of the data upon receipt.

Public key cryptography uses keys and certificates to authenticate users. The keys and certificates are protected with a keystore password.

You have 2 options for creating a certificate. You can use:

- A certificate from a trusted Certificate Authority (CA). This option provides the most security because the CA performs the authentication. See *To set up TLS using a Certificate Authority (CA) certificate* (page 224).
- A self-signed certificate. This option is quicker and easier to set up, but is less secure. See *To set up TLS using a self-signed certificate* (page 229).

Keystore Explorer (page 233) is an open source, third-party tool that can be used to manage your certificates.

To set up TLS using a Certificate Authority (CA) certificate

NOTES

- TLS is a more recent version of Secure Sockets Layer (SSL).
- For a list of trusted Certificate Authorities consult your web browser's certificates documentation.

Step 1: Create a key and certificate

1 In SiteBuilder, select **Configure** > **Preferences** > **Web Server**.

2 Select **HTTPS Only** in the **Enabled Web Server Ports** field.

NOTE For quicker navigation, select **Both HTTP and HTTPS** if operators will connect to the system from an internal network and the Internet. Change the setting in the **HTTPS Port** field only if the system will be using a non-standard port.

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3 Click **Delete Certificate**.

CAUTION Clicking this button will delete all certificates in your system.

4 Click **Make Certificate**.

5 In the **Make Certificate** dialog box, type a **Keystore password**.

6 In the **DNS name of your server** field, type the address of the server using one of the following formats:

- The domain name if accessing through the Internet. Example: `www.abi.com`.
- The IP address if accessing through the Internet. Example: `216.227.49.36`.
- The computer name if accessing internally. Example: `mycomputerxp`.

NOTES

- The address format you use in this field is the format operators must use to access the system in a web browser.
- The entered names will be used as the **Subject Alt Names** in the certificate.
- You can enter more than one name. Separate the names by a comma and no spaces.

7 The next 5 fields are optional, but the more information you enter, the more secure your key is.

8 Click **Apply**.

9 In the **Keystore Password** field, type the password that you entered in step 5 above.

NOTE This field is case sensitive.

10 Click **OK**.

Step 2: Obtain a CA certificate

1 Create a Certificate Signing Request (CSR).

a) In the i-Vu® Pro server's **Start** menu, select **All Programs** > **Accessories** > **Command Prompt**.

b) Type the following command as a single line of text, replacing <x.x> with the system's version number:

```
C:\i-VuPro<x.x>\bin\java\jre\bin\keytool.exe -certreq -alias ivu -keystore
C:\i-VuPro<x.x>\webserver\keystores\certkeys -file
C:\i-VuPro<x.x>\webserver\keystores\request.csr
```

c) Press **Enter**. This creates a **request.csr** file located in `C:\i-VuProx.x\webserver\keystores`.

2 Get a certificate from a certificate authority (typically from their website). The CA will ask you to send a copy of the CSR file (**request.csr**). Or, the CA may ask you to paste the contents of the **request.csr** file into their website.

3 You will receive the following files from your CA. Copy these .cer files to the i-VuProx.x folder:

- A chain or root certificate
- One or more intermediate certificates (Not all CA's provide intermediate certificates.)
- A received certificate

See **NOTE** at the bottom of this topic.

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4 Import the root certificate.

a) In the i-Vu® Pro server's **Start** menu, select **All Programs** > **Accessories** > **Command Prompt**.

b) Type the following command as a single line of text, replacing <x.x> with the system's version number and `<root.cer>` with the name of the root certificate file:

```
C:\i-VuPro<x.x>\bin\java\jre\bin\keytool.exe -import -trustcacerts -alias
root -keystore C:\i-VuPro<x.x>\webserver\keystores\certkeys -file
\i-VuPro<x.x>\<root.cer>
```

c) Press **Enter**.

d) The information for the root key is displayed and you are prompted to trust this certificate. Type `yes`.

5 If the CA provided an intermediate certificate, import that certificate.

a) In Command Prompt, type the following command as a single line of text, replacing <x.x> with the system's version number and <intermediate.cer> with the name of the intermediate certificate file:

```
C:\i-VuPro<x.x>\bin\java\jre\bin\keytool.exe -import -trustcacerts -alias
intermed -keystore C:\i-VuPro<x.x>\webserver\keystores\certkeys -file
\i-VuPro<x.x>\<intermediate.cer>
```

b) Press **Enter**.

NOTE If the CA provided more than one intermediate certificate, repeat step 5 for each one. Replace `-alias intermed` with `-alias intermed1`, `-alias intermed2`, etc.

6 Import the received certificate.

a) In Command Prompt, type the following command as a single line of text, replacing <x.x> with the system's version number and `<received.cer>` with the name of the received certificate file:

```
C:\i-VuPro<x.x>\bin\java\jre\bin\keytool.exe -import -trustcacerts -alias
i-VuPro -keystore C:\i-VuPro<x.x>\webserver\keystores\certkeys -file
\i-VuPro<x.x>\<received.cer>
```

b) Press **Enter**.

NOTE If you are not sure which file is which certificate, double click each .cer file. Go to the **Certificate Path** tab. If you see:

- Only 1 entry, this is your root certificate.
- Multiple entries but the last one is your domain name, this is your received certificate.
- Multiple entries but the last one is not your domain name, this is an intermediate certificate.

Step 3: Install the certificate

Start the i-Vu® Pro Server application (this may take up to a minute), then do the appropriate steps below on each workstation that will access i-Vu Pro Server.

1 Start your browser.

2 In the address bar, type the URL of the server running the i-Vu® Pro application using the server address that you entered in *Step 1: Create a key and certificate* (page 224). Use the TLS indicator `https` instead of `http`. For example, `https://216.227.49.36`.

3 Do one of the following:

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- If the TLS certificate is valid and trusted by the browser, skip to *Step 4: Enable TLS in your web browser* (page 229).
- If the certificate is not valid or not trusted by the browser, follow the steps below for your browser.

Edge®

1. If the page displays **Your connection is not private**, follow the steps below.
2. Export certificate to a known location:
   a) Press **F12** to bring up the **Developer Tools** pane.
   b) Navigate to the **Security** tab, and then click **View Certificate**.
   c) On the **Details** tab, click **Copy to File**.
   d) In the **Certificate Export Wizard**, click **Next**.
   e) Choose an option, then click **Next**.
   f) Click **Browse**.
   g) In the **File Name** field, type a name for your export file.
   h) Click **Save**.
   i) Click **Next**.
   j) Click **Finish**.
   k) In the message box **The export was successful**, click **OK**.
   l) Click **OK** again.
   m) Press **F12** to close the **Developer Tools** pane.
3. Import saved certificate:
   a) Click ... on the browser toolbar, then select **Settings**.
   b) Click **Privacy, search, and services**, then click **Manage certificates**.
   c) On the **Trusted Root Certification Authorities** tab, click **Import**.
   d) In the **Certificate Import Wizard**, click **Next**.
   e) Click **Browse**, then select the file you exported in step 2.
   f) Click **Open**.
   g) Click **Next**.
   h) Select **Place all certificates in the following store**.
   i) Click **Browse**, then select **Trusted Root Certification Authorities**.
   j) Click **OK**.
   k) Click **Next**.
   l) Click **Finish**.
4. Click **Yes** in the **Security Warning** dialog box to install the certificate.
5. In the message box **Import was successful**, click **OK**.
6. Click **Close**.
7. Close Edge®, then open it again.
8. Log in to the i-Vu® Pro interface.

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Google™ Chrome™

1 If the page displays **Your connection is not private**, follow the steps below.

2 Export certificate to a known location:

a) Press **F12** to bring up the **Developer Tools** pane.

b) Navigate to the **Security** tab, and then click **View Certificate**.

c) On the **Details** tab, click **Copy to File**.

d) In the **Certificate Export Wizard**, click **Next**.

e) Choose an option, then click **Next**.

f) Click **Browse**.

g) In the **File Name** field, type a name for your export file.

h) Click **Save**.

i) Click **Next**.

j) Click **Finish**.

k) In the message box **The export was successful**, click **OK**.

l) Click **OK** again.

m) Press **F12** to close the **Developer Tools** pane.

3 Import saved certificate:

a) Click on the browser toolbar, then select **Settings**.

b) Click **Advanced**.

c) Scroll down to **Privacy and security**, then click **Manage certificates**.

d) On the **Trusted Root Certification Authorities** tab, click **Import**.

e) In the **Certificate Import Wizard**, click **Next**.

f) Click **Browse**, then select the file you exported in step 2.

g) Click **Open**.

h) Click **Next**.

i) Select **Place all certificates in the following store**.

j) Click **Browse**, then select **Trusted Root Certification Authorities**.

k) Click **OK**.

l) Click **Next**.

m) Click **Finish**.

4 Click **Yes** in the **Security Warning** dialog box to install the certificate.

5 In the message box **Import was successful**, click **OK**.

6 Click **Close**.

7 Close Chrome, then open it again.

8 Log in to the i-Vu® Pro interface.

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Mozilla® Firefox®

1 If the page displays **This Connection is Untrusted**, expand **I understand the Risks**, then click **Add Exception**.

2 Check **Permanently store this exception**.

3 Click **Confirm Security Exception**.

4 Close Firefox, then open it again.

5 Log in to the i-Vu® Pro interface.

Safari®

1 If the page displays the message, **Safari can't verify the identity of the website**, click **Show Certificate**.

2 Check **Always trust <DNS name you entered in SiteBuilder> when connecting to <i-Vu Pro Server address>**.

3 Click **Continue**.

4 Enter the administrator password for your Apple® device.

5 Click **Update Settings**.

Step 4: Verify that TLS is enabled in your web browser

The i-Vu® Pro application attempts to use TLS when communicating with a web browser. The web browser must be set up for TLS.

- Google™ Chrome™, Mozilla® Firefox®, and Safari® use TLS by default.
- In the Internet Explorer® security options:
  - Verify that **Use TLS 1.x** is checked.
  - Verify that **SSL 2.0** and **SSL 3.0** are not checked.

To set up TLS using a self-signed certificate

NOTE TLS is a more recent version of Secure Sockets Layer (SSL).

Step 1: Create a key and certificate

1 In SiteBuilder, select **Configure** > **Preferences** > **Web Server**.

2 Select **HTTPS Only** in the **Enabled Web Server Ports** field.

NOTE For quicker navigation, select **Both HTTP and HTTPS** if operators will connect to the system from an internal network and the Internet. Change the setting in the **HTTPS Port** field only if the system will be using a non-standard port.

3 Click **Delete Certificate**.

CAUTION Clicking this button will delete all certificates in your system.

4 Click **Make Certificate**.

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5 In the **Make Certificate** dialog box, type a **Keystore password**.

6 In the **DNS name of your server** field, type the address of the server using one of the following formats:

- The domain name if accessing through the Internet. Example: `www.abi.com`.
- The IP address if accessing through the Internet. Example: `216.227.49.36`.
- The computer name if accessing internally. Example: `mycomputerxp`.

NOTES

- The address format you use in this field is the format operators must use to access the system in a web browser.
- The entered names will be used as the **Subject Alt Names** in the certificate.
- You can enter more than one name. Separate the names by a comma and no spaces.

7 The next 5 fields are optional, but the more information you enter, the more secure your key is.

8 Click **Apply**.

9 In the **Keystore Password** field, type the password that you entered in step 5 above.

NOTE This field is case sensitive.

10 Click **OK**.

Step 2: Install the certificate

NOTE If you change the server address after you create and install your certificate (for example, change from an IP address to a domain name), you must create a new key and certificate using the new address, then install the new certificate.

Start the i-Vu® Pro Server application (this may take up to a minute), then do the appropriate steps below on each workstation that will access i-Vu Pro Server.

Edge®

1 If the page displays **Your connection is not private**, follow the steps below.

2 Export certificate to a known location:

a) Press **F12** to bring up the **Developer Tools** pane.

b) Navigate to the **Security** tab, and then click **View Certificate**.

c) On the **Details** tab, click **Copy to File**.

d) In the **Certificate Export Wizard**, click **Next**.

e) Choose an option, then click **Next**.

f) Click **Browse**.

g) In the **File Name** field, type a name for your export file.

h) Click **Save**.

i) Click **Next**.

j) Click **Finish**.

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k) In the message box **The export was successful**, click **OK**.

l) Click **OK** again.

m) Press **F12** to close the **Developer Tools** pane.

3 Import saved certificate:

a) Click ... on the browser toolbar, then select **Settings**.

b) Click **Privacy, search, and services**, then click **Manage certificates**.

c) On the **Trusted Root Certification Authorities** tab, click **Import**.

d) In the **Certificate Import Wizard**, click **Next**.

e) Click **Browse**, then select the file you exported in step 2.

f) Click **Open**.

g) Click **Next**.

h) Select **Place all certificates in the following store**.

i) Click **Browse**, then select **Trusted Root Certification Authorities**.

j) Click **OK**.

k) Click **Next**.

l) Click **Finish**.

4 Click **Yes** in the **Security Warning** dialog box to install the certificate.

5 In the message box **Import was successful**, click **OK**.

6 Click **Close**.

7 Close Edge®, then open it again.

8 Log in to the i-Vu® Pro interface.

Google™ Chrome™

1 Start Chrome.

2 In the address bar, type the URL of the server running the i-Vu® Pro application using the server address that you entered in *Step 1: Create a key and certificate* (page 224). Use `https` instead of `http`. For example, `https://216.227.49.36`.

3 If the page displays **Your connection is not private**, follow the steps below.

4 Export certificate to a known location:

a) Press **F12** to bring up the **Developer Tools** pane.

b) Navigate to the **Security** tab, and then click **View Certificate**.

c) On the **Details** tab, click **Copy to File**.

d) In the **Certificate Export Wizard**, click **Next**.

e) Choose an option, then click **Next**.

f) Click **Browse**.

g) In the **File Name** field, type a name for your export file.

h) Click **Save**.

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i) Click **Next**.

j) Click **Finish**.

k) In the message box **The export was successful**, click **OK**.

l) Click **OK** again.

m) Press **F12** to close the **Developer Tools** pane.

5 Import saved certificate:

a) Click on the browser toolbar, then select **Settings**.

b) Click **Advanced**.

c) Scroll down to **Privacy and security**, then click **Manage certificates**.

d) On the **Trusted Root Certification Authorities** tab, click **Import**.

e) In the **Certificate Import Wizard**, click **Next**.

f) Click **Browse**, then select the file you exported in step 2.

g) Click **Open**.

h) Click **Next**.

i) Select **Place all certificates in the following store**.

j) Click **Browse**, then select **Trusted Root Certification Authorities**.

k) Click **OK**.

l) Click **Next**.

m) Click **Finish**.

6 Click **Yes** in the **Security Warning** dialog box to install the certificate.

7 In the message box **Import was successful**, click **OK**.

8 Click **Close**.

9 Close Chrome, then open it again.

10 Log in to the i-Vu® Pro interface.

Mozilla® Firefox®

1 Start Firefox.

2 In the address bar, type the URL of the server running the i-Vu® Pro application using the server address that you entered in *Step 1: Create a key and certificate* (page 224). Use `https` instead of `http`. For example, `https://216.227.49.36`.

3 If the page displays **This Connection is Untrusted**, expand **I understand the Risks**, then click **Add Exception**.

4 Check **Permanently store this exception**.

5 Click **Confirm Security Exception**.

6 Close Firefox, then open it again.

7 Log in to the i-Vu® Pro interface.

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Safari®

1 If the page displays the message, **Safari can't verify the identity of the website**, click **Show Certificate**.

2 Check **Always trust <DNS name you entered in SiteBuilder> when connecting to <i-Vu Pro Server address>**.

3 Click **Continue**.

4 Enter the administrator password for your Apple® device.

5 Click **Update Settings**.

Step 3: Verify that TLS is enabled in your web browser

The i-Vu® Pro application attempts to use TLS when communicating with a web browser. The web browser must be set up for TLS.

- Google™ Chrome™, Mozilla® Firefox®, and Safari® use TLS by default.
- In the Internet Explorer® security options:
  - Verify that **Use TLS 1.x** is checked.
  - Verify that **SSL 2.0** and **SSL 3.0** are not checked.

Step 4: Periodically change the password

You may want to periodically change the keystore password as an extra precaution. To do this, you must delete your existing certificate and create a new one. Follow the procedure in *Step 1: Create a key and certificate* (page 224).

To set up Keystore Explorer

Keystore Explorer is an open source, third-party tool that replaces working with the JAVA™ keytool on the command line. Follow the directions below to set up Keystore Explorer for WebServer and BACnet/SC Certificates. These instructions are for Keystore Explorer 5.4. Versions after 5.4 may have variations to the steps described in this document.

To download and install Keystore Explorer

NOTE The instructions in the following sections apply to Keystore Explorer 5.5.0 or later.

1 Ensure you have the required version of Java. Java Runtime Environment (JRE) Version 8 or above is required. You may obtain Java from the following sources.

   ○ https://www.java.com/en/download/ *requires oracle technology network license agreement

   ○ https://adoptopenjdk.net/releases.html *open source option

2 Download Keystore Explorer from https://keystore-explorer.org.

3 Follow the directions in the Keystore Explorer user manual for installation and use. The user manual can be found on the same site as the download files.

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To set up a web server with Keystore Explorer

There are two methods available for setting up a web server using Keystore Explorer. You can use either of the following:

- *Certificate Singing Request* (page 234)
- *Provided certificates (.pfx)* (page 235)

To set up a web server using Certificate Signing Request

For a web server to use HTTPS, it must have a TLS certificate signed with a standard trusted certificate authority (CA). This section describes how to take the generated self signed certificate, generate a CSR, and import the response from the CA.

Prerequisites

- An account with a Certificate Authority
- Webserver configured for HTTPS with self-signed certificate. See *To set up TLS using a self-signed certificate* (page 229).
- The keystore password that was used to setup the self-signed certificate

1 Open the Webserver Keystore

a) In Keystore Explorer, click **File** > **Open**, and browse to <WebServer Install>\webserver\keystores.

b) Select **certkeys**, and then click **Open**.

c) Enter the keystore password.

d) Click **Entry Name**, and select **webctrl**.

2 Generate CSR (Certificate Signing Request)

A CSR is a text file signed with your private key.

a) Right-click **webctrl,** and select **Generate CSR**.

b) Enter the keystore password.

c) Copy and save the path in **CSR File**. This is where the CSR file will be written and you will need it later.

d) Check with your CA for any additional required fields, for example, Challenge, Optional Company Name, or Signature Algorithm. Defaults are set for most common options.

3 Import the CSR File

a) Send the CSR File to your Certificate Authority. Your CA Authority may accept requests by email attachment, or provide a portal where you can upload the file.

b) Save the CA reply file the CA provides to your computer.

c) Open the webserver keystore, click **Entry Name**, and select **webctrl**.

d) Right-click and select **Import CA Reply" (From File)**.

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e) Save the keystore.

f) Restart the webserver.

To setup a web server using provided certificates (.pfx file)

Prerequisites

- A Certificate Archive with private key, .pfx file, .jks file, .pcks12
- The password for the archive and private key.

Create certkeys file from certificate archive.

1 Click **Open** > **File** and select the .pfx file containing certificates.

2 Enter the keystore password.

3 Click **Tools** > **Change Keystore Type** and select **PKCS12**.

4 Enter the keystore password.

5 Click **File** > **Save As** and save the files as "certkeys". **Type** must be "All Files" with no file suffix.

6 Select the private key entry.

7 Right-click and select **Rename**.

8 Enter alias `webctrl`.

9 Save the file.

10 Move the new certkeys file into "<Install Directory>\webserver\keystores".

11 Replace the existing certkeys file with the new certkeys file.

Configure keystore password using Sitebuilder

1 Open Sitebuilder™.

2 Click **Configure** and then select **Web Server**.

3 Set keystore password to the password used to create the certkeys file.

4 Restart the WebServer.

To create a BACnet/SC Certificate Authority using Keystore Explorer

Use Keystore Explorer to create a Certificate Authority (CA) to sign BACnet/SC certificates for the devices on a BACnet/SC network.

NOTE We recommend creating a separate keystore for each network, each with its own password.

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1 Create a new keystore by clicking **Create a Keystore** from the Quick Start menu or by clicking the **New** icon in the tool bar.

2 Select keystore type **PKCS#12**.

3 Click **File** > **Save** to save the keystore as a ".pkcs12" file.

4 Click **Tools** > **Generate Key Pair**.

5 Select one of the following algorithms, set the associated fields as indicated below, then click **OK**.

Algorithm	Fields
EC (recommended)	○ **Set**: SEC ○ **Named Curve**: secp256r1
RSA	○ **Key Size**: 2048

6 Set the **Validity Period**, and then click **Apply**. We recommend a minimum of 20 years. See *To replace a BACnet/SC network's Certificate Authority* (page 223).

TIP Set **Validity Start** to a previous date to avoid potential time zone issues.

7 Click the **Edit** icon beside the **Name** field to complete the Name fields with appropriate values for the site and customer.

8 Click **Add Extensions** > **Use Standard Template**, select **CA**, then click **OK**.

9 Click **OK** on the **Add Certificate Extensions** dialog.

10 Click **OK** on the **Generate Key Pair Certificate** dialog.

11 In **Enter Alias**, enter a meaningful alias that identifies the owner of the signing certificate and how it is to be used, then click **OK**.

12 Set a key pair password. We recommend giving each CA its own unique password.

13 If this new CA will be used to replace an existing CA on a BACnet/SC network, export the new CA's certificate:

a) Right click on the CA and select **Export** > **Export Certificate Chain**.

b) On the **Export Certificate Chain** dialog choose:

1. **Export Length**: Head Only
2. **Export Format**: X.509
3. **PEM**: select checkbox
4. **Filename**: Enter path and filename. File extension should remain .cer

To sign a BACnet/SC certificate signing request using Keystore Explorer

A BACnet/SC network requires each device to have a unique operational certificate signed by a common Certificate Authority (CA). You can use Keystore Explorer to sign an operational certificate using an existing CA.

1 Open the keystore containing the CA you wish to use.

2 Right-click on the CA and select **Sign** > **Sign CSR**.

3 Select the CSR file to sign. For example, "cert.csr".

4 On the **Sign CSR** dialog:

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1. Select the desired **Validity Period** on the **Sign CSR** dialog, and then click **Apply**.

   NOTE When choosing a validity period, consider that this process will have to be repeated whenever certificates expire. See *To create or replace a BACnet/SC device's operational certificate* (page 222) to replace this certificate when it expires.

   TIP Set **Validity Start** to a previous date to avoid potential time zone issues.
2. Click **Add Extensions**.
3. Click **Use Standard Template**.
4. Select **SSL Server**, then click **OK**.
5. Select the **Extended Key Usage** extension and click to select **TLS Web Client Authentication**. **TLS Web Server Authentication** should already be selected, do not deselect it. Click **OK**, then click **OK** on the **Add Certificate Extensions** dialog.
6. On the **Sign CSR** dialog, click **OK**.
7. On the **Export Certificate Chain** dialog, set the fields as indicated below, then click **Export**.
   - **Export Length**: Select **Entire Chain**
   - **Export Format**: Select **X.509**
   - **Export File**: Set the path and filename where the signed certificate (.cer) file will be created.

Setting up i-Vu® Open or i-Vu® XT/TruVu devices in the i-Vu® Pro application

These procedures differ for CCN devices. See *Setting up CCN devices in the i-Vu® Pro application* (page 244).

From the system level in the navigation tree, select **Devices** page > **Manage** tab to:

- *Search the network to populate the system with BACnet routers and controllers* (page 237)
- *Upload control programs, drivers, graphics, and screen files* (page 237)
- *Build, edit, and arrange the navigation tree for the* **User** *view* (page 265)
- *Perform downloads to individual or multi-selected controllers* (page 296)

Find and upload routers and controllers

1. Select the System in the navigation tree.
2. On the **Devices** page > **Manage** tab, click **Find Devices** to discover your routers.
3. Once routers are found, select one router at a time in the left-hand navigation tree and click **Find Devices** again.

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4 Once controllers are found, you must upload content from the routers and controllers. Select one or more in the list on the **Manage** tab and click **Upload All Content** to upload drivers, graphics, touch files, and control programs to the i-Vu® Pro application. Use **Ctrl+click**, **Shift+click**, or both to select multiple items.

NOTE If **Show Control Programs** is checked, all control programs are listed. If you have multiple control programs in one controller, you will see every control program in the list. If it is not checked, the list only shows the individual controllers and their model. The same information is uploaded, this option just controls what you see on the **Manage** tab and you can switch at will.

5 Click **OK** when you see the message **This will upload all content for the controller. Are you sure you want to do this?**. When complete, a check mark under **Status** indicates a successful upload.

NOTES

- If an error message appears, click on the message to view an explanation.
- Uploading can be time consuming, especially for multiple controllers. You may want to create the navigation tree for the **User** view while waiting. See *Create navigation tree.* (page 265)
- The MAC address shows to the left of the controller name in the **Installer** navigation tree only. Controllers may show multiple equipment listings with the same MAC address, based on control programs downloaded from EquipmentBuilder or Snap.
- To view the driver names after uploading, select the **Advanced** tab or right-click the controller in the navigation tree and select **Driver Properties** or **Module Status**.

TIPS

- Click the **i** symbol in the upper left corner to display the status of the latest operation.
- Status messages are color coded as follows:
  - Red - reports an error
  - Blue - requires action
  - Green - indicates an upload or download is in process

Verify network and device settings

CAUTION The i-Vu® Pro application automatically assigns a **BACnet Network IP number** and the **Server Device Id** for the application. Do **not** change these addresses unless absolutely necessary!

NOTE If you have more than 99 routers, you must set your own addresses.

To change an address:

1 Select the system, a router, or the USB network in the navigation tree and then go to the **Devices** page > **Advanced** tab.

2 Click **Accept** after making changes.

Verify and edit the following fields only as necessary.

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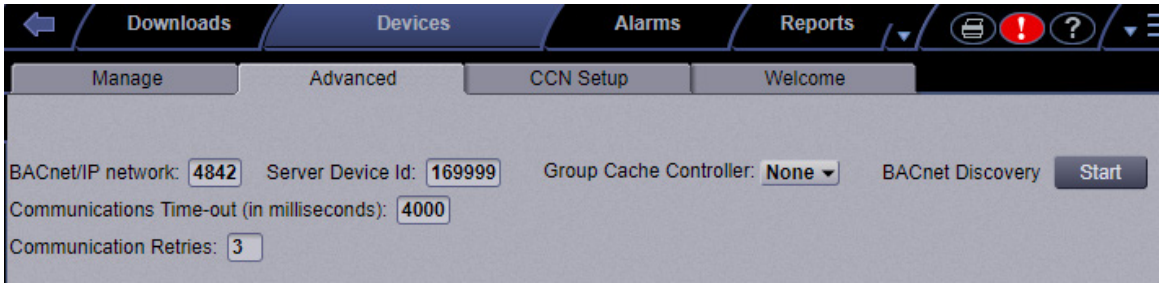
System level

- **BACnet/IP network** — default is 1600 (The maximum number allowed is 65,534)

  NOTE Typically, you should not need to change this.

- **Server Device Id** — address of the i-Vu® Pro web server (default is 169999)
- **Communications Time-out (in milliseconds)** — increase this value only if downloads to controllers or routers fail with communication time-out errors.
- **Communication Retries** — default is 3
- **Group Cache Controller** — select the peer caching router. See *To set up peer caching for details* (page 301).
- **BACnet Discovery —** locates all accessible BACnet networks, BACnet devices, and BACnet objects on a BACnet network. Typically used to integrate BACnet third-party devices into the i-Vu® Pro system. See *To discover third-party BACnet networks, devices, and objects* (page 263).



Router level

- **Router to Arcnet network** and **Auto-Assign**
- **Router to MS/TP network** and **Auto-Assign**
- **Device Identifier**

USB Network

- **Baud Rate** - recommended rate is 76,800
- **Router to Network**

Working with control programs

You can use EquipmentBuilder or Snap to create your control programs (.equipment files).

- EquipmentBuilder can also produce a graphic (.view file), BACview® file, touchscreen file, and a sequence of operation based on the equipment options you select.
- If using Snap, you must create your graphics separately in ViewBuilder. See Snap Help for detailed instructions on creating a custom control program.

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You can reload a revised control program located in **webroot**<system>**\programs**. On the i-Vu® Pro navigation tree, right-click the equipment, then select **Reload Control Program**. Reloading updates all instances of a control program throughout the system and marks the controller(s) for an All Content download.

See *Add or delete a custom control program* (page 242). After changing the control program, you **must** *Download All Content* (page 296) to the controller.

NOTE If you change a control program in the Snap application and it does not display correctly in the i-Vu® Pro interface, **Ctrl**+**right-click** the i-Vu® Pro action pane, and then select **Refresh**.

Reload, create, or edit a control program in EquipmentBuilder or Snap

If the control program has already been uploaded to the i-Vu® Pro application and loaded into the programmable controller, you must save it to your computer to be able to edit it in EquipmentBuilder or Snap.

To reload a control program

In the navigation tree, right-click the controller and select **Reload Control Program**. Reloading updates all instances of a control program throughout the system and marks the controller(s) for an All Content download.

To create your control program in EquipmentBuilder

1. Start EquipmentBuilder. (Windows **Start** > **All Programs** > **i-Vu Tools x.x**)
2. Click **Create Equipment** and then click **Next**.
3. Select the .sal library from the **Library:** drop-down list.
4. Select the equipment type from the list and click **Next**.
5. In the **Equipment Name** field, edit the name, if desired.

   NOTE Your name must not exceed 21 characters.
6. Select options on the **Summary** tab and, if applicable, edit setpoints on the **Sequence** tab.

   NOTE The **Points** and **Sequence** tabs change based on your choices on the **Summary** tab.
7. Click **Next**.
8. Check the files you wish to generate from the list.
9. Check to select saving your control program files to a folder of your choice or a folder linked to a system.
10. Click **Next**.

To save the control program you want to edit

1. Double-click the programmable controller in the navigation tree, or right-click and select **Configure**.
2. Select the control program you want to edit in the **Control Program** drop-down list.
3. Click **Edit Existing** in the **Control Programs** box. A new dialog window appears.
4. Save the file to a location of your choice.
5. Click **Close**.

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To edit the control program in EquipmentBuilder or S**nap**.

1 Click Windows **Start** < **All Programs** > **i-Vu Tools x.x** > **EquipmentBuilder** or S**nap**.

2 In EquipmentBuilder, click **Open Equipment** or, in Snap, select **File** > **Open**.

3 Open the .equipment file that you saved and edit it.

4 Save your revised control program with a different name.

5 Open the i-Vu® Pro application.

6 Double-click the programmable controller in the navigation tree, or right-click and select **Configure**.

7 Click **Add New** in the **Control Programs** box. A new dialog window appears.

8 Browse to your edited control program and click **Continue**. When message appears **File added successfully**, click **Close.**

9 Click **Close** again.

NOTE If you change a control program in the Snap application and it does not display correctly in the i-Vu® Pro interface, **Ctrl**+**right-click** the i-Vu® Pro action pane, and then select **Refresh**.

Apply these changes to the controllers

1 Select the router in the navigation tree.

2 On the **Devices** page > **Manage** tab, select any controllers with a **File Mismatch** error message. (**CTRL+click** or **Shift-click** to multi-select.)

3 Right-click and select **Download All Content**. You now have the updated control programs, graphics, drivers, and screen files in your routers and controllers.

To change the control program for all controllers of one type when adding new controllers

1 Select the **Devices** page > **Manage** tab

2 To upload one or more controller's graphics, screen files, and control programs, select one or more controller (**Shift-click** or enable **Select all)** and click the **Upload** button.

To change the control program for all controllers of one type when updating the current library

See *Update the equipment library* (page 322).

NOTE If you change a control program and it does not display correctly in the i-Vu® Pro interface, **Ctrl**+**right-click** the i-Vu® Pro action pane, and then select **Refresh**.

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Add or delete a custom control program and graphic

To save time when testing custom control programs, you can use **DEBUG MODE** (page 176) in the i-Vu® Pro interface for one controller at a time.

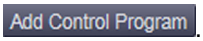
CAUTION Never leave your i-Vu® Pro system without unchecking DEBUG MODE first and then downloading all content. The source files are not in the controller until you complete both steps.

To add a new control program to a programmable controller

1 Select the router in the navigation tree.

2 Select **Devices** > **Manage** tab.

3 Select the controller in the list on the page.

4 If you are adding a new control program, click the **Add Control Program** button 

. A dialog window appears.

5 Enter a name for your control program in **Display Name** and select your controller in the **Controller** drop-down list.

NOTES

- If you already have the maximum number of control programs for a controller, it will not appear in the list.
- Optional: You can change the control program's **Reference Name** if needed.

6 Do one of the following:

If the control program is...	
In the **Control Program** drop-down list	a. Select the control program. b. Click **Accept**.
Not in the **Control Program** drop-down list	a. Click **Add New**. b. Browse to select the control program. c. Click **Open**. d. Click **Continue**. e. Click **Close**. f. Click **Accept**.

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7 To upload a graphic, do one of the following:

If the graphic is...	
In the **Views Available** list	a. Select the graphic, then click **Attach**. b. Click **Accept**.
Not in the **Views Available** list	a. Click **Add New**. b. Browse to select the view file. c. Click **Open**. d. Click **Continue**. e. Click **Close**. f. Click **Close** again.

8 Right-click on the programmable controller in the controller list and select **Check Status** from the list. The status of the controller should say **File Mismatch**.

9 Click the **Download All Content** (page 296) button.

NOTE If you need to edit the **Object Instance**, right-click the control program in the navigation tree and then select **Configure**. Click next to the field for additional information.

To delete a single control program in a programmable controller

1 Select the router in the navigation tree.

2 Right-click the the desired controller/control program in the list on the **Devices** page > **Manage** tab and click **Delete Selected** from the list.

3 The message appears **Do you wish to remove a controller and all its descendants?** Click **OK**.

IMPORTANT! The process is not finished until you complete the following steps.

4 Highlight the programmable controller in the controller list again, and select **Check Status**. The status of the controller should say **File Mismatch**.

5 Click **File Mismatch** and click the **Download** button. This deletes the files from the controller.

To delete all control programs in a programmable controller

1 Select the router in the navigation tree.

2 Right-click the desired controller/control program in the list on the **Devices** page > **Manage** tab and select **Delete Programs**. Click **OK** when the following message appears **This will delete all programs in this controller. Are you sure?**

IMPORTANT! The process is not finished until you complete the following steps.

3 Highlight the programmable controller in the controller list again, and select **Check Status**. The status of the controller should say **File Mismatch**.

4 Click **File Mismatch** and click the **Download** button. This deletes the files from the controller.

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To edit a control program on an i-Vu® client

On an i-Vu® client, you can get a copy of a control program from the server, edit it, then put it back on the server.

To get the control program

1 In the navigation tree, right-click the equipment, then select **Configure**.

2 In the **Control Programs** section, click **Edit Existing**.

3 Click **Save**.

4 Browse to the folder you want to put the file in.

5 Click **Save**.

6 Click **Close**.

7 Click **Close** again.

To put the edited control program back on the server

1 In the navigation tree, right-click the equipment, then select **Configure**.

2 In the **Control Programs** section, click **Add New**.

3 Browse to select the control program.

4 Click **Open**.

5 Click **Continue**.

6 Click **Close**.

7 Click **Close** again.

Setting up a CCN devices in the i-Vu® Pro application

If your CCN system has...	You must...
A single CCN Gateway	*Use the i-Vu® Pro application to find and download the Gateway and system* (page 245)
An i-Vu® Integrator	Add it in SiteBuilder, even if it is the only CCN Gateway. See "To add an i-Vu® Integrator" in SiteBuilder Help.

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If your CCN system has...	You must...
Multiple CCN Gateways without a NAT router	**1** In the SiteBuilder Network tree, add one site with one BACnet/IP network for each Gateway. **2** In the i-Vu® Pro interface, discover all the Gateways, Bridges, and controllers. **NOTES** • You must have the Multi-CCN license for this feature to work. • Supports up to 50 CCN Gateways in one system • Every Gateway must be Bus 0. • Every BACnet/IP Network Number must be the same.
Multiple CCN Gateways with a NAT router	**1** In SiteBuilder, configure the NAT information. **2** In the Network tree, add one site with one BACnet/IP network per Gateway. **3** Add one CCN Gateway and all its Bridges to each site you set up. **4** In the i-Vu® Pro application, discover the rest of your controllers under the Bridges. **NOTES** • You must have the Multi-CCN license for this feature to work. • Supports up to 50 CCN Gateways in one system • Every Gateway must be Bus 0. • Every BACnet/IP Network Number must be the same.

NOTE On the **System Options** > **System Settings** > **General** tab, you can check to **Use metric units for CCN tables and control programs**.

To find and download devices in a single CCN Gateway system

If you are using:

- A Carrier® ChillerVu™ as a CCN device, follow all of the steps on this page
- An i-Vu® CCN Router or i-Vu® Link, start with **Connect to a CCN system**

Connect to a Carrier® ChillerVu™

1. In the navigation tree, from the system level, go to the **Devices** page > **Manage** tab.
2. Click **Find Devices**.
3. Select the Carrier® ChillerVu™ in the list on the **Manage** tab and click **Upload All Content**.

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4 You must set the Carrier® ChillerVu™ to be the Gateway or Bridge.

a) Right-click the router, select **Driver Properties**.

b) Expand **Protocols** and select **CCN**.

c) Select the correct baud from drop-down list.

d) If it is the Gateway, select **CCN Gateway** for **Device Type**. If it is a Bridge, select **CCN Bridge**.

e) Fill in **Element** number.

5 Continue with the steps below.

Connect to a CCN system

1 In the i-Vu® Pro interface, select the system in the navigation tree.

2 On the **Devices** page > **CCN Setup** tab, enter your CCN Gateway IP address and click **Connect to Gateway**.

NOTE If the server has more than 1 NIC, type the IP address the server will use to connect to controllers.

3 After connecting to the Gateway, select it in the navigation tree.

4 On the **Devices** page > **CCN Discovery** tab, verify that **Discover Tables** is checked.

NOTE The scanning time for discovering tables increases based on the number of devices. You may choose to discover tables at a later time for a faster scan.

5 Enter the **Bus** and **Element** ranges that encompass all your devices.

NOTE Depending on your number of devices, it could be faster to scan several small ranges.

6 Click **Start Scan**. When the process is complete, a message appears showing the number of control programs found.

NOTES

- If the scan does not begin, wait a minute and try again. There may be a delay when first starting the system.
- If an error message appears, click on the message to view an explanation.

7 Click **Download CCN** to download the control programs, drivers, and parameters.

NOTE This process can be time consuming. While waiting, you may want to create the navigation tree for the **User** view. See *Create navigation tree.* (page 265)

8 If you have programmable controllers and want to add a .equipment file made in EquipmentBuilder or Snap, see *Assign and download a custom equipment file* (page 251).

TIPS

- indicates you need to download the device by clicking **Download CCN**.
- Click to view a log of activity on the **Devices** page in the current session. **Copy to Clipboard** lets you copy the text to paste it into another application.
- Status messages are color coded as follows:
  - Red - reports an error
  - Blue - requires action
  - Green - indicates an upload or download is in process

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To set up a system for multiple CCN Gateways

You MUST have a Multi-CCN license to use this feature. We recommend not exceeding 50 CCN Gateways in one system.

The following is an overview of features and requirements for an i-Vu® Pro system with multiple CCN Gateways. You can see more details in the Help for individual topics.

SiteBuilder application

- You must set up one site and one BACnet over/IP network for each and every Gateway.
- The BACnet/IP number must be the **same** for all Gateways.
- You can use copy and paste to duplicate your sites and networks. However, if you use this function, it's essential that you manually open each network dialog and change the BACnet/IP number.
- Every Gateway must be Bus 0.
- You can import a clipping that results in multiple CCN sites.
- If using a NAT router, different procedures apply. See SiteBuilder Help.
- There is a new field to enter the NAT port used for CCN communications.

i-Vu® Pro application

- Sites are listed in the Installer navigation tree.
- The **Devices** > **CCN Setup** tab is at the site level and not the system level
- You can import a clipping that results in multiple CCN sites.
- You can manage the CCN/IP settings from the site level on the **CCN Setup** tab.
- On the CCN Setup page, you can enter the server's IP address. if the server has more than 1 NIC.
- If using a NAT router, the NAT address and port for the server and gateway are displayed on both the:
  - Device's **Driver Properties** page
  - **CCN Setup** tab
- To change CCN addresses, use the Network Service Tool.
- **Devices** > **CCN Discovery** tab
  - You discover devices from the Gateway level and not the system level. You can start the scanning process for one, select another Gateway in the naviagation, and start the scan for that one also. You can run several scans simultaneously.

See detailed instructions *To find and download i-Vu® CCN routers in a multiple CCN Gaeway system* (page 248) or *To set up the Carrier® ChillerVu™ in a multiple CCN Gateway system* (page 249).

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To find and download i-Vu® CCN routers in a multiple CCN Gateway system

Prepare your system in SiteBuilder

For details on the following procedures and information about using a NAT router with multi-CCN, see SiteBuilder Help.

1 In SiteBuilder, select **File** > **New** to create a new system database.

2 In the **Network** tree, right-click the system and add a site.

3 Right-click the site and add a BACnet/IP network

4 Repeat adding sites and a network for each Gateway in your system.

NOTE Every BACnet/IP network **MUST** be the same number throughout the system.

5 Close SiteBuilder.

If you have a Gateway or Bridge that is a Carrier® ChillerVu™ or the i-Vu® Integrator:

- See *To st up the Carrier® ChillerVu™* (page 249).
- See SiteBuilder Help to set up an i-Vu® Integrator. Then, in the i-Vu® Pro application, follow steps 4 - 8.

The i-Vu® Pro application

1 After setting up the sites and networks in SiteBuilder, use the i-Vu® Pro application to discover the Gateways, Bridges, and controllers.

2 Select a site in the navigation tree and go to **Devices** > **CCN Setup** tab.

3 Enter your CCN Gateway IP address and click **Connect to Gateway**. When complete, the parameters appear below the Gateway's IP address.

NOTE You can edit the Server IP Address on the **CCN Setup** tab before the Gateway is discovered. This is important for systems with multiple NICs.

4 After connecting to the Gateway, select it in the navigation tree.

5 On the **Devices** page > **CCN Discovery** tab, verify that **Discover Tables** is checked.

NOTE The scanning time for discovering tables increases based on the number of devices. You may choose to discover tables at a later time for a faster scan.

6 Enter the **Bus** and **Element** ranges that encompass all your devices under that Gateway.

NOTES

- In a system with multiple Gateways, every Gateway must be Bus 0.
- Depending on your number of devices, it could be faster to scan several small ranges.

7 Click **Start Scan**. When the process is complete, a message appears showing the number of control programs found.

NOTES

- You can leave this page and the discovery continues.
- If you have already set up multiple sites, you can select them one at a time in the navigation tree and start the scanning process for each. They can run simultaneously, even though you have to start the scan for each site separately.

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- If the scan does not begin, wait a minute and try again. There may be a delay when first starting the system.
- If an error message appears, click on the message to view an explanation.

8 You must Download after the scan is complete, to download the control programs, drivers, and parameters. Use either of the following methods:

- On the **Downloads** page, from the system level, all of the Gateways and Bridges appear in the list as they are discovered. You can multi-select, click **Start** and download them all at the same time.
- On the **Devices** page > **CCN Discovery** tab, one site at a time, click **Download CCN** after CCN devices have been scanned and appear in the list on the page.

NOTE This process can be time consuming. While waiting, you may want to create the navigation tree for the **User** view. See *Create navigation tree.* (page 265)

TIPS

- indicates you need to download the device by clicking **Download CCN**.
- Click to view a log of activity on the **Devices** page in the current session. **Copy to Clipboard** lets you copy the text to paste it into another application.
- Status messages are color coded as follows:
  - Red - reports an error
  - Blue - requires action
  - Green - indicates an upload or download is in process

To set up the Carrier® ChillerVu in a multiple CCN Gateway system

Only the i-Vu® Pro application v6.5 and later supports multiple CCN Gateways.

CAUTION When the Carrier® ChillerVu™ is a CCN Gateway (the default from the factory is a Bridge), it must be discovered differently than other i-Vu® CCN routers.

Prepare your system in SiteBuilder

For details on the following procedures and information about using a NAT router with multi-CCN, see SiteBuilder Help.

1 In SiteBuilder, select **File** > **New** to create a new system database.

2 In the **Network** tree, right-click the system and add a site.

3 Right-click the site and add a BACnet/IP network

4 Repeat adding sites and a network for each Gateway in your system.

NOTE Every BACnet/IP network **MUST** be the same number throughout the system.

5 Close SiteBuilder.

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The i-Vu® Pro application

1 After setting up the sites and networks in SiteBuilder, use the i-Vu® Pro application to discover the Gateways, Bridges, and controllers.

2 In the navigation tree, select the site where you want the Carrier® ChillerVu™ discovered and go to the **Devices** page > **Manage** tab.

3 Click **Find Devices**.

4 Select the Carrier® ChillerVu™ in the list on the **Manage** tab and click **Upload All Content**

5 You must set the Carrier® ChillerVu™ to be the Gateway or Bridge.

a) Right-click the router, select **Driver Properties**.

b) Expand **Protocols** and select **CCN**.

c) Select the correct baud from drop-down list.

d) If it is the Gateway, select **CCN Gateway** for **Device Type**. If it is a Bridge, select **CCN Bridge**.

e) Fill in **Element** number.

6 Select a site in the navigation tree and go to **Devices** > **CCN Setup** tab.

7 Enter your CCN Gateway IP address and click **Connect to Gateway**. When complete, the parameters appear below the Gateway's IP address.

NOTE You can edit the Server IP Address on the **CCN Setup** tab before the Gateway is discovered. This is important for systems with multiple NICs.

8 After connecting to the Gateway, select it in the navigation tree.

9 On the **Devices** page > **CCN Discovery** tab, verify that **Discover Tables** is checked.

NOTE The scanning time for discovering tables increases based on the number of devices. You may choose to discover tables at a later time for a faster scan.

10 Enter the **Bus** and **Element** ranges that encompass all your devices under that Gateway.

NOTES

- In a system with multiple Gateways, every Gateway must be Bus 0.
- Depending on your number of devices, it could be faster to scan several small ranges.

11 Click **Start Scan**. When the process is complete, a message appears showing the number of control programs found.

NOTES

- You can leave this page and the discovery continues.
- If you have already set up multiple sites, you can select them one at a time in the navigation tree and start the scanning process for each. They can run simultaneously, even though you have to start the scan for each site separately.
- If the scan does not begin, wait a minute and try again. There may be a delay when first starting the system.
- If an error message appears, click on the message to view an explanation.

12 You must Download after the scan is complete, to download the control programs, drivers, and parameters. Use either of the following methods:

- On the **Downloads** page, from the system level, all of the Gateways and Bridges appear in the list as they are discovered. You can multi-select, click **Start** and download them all at the same time.
- On the **Devices** page > **CCN Discovery** tab, one site at a time, click **Download CCN** after CCN devices have been scanned and appear in the list on the page.

NOTE This process can be time consuming. While waiting, you may want to create the navigation tree for the **User** view. See *Create navigation tree.* (page 265)

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TIPS

- indicates you need to download the device by clicking **Download CCN**.
- Click to view a log of activity on the **Devices** page in the current session. **Copy to Clipboard** lets you copy the text to paste it into another application.
- Status messages are color coded as follows:
  - Red - reports an error
  - Blue - requires action
  - Green - indicates an upload or download is in process

To assign and download a custom CCN equipment file

To add a custom control program to the list of available programs:

1 In the i-Vu® Pro navigation tree, right-click the controller you want to associate the equipment or control program with.

2 Either double-click the controller in the navigation tree, or right-click and select **Configure** in the list.

3 Enter the **Display Name**.

4 To add a control program to the list of possible .equipment files in i-Vu® Pro, do one of the following:

If the control program is...	
In the **Control Program** drop-down list	a. Select the control program that you generated in EquipmentBuilder or Snap. b. Click **Accept**.
Not in the **Control Program** drop-down list	a. Click **Add New**. b. Browse to select the equipment file. c. Click **Open**. d. Click **Continue**. e. Click **Close**. f. Click **Close** again.

5 To add a graphic, do one of the following:

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If the graphic is...	
In the **Views Available** list	a. Select the graphic, then click **Attach**. b. Click **Accept**.
Not in the **Views Available** list	a. Click **Add New**. b. Browse to select the view file. c. Click **Open**. d. Click **Continue**. e. Click **Close**. f. Click **Close** again.

6 When finished, select the Gateway in the navigation tree and select the **Devices** page.

7 Click **Download CCN** to finalize your changes.

For additional pieces of equipment controlled by your Universal Controller/Comfort Controller (expansion controllers)

1 In the navigation tree, select the device manager that the controller is associated with.

2 Select the **Devices** page and click **Add Control Program**.

3 Enter the **Display Name**.

4 Select the controller or Gateway that you want to associate the new equipment with. If you select **CCN Controller**, enter the Bus and Element number of the controller.

5 Do one of the following:

If the control program is...	
In the **Control Program** drop-down list	a. Select the control program that you generated in EquipmentBuilder. b. Click **Accept**.
Not in the **Control Program** drop-down list	a. Click **Add New**. b. Browse to select the view file. c. Click **Open**. d. Click **Continue**. e. Click **Close**. f. Click **Close** again.

6 Add a graphic or, if finished, select the Gateway in the navigation tree and, on the **Devices** page, click **Download CCN** to finalize your changes.

7 To add a graphic, do one of the following:

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If the graphic is...	
In the **Views Available** list	a. Select the graphic. b. Click **Accept**.
Not in the **Views Available** list	a. Click **Add New**. b. Browse to select the view file. c. Click **Open**. d. Click **Continue**. e. Click **Close**. f. Click **Close** again.

8 When finished, select the Gateway in the navigation tree and, on the **Devices** page, click **Download CCN** to finalize your changes.

To view an equipment's CCN tables

1 In the navigation tree, select the equipment.

2 Click next to the equipment to expand it.

3 Select the table you want to view.

Working with Universal and Comfort Controllers (CCN)

Universal Controllers (UC) and Comfort Controllers (CC) are assigned a generic equipment and view file, which have setpoint control, but no additional pre-mapped I/O. To generate additional I/O points for graphic display, you must use EquipmentBuilder to create custom equipment files that support your application. These files map the CCN variables to i-Vu® BACnet points.

In EquipmentBuilder, you can create **CCN Values Only**, **Read Integration**, or **Link Integration** custom equipment for UC/CC's that are tailored for your specific application.

EquipmentBuilder can also create some stand-alone applications for Consumable Reports for:

- **Energy Meters**
- **Non-linear flow meters**
- **Energy (BTU) consumption**
- **Equipment Runtime**

NOTE You can add these options to **CCN Values Only** and **Link Integration** custom equipment and require mapping just the points to be monitored.

Once the equipment files and the view file are *added to a device in the i-Vu® Pro interface* (page 251), you can assign these points to custom graphic elements created in ViewBuilder.

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Because CC's will likely control multiple pieces of HVAC equipment, expansion controllers associated with CC's must be added to the i-Vu® Pro **Devices** page (select the Gateway in the navigation tree.) You can control separate setpoints and schedules for multiple physical equipments from a single CC. The expansion controllers support the additional equipment and view files required for these systems.

Create custom equipment files in EquipmentBuilder for UC/CC's that link only to CCN points

You create an equipment file in EquipmentBuilder for the UC/CC, which maps the I/O points required for one or more applications. Once you have created the files, you can associate the linked I/O points with ViewBuilder graphics.

NOTE To have a **Prime Variable**, (a temperature displayed in a color oval when the UC/CC is shown in a site or area equipment list), you must select the **Schedule and Setpoint** option when creating the equipment file.

1. Start EquipmentBuilder. (Windows **Start** > **All Programs** > **i-Vu_Tools_x.x**)
2. Click **Create Equipment**.
3. Select i-Vu EquipmentBuilder SAL from the Library drop-down list.
4. Select equipment type: **Custom Equipment** > **CCN Values Only.**
5. Click **Next**.
6. In **Equipment Name**, type a name for the custom equipment (i.e., Hot Water system).
7. Enable **English** or **Metric** units.
8. Select options from the drop-down lists.
9. Select **Schedule and Setpoint** in the first drop-down list to use the setpoint slidebar graphic in the i-Vu® Pro interface and to have a **Prime Variable** (a temperature displayed in a color oval when the UC/CC is shown in a site or area equipment list).
10. Click **Next.**
11. Choose the type of element, quantity, and click .

Add Elements to your application

NOTE Elements are a collection of input/output points that perform a specific operation. The input/output point that is reading or writing to the UC/CC is called a CCN point.

The available Elements that you can add to your custom equipment in EquipmentBuilder are:

Point type	Used for
Read CCN Point	Reading an analog or binary value from the UC/CC
Carrier Text Point	Reading a text string from the UC/CC
Analog - Setpoint Write	Reading and writing individual variables
Demand Limit Load to Shed	!/O points for Demand Limiting

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1 As you add Elements, enter the requested information for the CCN points:

- **Display Text -** the description of the point as it appears in the i-Vu® Pro interface (i.e., Pump status)
- **Reference Base -** the name of the point used when linking the point to a graphic element. All points have a unique identifier (i.e.,input_pumpstat, trendPumpstat)
- **Input Address** - enter the CCN path to link to this point. In the i-Vu® Pro interface, all CCN tables have a **Copy Path** symbol at the far right of the display. Clicking on this symbol places a copy of the path on the clipboard. In EquipmentBuilder, paste the path into the **Input Address** field, using Ctrl+v.

2 When you are finished adding Elements for your application, click **Next.**

3 Type a new **Equipment Name**, if desired.

4 In **Save Location**, browse to a location where you would like to save the new custom equipment.

5 Click **Save**.

Custom graphic

Use ViewBuilder to edit the graphic.

Create custom equipment files for UC/CC's that link to TPI points

You create an equipment file In **EquipmentBuilder** for the UC/CC, which maps the I/O points required for one or more applications. In this type of equipment, you can link CCN to TPI points in a UC/CC. Once you have created the files, you can associate the linked I/O points with ViewBuilder graphics.

NOTE To have a **Prime Variable**, (a temperature displayed in a color oval when the UC/CC is shown in a site or area equipment list), that comes from a TPI point, you must select the **Link to Third Party to Prime Variable** option when creating the equipment file. You must not select he **Schedule and Setpoint** option for this equipment.

1 Start EquipmentBuilder. (Windows **Start** > **All Programs** > **i-Vu Tools x.x**)

2 Click **Create Equipment**.

3 Select **i-Vu ApplicationBuilder**.

4 Select equipment type: **Custom Equipment** > **CCN Link Integration**.

5 Click **Next**.

6 In **Equipment Name**, type a name for the custom equipment (i.e., Hot Water system).

7 Select options from the drop down menus.

8 Click **Next.**

9 Choose the type of element, quantity and click the .

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Add Elements to your application

NOTE **Elements** are a collection of input/output points that perform a specific operation. The input/output point that is reading or writing to the UC/CC is called a CCN point.

The available Elements that you can add to your custom equipment in EquipmentBuilder are:

Point type	Used for
Read CCN Point	Reading an analog or binary value from the UC/CC
Read Integration Point	Reading an analog or binary value from a TPI
Carrier Text Point	Read a text string from the UC/CC
Analog - Setpoint Write	Reading and writing individual variables
Analog - Link CCN to Integration	Writes CCN variables to TPI
Analog – Link Integration to CCN	Writes TPI variables to CCN
Analog – Link CCN Passive to Integration	Writes CCN variables to TPI
Analog – Link Integration to CCN Passive	Writes TPI variables to CCN
Analog – BACnet Value to CCN	Writes BACnet variable to CCN
Analog - CCN to Integration Setpoint Write	Writes CCN to TPI setpoint
Analog - Manual TPI output/setpoint	Manual control from UI to TPI/CCN
Demand Limit Load to Shed	I/O points for Demand Limiting
Binary – Link CCN to Integration	Writes CCN variables to TPI
Binary – Link Integration to CCN	Writes TPI variables to CCN
Binary – Link CCN Passive to Integration	Writes CCN variables to TPI
Binary – Link Integration to CCN Passive	Writes TPI variables to CCN
Binary – Link BACnet Value to CCN	Writes BACnet variable to CCN
Binary - Manual Control	Manual Control from UI to TPI/CCN
Binary - Time Manual Control	Delay on Make Control

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1 As you add Elements, enter the requested information for the CCN or TPI points:

- **Display Text -** the description of the point as it appears in the i-Vu® Pro interface (i.e., Pump status)
- **Reference Base -** the name of the point which is used when linking the point to a graphic element. All points have a unique identifier (i.e.,input_pumpstat, trendPumpstat)
- **Input Address** - enter the CCN path to link to this point. In the i-Vu® Pro interface, all CCN tables will have a **Copy Path** symbol at the far right of the display. Click on this symbol to place a copy of the path on the clipboard. In EquipmentBuilder, paste the path into the **Input Address** field, using Ctrl+v.

2 When you are finished adding **Elements** for your application, click **Next.**

3 Type a new **Equipment Name**, if desired.

4 In **Save Location** - browse to a location where you would like to save the new custom equipment.

5 Click **Save**.

Custom graphic

Use ViewBuilder to edit the graphic.

Create stand-alone applications

In EquipmentBuilder**,** you can create some pre-engineered, stand-alone equipment applications with a view for Consumable Reports for Energy Meters (electric, gas, water, steam, generic), non-linear flow meters, energy (BTU) consumption, and equipment runtime.

These options can be added to **CCN Values Only** and **Link Integration** custom equipments. Mapping the points allows monitoring.

NOTES

- 1 meter and 1 Runtime may be added to equipment.
- There is an application for a CCN Vertical Pack unit. This is a CC with special software and BEST++. While this controller can be discovered in the i-Vu® Pro application in **CCN Setup** as a Vertical Pack, none of the possible selected options can be auto-discovered, so only a base view is generated. This application allows your to generate a correct equipment and view file, based on the selected options.

Map to Point procedures for the UC/CC

I/O Points that are included in a custom equipment file are automatically mapped to their associated CCN points once the file is downloaded in the i-Vu® Pro application. The following procedure is not required for those points.

This procedure is necessary to map associated points with the **Setpoint Support** option:

1 In the navigation tree, select the UC/CC and click **+** to expand tables**.**

2 Click **+** next to the table headings (**Setpoint, Status Display**, **Maintenance**, etc.) to see additional tables.

3 Select the table you want.

4 Click the drop-down list under **Map to Point** in the far right column and select the variable to be mapped.

NOTE **Not Mapped** erases any previously selected information.

5 Click **Accept**. The **Map to Point** entry changes to the mapped point's description.

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Working with Terminal System Managers

A Terminal System Manager (TSM) that is scanned into the system is assigned an auto-generated equipment that represents Group 1 in the TSM. Group 1 is the default group which can control the setpoints and occupancy for all of the existing zones, or up to 16 specifically selected zones. This equipment is pre-mapped and requires no further action.

All other Groups or Zone equipment must be added as expansion equipments. You must use EquipmentBuilder to create the necessary additional Group or Zone equipment files. These files map the CCN variables to i-Vu® BACnet points and replace the default equipment in the expansion equipments that have been added for the additional Groups or Zones.

Once the equipment files are created and uploaded to the i-Vu® Pro application, these points can be assigned to custom graphic elements, which you create in **ViewBuilder**.

Expansion equipment associated with a TSM must be added to the i-Vu® Pro application on the **Devices** page to support additional Groups and Zones. You must create separate equipment and view files in EquipmentBuilder for each expansion equipment.

Important points when setting up your TSM in the i-Vu® Pro application

- You must add each group or zone as a new equipment.
- TSM's can only be on Bus **0**.
- Only the Gateway can be Bus **0**.
- The Gateway can support 140 devices and 200 equipments
- A fully utilized TSM (12 Groups/64 Zones) takes 76 equipment files.

  NOTE If you have 2 TSM's with 8 Groups and 37 Zones in each, it takes 45 equipment files for each TSM, or a total of 90 equipment files from a possible 200. This allows another 110 equipments for every other controller on Bus **0**.

Create custom equipment files in EquipmentBuilder for Terminal System Managers (TSM)

EquipmentBuilder creates .equipment and .view files for the TSM temperature zones and control groups. The .equipment file contains points that you finish formatting in the i-Vu® Pro interface after uploading.

You specify the air source(s) that the TSM communicates with by configuring its Linkage function. A system can consist either of 1 TSM communicating with 1 to 4 air sources, or 1 to 4 TSM's communicating with a single air source.

1. Start EquipmentBuilder. (Windows **Start** > **All Programs** > **i-Vu_Tools_x.x**)
2. Click **Create Equipment**.
3. Select your equipment type:
   - **TSM II Plus Group**
   - **TSM II Plus Zone**
   - **TSM II Group**
   - **TSM II Zone**
4. Click **Next**.

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5 In **Equipment Name**, type a name for the custom equipment (i.e., Hot Water system).

6 Enable **English** or **Metric** units.

7 Click **Next**.

8 Check the files that you want to generate.

9 Browse to the desired location to store your files and click **Open**.

10 Click **Next**.

11 Click **Save**.

12 Click **Exit** to close or **Start Over** to create another equipment file.

Custom graphic

Use ViewBuilder to edit the graphic or make a custom graphic.

Assign and download a TSM equipment file in the i-Vu® Pro application

When you scan equipment in the i-Vu® Pro application, each TSM is assigned Group 1. You must:

- Add a new separate equipment for each additional zone and group that you want a graphic for
- Create the .equipment file for each in EquipmentBuilder
- Upload the .equipment and .view file for the new equipment that was added in the i-Vu® Pro application

The group or zone that you create in EquipmentBuilder contains setpoint support, schedules, and a Group or Zone's points configuration. The CCN path information is automatically configured, however, it is incomplete and you must use a **Search and Replace** function to exchange the generic Groups or Zones for your specific Group or Zone number.

To upload an equipment file to a TSM Group or Zone that is already present in the i-Vu® Pro application

1 Either double-click the controller in the navigation tree, or right-click and select **Configure** in the list.

2 Enter the **Display Name**.

3 To add a control program to the list of possible .equipment files in i-Vu® Pro, do one of the following:

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If the control program is...	
In the **Control Program** drop-down list	a. Select the control program that you generated in EquipmentBuilder or Snap. b. Click **Accept**.
Not in the **Control Program** drop-down list	a. Click **Add New**. b. Browse to select the equipment file. c. Click **Open**. d. Click **Continue**. e. Click **Close**. f. Click **Close** again.

4 To add a graphic, do one of the following:

If the graphic is...	
In the **Views Available** list	a. Select the graphic, then click **Attach**. b. Click **Accept**.
Not in the **Views Available** list	a. Click **Add New**. b. Browse to select the view file. c. Click **Open**. d. Click **Continue**. e. Click **Close**. f. Click **Close** again.

5 When finished, select the Gateway in the navigation tree and select the **Devices** page.

6 Click **Download CCN** to finalize your changes.

To add expansion equipment for additional groups and zones controlled by your TSM (expansion controllers)

1 In the navigation tree, select the device manager that the controller is associated with.

2 Select the **Devices** page and click **Add Control Program**.

3 Enter the **Display Name**.

4 Select the controller or Gateway that you want to associate the new equipment with. If you select **CCN Controller**, enter the Bus and Element number of the controller.

5 Do one of the following:

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If the control program is...	
In the **Control Program** drop-down list	a. Select the control program that you generated in EquipmentBuilder. b. Click **Accept**.
Not in the **Control Program** drop-down list	a. Click **Add New**. b. Browse to select the view file. c. Click **Open**. d. Click **Continue**. e. Click **Close**. f. Click **Close** again.

6 Add a graphic or, if finished, select the Gateway in the navigation tree and, on the **Devices** page, click **Download CCN** to finalize your changes.

7 To add a graphic, do one of the following:

If the graphic is...	
In the **Views Available** list	a. Select the graphic. b. Click **Accept**.
Not in the **Views Available** list	a. Click **Add New**. b. Browse to select the view file. c. Click **Open**. d. Click **Continue**. e. Click **Close**. f. Click **Close** again.

8 When finished, select the Gateway in the navigation tree and, on the **Devices** page, click **Download CCN** to finalize your changes.

Configure the path to the source of the point for TSM Groups and Zones

A generic list of points is created in the i-Vu® Pro application when the TSM Group or Zone is scanned into the system or when you upload the .equipment file.

You must initially revise the address of the path for every point!

1 Select the TSM Group or Zone in the navigation tree, then click **Properties** > **Network Points** tab.

2 To substitute the correct Group or Zone number where the double X (XX) is in each path, click the **Search/Replace** button under the **Address** column.

3 Enter "XX" in the **Search** field and enter the appropriate Zone or Group number in the **Replace** field. This updates all of the paths for that Zone or Group.

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IMPORTANT!

TSM Zone 1 requires an extra step because 1 point has a slightly different name than in Zones 2 thru 64. The setpoint offset point in Zone 1 is inadvertently named **STPOFF**, while it is named **SPTOFF** in the remaining Zones.

This causes an error because the point is incorrectly mapped in the template for Zone 1, even though it is correctly mapped for Zones 2 through 64.

You must change **SPTOFF** to **STPOFF** for this one zone!

Example:

CCN://LINK/TZDSP01/SPTOFFST must be changed to **CCN://LINK/TZDSP01/STPOFFST**.

Integrating third-party data into the i-Vu® Pro system

You can integrate third-party devices into the i-Vu® Pro system if the following are true:

- The third-party devices are physically connected on the i-Vu® Pro system's network
- You have a Carrier controller that supports third-party integration
- You have the correct Carrier driver for the third-party protocol
- You have enabled a port for a third-party protocol on the Carrier controller's driver page

To read from or write to a third-party device, you need the following information from the third-party vendor:

- Protocol
- Third-party device's network address
- Memory location of the object in the device you want to read from or write to

If you are integrating with BACnet devices, you can use the i-Vu® Pro *BACnet Discovery* (page 263) feature to gather this information.

Before you begin a third-party integration, study the Carrier controller's *Installation and Start-up Guides* and the third-party protocol's *Integration Guide*. Both are available on the Carrier website.

The following Carrier routers let you integrate the allowed number of third-party points into your i-Vu® Pro system:

This router...	Allows this number of non-BACnet third-party points...
i-Vu® Link	500
i-Vu® Open Link	500
Carrier® ChillerVu™	1000
i-Vu® XT BACnet Link	1500

NOTE The point allowance of a router that provides third-party points applies to only itself. For example, if you purchase an i-Vu® Open Link and download control programs that use 125 third-party Network I/O points, you cannot apply the unused 125 points to a different router.

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To discover third-party BACnet networks, devices, and objects

The i-Vu® Pro **BACnet Discovery** feature locates all accessible BACnet networks, BACnet devices, and BACnet objects (including devices in your i-Vu® Pro system) on a BACnet network. The information gathered in this process is typically used to integrate third-party BACnet devices and their BACnet objects into the i-Vu® Pro system.

To use **BACnet Discovery:**

1 On the i-Vu® Pro **System Options** tree, select **Connections**.

2 On the **Configure** tab, disconnect the BACnet/IP connection by selecting **No Connect** in the drop-down list.

3 While the connection is stopped, enter or verify the server's **IP Address** and **Subnet Mask** for the BACnet/IP connection.

4 Restart the connection.

5 Close the **System Options** window.

6 On the navigation tree, select the system level.

7 Click **Devices**.

8 On the **Advanced** tab, click the **Start** button to discover BACnet sites for the system. An item called **Discovered Networks** appears in the tree.

9 To discover BACnet networks, select **Discovered Networks**, then click **Go**. A list of all BACnet networks appears on the navigation tree. After all networks are found, close the status dialog box.

TIP Run a commstat manual command to determine which device routes to each network. The **BACnet Bind Show Network** section of the Commstat window shows the IP address of the router to each network.

10 To discover BACnet devices on a network, select a network on the navigation tree, then click **Go**. After all devices are found, close the status dialog box. Click ▶ beside an item to expand the list of devices.

11 To discover BACnet objects on a device, select the device on the navigation tree, then click **Go**. After all objects are found, close the status dialog box. A list of all BACnet objects in this device appears on the navigation tree.

TIP Make sure you are discovering objects in the correct device. It may take some time to discover objects in devices with more than 100 objects.

12 Optional: Do the following to export the BACnet information so that it can be used in the Snap application:

a) On the navigation tree, select a discovered network with devices or a single device.

b) Click **Export**.

c) Name and save the .discovery file in any folder.

NOTES

- Some third-party BACnet devices may not be discovered because they do not support the BACnet methods required for auto discovery.
- If the discovery process returns ambiguous information, such as multiple points with similar names, contact the third-party manufacturer's representative for clarification.
- Device configuration or network load can prevent the i-Vu® Pro interface from showing all BACnet devices. If you do not see a BACnet device that you expect to see, check the system's BBMD configurations. If the configurations are correct, try the discovery process again.

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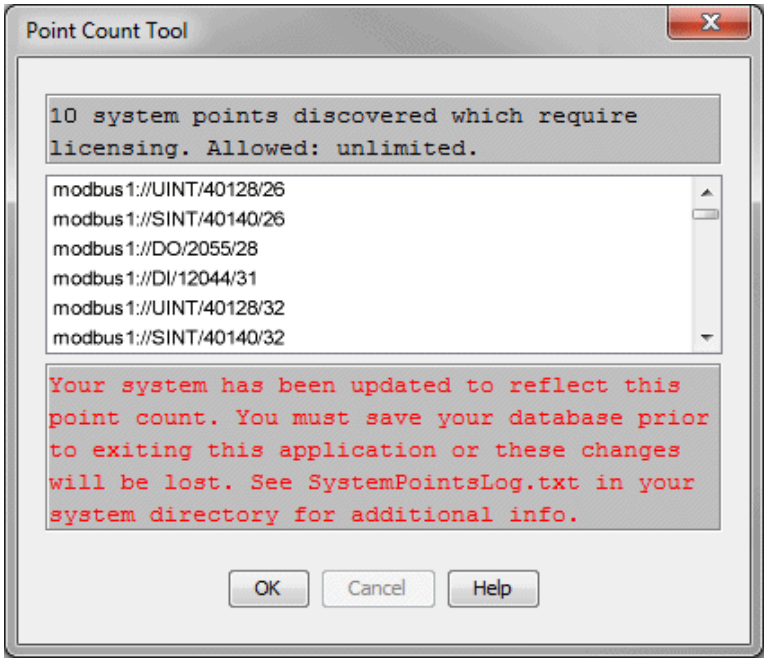
To determine the number of non-BACnet third-party points used in a system

In SiteBuilder, right-click the system level on the **Geographic** tree, then select **Run Global Point Count**.

TIP Select **Run Local Point Count** below the system level to count third-party points at and below the selected item.

SiteBuilder displays the addresses that require licensing, but does not show the location of the point.



To determine the number of third-party points used in a controller

i-Vu® Pro application only - SiteBuilder

Right-click the controller on the **Network** tree, then select **Run Point Count**.

In the i-Vu® Pro application

1. On the navigation tree, right-click the controller.
2. Select **Driver Properties** > **Properties** page > **Settings** tab, and then scroll to the bottom of the page.
3. **Number of integration points requested** and **Number of integration points active** show how many non-BACnet third-party Network I/O microblocks the controller is using. These two counts will differ if you exceed the product's integration point limits. For example, if your control program includes 27 Modbus points, your **Integration points requested** will be 27 and your **Integration points active** will be 25.

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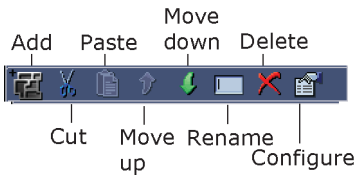
To configure LonWorks points using the LonWorks Integration Tool

1. Log in to the i-Vu® Pro application.
2. Double-click the third party controller in the navigation tree. A dialog window appears.
3. Click **Export.erl** under **Integration Points**.
4. Click **Save**.
5. Browse to a location on your computer to save the file. (The file will have a .erl extension.)
6. Start the **LonWorks Integration Tool** (Lonworks_Integration_Tool.jar).
7. Click to start the wizard
8. Follow the wizard's instructions to create your LonWorks addresses.
9. Click to save the file to your PC. (The file will be saved with a .erl extension.)
10. Return to i-Vu® Pro.
11. In the navigation tree, double-click the i-Vu® Pro to open the **Configure** dialog box.
12. Navigate to **Integration Points** at the bottom of the screen and click **Import .erl**.
13. Browse to the .erl file that you saved in the LonWorks Integration Tool.
14. Click **Open** and then **Continue** to upload the file.
15. Click **Close**. The LonWorks addresses are now set.

Create navigation tree for the User view

The navigation tree is a hierarchical representation of the areas or locations at your site and the mechanical equipment in your system.

1. Use the **Arrange User View** window in the **Installer** view to add, delete, rename, or move items in your tree. You can also select a system or controller in the tree and right-click to configure change it.



2. Right-click on your system name at the top of the tree in the **Arrange User View** window and select **Add Area** (or click in the toolbar above the navigation tree). Type in the name of an area, location, or building that contains mechanical equipment.
3. Repeat the above until all required areas have been added to the navigation tree. The following is an example:

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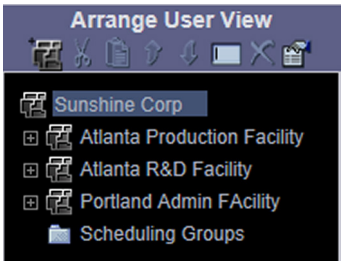
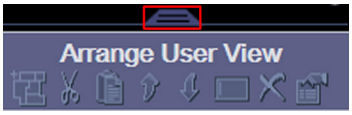


4 To move one or more controllers to a specific area, select the icon in the User tree, (use Ctrl+click, Shift+click, or both to select multiple controllers) and:

- Use the **Move Up** or **Move Down** arrows in the toolbar
- Use **Move Up** or **Move Down** arrows in right-click menu
- Drag and drop

NOTES

- A user with the **Administrator** role can change the display name in the **User** view by selecting the item in the navigation tree and double-clicking, or right-clicking and selecting **Configure**. The **Installer** must make all other changes.
- In the **Installer** view, click and drag the tab at the top of **Arrange User View** to adjust the height of the window.



Configuring your system

Work with controllers, set up Linkage, and perform Test and Balance

Refer to your individual controller's *Installation and Start-up Guide* for detailed explanations and procedures on configuration, sequence of operation, and Linkage.

Commissioning equipment

Follow the process below to commission system equipment.

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Step 1: Check out point setup

1. On the i-Vu® Pro navigation tree, select the piece of equipment you want to check out.
2. Click **Properties**.
3. View and change properties on the **I/O Points, Alarm Sources, Trend Sources, Network Points, BACnet Objects**, and **Rnet Points** tabs. See "Property descriptions" below.
4. After completing the equipment checkout, click the **Equipment Checkout** tab.
5. Select **Checked Out**. This field is for your reference only.
6. Optional: Type notes.
   - Notes typed in this field appear in the Equipment Checkout report and can also be changed from the SiteBuilder Notes tab and the Properties page Notes field for this piece of equipment.
   - Notes remain in this field until an operator deletes them.
7. Optional: Click the **Reports** drop-down arrow button, then select and run each of the following reports to verify your work:
   - **Equipment** > **Point List**
   - **Alarms** > **Alarm Sources**
   - **Equipment** > **Trend Usage**
   - **Equipment** > **Network IO**

TIP You can export the calibrated data so that you can import it into another control program. See *Optional: Import/export calibration data* (page 273).

Property descriptions

I/O Points

Name	Click the name to display the microblock pop-up. **NOTE** A red name indicates a fault condition where the point may be misconfigured. **EXAMPLE** No input/output number or a nonexistent input/output number.
Type	Type of Input or Output point. See *Point types* (page 26).
Value	The point's present value.
Offset	Allows for fine calibration of the present value of an analog point.
Polarity	Determines the point's binary normal polarity in the control program. **NOTE** Polarity is not the hardware normally open/normally closed position.
Locked	Select the checkbox to lock the present value at the value you specify.
Exp:Num	Expander numbers and input or output numbers associated with where the physical point wires, such as a sensor wire, are physically connected to a controller.
I/O Type	Selects the bank of physical inputs or outputs on the controller.

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Sensor	Selects how the physical input is mapped to the engineering units. **Min/Max** is used with the sensor type of linear to scale the input to engineering units. **NOTE** This field is ignored for sensor types other than linear. **EXAMPLE: AI** linear sensor type min -10 max 50 when input reads 100% the value is 50 50% 20 0% -10
Actuator	Selects how the present value in engineering units is mapped to the physical output. **Min/Max** is used with the actuator type of linear to scale the output from engineering units. **NOTE** This field is ignored for actuator types other than linear. **EXAMPLE: AO** linear sensor type min -10 max 50 when input reads 50 the output is 100% 20 50% -10 0%
Resolution	Amount by which the present value will change. **EXAMPLE** If a physical input changes by 1, but the resolution is set at 2, then the present value remains the same. If the input changes by 2, the present value will then change by 2.
Checked Out **Checkout Notes**	These fields are for your reference only.

Alarm Sources

Name	Click the name to display the microblock pop-up.
Type	Type of point that is an alarm source. See *Point types* (page 26).
Alarm	Shows **Alarm** in red if a current alarm exists.
Network Visible	Select to allow the microblock to be seen by the i-Vu® Pro application and third-party BACnet controllers on the network.
Potential alarm source	Select to enable the microblock to generate alarms.
Alarm Enabled	**Alarm—**Select to generate an alarm when conditions exceed the limits set in the **Condition** column. **Return—**Select to generate a return-to-normal message when the alarm condition returns to a normal state. **Fault—**Select to have an alarm generated if the alarm source is not configured correctly. For example, a misconfigured channel number produces a no sensor fault.
Requires ack	**Alarm—**Select to require that the alarm be acknowledged. **Return—**Select to require that the return-to-normal message be acknowledged.
Critical	Select if the alarm is critical.

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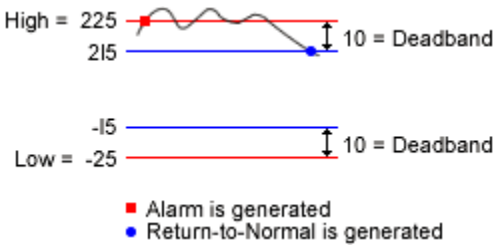
Category	You can change the alarm category assigned to the microblock.
Condition	An alarm will be generated if conditions exceed the low or high limits set. **Deadband**: The amount inside the normal range by which an alarm condition must return before a return-to-normal notification is generated. **EXAMPLE** 
Delay	Delay time in seconds for notification after an alarm is generated.

Trend Sources

Name	Click the name to display the microblock pop-up. **NOTE** A red name indicates a fault condition where the point may be misconfigured. **EXAMPLE** No input/output number or a nonexistent input/output number.
Type	The type of point being trended.
Sample Interval	The interval or COV (Change of Value) increment that triggers the trend sample.
Max Samples	The maximum number of trend samples the controller will hold before replacing oldest samples with newest. **NOTE** Changing **Max Num of Samples** will delete all of the point's trend samples currently stored in the controller. But, you can transfer the trend data from the controller to the system database before you change the value. Click on the point name. In the pop-up, go to **Trends** > **Enable/Disable**, and then click **Store Trends Now**.
Stop When Full	Stops trend sampling when the maximum number of samples is reached.
Historian - Enable (Samples)	Triggers the trend historian to record trends when the controller has accumulated the defined number of samples. This must be less than the **Max Samples** allocated. **TIP** A good value is a little less than 1/2 of the **Max Samples**.
Keep for __ days	Defines how long trend data is stored in the system database. This is based on the date that the sample was read. Select **System Default** to use the value defined on the **System Settings** > **General** tab, or select **Custom** to set a value for this trend only.
Samples In Controller	The number of samples that are currently stored in the controller.

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Network Points

Name	Click the name to display the microblock pop-up. **NOTE** A red name indicates a condition where the point may be misconfigured.
Type	Type of network point. See *Point types* (page 26).
Value	The point's present value. **EXAMPLE** For a Maximum point type, Value is the maximum value of all the target BACnet object properties the point is communicating with.
Locked	Select the checkbox to lock the present value at the value you specify.
Default Value	The value that the control program will use as the point's value when communication with the target defined in the **Address** column is lost or communication is disabled.
Com Enabled	Select to enable this point's network communications. Disable this property for troubleshooting. **NOTE** Select **All** in the column header to quickly enable all points in the control program.
COV Enable	Select to make: • A digital network output point write a value to the target defined in the **Address** column only when the value changes. • An analog network output point write a value only when the value changes by the specified increment.
Refresh Time (mm:ss)	The time interval at which the network point writes or retrieves the value to or from the target. For network output points, this time is used when COV is not enabled or when COV is enabled but fails. **NOTE** If COV fails and the Refresh Time is zero, the value is sent once per second.
Address	The address of the target BACnet object property or third-party value that the point communicates with. **NOTE** Click **Search/Replace** at the top of the **Address** column to have the i-Vu® Pro application replace all instances of specific text in the addresses with different text. This is especially useful when copying a control program to use for multiple third-party devices.
Error	The error code and error if the point cannot communicate with the target.
Present Value	Current value of the target defined in the **Address** column.
Checked Out	These fields are for your reference only.
Checkout Notes	Notes typed in this field appear in the **Equipment Points List Report**.

BACnet Objects

Name	Click the name to display the microblock pop-up. **NOTE** A red name indicates a condition where the point may be misconfigured.
Reference name	A unique identifier that allows the point to be referenced for used for graphics, source tree rules, or network links.

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Type	The BACnet object type. See *Point types* (page 26).
Present Value	The object's current value.
Locked	Check to lock the third-party object to a specific value.
Device	A device alias. See "To reuse a control program" in Device Alias in Microblock Reference.
Object Name	An alpha-numeric string that is unique within the third-party device.
Object ID	A combination of the object type and a unique instance number. The object ID must be unique within the device.
Address	The address of the third-party object that the microblock references.
Network Visible	Allows other BACnet equipment to read or change the microblock's present value. Must be enabled for this microblock to generate alarms.

Rnet Points

This tab shows varying information for the different point types. Below are all possible properties that may appear on this tab and a list of the applicable points. The following list is arranged alphabetically.

Combination Algorithm	(Analog Sensed Values) The method used to combine the ZS sensors' values to determine the microblock's output value.
Default Value	(Analog Parameters, Binary Parameters, Multi-State Parameters) The value the control program uses until a user changes the value in the system interface.
Display Resolution	(Analog Sensed Values, Analog Statuses, Analog Parameters) Defines the resolution of the value to be displayed on the ZS sensor. For example, 1 displays only integers (example: 74) and 0.5 displays values to the nearest 0.5 (example: 74.5).
Edit Increment	(Analog Parameters) The amount that you want each press of the sensor's ▲ or ▼ button to change the microblock's value.
Editable	(Analog Parameters, Binary Parameters) When enabled, the microblock's value is editable on the ZS sensor.
Lock Present Value to	(Binary Parameters) Check to output the locked value from the microblock instead of the microblock's calculated value.
Maximum	(Analog Parameters) The highest amount that this value can be changed to on the ZS sensor or in the i-Vu® Pro interface.
Menu Configuration	(All points) Shows which sensor screens display the value.

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Minimum	(Analog Parameters) The lowest amount that this value can be changed to on the ZS sensor or in the i-Vu® Pro interface.
Minimum off time	(Binary Parameters) The minimum period (seconds) that the microblock sends an off signal to the controller, regardless of the input signal to the microblock.
Minimum on time	(Binary Parameters) The minimum period (seconds) that the microblock sends an on signal to the controller, regardless of the input signal to the microblock.
Object Id	(All points) A combination of the object type and a unique instance number.
Object Name	(All points) A unique alphanumeric string that defines the BACnet object. Although the **Object Name** field can be edited, it is not recommended.
Reference name	(All points) A unique identifier that allows the point to be referenced for used for graphics, source tree rules, or network links.
Rnet Tag	(All points) Defines what type of information this value represents and determines how the sensor will display the value. For example, for the Rnet Tag **Fan Status**, the sensor automatically displays on the Home screen when the microblock is active.
Show on sensors	(Analog Sensed Values) Defines whether the ZS sensors are to display their individual sensed values, or the value determined by the **Combination Algorithm**.
Type	(All points) Type of Input or Output point.
Value	(All points) The point's present value.

Step 2: Check controller communication

1. On the navigation tree, select the network that the controller is on.
2. On the **Devices** page, view the status of all controllers on that network.

TIPS

- Navigate to a network or router further down in the tree to show its controllers on the **Devices** page.
- In the **Reports** button drop-down list, select **Network** > **Equipment Status**, then click **Run** to see the status of all controllers below the selected tree item.

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Step 3: Check equipment operation

Refer to the sequences of operation in the system specifications to verify that the equipment operates in each operational mode (for example, occupied and unoccupied) as specified.

TIP If needed, you can import calibration data that you exported from another control program. See *Optional: Import/export calibration data* (page 273).

Step 4: Check the commissioned status

1. In the i-Vu® Pro interface, select the system.
2. Click the **Reports** drop-down arrow button, then select **Commissioning** > **Equipment Checkout**.
3. Run the report.

Optional: Import/export calibration data

You can export I/O point calibration data from a control program and import it into the same control program or another control program with the same I/O point configuration.

To export calibration data

1. On the i-Vu® Pro navigation tree, select the control program whose data you want to export.
2. Scroll to the bottom of the **Properties** page **I/O Points** tab, and then click **Export**. The file **<control program name>_<ref name>.xml** is saved in your browser's **Downloads** folder.

To import calibration data

NOTE We recommend that you export existing data as a backup before you import new data.

1. On the i-Vu® Pro navigation tree, select the control program that you want to import the data into.
2. Scroll to the bottom of the **Properties** page **I/O Points** tab, and then click **Import**.
3. Browse to the file you want to import.
4. Click **Continue**. A side-by-side comparison of existing data and the new import data will appear. Red text indicates one of the following errors:
   - Duplicate data—Existing data has duplicate I/O numbers so that import cannot determine its match.
   - I/O type mismatch—I/O Type in existing data does not match I/O Type in import data.
   - Missing import data—Existing data has a point that import data does not have.
   - Missing system data—Import data has a point that existing data does not have.
5. Click **OK** to complete the import. Existing data that does not show an error will be overwritten by the imported data.

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Adjust airflow configuration for VAV or VVT controllers

To enter airflow parameters for a VAV Zone, VVT Zone or VVT Bypass controller, right-click on the controller in the navigation tree and select **Airflow Config** in the menu.

For more information, see the following microblock details.

- VAV Zone, VAV Zone II, Zone Ctrl, VAV Zone II Secondary Duct - Airflow Control
- VVT Zone, VVT Zone II - PD Airflow Control
- VVT Bypass, VVT Bypass II - BACnet Bypass Control

Commissioning equipment using Field Assistant

PREREQUISITES Your controllers have v4.x or later drivers.

To start up and commission a piece of equipment or a network of controllers, you can run Field Assistant on:

- A laptop connected to a controller's or sensor's Local Access port. See *Communicating locally with Open devices* (page 212).
- A laptop connected to a controller's or sensor's Rnet port. See *Communicating locally with the i-Vu® XT or TruVu™ devices* (page 215).
- A laptop or computer connected to an IP network if your controllers are communicating on the network.

See *Field Assistant Help* for information on using Field Assistant.

Providing source files to Field Assistant

Field Assistant requires a controller's source files. Source files include:

- Control programs (.equipment)
- Drivers (.driver)
- Graphics (.view)
- Touchscreen files (.touch)
- BAC*view*® files (.bacview)

To provide Field Assistant with source files, do one of the following:

- *Download source files from the i-Vu® Pro application* (page 275) to the controller so that they can be uploaded in Field Assistant.
  NOTES
  - All Open PIC's arrive from the factory containing all their source files. They will no longer have the source files if they have been optimized for download in the i-Vu® Pro application and then downloaded.
  - To make sure the controller has the source files in it, verify that in the **System Options** > **System Settings** > **General tab** > **Download** section that **Optimize download for Open PIC controllers** is unchecked (the default) before downloading from the i-Vu® Pro application.
- *Export the source files from the i-Vu® Pro application* (page 275) to a zip file so that they can be imported in Field Assistant. This option exports all source files for all controllers in the system.

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TIP If you download source files to a controller, you may still want to export files from the i-Vu® Pro application. Importing the files in Field Assistant reduces the time required to upload the controllers.

If the technician using Field Assistant changes or adds source files, he can get the new source files back to the i-Vu® Pro application by doing one of the following:

- Download the source files to the controller in Field Assistant so that you can *upload the files in the i-Vu® Pro application* (page 276).
- Export the source files from Field Assistant to a zip file so that you can *import the files in the i-Vu® Pro application* (page 276).
  This option exports the source files for all controllers in the system to the zip file.

See Field Assistant Help for instructions on uploading, downloading, importing, or exporting source files in Field Assistant.

To download source files from the i-Vu® Pro application

1 Click , then select **System Options** > **System Settings** > **General** tab > **Download** section and verify that **Optimize download for Open PIC controllers** is unchecked (the default setting).

2 Select the site level or a router on the navigation tree.

3 On the **Devices** page, select the controller that you want to download.

NOTE **Shift+click** or **Ctrl+click** to select multiple controllers to download.

4 Select **All Content** in the Download drop-down list, then click the **Download** button.

NOTE If a programmable controller does not have enough memory for the files, the download will fail and an error message displays. You must remove or edit the control programs.

To export source files from the i-Vu® Pro application

Export the source files from the i-Vu® Pro application to a zip file so that they can be imported in Field Assistant. This option exports all source files for all controllers in the system.

1 Click , then select **System Options** > **System Settings** > **General** tab > **Source Files** section and click the **Export** button.

2 Save to your desired location.

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To upload source files to the i-Vu® Pro application

1 Select a router in the navigation tree.

2 On the **Devices** page, select the controller whose files you want to upload.

NOTE **Shift+click** or **Ctrl+click** to select multiple controllers to upload.

3 Select **All Content** in the Upload drop-down list and then click the **Upload** button.

NOTE If an equipment has multiple views attached, the views will be uploaded with a display name of **Default**. To change the names, right-click the equipment in the tree, select Configure, then select the view in the **Views** > **Attached** list. The **Display Name** field appears for you to edit.

To import source files in the i-Vu® Pro application

1 Click , then select **System Options** > **System Settings** > **General** tab > **Source Files** section and click the **Import** button.

2 Browse to the ***sourcefiles.zip** file.

3 Click **Continue**.

4 Click **Close**.

NOTE If the import detects a difference between a database file and an import file with the same name, import does not overwrite the database file. A message lists any file differences so that you can resolve them.

ACxelerate automated commissioning

ACxelerate automated commissioning allows you to verify and report on the health state of VAV dampers and reheat valves in your VAV boxes.

To obtain the health report for any of your equipment, you first need to:

1 Configure the equipment.

2 Configure and design your test. See *Configuration & Design* (page 283).

3 Set up and initiate a Run Test on selected equipment. See *Run Test* (page 285).

4 View the analytics report. See *Analyzing Data* (page 291).

ACxelerate Requirements

To use ACxelerate, you will need to:

- have Access Commissioning Tools privilege
- purchase and download the Automated Commissioning Tool license

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ACxelerate License

- Your free 6 month trial must be used within 2 years of the i-Vu® Pro license issue date, and begins on the first use of ACxelerate. You can purchase a renewal license for ACxelerate; this period begins immediately after activation.
- To activate renewal license: upload the ACxelerate license file to > **System Options** > **License Administration**.
- Both the ACxelerate free trial and renewal license include unlimited Run Tests.
- If the ACxelerate free trial or renewal license expires, the Configuration and Analyze Data page remains accessible but Run Tests are locked.
- If using a dealer license, no ACxelerate license is required. It includes unlimited Run Tests but report downloads are disabled.

Before you begin checklist

General

- ☐ Avoid using consecutive underscore characters in the equipment display name, or the test won't execute properly. For example, type `VAV_1`, not `VAV__1`.
- ☐ Verify that the i-Vu® Pro BACnet communication is well established between the VAVs and AHUs you will be testing. This tool sends override commands to VAVs at fixed time intervals (18 minutes is the default). If communication fails, commands will not reach the VAV boxes and the test may return incorrect results.
- ☐ AHU and VAV Display Names must be unique in the i-Vu® Pro database. AHU and VAV Reference Names must start with the '#' symbol.
- ☐ We recommend creating an AHU display name with no more than 31 characters. Otherwise, the AHU group tab hyperlink in the Excel® reports download will not work. However, you can still manually access the AHU tab.
- ☐ Zero flow balancing of all VAV boxes must be done prior to starting a Run Test. Otherwise, the VAV airflow sensor issue may be marked as damper stuck.
- ☐ VAV must be linked to AHU using any one of the following sources:

  Linkage (recommended)
  Airside Linkage must be set up correctly for ACxelerate to complete the auto-commissioning process.

  NOTE When using Linkage for ACxelerate, Master, Sub-master, and Rogue zone configurations are fully supported.

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User Tree

AHUs can be linked to VAV by having them both in a dedicated area. For example, in the tree to the right, AHU1 and VAV1-VAV7 are in dedicated area 'floor1'. VAVs can reside in area (ZoneA, ZoneB...) which are under the area floor1 where AHU is present.

- ☐ The AHU must be fully commissioned. High static shutdown (hardware/software interlock) must be working before using ACxelerate. The supply fan speed control static pressure setpoint must be constant and **high enough** to avoid starving VAV when cumulative VAV damper load on AHU fan is 60% of actual box size.

  NOTE During the damper/reheat valve Run Test, average damper/reheat valve open position of all VAVs served by an AHU is between 40% to 60% open.

- ☐ The AHU supply air temperature must be at a constant setpoint (bypass any setpoint optimization algorithms).
- ☐ People should not be occupying the zones being tested, but make sure the equipment schedule microblock is in the occupied state.

  For systems with series fan VAVs, the series fan boxes' schedule must be occupied so the fan is rotating in the right direction before initiating the Run Test.

- ☐ All hardware configuration and design parameters of the **Airflow Control** microblock must be set to the appropriate value as per the VAV box's design. This includes the **Manufacturer's specified air flow at 1" water column** parameter (value is supplied by the VAV box manufacturer and is usually printed on the side of the VAV box).
- ☐ ACxelerate does not support any browser extension or built-in browser feature for content filtering, including ad-blocking. Before using ACxelerate, disable any such browser extension or feature. Example: uBlock Origin.

Reheat valve test

- ☐ The boiler control system must be fully commissioned.
- ☐ Bypass any setpoint optimization algorithms to keep the boiler supply temperature at a constant setpoint. Set to the highest temperature allowed by the operator. Maintaining a constant hot water temperature ensures a noticeable difference in the VAV's discharge air temperature when the reheat coil goes from the closed position to the open position.
- ☐ The associated boiler pumps should operate continuously over the duration of the test and be kept at a constant setpoint.
- ☐ Keep the AHU supply air temperature at a constant setpoint. We recommend keeping the setpoint at 55°F (13°C) or lower to achieve a noticeable difference between AHU supply air temperature and the VAV discharge air temperature when the VAV reheat coil is 100% open.

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Setting up the ACxelerate Automated Commissioning Tool

To obtain the health report for any of your equipment, complete the following tasks in this order.

Task 1. Configuration & Design

In the first task, create a database of equipment in order to do the following:

- Discover all the equipment
- Define the relationships between AHUs and VAVs
- Define reference names of points which need to be targeted
- Defines the test configuration parameters for damper loop and reheat valve loop test

This only needs to bet set up one time, but you can return here at any time to the following:

- Rediscover new equipment and point list due to change in equipment or its point names
- Change the equipment's configurations

See *Configuration & Design* (page 283) for further instruction on creating your database of equipment.

Task 2. Run Test

In the second task configure the test by selecting the equipment for the test, setting up parameters, and scheduling the test. This also displays the progress of the test running for each VAV.

Once the test is complete, it passes the collected samples through to the analytics engine to find faults in VAVs.

NOTE If the Configuration & Design task has previously been performed, start from here.

See *Run Test* (page 285) for further instruction.

Task 3. Analyze Data

In the third task use a dashboard to display the result of the analytics performed by the Run Test task above. It also allows the end user to download the reports in HTML and Excel formats (**NOTE** This feature is not available with a dealer license). This task activates once the Run Test is completed.

NOTE If the test was run in the past, then you can visit the dashboard of the last run test from this tool's homepage.

See *Analyzing Data* (page 291) for further instruction.

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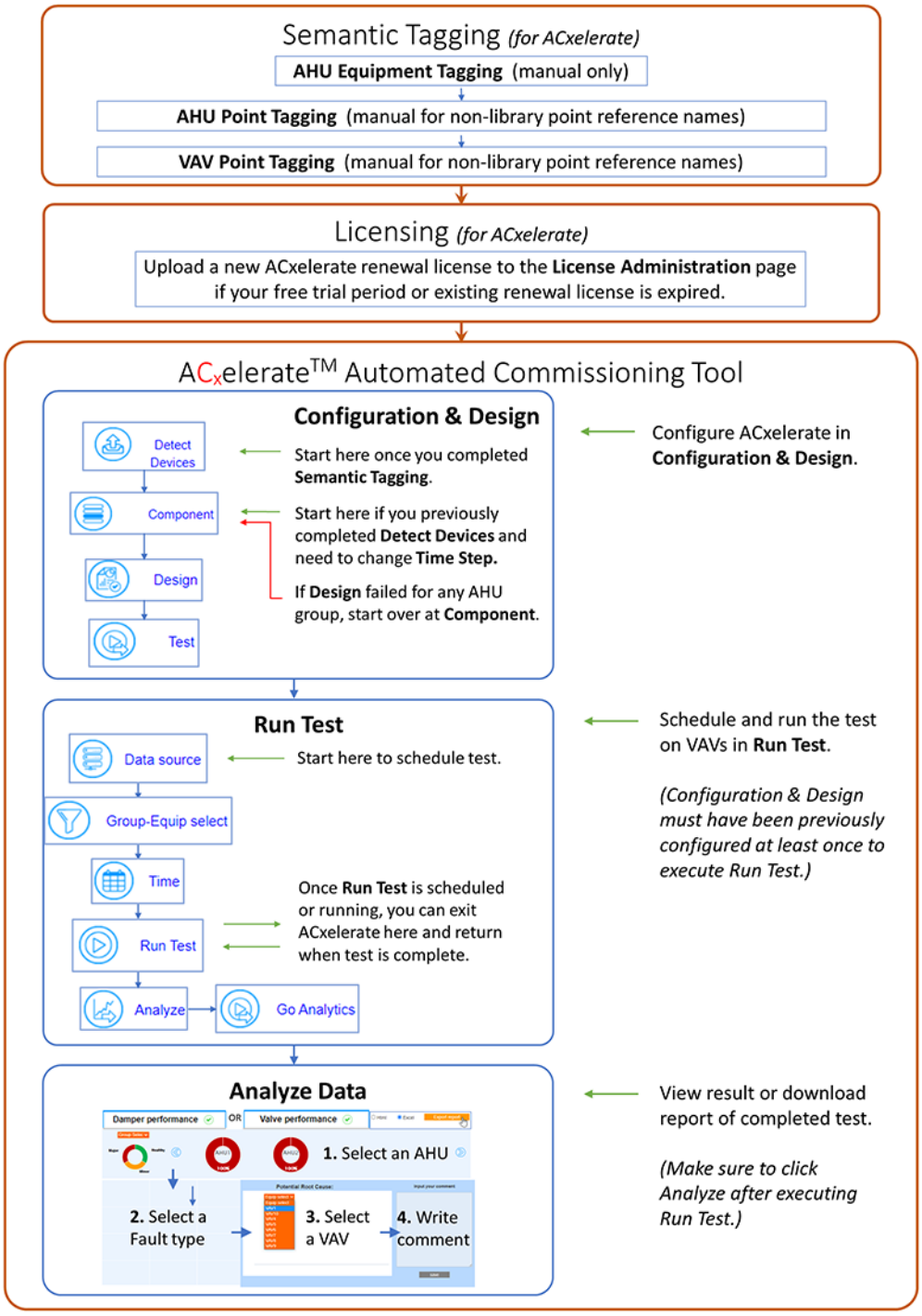
ACxelerate Process Flowchart



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Semantic tagging for ACxelerate

Use *semantic tagging* (page 152) to reference AHU equipment and points in AHU and VAV equipment. VAV equipment does not need semantic tags. It includes:

- Built-in semantic tags which are used by ACxelerate (you may see more built-in tags for ACxelerate, but they are for future use)
- Built-in semantic tag rules

Semantic Tags used in ACxelerate

Below is a list of semantic built-in tags that refer to the points in the description.

For AHU equipment

Tag	ID	Description
ACx AHU	acx_ahu	Applied to VAV AHU equipment to be tested
Hot Water Source	acx_hw_source	Optionally applied to Hot Water System or Boiler System equipment in which Hot Water Supply Temperature Point is present

For points in VAVs

Tag	ID	Description
ACx Flow Control	acx_airflow	Applied to airflow microblock to override damper command
ACx Airflow Value	acx_airflow_value	Applied to point to read airflow value
ACx Enable Damper Lock	acx_dmp_lock_check	Applied to point to read damper lock status - This is an optional point and required only if external damper lock enable point is present in VAV equipment.
ACx Heat Type	acx_heat_type_check	Applied to read heat type at relinquish.default used in equipment file. This is an optional point which is generally used in Carrier factory controllers
ACx HW Valve	acx_hw_valve	Applied to analog output microblock intended to override Reheat Valve command. This is an optional point required only for reheat valve test.
ACx Smart HW Valve CF	acx_hw_smart_valve_cf	Applied to analog output microblock intended to override smart Reheat Valve command. This is an optional point required only for reheat valve test that are smart valve in the Carrier factory controller.
ACx VAV Discharge Temp	acx_vav_dat_value	Applied to point to read VAV Discharge Air Temperature. This is an optional point required only for reheat valve test.

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For points in VAV AHUs

Tag	ID	Description
ACx AHU Supply Air Temp	acx_ahu_sat_value	Applied to point to read AHU Supply Air Temperature. It's an optional point required only for reheat valve test.
ACx AHU Supply Fan Status	acx_ahu_fan_status	Applied to point to read AHU Supply Fan Status.

Semantic Built-in Tags rules for Point Tags

The following list shows the built-in rules for points in VAV and in VAV AHU (there are no built-in rules for AHU equipment tag). Note that the reference names used in rules are taken from the EquipmentBuilder library as well as reference names used in Carrier factory controllers.

If you are using an EquipmentBuilder generated equipment file, Carrier factory controller, or reference name mentioned in the table below, then you do not need to assign any tags for any points.

Rule name	Reference name	Tags (ID)
ACx Flow Control	air_flow	ACx Flow Control (acx_airflow)
ACx Airflow Value	air_flow/flow_input	ACx Airflow Value (acx_airflow_value)
ACx Enable Damper Lock	lock_dmpr	ACx Enable Damper Lock (acx_dmp_lock_check)
	dmpr_lock	
ACx Heat Type	heat_type	ACx Heat Type (acx_heat_type_check)
ACx HW Valve	hw_valve	ACx HW Valve (acx_hw_valve)
ACx Smart HW Valve CF	hw_valve_b	ACx Smart HW Valve CF (acx_hw_smart_valve_cf)
ACx VAV Discharge Temp	da_temp	ACx VAV Discharge Temp (acx_vav_dat_value)
	sa_temp	
ACx AHU Supply Air Temp	sa_temp	ACx AHU Supply Air Temp (acx_ahu_fan_status)
	sat	
	lvg_air_temperature	
	sa_temp_sens	
	supply_temp	
ACx AHU Supply Fan Status	sf_status	ACx AHU Supply Fan Status (acx_ahu_sat_value)
	sf_status_bi	
	sfan_status	
	sfs	
	supfanstat	

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NOTE These built-in rules are only for VAV and VAV-AHU points. AHU equipment tag 'ACx_AHU (ID: acx_ahu)' needs to be assigned manually to each AHU equipment. You can do this by either individually assigning it to each equipment through the **Tags** tab in **Properties** page of each equipment, or by creating custom rules in the > **System Options** tree > **Semantics** > **Custom Rules**.

Semantic tagging for ACxelerate

CAUTION Before disabling ACxelerate make sure there is no ACxelerate activity in progress and no concurrently open ACxelerate browsers.

The ACxelerate database connection can be enabled or disabled from the ACxelerate home page (> **System Options** tree > **ACxelerate**). In the disabled state, ACxelerate is not connected to its database and cannot be used. In the enabled state, ACxelerate can be used as usual.

By default, it will be in the enabled state and for every restart of the i-Vu® Pro application it will retain its last state.

NOTE Enabling/disabling ACxelerate allows for a hot backup of the i-Vu® Pro application. If a hot backup is necessary, we recommend disabling ACxelerate when it's not in use. Otherwise, leave it enabled.

Configuration and Design

Once the ACxelerate database connection is enabled, you can configure and design ACxelerate.

This section covers:

- Discovering all VAV equipment and relating it to the appropriate AHU group with AHU equipment tagging
- Defining time step interval
- Designing the Run Test database for the configured VAVs

To initiate Configuration and Design

1 In the > **System Options** tree, click **ACxelerate**.

2 Enable ACxelerate if not already enabled.

3 Click **Configuration & Design**, then click **Detect devices**.

4 Click **Auto-detect devices**.

- Verify project and data source information:
  - **Project Name** is written by default. Change as per project needs.
  - **Data Source From** option defaults to **Linkage**. **User Tree** source is also available based on which option is used to link AHU and VAV. See *Before you begin checklist* (page 277) for details.

5 Click **OK** to accept values or click **Reset** to revert to default values.

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ACxelerate will scan the i-Vu® Pro database to find all VAVs and associate them with the AHU group. It will also find all required points for the damper and reheat valve test in the VAV and AHU equipment. ACxelerate is not required to be connected to the live system in order to complete Configuration & Design.

Once complete, the VAV matrix is displayed on-screen and the same data is also saved to Project Namecommission.xlsx where 'Project Name' is the name you created. The file is saved to **i-Vu Proxx\webroot**<system_name>**\webapp_public_acxelerate**.

The content in each column of the VAV matrix is explained below:

Point	Description
Air Source	'Display Name' of AHU equipment that this group of VAVs belong to
Equipment	'Displays Name' of VAV that the configuration parameter belongs to
Component Actuator	Parameter belongs to damper or reheat valve test
Time Step	By default, the step size is fixed at 20%. This means for the range of 0% to 100% as full stroke of actuator, there will be 6 steps where complete actuation range will be tested (0%, 20%, 40%, 60%, 80% and 100%). The time period for which data will be collected for each step is set here. The default value is 1080 seconds (18 minutes). While changing this make sure that: All VAVs damper and reheat valve tests are set to the same value. Values are set in multiples of 60 seconds. Values are not set less than 840 seconds for both damper and reheat valve system. For a damper only system, values cannot be set less than 660 seconds. If the system response is slower and more data points are required, then this period should be increased.
Actuator Mode	Path of the point to the override actuator value in VAVs
Actuator Enable Node	Path of the point to enable the actuator override in VAVs
Pos Cmd	Path of the trend point which store data for the override actuator value in VAVs
Pos Fdb	Path of the trend point which stores data for the value of damper position (feedback) in VAVs
Air Flow	Path of the trend point which store data for the airflow value in VAVs
VAV Dis Temp	Path of the trend point which store data for the VAV discharge air temperature value in VAVs
AHU Sup Temp	Path of the trend point which store data for the AHU supply air temperature value present in VAVs
Fan Status	Path of the Boolean status point to read the AHU supply fan status present in AHUs
Max AirFlow	Path of the point to read the cooling max airflow value in VAVs
Min AirFlow	Path of the point to read the occupied minimum airflow value in VAVs

NOTE Excel® contains additional columns for internal use only and should not be changed. These include Constraint Type, Constraint Limit, Lower Range, High Range, Var Step, Nominal Flow, and Location.

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Causes of auto-detect device failure:

- AHU Equipment Tag ‘ACx_AHU (ID: acx_ahu)’ is not assigned to AHU Equipment.
- Option selected for Data Source (where AHU and VAV are linked) is either incorrect or not working. Do not use for User Tree; VAVs are searched from their controller model type.

To modify time step from the table, use one of two methods:

Modify

1. Click **Modify**.
2. **Time Step** is the only value that can be modified from here. Changing the value in any row applies the same value to all rows.
3. Click **Save**.

Load file/Load existing file

To use this option, the auto-detect device option must have been used at least once so that the Excel® file "Project Namecommission.xlsx" already exists. Use Excel® to modify the file and upload it here.

NOTE Changes made in Excel® are not verified when uploading but will be verified in the Component tab.

6 After verifying that the equipment and parameter information from the VAV Matrix is correct, click **Component**.

- Damper is selected by default in the component selection option. If there is any reheat valve present on site, then only check the **Reheat Valve** check box.
- Click **OK**. Here you can modify **Time Step** for the selected component, if necessary.
- To temporarily clear a reheat valve for test, do this in **RunTest/Group-Equip** Select; see Setting up and running a test.
- Entries in the VAV Matrix that are marked in red have points missing that are required for the damper test.
- Entries marked in orange have points missing that are required for the reheat valve test.
- Missing points are caused by a semantic tagging mismatch and can cause the damper test and reheat valve test to fail.

7 Click **Design**. ACxelerate will automatically define the override values for each step of all VAVs to be used in the damper/reheat valve test.

NOTE The list is complete when all items are marked "Done". This may take up to a minute. If any of the AHU groups fail, start over at **Component**.

8 Click **Test**.

Run Test

Run Test allows ACxelerate to:

- select VAVs for the test
- schedule the damper and/or reheat valve test
- collect the field present value data and store it in its own database

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- pass data through the Analytics engine to find VAV faults
- route you to the Analyze Data Dashboard where results are displayed

NOTE If the Configuration & Design task has been previously performed, you can start the Run Test from here.

To select VAVs for Run Test

1 Click **Data source**, then click **Functional Test**. Click **OK** to continue.

2 Click **Group-Equip select**.

3 Select AHU(s) from the **Group selection** column (left) and the desired associated VAV(s) from the **Equip selection** column (center).

NOTE AHU groups marked in red have failed or were aborted in the previous test.

4 Right click to select a VAV from the **Equip selection** column.

5 Click > to move selected VAV from the **Equip selection** column to the **Enable or disable the test individually** column (right). To move all VAVs, click All >.

NOTE The **Enable or disable the test individually** column shows VAVs selected for the function test. VAV names are prefixed by AHU followed by two underscores. For example, if AHU name is 'AHU1' and VAV name is 'VAV1' then it will display as 'AHU1__VAV1'.

6 Right click to select/deselect VAVs in the **Enable or disable the test individually** column. Selection status is shown by the damper and reheat valve selection symbols:

Symbol	Meaning
	Damper test is selected for VAV
	Damper test is not selected for VAV
	Reheat valve test is selected for VAV
	Reheat valve test is not selected for VAV

7 Click < to remove selected VAVs from the **Enable or disable the test individually** column. To remove all VAVs, click All >.

8 Once the required VAVs are selected, you can group select/clear the damper or reheat valve test from the **Group Select** check box in the bottom of Equipment selection window.

9 Click **OK** to continue.

CAUTION For systems with low diversity and/or significantly over-sized VAV boxes causing AHU supply fan to max out for 70% of damper load, we recommend testing half of the VAVs in an AHU system at a time to avoid supply-starvation incidents.

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We recommend to:

- Test the damper first. Fix any faults and re-run the test until it passes.
- After the damper test passes, test the reheat valve. Fix any faults and re-run the test until it passes. You can also test the damper and reheat valves together.

To schedule Run Test

Click **Time** and select the date and time to run the test on all selected equipment. Date format is **mm/dd/yyyy**, and time format is **HH:MM** (24 hour).

- To ensure the test runs, schedule it to at least 2 minutes in the future.

If the damper and reheat valve tests are selected together, the damper test is scheduled first, followed by reheat valve. By default, the reheat valve test time is set to begin 30 minutes after the damper test is scheduled to be completed. (Damper Run Test is completed in = Time Step * 6 in minutes)

- To edit reheat valve test time, click Unlock and schedule the reheat valve test at least 30 minutes after the damper test is scheduled to be completed.
- If the reheat valve is selected for testing, you can set the **damper Lock at** to a value between 40 to 60% (default is 50%.) This locks all VAV dampers to the set value while the reheat valve test is in progress.
- Select the **Temperature Unit** to which Temperature points are set. The default is °F.

To initiate Run Test

1 Click **OK** to proceed to **Run Test**.

- The Run Test screen shows the Run Test Under Progress status. The damper test and reheat valve test each have their own tabs, depending on whether one or both tests are selected.
- All VAVs selected for the test are grouped by serving AHUs. Each VAV has dedicated rows with 8 steps displayed in columns described as follows:

Step 1: Lock

- In the damper test, **Lock** indicates an active damper override.
- In the reheat valve test, **Lock** indicates an active damper and reheat valve override.
- When executed, it turns from black to green. If failed, it turns red.

Steps 2-7: Test override values

- The damper test displays 6 damper override values in order of execution.
- The reheat valve test displays 6 reheat valve override values in order of execution.
- The reheat valve test in progress damper will be overridden to the value set in the **Time** window (not displayed in Run Test section).
- Each step will be executed for the time set in Time Step in Configuration & Design. When executed, each value turns from black to green. If failed, they turn red.

Step 8: Unlock

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- In the damper test, **Unlock** indicates that the damper override is released.
- In the reheat valve test, **Unlock** indicates that the damper and reheat override is released.
- When executed, it turns from black to green. If failed, it turns red.

- In the damper test, all VAVs start the test at the same time. Unless VAVs are aborted, they execute each step at the same time and finish at same time.
- The reheat valve test follows the same procedure.

2 Click **View ALL VAV** to view test progress of any group. The test is not complete until all items in the list are marked Done in the **Test Status** column.

The VAV Run Test will end in one of three states:

State	Meaning
Success	VAV test was completed successfully.
Failed	VAV test failed to start due to a missing point. If the reheat valve is not present in the VAV but is selected for the reheat valve test from **Group-Equip Select**, it will show as failed and can be ignored.
Aborted	VAV test was either automatically or manually aborted and failed to complete.

3 Once Run Test is complete, click **Analyze**. This process will take a few minutes.

4 Once complete, click **Go Analytics** to view results on the **Analyze Data** Dashboard.

NOTE If you go to the **Analyze Data** Dashboard without first clicking **Analyze**, the dashboard will display results from the previously run test.

NOTE While initiating Run Test, ACxelerate may display an orange pop-up screen as shown below. Do not perform any actions until this message closes. It will stay on screen for up to several minutes depending on server processing power and number of VAVs.

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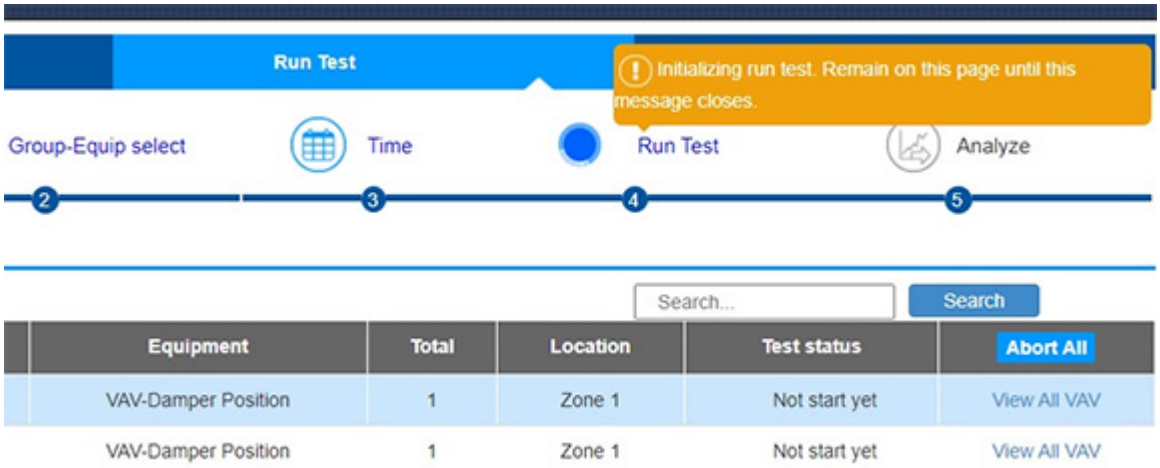


Once the orange pop-up screen closes, you can leave the screen while the test is in progress and return here when the test is expected to complete.

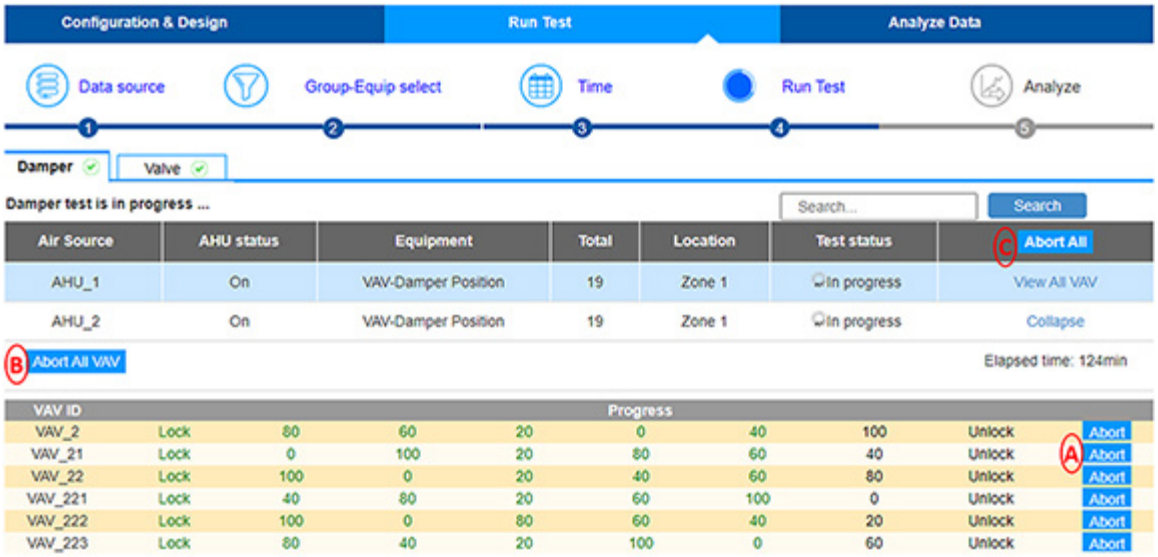
To cancel Run Test

a To cancel a specific VAV test, click **Abort**.

CAUTION Aborting the majority of the VAV tests for an AHU can create a high static risk if they are run while Building Schedule is unoccupied.

b To cancel all VAV tests associated with an AHU, click **Abort All VAV**.

c To cancel all AHU-VAVS tests in the lists, click **Abort All**.



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Automatic Aborts

- If the AHU fan status is OFF, all VAVs associated to that AHU group will automatically abort. Automatic abort may take up to 30 seconds to start.
- If the AHU fan status is not readable due to a communication issue, ACxelerate will attempt to read the AHU fan status for 3 minutes. If the AHU fan status is still not readable, then all VAVs associated with that AHU group will automatically abort.
- If a VAV point with the Tag Name 'ACx Enable Damper Lock' (Tag ID: acx_dmp_lock_check) turns true while test is in progress, it will automatically abort. Automatic aborts may take up to 30 seconds to start.
- If the damper override command does not match the damper position for 3 minutes from the step start time (applicable for all 6 steps in Run Test), the VAV test will be automatically aborted.
- If VAV controller is not readable while Run Test is under progress, ACxelerate will continue to make attempts until the end of the currently active step. If the VAV remains unreachable, it will automatically abort.

VAV test data details

VAV damper test data

- VAV damper test data is not collected for the first 3 minutes of each step. This time is used to allow the damper to transition to a new commanded state while allowing the air flow value to stabilize. Sample collection for the airflow sensor value starts from end of 4th minute and continues every minute for the duration of the step. This process is repeated for all 6 steps.
- A minimum of 7 stable state samples are required for ACxelerate analytics to work. The damper test time step value (set at the time of configuration) cannot be lower than 10 total minutes (3 minutes transition time + 7 minutes stable state data).

VAV reheat valve test data

- VAV reheat valve test data is not collected for the first 6 minutes of each step. This time allows the valve to transition to a new commanded state while allowing the VAV discharge air temperature value to stabilize. Sample collection for the AHU supply temperature and the VAV discharge air temperature sensor value starts after 7 minutes and continues every minute for the duration of the test. This process is repeated for all 6 steps.
- A minimum of 7 stable state samples are required for ACxelerate analytics to work. The reheat valve test time step value (set at the time of configuration) cannot be lower than 13 minutes (6 minutes transition time + 7 minutes stable state data).
- During the reheat valve test, it could take more than 6 minutes for the sensor value to stabilize. Some transition data nearing the stabilized state may be recorded. If this occurs, increase the time step to a higher value (a minimum of 7 stable state samples are required).

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Analyzing data

To view the analysis

1 Click **Go Analytics** in Run Test to view the current test results. You can also view previous test results from Analyze Data on the Home page.

2 Click on each **Damper Performance** and/or **Valve Performance** tab to view results.

3 From upper overview, select any AHU Group to review from either the **Group Select** drop-down list or from any pie chart. Each AHU pie chart is divided into 3 fault categories: **Healthy**, **Minor**, and **Major** faults.

4 All VAVs from the selected AHU group are grouped by fault category. Each category displays a point curve for all VAVs with that fault. Click any filled fault box to see further details. This screen will also show any healthy faults.

5 This section will display the potential root cause of the VAVs. Click on the **Equip select** drop-down list and select any VAV to see its corresponding IO curve. The damper test IO curve has the damper position on the X axis and airflow on the Y axis. The reheat valve test IO curve has the reheat valve position on the X axis and the temperature differential (VAV discharge temperature minus AHU supply temperature) on the Y axis.

6 Add any comments you wish to retain into the comments box on the right. Comments will be exported to the reports. Select either **Html** or **Excel** in the upper-right; then click **Export results**. Test results are found in your system's **Download** folder or wherever you have designated your browser to save the files.

7 AHU level warning message (if any) appear here.

NOTE Report downloads are disabled for dealer licenses.

TIP Raw data is available in the Excel® file on each AHU tab. This data is hidden to the right of column 'P'. To view the additional details, hover over the column headings, right-click, and select **Unhide**.

Faults identified by ACxelerate

ACxelerate VAV test results are divided into 4 fault types with 3 severity levels:

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Fault type	Fault name	Description
Healthy (Severity Level: 0) Indicates a healthy VAV. It may also show system level anomalies or unusual VAV configurations.	**Healthy**	No fault identified; device and sensor under test are working normally.
	Maximum Airflow Error (Damper performance only)	Maximum recorded airflow value during the test is less than the cooling maximum airflow setpoint. This could also indicate a possible starving box, as the maximum VAV load on AHU Fan is up to 60% at any point during the test.
	Minimum Airflow Error (Damper performance only)	Minimum recorded airflow value during the test is more than the occupied minimum airflow setpoint. This could also indicate a possible leakage fault. If minimum airflow is set to 0 cfm, the minimum airflow alarm will always appear. For CAVs with minimum airflow and maximum cooling airflow set to same value, the minimum airflow error alarm will never appear.
	Minimum and Maximum Airflow Error (Damper performance only)	Both maximum and minimum airflow errors are detected.
Minor Faults (Severity Level: 1) Indicates minor functional faults in the VAV. It may also show system level anomalies or minor issues.	**Starving**	For the damper, there may be a starving actuator. For the reheat valve, causes could include: • starving valve • oversize • valve and actuator together displaying quick-opening behavior • stuck actuator
	Obstruction	There may be obstacles in the duct/pipe or higher airflow/water flow resistance.
	Over-Stroking	Damper/reheat valve is stroking at a higher percentage than the actuator percentage.
	Under-Stroking	Damper/reheat valve is stroking at a lower percentage than the actuator percentage.
Major Functional Faults (Severity Level: 2) Indicates major functional faults in the VAV. Shows critical issues in VAV functionality.	**Leakage**	Leakage of air/water when damper/reheat valve is closed.
	Stuck	Damper/reheat valve is stuck in a particular position. An error in airflow sensor zero flow calibration could cause a damper test sensor issue to be flagged as Stuck Alarm.

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Fault type	Fault name	Description
	Sensor Issue	For damper test, the VAV airflow sensor is at fault. For reheat valve test, the VAV discharge air temperature and/or AHU supply air temperature sensor are at fault.
	Reverse-Stroking	Damper/reheat valve operating in reverse of the expected direction.
	Expert Diagnosis Required	If the input-output curve is abnormal but does not fall under any of the mentioned faults, manually check the VAV box for issues. This fault could be caused by higher variation in airflow or static pressure from the AHU fan during the damper or reheat valve test. It could also be caused by higher variation in boiler supply temperature or boiler pump speed during the reheat valve test. Time step value may need to be increased to allow residual heat to settle during step position changes.
	Actuation Range Insufficient	Data samples collected by the tool do not cover all of the expected steps defined at design stage. Actuation range is comprised of 6 steps: 0%, 20%, 40%, 60%, 80%, 100%. If data associated with any of these steps is not available, it will lead to this fault.
Major Data Faults (Severity Level: 2) Indicates major faults in collecting data from VAV and/or AHU controllers. There may be a communication issue or the controller is offline.	**Data Insufficient**	Data samples collected by the tool from the i-Vu® Pro database are not sufficient to run analytics. 42 or more are required to run the analytics.
	Data Unavailable	Data sample collection failed due to offline VAV, or VAV test failed.

NOTE If damper and reheat valve test are selected together and any fault is identified during a damper test for a VAV, the reheat valve test results may not be valid. Repair the damper, then re-run the tests.

Testing other types of VAV boxes

ACxelerate can run tests for single-duct VAVs with damper and reheat valve control. Fan control or dual-duct (two damper) control is not available. See the guidelines below for testing other types of VAVs.

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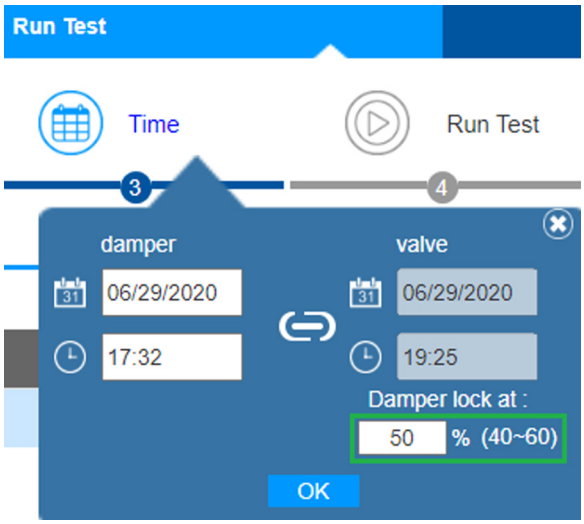
Fan power box

- **Series Fan VAVs**: Manually override the series fan running in the correct direction before running the ACxelerate damper and reheat valve test. For a reheat valve test, go to **Run Test** > **Time** > **Damper Lock at** and set the damper lock value to 60%.



NOTE For Series fan VAV, during the reheat Valve test it is important that the air flowing through VAV damper (when the damper is 60% open) is greater than or equal to the air pulled by VAV Fan. To achieve this, run the AHU at highest allowed statis pressure setpoint. If this does not help, then try reducing the VAVs for the test and ensure all unselected VAV dampers are closed.

- **Parallel Fan VAVs with reheat coil installed in series**: Manually override the parallel fan to **Off** before running the ACxelerate damper and reheat valve test.
- **Parallel Fan VAVs with reheat coil installed in parallel duct before fan**: Manually override the parallel fan to **Off** before running the ACxelerate damper test (you cannot execute a reheat valve test for this VAV).

NOTE The additional built-in tags and tag rules for series and parallel fans in Semantics for ACxelerate are for future use, and can be ignored at this time.

Dual duct VAVs

Only one damper and airflow sensor can be tested at a time in a VAV. To test both decks in dual-duct VAVs:

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1 Create separate custom semantic tag rules for each airflow microblock and airflow value for each deck (cold and hot) using tags as shown in the table below. Keep them disabled.

Point Description	Reference name	Built-in Tags (ID)
Cold Deck Airflow Control Microblock	at actual	ACx Flow Control (acx_airflow)
Hot Deck Airflow Control Microblock	at actual	ACx Flow Control (acx_airflow)
Cold Deck Airflow Value	at actual	ACx Flow Control / Flow Input (acx_airflow_value)
Hot Deck Airflow Value	at actual	ACx Flow Control / Flow Input (acx_airflow_value)

2 To test a cold deck:

a) Enable Cold Deck Airflow Control Microblock and Cold Deck Airflow Value Custom Semantic Tag rules.

b) Force hot deck damper to close.

c) Discover ACxelerate equipment and run the test.

d) Once the testing is complete, disable the custom tag rules from step a.

3 To test a hot deck:

a) Enable Hot Deck Airflow Control MicroBlock and Hot Deck Airflow Value Custom Semantic Tag rules.

b) Force cold deck damper to close.

c) Discover ACxelerate equipment and run the test.

d) Once testing is complete, disable the custom tag rules from step a.

NOTE You can also use this strategy to test additional applications that combine the VAV Zone Controller II with the Secondary Terminal controller.

VAVs with 2 reheat coils

The process below is only for valves with 2 reheat coils installed in series with a VAV damper, with both reheat coils supplying air to the same VAV discharge air temperature sensor. This can also be used for parallel smart valves used for reheat coils.

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1 Create separate custom semantic tag rules for each reheat coil valve AO microblock as shown in the table below. Keep them disabled.

Point Description	Reference name	Built-in Tags (ID)
Reheat Valve1 AO Microblock	at actual	ACx HW Valve (acx_hw_valve)
Reheat Valve2 AO Microblock	at actual	ACx HW Valve (acx_hw_valve)

2 To test reheat valve 1:

a) Enable Reheat Valve1 AO Microblock Custom Semantic tag rules.

b) Force Reheat Valve2 AO Microblock to close.

c) Discover ACxelerate equipment and run the test.

d) Once the testing is done, disable the custom tag rules from step a.

3 To test reheat valve 2:

a) Enable Reheat Valve2 AO Microblock Custom Semantic tag rules.

b) Force Reheat Valve1 AO Microblock to close.

c) Discover ACxelerate equipment and run the test.

d) Once testing is complete, disable the custom tag rules from step a.

NOTES

- ACxelerate can test only one reheat valve at a time.
- Base board valves cannot be tested.

VAVs with SCR Control Electric Reheat

The ACxelerate reheat valve test is designed for water coils control with value and actuator. However, this tool can also be used to test whether the SCR system is functioning or failed. If you do so, note the following:

1 This test requires VAV discharge air temperature.

2 In the **Run Test** section, at the **Time** popup screen on the reheat valve side, set the **damper Lock at** to 60%.

3 Ignore all minor faults. Proceed as if SCR Reheat is functioning properly.

4 Consider stuck faults as SCR Control Reheat failures.

Downloading to controllers

If you make any of the following changes, you must download the new data from the i-Vu® Pro application to the affected controllers.

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In the i-Vu® Pro interface	• Change or reload a control program • Change or reload a driver • Change a schedule **NOTE** A schedule change automatically downloads unless you uncheck **Automatically Download Schedules on each change** on the **My Settings** page. • Change a screen file

The i-Vu® Pro application automatically marks the affected controllers as requiring a download. You can download these controllers from the **Properties** *page* (page 299) for the controller, the equipment, or a microblock.

When the i-Vu® Pro application marks a controller for download, it determines what information needs to be downloaded based on the type of information that changed. See *Download Options* (page 297).

By default, Full Source files are downloaded to Open PIC controllers because **Optimize download for Open PIC controllers** is unchecked in the **System Options** (or **System Settings**) > **General** tab > **Download** section. If you have multiple sites, you can adjust this for each site individually. Check this option if you do not want Full Source downloaded.

CAUTION If you want this option checked and purposely had it checked in your previous system, it is automatically unchecked after upgrading and you must check it again.

NOTES

- A property change in the i-Vu® Pro interface is automatically downloaded to the controller. If the download fails, the controller is added to the **Downloads** page with the reason for the failure.
- To see who downloaded a controller last, go to the navigation tree, select the controller, then do one of the following:
  - Select **Properties** > **Control Program** > and click the underlined **Controller:** name (Controller 1, Controller 2...) at the top left. This opens the **Controller Information** page, where you click the **Module Status** button.
  - Select **Reports** > **Network** > **Controller Status** and then click **Run**.
  - Right-click the controller in the tree and select **Module Status**.

Download Options

When the i-Vu® Pro application marks a controller for download, it determines what information needs to be downloaded based on the type of information that changed. Below are the options that can be downloaded.

This option...	Downloads...
All Content	• The names and executable portion of the driver and control programs • The names and full content of Equipment Touch and BACview® files • The names of any .view files that are marked to be included in a download • Parameters • Schedules **NOTE** An All Content download also: • Synchronizes the controller's time to the i-Vu® Pro web server. • Overwrites trends in the controller. • Restarts the controller.

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This option...	Downloads...
Only Schedules	All schedules that are not set for automatic download
Only Parameters	All editable properties
Only BBMDs	BBMD tables (.bdt file) that you have updated but have not yet written to the controller

NOTES

- An All Content download clears trend, history, and alarm data from the affected controllers. At the beginning of the download process, trends that have the Trend Historian enabled are saved to the system database.
- If Field Assistant will be used with your system, you can choose to have the **All Content** option download the full source files instead of only their names. See *Commissioning equipment using Field Assistant* (page 274).

To download from the Downloads page

The **Downloads** page shows any controllers that the i-Vu® Pro application marked for download. But if needed, you can add other controllers to the list.

To download:

1 On the navigation tree, select an item to download controllers at and below that item.

2 Click **Downloads**.

3 Click ▶ to the left of a **Location** to see controllers that require a download.

4 Optional: To add controllers to the list:

a) Click **Add**.

b) Select the controller(s).
NOTE Use **Ctrl+click** or **Shift+click** to select multiple controllers.

c) Select a *Download Option* (page 297).

d) Click **Add**, then click **Close**.

5 Select the controllers that you want to download.

NOTES

- Use **Ctrl+click**, **Shift+click**, or the **Select All** checkbox to select multiple controllers.
- A network's controllers download in the order shown. To change the order, select a controller(s), then drag and drop or click **Move to Top** or **Move to Bottom**.
EXCEPTION If a controller's router requires a download, it will download first regardless of its position on the Download page.

6 Click **Start**.

NOTES

- Click **Hold** to stop pending downloads. Active downloads cannot be stopped.
- Up to 5 routers can download simultaneously.
- A controller is removed from the list when its download is complete.
- Icons in the **Tasks** column indicate the following:

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	Active—The i-Vu® Pro application is downloading to the controller.
	Pending—You initiated the download, and the controller is waiting for its turn to download.
	Failed—The download failed. See *If a controller fails to download* (page 299).
	On Hold—Indicates either of the following: • The controller requires a download • You clicked **Hold** to stop a pending download.

- Click in the upper left-hand corner to view a log of download activity in the current session. **Copy to Clipboard** lets you copy the text to paste it into another application.
- To remove an item from the download list, right-click the item, then select **Remove selected tasks**.

To download from a Properties page

If a controller requires a download, a red download message and a **Download** button appear at the top of the **Properties** page for the controller, the equipment, or a microblock. Click the button to start the download.

Downloading from the **Properties** page downloads **All Content** to the controller.

If a controller fails to download

A controller that fails to download appears on the **Downloads** page with this icon .

1 Review the reason for the failure:

   - Hold your cursor over the failed task to see hover text giving the reason.
   - Click in the upper left-hand corner of the page to see information on all failed downloads. **Copy to Clipboard** lets you copy the text to paste it into another application.

2 Correct the problem that caused the failure.

3 Select the controller on the **Downloads** page, then click **Start**.

Monitoring and controlling equipment

You can monitor and control your equipment from:

- The Open and i-Vu® XT controller's **Properties (page 25)** pages
- The CCN controller's **Properties** (page 25) pages and the tables that are available when you expand the categories under the controller in the navigation tree
- *The equipment graphic* (page 19) (if applicable)

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To lock a BACnet point or value

You can lock certain editable parameters to a specified setting from the **Properties** page or microblock popup.

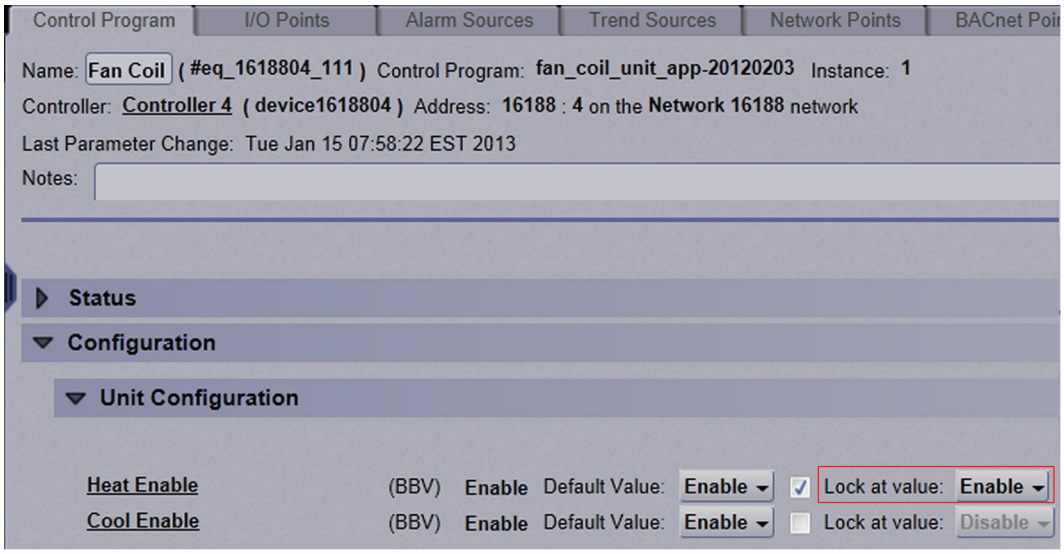
1 Select the **Lock** checkbox.

2 Type the value you want to send to the controller.

3 Click **Accept**.

NOTE Locked values are indicated by a dashed yellow line on graphics.

On **Properties** page > **Control Program** tab, click ▶ to locate the point you wish to lock.



On the microblock popup:

1. Click on the underlined **Name** or **Reference Name** of the point on any of the **Properties** tabs to open the microblock popup.
2. Click **Properties** page > **Details** tab to lock a value.

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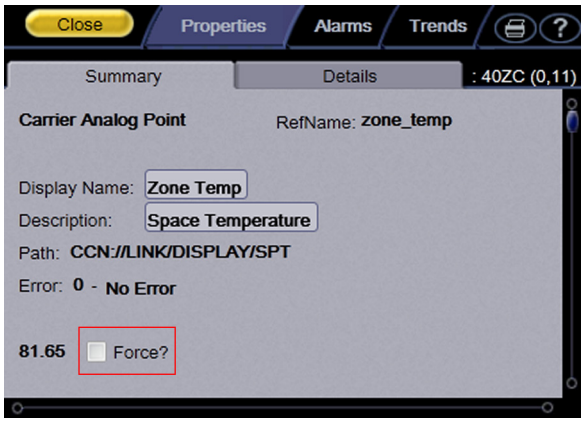
To force a CCN point value

You can force certain editable point values to a specified setting from:

- Equipment tables - click ▶ next to the equipment to expand tables
- A graphic - hold down Ctrl and, using your mouse, click on the point value on the graphic. A microblock popup appears.
- Properties pages

Forced values are indicated by a dashed yellow line on graphics.



1 Select the **Force** checkbox.

2 Type the value you want to send to the device.

3 Click **Accept** or **Apply**.

To set up peer caching

On the **Devices** page > **Advanced** tab, you can select a **Group Cache Controller** from the drop-down list. Choose the router closest to the i-Vu® Pro server to be the peer caching router. The peer caching router will poll other routers on the IP network for colors and prime variables.

Peer caching also checks the communication status of the peer caching router and any routers for which it is caching. If any of the routers cannot communicate, a Dead Module Timeout alarm is issued.

Working with drivers in the i-Vu® Pro interface

A controller's driver is defined in SiteBuilder when the system is engineered, but you can make the following changes in the i-Vu® Pro interface.

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- Change the driver settings.
- Change or upgrade a driver. See topic below.
- Reload a driver if it becomes corrupt (for example, a driver page is missing in the i-Vu® Pro interface). On the i-Vu® Pro navigation tree, right-click the controller or driver, then select **Reload Driver**. Changes you made on the driver pages in the i-Vu® Pro interface remain in effect.

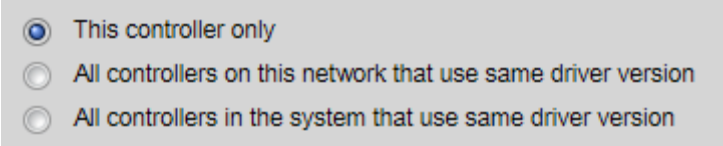
After you make these changes, you must *download All Content* (page 296) to the affected controller(s).

NOTE You can also make these changes in SiteBuilder. See "To change or upgrade a driver" in SiteBuilder Help.

To change or upgrade a driver

1 On the i-Vu® Pro navigation tree, right-click the controller, then select **Configure**.

2 If other controllers in the system use this driver, select which controllers you want to change.



3 Do one of the following:

If the driver is...	
In the **Driver Version** drop-down list	a. Select the driver. b. Click **Accept**.
Not in the **Driver Version** drop-down list	a. Click **Add**. b. Browse to select the driver. c. Click **Open**. d. Click **Continue**. e. Click **Close**. f. Click **Close** again.

4 *Download All Content* (page 296) to the controller.

NOTE You can click **Delete Unused** in the **Controller** section to delete all unused drivers in **I-VuProx.x\webroot**<system_name>**\drivers**.

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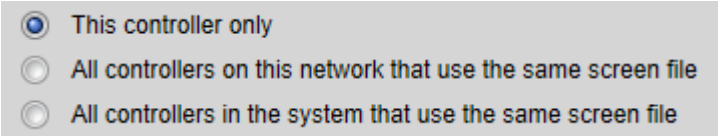
Working with touchscreen or BACview® files in the i-Vu® Pro interface

To use a touchscreen device or BAC*view*® to view or edit a controller's property values, you must download a screen file (.touch, .bacview, .S37, or.kpd) to the controller. The screen file is typically defined in SiteBuilder and downloaded with the initial download to the controller, but you can select a different file in the i-Vu® Pro interface.

To select a different screen file

1 On the i-Vu® Pro navigation tree, right-click the controller, then select **Driver Properties** > **Update** tab.

2 If other controllers in the system use the current screen file, select which controllers you want to change.



3 Do one of the following:

If the screen file is...	
In the **Screen file** drop-down list	a. Select the file. b. Click **Accept**.
Not in the **Screen file** drop-down list	a. Click **Add**. b. Browse to select the screen file. c. Click **Open**. d. Click **Continue**. e. Click **Close**. f. Click **Close** again.

4 *Download All Content* (page 296) to the controller.

NOTE You can click **Delete Unused** in the **Screen File** section to delete all unused screen files in:

- **i-VuProx.x\webroot**<system_name>**\views**
- **i-VuProx.x\webroot**<system_name>**programs**

To edit a screen file on an i-Vu® Pro client

On an i-Vu® Pro client, you can get a copy of a screen file from the server, edit it, then put it back on the server.

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To get the screen file

1. On the i-Vu® Pro navigation tree, right-click the controller that uses the screen file, then select **Driver Properties** > **Update** tab.
2. Under **Screen File**, click **Edit**.
3. Click **Save as.**
4. Browse to the folder you want to put the file in.
5. Click **Save**.
6. Click **Close**.

To put the edited file back on the server

1. On the i-Vu® Pro navigation tree, right-click the controller that uses the screen file, then select **Driver Properties** > **Update** tab.
2. Under **Screen File**, click **Add**.
3. Browse to select the file.
4. Click **Open**.
5. Click **Continue**.
6. Click **Close**.
7. Click **Close** again.

Setting up i-Vu® Pro client devices and web browsers

The i-Vu® Pro system can be viewed on the following client devices and web browsers.

Computers

The client computer should have at least:

- Quad core processor
- 4 GB RAM
- Communications link of 100 Mbps or higher

The i-Vu® Pro application will work with slower computers and slower links, but the results may not be satisfactory.

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A computer with this operating system...	Supports these web browsers...
Windows®	Google™ Chrome™ v84.0 or later [1] Microsoft® Edge v84 or later Mozilla® Firefox® v79.0 or later
Mac® OS X® (Apple® Mac only)	Safari® v11 or later [2] Google Chrome v84.0 or later Mozilla Firefox v79.0 or later

1 Best performance

2 Best performance unless browser is running on a Mac® Mini or a MacBook:

WARNING If machine is running Mountain Lion 10.8x with an integrated Intel HD 400 graphics card, it will experience display issues. Use one of these workarounds for better performance:

- If an additional NVIDIA graphics card is available, manually switch the graphic card setting in MAC® OS X® to use that card.
- If not, use Google™ Chrome™ v84.0 or later.

Mobile devices

Device type	Platform support
Smart phone	Android™, iOS
Tablet	Android™, iOS, Surface™

NOTE Some functionality may be limited by the capability of the mobile device and operating system.

Setting up and using a computer with the i-Vu® Pro system

- Set the monitor's screen resolution to a minimum of 1920 x 1080 with 32-bit color quality
- You may want to disable the computer's navigation sounds.

Mac only

NOTE The instructions below are for a Mac OS X 10.8. Other versions may vary slightly. See your computer's Help if necessary.

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Computer settings	To change setting...
Enable right-clicking to see right-click menus:	
On a Mac	1 Select **System Preferences** > **Mouse**. 2 Click the drop-down list that points to the mouse's right-click button, then select **Secondary Button**.
On a MacBook	1 Select **System Preferences** > **Trackpad**. 2 Enable **Secondary click**.

The instructions in Help are for a Windows computer. For instructions that include the **Ctrl** key, replace **Ctrl** with **Command**. For example, replace **Ctrl+click** with **Command+click**.

Setting up and using a web browser to view the i-Vu® Pro interface

To set up and use Microsoft Edge

The instructions below are for Microsoft® Edge.

Web browser settings	To set in Microsoft Edge...
Do not block cookies	1 Click **...** to display the Actions droplist. 2 Select **Settings** > **Site Permissions** > **Cookies**.
Disable web browser's pop-up blockers *	1 Click **...** to display the Actions droplist. 2 Then select **Settings** > **Site Permissions** > **Pop-ups and redirects**.

To...	Do the following...
Maximize the web browser window *	Use the minimize/maximize button in the top right corner of the browser window.
Have 2 different users logged in to the i-Vu® Pro system on the same computer *	1 Click **...** to display the Actions droplist. 2 Select **New Window**.
Clear browser cache	1 Click **...** to display the Actions droplist. 2 Select **Settings** > **Privacy, Search, and Services** > **Clear browsing data**. 3 Click **Choose what to clear**. 4 Click **Clear now**.

* Does not apply to Microsoft Edge on a phone.

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To set up and use Mozilla Firefox

NOTES

- The instructions below are for Mozilla® Firefox® v60.0 on a Windows operating system. Other versions may vary slightly. See your web browser's Help if necessary.
- If the menu bar is not visible, right-click on the window's title bar, and then select **Menu bar**.
- If a message appears in the i-Vu® Pro interface that includes the checkbox **Prevent this page from creating additional dialogs**, DO NOT check this box.

Web browser settings	To set in Firefox...
Disable Pop-up blocker	**1** Click **Tools** > **Options** > **Privacy & Security**. **2** Under **Permissions**, click **Exceptions** next to **Block pop-up windows**. **3** Type `http://` (or `https://`) and then the server name or IP address of your system. **4** Click **Allow** and then **Save Changes.**
Enable JavaScript	**1** In the address bar, type `about:config`, and then press **Enter**. **2** Click **I accept the risk**. **3** In the **Search** bar, type `javascript.enabled`. **4** If the value field shows **true**, JavaScript is enabled. If it shows **false**, right-click **javascript:enabled**, and then select **Toggle**.
Add-ons Manager	Select **Tools** > **Add-ons** > **Extensions**. On this page, you can enable/disable installed add-ons such as: • Adobe® Acrobat® Reader (to view PDF's) • QuickTime Plug-in (to play audible alarms) Only installed Firefox add-ons will show up in the list.

To...	Do the following...
Maximize the web browser window	Press **F11** to turn full-screen mode on\off.
Clear browser cache	**1** Click **Tools** > **Options** > **Privacy & Security**. **2** Under **Cookies and Site Data**, click **Clear Data**. **3** Click **Clear**.
Have 2 different users logged in to the i-Vu® Pro system on the same computer	Start a new web browser session. Select **File** > **New Private Window**.

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To set up and use Google Chrome

NOTES

- The instructions below are for Google™ Chrome™ v66.0. Other versions may vary slightly. See your web browser's Help if necessary.
- If a message appears in the i-Vu® Pro interface that includes the checkbox **Prevent this page from creating additional dialogs**, DO NOT check this box.

On a computer

Web browser settings	**To set in Chrome...**
Enable pop-ups	**1** Click on the browser toolbar. **2** Select **Settings**. **3** Click **Advanced** at the bottom of the page. **4** Under **Privacy and security**, click **Content settings**. **5** Under **Pop-ups** > **Allow**, click **ADD**, and then type http:// (or https://) and then the server name or IP address of your system.

To...	**Do the following...**
Clear browser cache	**1** Click on the browser toolbar. **2** Select **More tools** > **Clear browsing data**. **3** Select a time range in the drop-down list. **4** Check the types of information that you want to remove. **5** Click **CLEAR DATA**.
Maximize the web browser window	Press F11 on your keyboard to turn full-screen mode on/off.
Have 2 different users logged in to the i-Vu® Pro system on the same computer	Start a new web browser session. Click , then select **New incognito window**.

On Chrome for Android

NOTE The following settings are based on Android v11 - options may vary with versions.

Web browser settings	**In the Chrome menu...**
Turn off desktop mode	Uncheck **Request desktop site**
Disable pop-up blocker	**Settings** > **Advanced** > **Site Settings** > uncheck **Block pop-ups**

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Web browser settings	In the Chrome menu...
Enable JavaScript	**Settings** > **Advanced** > **Site Settings** > check **Enable JavaScript**
Enable Cookies	**Settings** > **Advanced** > **Site Settings** > check **Accept Cookies**

To...	In the Chrome menu...
Clear browser cache	**Settings** > **Basics** > **Privacy** > **CLEAR BROWSING DATA**

To set up and use Safari

NOTES

- The instructions below are for Safari® v11. Other versions may vary slightly. See your web browser's Help if necessary.
- We recommend that you do not run Safari in full-screen mode. If you do, i-Vu® Pro pop-ups will open full-screen, covering the main application window.

On an Apple® computer (Mac®)

Web browser settings	To set in Safari...
Disable pop-up blocker	**Preferences** > **Security** > uncheck **Block pop-up windows**
Enable JavaScript	**Preferences** > **Security** > check **Enable JavaScript**
Enable Plug-ins	**Preferences** > **Security** > check **Enable plug-ins**
Prevent pop-ups from opening in a new browser tab	**Preferences** > **Tabs** > uncheck **Command-click opens a link in a new tab**
Prevent Safari from automatically opening zip files exported from the i-Vu® Pro application	**Preferences** > **General** > uncheck **Open "safe" files after downloading**

To...	Do the following...
Clear browser cache	**History** > **Clear History**
Have 2 different users logged in to the i-Vu® Pro system on the same computer	Start a new web browser session. Select **Safari** > **Private Browsing** > **File** > **New window**

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On an Apple® iPad

Web browser settings	To set on the iPad...
Disable pop-up blocker	**Settings**> **Safari** > set **Block pop-ups** to **Off**
Enable JavaScript	**Settings** > **Safari** > set **JavaScript** to **On**

TIP Re-enable popup blocking on your device when not using our software.

To...	Do the following...
Clear browser cache	**Settings** > **Safari** > **Clear History**

TIP Re-enable popup blocking on your device when not using our software.

On an Apple® iOS 12.2

Web browser settings	To set on the iPhone...
Enable JavaScript	**Settings** > **Safari** > **Advanced**

Setting up a system in the i-Vu® Pro interface

Using System Options

System Options provides administrative access for the following functions:

- *My Settings* (page 311) **-** user's login, navigation tree preferences, and personal contact information
- *System Settings* (page 312)
  - *General* (page 312)
  - *Security* (page 315)
  - *Communications* (page 317)
  - *Scheduled Tasks* (page 317)
  - *Daylight Saving* (page 318)
  - *Add-ons* (page 318)
- *Operators* (page 156) - operator passwords, levels of access (roles), menu starting location
- *Privilege Sets* (page 157)
- *Operator Groups* (page 161)

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- *Categories* (page 51) - Schedule, Alarm, Graphic, Property, Trend, Report
- *Connections* (page 195, page 198) - To set up a BACnet/IP connection in the i-Vu® Pro interface
- *Services* (page 11)
- *License Administration* (page 321)
- *Update* (page 322)
- Client Installs - download Sun's Java VM. See *Setting up a computer* (page 305) and *Alarm Popup Application* (page 70) in the i-Vu® Pro Help.

My Settings

On the **My Settings** page, you can change settings, such as your:

- Password
- Viewing preferences
- Contact information

NOTE The System Administrator can also change these settings on the **Operators** page.

To change your settings:

1 On the **System Options** tree, select **My Settings**.

2 Make changes on the **Settings** or **Contact Info** tab. See table below.

3 Click **Accept**.

Field	Notes
Change password	Enable this field, then type your current and new password and then confirm. Limit is minimum of 8 and maximum 40 characters of any type.
Starting Location and **Starting Page**	The i-Vu® Pro view, location, and page that will be displayed after you log in.
Automatically collapse trees	Expands only one tree branch at a time.
Automatically download schedules on each change	Select to automatically download all new schedules that you create and schedules that you change.
Play sound at browser when server receives	Check **Non-critical alarms** or **Critical alarms** if you want the system to audibly notify you when that type of alarm is received. You can specify a different sound file. • Internet Explorer, Firefox, and Safari support .wav, .mp3, or .au files. • Google Chrome supports .wav or .mp3 files. 1 Put your file in the **webroot_common\lvl5\sounds** folder. 2 In the **Sound File** field, replace **normal_alarm.wav** or **critical_alarm.wav** with the name of your sound file. **NOTE** You can put your sound file anywhere under the **i-VuProx.x** folder, but you must change the path in the **Sound File** field.

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System Settings

The **System Settings** page contains information that you must enter before the i-Vu® Pro application can run properly.

1 On the **System Options** tree, select **System Settings**.

2 Click each tab, then enter the necessary information. Tab details are described below.

General tab

The **General** tab presents the following **System Information**:

- **System Directory Name**
- Path to the **Webroot Directory**
- **Database Type**
- **System Language**

You can edit or use the following fields and buttons.

Field	Notes
System Information	
System Statistics button	Click to see the following system information: • Number of controllers • Number of controllers that can run control programs • Number of points, regardless of vendor • Number of trend sources in database • Number of trend samples in database
Levels displayed in paths	The number of levels displayed in i-Vu® Pro paths. For example, if **Node Name Display Depth** is set at: 2, a typical path might be ..\AHU-1\RA Temp 3, a typical path might be ..\Atlanta R&D\First Floor\AHU-1 **NOTE** Changing this field does not take effect until you restart the i-Vu Pro Server application.
Use metric units for CCN tables and control	Check to use metric values.
Logs	
Select a week of logs to review	For troubleshooting, you can download a zip file that contains logs of system activity.
Time	
Time Format	Select one of the following for the system's time: • **12-hour clock** (Example: 4:34 pm) • **24-hour clock** (Example: 16:34)
Date Format	Select the format you want the system to use.

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Field	Notes
Time Sync	Click to immediately synchronize the time on all IP network controllers in the system database to the i-Vu® Pro server's time. Check **Enable time synchronization of controllers daily at____** to set daily time synchronization occurs daily if the field on the *Scheduled Tasks tab* (page 317) is enabled. (Click this link for more information on time synchronization.) Automatically synchronizes the time on all equipment to the time on the server, adjusting for different time zones and Daylight Saving Time. We recommend that you check this field. The i-Vu® Pro application will send a daily time sync message to each IP network device that is in the system database. IP devices not in the database will not be synchronized. For all MS/TP networks in the database, the i-Vu® Pro application will send a broadcast time sync message. All devices on these networks will be synchronized, regardless of whether or not the devices are in the database. **CAUTIONS** • Make sure that your server's time and time zone setting are correct. • To prevent time sync problems when the transition to and from Daylight Saving Time occurs, set the time sync to occur at least 1 hour after the last controller in the system is adjusted for DST. For example, your server and part of your system is in the Eastern Standard Time zone, but you also have controllers in the Pacific Time zone. Your server is adjusted for DST at 2:00 a.m. Eastern Standard Time, but the controllers in the Pacific Time zone are not adjusted until 3 hours later. So you would set the time sync to occur daily at 6:00 a.m. or later. **NOTES** • You can perform system-wide time synchronizations using the **Time Sync** button. • Between time sync broadcasts, Carrier routers include time sync information in each color request to the devices below the router. This ensures devices without a battery-backed clock will get the time shortly after powering up.
Alarms	
Enable support for Alarm Notification Clients to connect to this server	Check to use the Alarm Notification Client application. See *Alarm Popup* (page 70) alarm action. **NOTE** When using location-dependent security, users only receive alarms for locations they are allowed to access.
Schedules	
Disable Schedules	If your system has no need to run schedules, check this box so that the Schedules feature is no longer visible in the i-Vu® Pro interface.

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Trends	
Keep trends for ___ days	Stores trend data in the i-Vu® Pro database for the time you specify. This is a default setting that you can change when you set up trends for an individual point.
Display gap in graph line for missing data	Check to show a gap if trend data is missing.
Source Files	
All Source Files	Use to export source files to a .zip file that can be imported into another i-Vu® Pro or Field Assistant system. Source files include: • Control programs (.equipment files only) • Drivers • Graphics (.view files only) • Touchscreen files • BACview® files • Report design files for Equipment Values or Trend Sample reports **NOTE** If import detects a difference between a database file and an import file with the same name, import does not overwrite the database file. A message lists any file differences so that you can resolve them. See *Commissioning equipment using Field Assistant* (page 274).
Download	
Optimize download for Open PIC controllers	Check to increase download speed. The full source files are not downloaded into the PIC controllers when this is checked.
Include graphics in Open programmable controller download	Uncheck to increase download speed. If you are not changing the graphics, you may not want to include them in every download.
Clippings	
Import	Click button to import clipping files, which include: • Navigation tree items including attached control programs, graphics, drivers, and screen files • Trend data • Reports • Alarm categories • Schedules and schedule group membership (including the entire schedule group and schedules, if it does not exist in the target system) • Alarm actions **NOTES** • Does not include operators or alarms • A clipping containing CCN controllers does not include the CCN tables. When importing a clipping containing CCN devices, you must re-scan the table.

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Email Server Configuration	The information in this section is used by the *Send email alarm action* (page 78) and used to email a *Scheduled Report* (page 145).
From	Enter a valid address if required by your mailserver.
Mail Host	The mailserver's address. This can be an IP address or a system name, such as mail.mycompany.com.
Mail Host Port	Change this field if using a port other than the default port 25.
Mail Host Security Options	Select the type of security the mailserver uses. • **Cleartext (SMTP)** – Uses the SMTP protocol to send as clear text over TCP/IP • **Secure SSL (SMTP with SSL)** – Uses SSL, a communication protocol that provides data encryption • **Secure TLS (STARTTLS)** – Uses TLS, but does not begin encryption until the i-Vu® Pro application issues STARTTLS command
Specify Mail User for Mail Host Authentication	Select if your mailserver requires a username and password.
Test connection	Click to have the i-Vu® Pro application try to connect to the email server. A message will appear below this button stating if the connection was successful or if it failed.

Security tab

Field	Notes
Logging	
Log audit data to file	Records operator activities and some system activities (such as opening and closing the database or automatic deletions) in a text file. The default file is **auditlog.txt** stored in **i-VuPro\webroot**<system_name>. You can change the file name and include a different path. To prevent the file from growing too large as new data is appended, you can archive the data to another text file by selecting an archive frequency in the **Archive log file contents** field. The archive file is **auditlog**_yyyy_mm_dd**.txt**, where *yyyy_mm_dd* is the creation date of the archive file. This file is created in the same location as **auditlog.txt**. **NOTE** If you do not archive the log file contents, you should manually delete the oldest entries.
Log audit data to database	Records audit data in a database named **audit.mdb** that can be accessed by third-party software. **NOTE** For Access, MSDE, and Derby, the database is automatically created. An Access database is named **audit.mdb**; a MSDE database is named **audit.mdf**. The Derby database consists of multiple files in a folder called **audit**. For MySQL, SQL Server, or PostgreSQL, you must create the database manually.

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Field	Notes
Delete database entries older than ____ days	Automatically deletes entries in the database that are older than the number of days you specify.
Log errors for invalid URLs	Check this field to write to the core.txt log any time an external source sends a request to the i-Vu® Pro Server application. **NOTE** Regular maintenance scans by external software can cause the log files to grow large.
Security Policy	
Change Policy	See *Location-dependent operator access* (page 165) for information on **Change Policy**.
Remote Access	
Allow remote file management	Lets you access the system using WebDAV.
Operators	
Return operators to previous locations when server reconnects	Returns operators to current tree locations when the server reconnects.
Log off operators after _:_ (HH:MM) of inactivity	The system automatically logs off an operator who has had no activity in the system for the time period specified. This is a default setting for the system. The System Administrator can change this setting for an individual operator on the Operators page.
Lock out operators for __ minutes after __ failed login attempts	**Clear Lockouts** removes lockouts for all users. **NOTE** Restarting the i-Vu® Pro Server application will remove lockouts.
Use advanced password policy	You can place specific requirements on passwords to increase security. See *Advanced password policy* (page 169).
Permissions	
Permissions	When control programs, views, touchscreen, and BACview® files are created by an original equipment manufacturer (OEM), they cannot be used in the i-Vu® Pro system without the creator's permission. However, the creator can produce a key for a system with a different license that will grant permission to the key's recipient. If you receive a key, put it in the **i-VuPro x.x\resources\keys** folder. The table in the **Permissions** section of the **Security** page shows all keys in the that folder. To activate a key, click **Add**, then browse to the key. To delete a key from your system, select the key in the table, then click **Delete**. Red text in the table indicates the key has a problem such as it does not apply or has expired. See the **Notes** column for an explanation.

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Communications tab

The fields on this tab let you define controller communication with the i-Vu® Pro Server application and BACnet network communication.

Field	Notes
i-Vu Pro Server BACnet Controller Instance and **BACnet Alarm Recipient Instance**	The BACnet identifier for the system's server and the alarm recipient. You enter these system properties in SiteBuilder.
Always upload properties from controllers to i-Vu Pro database on mismatch	Automatic uploads are listed in the Audit Log. If you do not check this field, properties must be manually uploaded or downloaded by the operator when a mismatch occurs. **NOTE** If an automatic upload fails and the operator chooses to do nothing at that time, the upload will be attempted again when he returns to the page where he encountered the mismatch.
Ignore incoming alarms from sources not in this database	The i-Vu® Pro application will ignore alarms from third-party devices not in the database or devices from other i-Vu® Pro systems on the same network.
BACnet Settings	Native i-Vu® Pro system only
Log BACnet Binding Conflicts	The i-Vu® Pro application uses BACnet (dynamic) binding for communication between devices unless your system uses NAT routing. If using NAT, the i-Vu® Pro application uses information in its database to bind to BACnet devices. When checked, the i-Vu® Pro application logs binding conflicts that result from duplicate network numbers or device IDs.

Scheduled Tasks tab

Field	Notes
Automatically delete alarm incident groups which have been closed for more than ___ days	An incident group is all alarms related to a particular incident, such as Off Normal, Fault, and Return to Normal. You can edit this on the **Devices** > **Advanced** tab. **NOTE** Alarms in an incident group are not deleted until all alarms in the group have been closed.
Archive alarm information upon alarm deletion	Writes alarm information to a text file.
Automatically delete expired schedules daily at ___	To ensure there are no time zone conflicts, the i-Vu® Pro application waits 2 days after a schedule expires to delete it.
Remove expired historical trends daily at ____	Deletes trend data that has been in the database longer than the time specified in the **Keep historical trends for ___ days** field on the **General** tab.
Check for expiring BACnet/SC certificates daily at ____	Triggers an alarm when a BACnet/SC Hub certificate will expire within the Warning or Critical thresholds. While in the Warning threshold, the alarm repeats once per week. In the Critical threshold, the alarm repeats daily and every operator will get a pop-up message when they log in.

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Daylight Saving tab

On this tab, you can adjust the Daylight Saving Time settings.

Click **Update** to automatically set the table's **Begin** and **End** dates for the next 10 years based on the system's timezone. This marks all controllers for a Parameters download.

If the updated dates are incorrect

If you clicked **Update** but the dates are incorrect, your system's Java timezone data may be out-of-date. Do the following:

1. Go to the *Internet Assigned Numbers Authority* (*http://java.sun.com/javase/downloads*) website and navigate to **Time Zone Database**.
2. Download the **tzdata**< version >**.tar.gz** file.
3. In the i-Vu® Pro interface, click , then select **System Options** > **Daylight Saving** and then click **Import**.
4. Browse to the **tzdata**< version >**.tar.gz** file, select it, and then click **Open**.
5. Click **Continue**. This restarts the i-Vu® Pro application.
6. On the **System Options** > **Daylight Saving** tab, click **Update**.

Add-ons tab

The i-Vu® Pro system supports add-ons, such as Tenant Billing, that retrieve and use the i-Vu® Pro data.

Some add-ons have been updated for compatibility with the i-Vu® Pro v7.0 application . Be sure that you have the latest version of the add-ons that were used in the previous i-Vu® Pro version.

By default, the i-Vu® Pro application allows only signed add-ons that have been approved by Carrier. If needed, you can override this setting in SiteBuilder by going to **Configure** > **Preferences** > **Web Server**, and checking **Allow unsigned add-ons.** However, unsigned add-ons are not supported.

To install an add-on

1. Save the add-on's file (.addon or .war) to your computer.
2. On the **System Options** > **System Settings** > **Add-ons** tab, click **Browse,** and then open the file.

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3 Click **Install Add-on**. After a few seconds, the add-on will appear in the **Installed** table, and will be enabled. The table below gives a description of each column.

Column	Notes
Name	The add-on's name.
Path	To open the add-on in a web browser, append this path to your i-Vu® Pro system's address. For example, to start Tenant Billing, enter `http://<system_name>/override`, or `http://<system_IP_address>/override`
Version	The version is shown if the author provided the information in the add-on.
Status	If this column shows: ○ **Running**, you can open the add-on in a web browser. ○ **Disabled**, click **Enable** to run the add-on. ○ **Startup error**, select the table row to see an explanation of the error under **Details**.

4 Select an add-on in the **Installed** table to disable or enable it, or to see the following **Details**.

Add-on main page	Click the main page link to open the add-on, if the author provided a main page.
Description	A description of the add-on, if the author provided one
Vendor Name	The add-on's author
Public Data Directory	This public directory contains data generated by the add-on. This data is visible in a web browser.
Private Data Directory	This private directory contains information such as configuration data.

To back up the add-on's private and public data directories

NOTE This procedure will not back up data stored in an external database.

1 Select the add-on in the table.

2 Click **Save Data**.

3 Click **OK**.

4 Click **Save**.

5 Select the location where you want to save the data, then click **Save**.

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To update an add-on

NOTE Add-ons for i-Vu® Pro v6.0 or later systems have a different folder structure than previous versions.

1 Select the add-on in the table.

2 Click **Remove Add-on and Keep Data**

3 Follow the procedure above to install the new version of the add-on.

To uninstall an add-on

1 Select the add-on in the table.

2 Click **Remove Add-on and Data**.

To set up site properties

1 On the navigation tree, select the site.

2 Click **Properties**.

3 Configure site properties.

Field	Notes
Enable Timesync	Daily synchronizes the time in the site's controllers with the server's time, adjusting for different time zones and Daylight Saving Time. Synchronization occurs each day at the time specified in the field **Enable time synchronization of controllers daily at** on the **System Options** > **System Settings** > **General** (page 312) tab > under **Time**. **CAUTION** Make sure that your server's time and time zone setting are correct. Also, make sure that the site's time zone setting is correct in SiteBuilder.
View DST Dates	If the site's time zone (set in SiteBuilder) uses Daylight Saving Time, you can click **View DST Dates** to see DST information and time change dates.
Group Cache Controller	The designated router where colors are cached when peer caching is enabled in SiteBuilder.
Device Password (**Installer** tab)	Applies only to devices with a drv_gen5 driver. This password allows access to the controller setup pages from the Service Port. Once it is set, no one can connect to the Service Port and reach the pages without the password.

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Registering and downloading your i-Vu® Pro license

To register your software, you must obtain a license from Carrier and then apply it in the i-Vu® Pro interface.

1 Log in to the Carrier Community Portal website.

NOTES

- Only Carrier authorized personnel may access the Community Portal website. To set up your account, please contact Control Systems Support with the following information: name, phone number, e-mail address, office address, and your password of choice.
- If you are an end-user or contractor, please contact your local Carrier office to obtain your license.

2 Click **Order Management** > **Licenses & Subscriptions** > **Software Licenses**, then click the link.

3 Expand the section containing the unregistered license(s) indicated by the symbol on the right side of the blue bar.

4 Click on the row that shows **unregistered** in the **Registration Status** column.

5 In **License Details**, complete the fields under **Owner Information** and **Site Information**.

6 Click **Register License**.

7 Check **I agree to the terms of use**.

8 Click **Download License** and then save the .properties file to a convenient location to use when installing the i-Vu® Pro application.

To apply the license to the i-Vu® Pro application

During the i-Vu® Pro installation, in the **Setup Wizard**, on the **Product License** screen, check **Browse to a different license**, and select the site license you obtained.

NOTES

- Selecting the default license results in a prompt appearing every few minutes in the i-Vu® Pro interface to remind you to apply your site license.
- Do not edit any part of this registered license file. Editing a license file invalidates the license.
- Store the license in a safe location.

To apply the site license after the installation:

1 In the i-Vu® Pro interface, select **System Options** > **License Administration**.

2 Browse to the license file.

3 Click **Apply**.

4 Restart i-Vu® Pro Server using the rebootserver manual command.

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Update

In **System Options** on the **Update** tab, click the **Update** button to install .update files (patches, service packs, drivers, language packs, graphics libraries, and help updates).

See below for details on updating the SAL library and applying it to your system.

Update the SAL library

The i-Vu® Pro SAL files update your i-Vu® Pro controllers. The SAL libraries contain control programs, graphics, drivers, screen files, and other important controller data.

Carrier periodically provides updates, which include enhancements and bug fixes.

NOTES

- The library update only changes **default** graphics. If you have edited your graphic in ViewBuilder, it is not updated.
- The last digits in the SAL library name are the release date of the library.
- All of the SAL files will not necessarily have the same <date> revision.
- To ensure that your installation is running the latest software, we recommend that you check *Control Systems Support http://www.hvacpartners.com/* for updates. Download the latest SAL files and apply them to all new installations.
- If you are changing to an older SAL file than the current one being used, a warning asks you if you are sure you want to apply an older version.

NOTE Keep copies of the latest libraries in a safe place. In the event of a system restore, the updated .sal file must be reapplied.

To check current SAL library version

1 Login to the i-Vu® Pro application.

2 Click , then select **System Options** > **Update** tab.

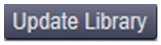
3 Click **Current Libraries (.sal)** to view the current SAL libraries and their revision date.

Step 1: Update library

1 Save the updated library (.sal file) to your computer.

2 Click , then select **System Options** > **Update** tab.

NOTE Expand **Current Libraries (.sal)** to see the current SAL libraries and their revision. Compare them to what you downloaded from the Control Systems Support to determine if any of them have been updated.

3 Click 

and browse to the updated .sal file that you have saved on your computer, select the file, and click **Open**.

4 Click **Continue**.

5 When process is complete, the message appears **File added successfully**.

6 Click **Close**.

NOTE These changes are not applied to the controllers until you have updated routers and controllers.

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Follow these steps to implement the new equipment library:

Step 2: Update the files for the routers

1 Select the router that you wish to update in the navigation tree.

2 Right-click and select **Driver Properties**.

3 Select **Properties** page > **Update** tab.

4 If the database contains two or more routers, you must check **Change for all controllers of this type?** in the **Controller** section.

5 Click **Update**. A message appears **Changes the driver and screen file to use the current library version. Continue?**

NOTE If more than one router exists, the additional routers are listed below the **Update** button.

6 Click **OK.**

7 Click **Accept.**

Step 3: Update the files for the controllers

1 Double-click the controller in the navigation tree or right-click and select **Configure**.

2 If you have multiple controllers of the same type, enable **Change for all control programs of this type?**.

3 Click **Update** under **Control Program**. A message appears **Changes the control program, view, driver, and screen file to use the current library version. Continue?**

4 Click **OK.** When the message **Updated to the library version xx.** appears, click **Close.**

5 Repeat steps 1 - 4 for any additional types of controllers.

6 Click **Close** again.

Step 4: Update the files for CCN controllers

1 In the navigation tree, select the CCN device manager associated with the controllers that are to be updated.

2 Select **Devices** > **CCN Discovery** and re-scan any controllers that need to be updated by checking **Rescan Controllers Selected Below for Configuration Changes** and clicking **Start Scan**.

Step 5: Apply the update to the routers and controllers

1 Select the **System** in the navigation tree and then select the **Downloads** page.

2 If you wish to apply the new SAL file to your entire system, you can use this page to compare to your navigation tree and verify that you have selected all of your routers and controllers for download.

NOTE Only the CCN Gateway and device managers require download, so the CCN controllers/equipment will not be listed.

3 A network's controllers download in the order shown. To change the order, select a controller(s), then drag and drop or click **Move to Top** or **Move to Bottom**.
EXCEPTION If a controller's router requires a download, it will download first regardless of its position on the Downloads page. Click the **Start** button.

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NOTES

- Use **Ctrl+click**, **Shift+click**, or the **Select All** checkbox to select multiple controllers.
- See *To download from the Downloads page* (page 298) in Help for more details.

Adding links or text to i-Vu® Pro's login page

You can add a privacy notice, links, or text to the i-Vu® Pro login page.

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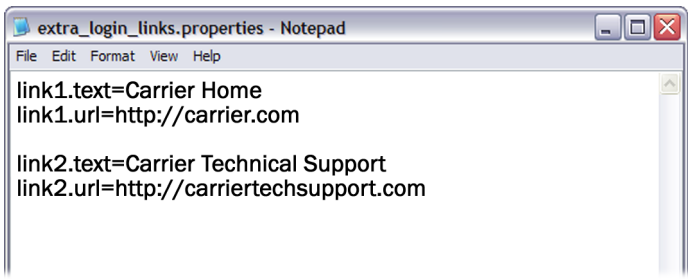
To add links to the login page

1 In a text editor such as Notepad, type 2 lines for each link that you want on the login page.

Line 1: `link#.text=<the link text that is to appear on the login page>`
Line 2: `link#.url=<the link's address>`

Example to add links shown above:

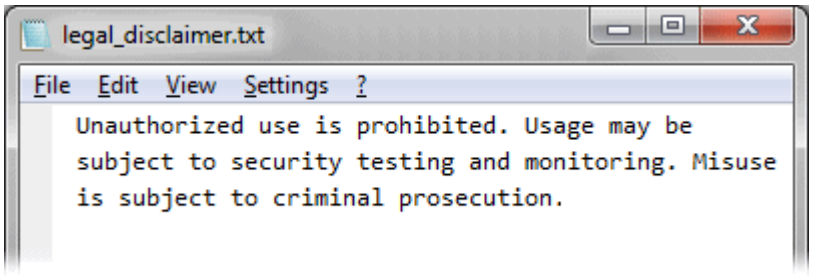


2 Save the file with the following name and location.
File name: extra_login_links.properties
Location: ivu_pro_x.x\webroot\<system_name>

To add text to the login page

1 In a text editor such as Notepad, type the text that you want on the login page.

Example to add text shown above:



2 Save the file with the following name and location.
File name: legal_disclaimer.txt
Location: ivu_pro_x.x\webroot\<system_name>

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To add a privacy notice to the login page

You can create a privacy notice in two ways:

- Create a privacy_notice.html file in the system directory with the information you wish to display.

  OR

- Edit the system.properties file and add a privacy_notice_url=SOME_URL line with a link to an existing privacy notice.

Editing a system remotely

To import a clipping

You can export a clipping (a portion of a system) in SiteBuilder and then import it in the i-Vu® Pro interface. The following items are imported:

- One or more selected tree items including attached control programs, graphics, and drivers
- Reports
- Alarm categories
- Location-dependent security information
- Schedules and schedule group membership (including the entire schedule group and schedules, if it does not exist in the target system)
- Alarm actions
- Source tree relationships (including source tree rules if the source tree does not exist in the target system)

To import a clipping:

1 Click , then select **System Options** > **System Settings**.

2 On the **General** tab, click ▶ **Clippings**. and then

.

3 **Browse** to and select the clipping you want to import, then click **Next**.

4 Optional: If necessary, you can change the location path where the clipping will be imported. Select the system fragment, then select the import location in the tree below.

5 Click **Next**.

6 If asked if you want to overwrite components, follow the on-screen instructions.

7 The interface shows any conflicts and problems that were found during the import. Make any needed corrections in SiteBuilder.

  NOTE Click **Copy to Clipboard** and then paste the list into another program such as Notepad for viewing or printing.

8 Click **Next**.

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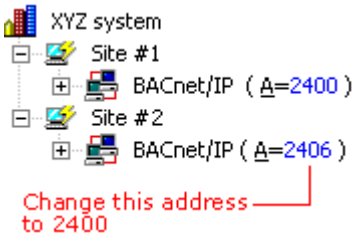
9 Click **Finish**.

10 Do any of the following that apply.

If you imported...	Do the following in the SiteBuilder application...	Do the following in the i-Vu® Pro application...
Another site into the system	Change the new site's BACnet/IP network number to be the same as the other BACnet/IP network(s). 	Download All Content to all Carrier IP routers in the system.
A second BACnet/IP network into a site	Move the items under the new network to the original BACnet/IP network, then delete the new network.	Download Parameters to any controllers that you moved.
Any controllers that use the SiteBuilder option **Automatically Configure My BBMDs**	N/A	Download BBMDs to the routers.
Any controllers that use manually configured BBMD tables	N/A	Update the routers' BBMD tables. See "*To set up BBMDs through the i-Vu® Pro interface* (page 200)" or "To set up BBMDs using the BBMD Configuration Tool" in i-Vu® Pro Help.
A clipping without trends into a system using NAT	N/A	Restart IP connection(s) to new devices.

Managing files on a remote i-Vu® Pro server

The i-Vu® Pro application supports WebDAV, a network protocol designed for managing remote server files through an Internet connection. Use a third-party WebDAV client application, such as WebDrive, to access the Internet from anywhere in the world and manage your system files residing on a distant i-Vu® Pro server.

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Options for running the i-Vu® Pro system

Running i-Vu Pro Server without connecting to controllers

To verify links between graphics and to set up properties, schedules, alarms, and trends before you connect to the network, run **i-Vu Pro Design Server** instead of **i-Vu Pro Server**. Then view the i-Vu® Pro interface in a web browser.

NOTE Question marks indicate correct microblock paths. Missing data indicates errors.

Switching i-Vu Pro Server to a different system

Design engineers working on multiple projects can switch systems in the i-Vu Pro Server application.

1 In the i-Vu Pro Server application, select **Server** > **Change Active System**.

2 Select a different system (it must be in the **webroot** folder) and mode.

3 Click **Select**.

Running i-Vu Pro Server as a Windows® service

For Windows 8.1, 10, 2012R2, 2016, 2019, and 2020

Run i-Vu Pro Server as a Windows service if you want i-Vu Pro Server to automatically start up when the server computer is restarted.

NOTE If your i-Vu® Pro system uses a database other than Derby and the database is located on the same computer as i-Vu Pro Server, you must set up Windows to delay starting i-Vu Pro Server until the database service has started. See *"How to delay loading of specific services"* (*http://support.microsoft.com/kb/193888*) on the Microsoft® website.

To install i-Vu® Pro Server service

NOTE If you are not sure if the service was previously installed, see *To determine if i-Vu Pro Server service is installed* (page 330).

1 In the Windows **Start** menu, select **All Programs** > **Accessories**.

2 Right-click **Command Prompt**, then select **Run as administrator**.

3 Select **Yes** in the User Account Control message.

4 In the Command Prompt window, type: `cd <path to the i-Vu Pro install directory>`
For example, type: `cd c:\i-VuProx.x`
replacing x.x with your current version number.

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5 Press **Enter**.

6 Type: `"i-Vu Pro Service.exe"`

7 Press **Enter**.

To start i-Vu® Pro Server as a Windows service

1 In the Windows **Start** menu, select **Control Panel**.

2 Select **Administrative Tools**, then double-click **Services**.

3 In the **Services (Local)** list, double-click **i-Vu Pro Service X.X**.

4 In the **Startup type** drop-down list, select **Automatic**.

5 On the **Log On** tab, do one of the following:

- Use the defaulted **Local System account**.
- Select **This account**, then browse to select a user who is a member of the **Administrator Group** on that computer.

6 Optional: If you selected **Local System account** in step 5 and you want to be able to access i-Vu Pro Server on the server computer's desktop, check **Allow service to interact with desktop**.

NOTES

- If you do not check this field, the computer screen will give no indication that i-Vu Pro Server is running; you must view the computer's Services page to see if it is running.
- This checkbox applies only to a user logged in on the server. A Windows Remote Desktop user cannot access i-Vu Pro Server running as a service.
- If you check this field, you cannot use the instructions below to set up printing to a network printer. Ask your Network Administrator to set up **Local System account** to use a network printer.
- If you check this field and the i-Vu® Pro application is to run email alarm actions, ask your Network Administrator to set up **Local System account** to send emails.

7 On the **General** tab, click **Start**.

8 Click **OK**.

NOTE If i-Vu Pro Server does not start after you click **Start**, you may have a Windows permissions problem. Follow the procedure below in *To set up the i-Vu Pro service for network printing* (page 329) to set up the Windows user name and password.

To set up the service for network printing

If i-Vu Pro Server runs as a service on a computer that is using a network printer, you must set up the Windows user name and password for the service. The Print alarm action requires this setup to be able to print.

1 In the Windows **Start** menu, select **Control Panel**.

2 Select **Administrative Tools** > **Services**.

3 Double-click **i-Vu Pro Service x.x**.

4 On the **Log On** tab, select **This account**.

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5 Browse to the computer's domain, then select the user that the service will log in as.

NOTE Contact your network administrator if you need help determining the domain.

6 Type the user's password in the **Password** and **Confirm password** fields.

To stop or uninstall i-Vu® Pro Server service

To stop i-Vu Pro Server service

1 In the Windows **Start** menu, select **Control Panel**.

2 Select **Administrative Tools**, then double-click **Services**.

3 In the **Services (Local)** list, double-click **i-Vu Pro Service X.X** (where x.x is the i-Vu Pro version number.

4 In the **i-Vu Pro Service x.x Properties** dialog box, click **Stop** on the **General** tab.

5 Click **OK**.

To uninstall i-Vu Pro Server service

1 In the Windows **Start** menu, right-click **Command Prompt**, then select **Run as administrator**.

2 Select **Yes** in the User Account Control message.

3 In the Command Prompt window, type: `cd <path to the i-Vu Pro install directory>`
For example, type: `cd c:\i-VuProx.x`

4 Press **Enter**.

5 Type: `"i-Vu Pro Service.exe" -remove`

6 Press **Enter**.

To determine if i-Vu® Pro Server service is installed

If you do not know if the service was previously installed, follow the appropriate steps below.

1 In the Windows **Start** menu, right-click **Command Prompt**, then select **Run as administrator**.

2 Select **Yes** in the User Account Control message.

3 In the Command Prompt window, type: `cd <path to the i-Vu Pro install directory>`
For example, type: `cd c:\i-Vu Prox.x`

4 Press **Enter**.

5 Type: `"i-Vu Pro Service.exe" -check`

6 Press **Enter**.

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Setting up a system for non-English languages

English is the i-Vu® Pro default language, but you can set up your system to display a different language. You can also set up multiple languages so different operators can view the system in different languages.

Follow the procedures below to display the i-Vu® Pro interface in non-English languages.

1 *Install a language pack* (page 333).

2 *Prepare your workstation for non-English text* (page 331).

3 *Create control programs and translation files* (page 333).

4 *Create graphics* (page 335).

5 *Create your system in SiteBuilder* (page 337).

6 *Set an operator's language in the i-Vu® Pro interface* (page 338).

Preparing your workstation for non-English text

NOTE The instructions below are for a Windows XP operating system. If you have a different operating system, see your system's Help for instructions.

Set up your workstation so you can type international characters in control programs, graphics, or SiteBuilder.

1 Install the appropriate fonts for the languages you will be using. In the Windows **Control Panel**, open **Fonts**, select **File** > **Install new fonts**.

2 In the **Control Panel**, open **Regional and Language Options**, then select the **Input language**.

3 Install an Input Method Editor (IME) for non-alphanumeric characters.

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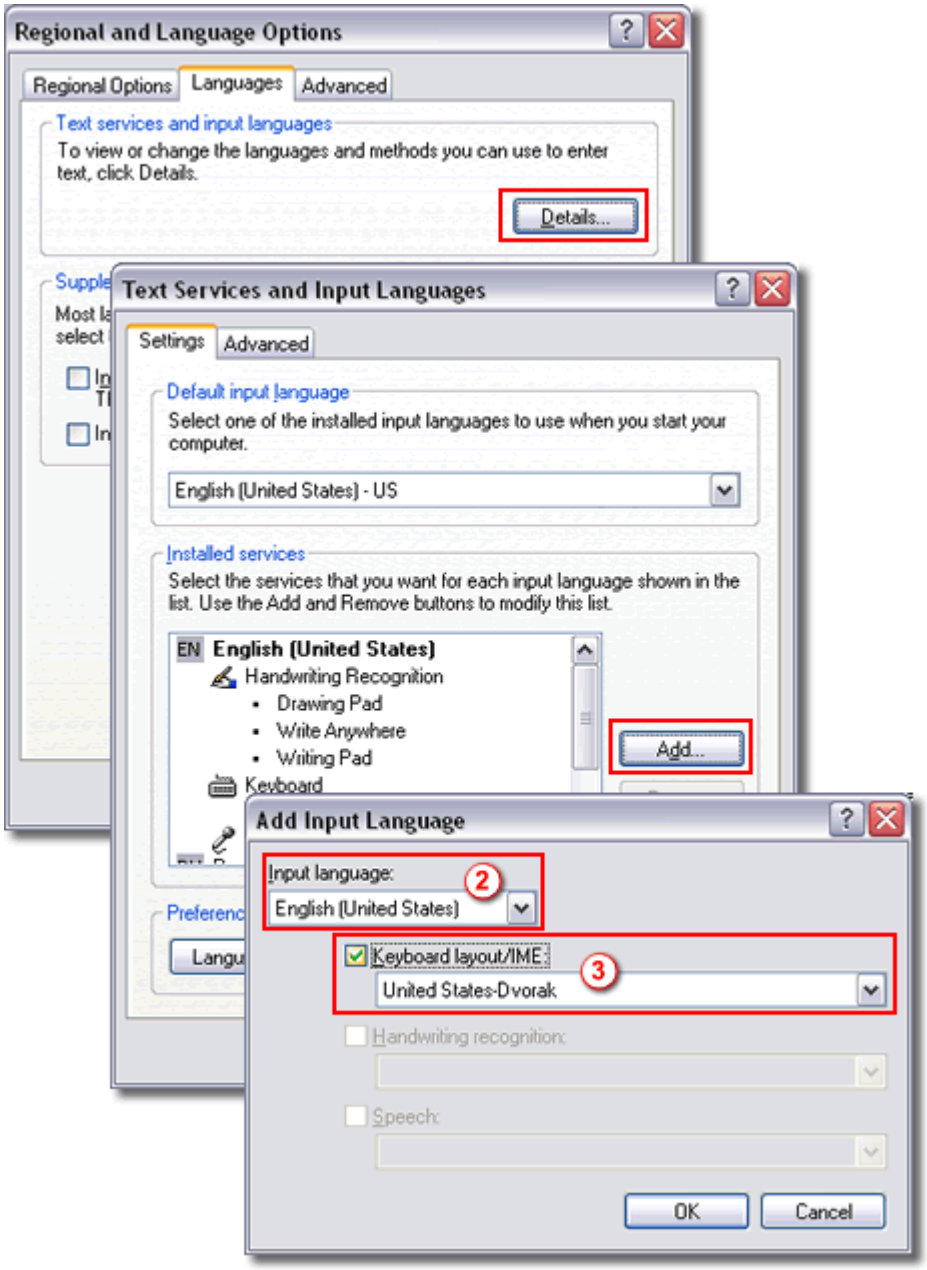

See your operating system's Help for more information.

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Installing a language pack

A language pack translates the text in the i-Vu® Pro interface. i-Vu® Pro is installed with an English language pack. To download other language packs, obtain them from the *Carrier Control Systems Support Site http://www.hvacpartners.com/*.

NOTE If you create a system by copying an existing system that uses language packs, install the same language packs on the new system.

Creating control programs and translation files for a non-English system

To have the i-Vu® Pro interface display a control program's user-defined text (such as microblock names and property text) in a non-English language, you must:

1 Create the control program using key terms instead of the text.

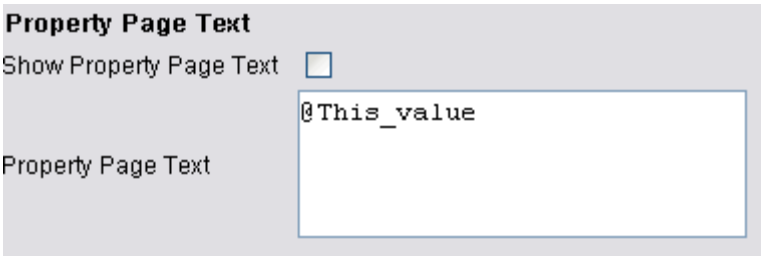
2 Create translation files of key terms and their language-specific equivalents.

In the i-Vu® Pro interface, the key term is replaced with its equivalent in the translation file for the current operator language. If a Properties page, Logic page, shows **??key term??**, the key term is missing from the translation file.

NOTE To edit existing control programs or translation files, see *Editing translation files, control programs* (page 339).

To enter a key term in the Snap application

In the Snap Property Editor, type `@` before each key term.



NOTES

- Type only the key term in the Snap application. Expressions such as $present_value$ are put in the translation file as part of the translated text. See EXAMPLES in "Translation files" below.
- Key terms can contain only alphanumeric characters and underscores (no spaces) and cannot start with a number.

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Translation files

Translation files are used to translate key terms in control programs. A translation file contains key terms and their language-specific equivalents.

For a non-English system, you must create an English translation file and a non-English translation file* for each of the following:

- Each control program
- Key terms used in multiple control programs

EXAMPLES

Translation files	Key term=Language-specific equivalent
English	This_value=This value is $present_value$ Zone_temp=Zone temperature
Spanish	This_value=Este valor es $present_value$ Zone_temp=Temperatura de zona

*If the i-Vu® Pro interface will display multiple non-English languages, create a translation file for each language.

To create and implement a translation file

Create your translation file in a text editor, such as Microsoft® Word, that supports the character encoding you need.

1 Type one key term and language equivalent per line, left justified, starting in column 1. Do not put spaces on either side of the equal sign.

2 Save the file using the appropriate file name and location in the table below.

If key terms are used in...	the file name is...	File location
A single control program	<any_name>_xx.native*	Any location
Multiple control programs	equipment_xx.native*	i-VuPro\webroot\ <system_name>\resources

* xx = the language extension code. See "Extension codes and encoding" below.

If you are using:

- the English character set, save the file as Text only.
- a non-English character set, save the file as Encoded text . (See your application's help for information on saving files as encoded text.) When prompted for the language and encoding, see "Extension codes and encoding" below.

3 Open the control program in the Snap application, then select **Control Program** > **Bundled Resources**.

4 Click , locate and select the translation file(s) for this control program, then click **Open**.

NOTES

- Do not add equipment_xx.native files that you created for multiple control programs.
- You can use **Ctrl+click** or **Shift+click** to select multiple files.

5 Save the control program. The translation files are embedded in the control program; the original files are no longer necessary.

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Extension codes and encoding

Language	Extension codes	Encoding*
Brazillian Portuguese	pt_BR	ISO-8859-1
English	en	ISO-8859-1
Canadian French	fr	ISO-8859-1
French	fr_FR	ISO-8859-1
German	de	ISO-8859-1
Italian	it	ISO-8859-1
Japanese	ja	EUC-JP
Korean	ko	EUC-KR
Russian	ru	KOI8_R
Spanish	es	ISO-8859-1
Swedish	sv	ISO-8859-1
Simplified Chinese	zh	GB2312
Traditional Chinese	zh_TW	Big5
Thai	th	TIS620
Vietnamese	vi	Cp1258

* Encoding is used when you create the translation file.

Creating graphics for a non-English system

To create a non-English graphic in ViewBuilder:

1 *Set the language font* (page 335).

2 *Create the graphic.* (page 336)

3 Save the .view file.

NOTE The names of your .view file and any inserted image files must contain only ASCII characters.

Setting the language font

If your system has language packs installed, you can select a font for each language. Your selection affects only how text in your graphic appears in ViewBuilder.

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To set the font for each language

1 Select **Configure** > **Preferences** > **Graphic (.view)**.

2 On the **Language** tab, check the language that you want to be the default for all new graphics.

To select the default language font for all new graphics

In the **Preview Font** column, click the font name to select a different font.

To select the active language when creating a view

If you will use multiple language fonts in a single view, you can switch to a different language font as follows:

1 Select **Configure** > **View Properties**.

2 In the **Language** field, select the language you want to use.

3 Click **OK**.

To create a Non-English graphic

The method you use to create a graphic that will be displayed in a non-English i-Vu® Pro system depends on the following:

- If the i-Vu® Pro system will display only a single non-English language, create the graphic in that language.

- If the i-Vu® Pro system will display multiple non-English languages, use either of the following methods:
  - Create the graphic in layers (one layer for each language), and then assign a show/hide conditional expression (see format below) to each layer so that it displays in i-Vu® Pro based on the operator language. See "To show/hide a layer in the i-Vu® Pro interface" in ViewBuilder Help.
  - Create each piece of the graphic in the different languages, and then assign a show/hide conditional expression (see format below) to each piece so that it displays in i-Vu® Pro based on the operator language. See "Setting objects on a graphic to show/hide in the i-Vu® Pro interface" in ViewBuilder Help.

Show/Hide conditional expression format

$$operator_language$$='*language*'

where *language* is the language code from the list below.

For example, the conditional expression to display French would be:
$$operator_language$$=='fr_FR'

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Language	Language code
Brazillian Portuguese	pt_BR
English	en
Canadian French	fr
French	fr_FR
German	de
Italian	it
Japanese	ja
Korean	ko
Russian	ru
Spanish	es
Swedish	sv
Simplified Chinese	zh
Traditional Chinese	zh_TW
Thai	th
Vietnamese	vi

Creating a non-English system in SiteBuilder

To choose the language(s) for your system

1. In SiteBuilder, select **Configure** > **Preferences**.
2. Select the **Language** tab.
3. Under **Supported Languages**, select each language that you want to be available in your system.

   NOTE This list shows all installed language packs. To install additional languages, see *Installing a language pack* (page 333).
4. In the **System** field, select the *system Language* (page 338).
5. Click **OK**.
6. Save your database.

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To create your system

To create your system in each language that the system will display:

1 In SiteBuilder, select **Configure** > **Preferences**.

2 Optional: The **Font** tab shows the font that will be displayed in SiteBuilder for each language that you selected on the **Language** tab. To change a font, click on the name in the **Preview Font** column, then make a new selection.

3 On the **Language** tab, select a language in the **Current Session** field.

4 Click **OK**.

5 Create your system.

6 Save your database.

7 If your system will display multiple languages:

a) Select **Configure** > **Preferences**, select the **Language** tab, and select another language in the **Current Session** field.

b) Re-enter all node names and display names in the current language.

c) Save your database.

d) Repeat steps a. through c. for each additional language the system will display.

System language

The system language is used for:

- The default language for new operators
- Alarms sent to the database
- State text and object names downloaded to the field
- The default login page *

All other information is displayed in the operator's language, which may be different than the system language. See *To set an operator's language in the i-Vu® Pro interface* (page 338).

* You can change the language shown on the i-Vu® Pro login page by selecting a different language from the list below the **Password** field.

To set an operator's language in the i-Vu® Pro interface

An operator can change their language preference in the i-Vu® Pro interface.

1 On the **System Options** tree, select **My Settings**.

2 Under **Preferences**, select the **Language** in the drop-down list.

3 Click **Accept**.

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Editing translation files or control programs for a non-English system

If you add or edit a key term in a control program, be sure to make the same change in the translation file. See *Creating control programs and translation files* (page 333).

If you make changes after attaching a control program in SiteBuilder, do one of the following:

- If you changed text only in a control program or its translation file, right-click the control program on the **Geographic** tree, then select **Rebuild Equipment Pages**.
- If you changed logic in the control program, right-click the control program on the **Geographic** tree, then select **Reload Control Program**.

To edit a bundled resource

The Snap application bundles (embeds) the translation file(s) for a control program into the .equipment file. See steps 3 through 5 in *To create and implement a translation file* (page 334). To edit a bundled translation file:

1. Open the control program in the Snap application.
2. Select **Control Program** > **Bundled Resources**.
3. Select the file, then click to save it to your hard drive.
4. Edit the translation file.
5. In the **Bundled Resources** dialog box in the Snap application, click and select the edited file.
6. Click **OK** to overwrite the existing file.

Copying translation files to another system

To copy most translation files from one system to another, you copy the files in the source system and paste them into the same folders in the destination system.

However, if your source system and destination system have translation files with the same name, copying and pasting would overwrite the file(s) in the destination system. In this case:

1. Open the source system's translation file in a text editor, then copy the key terms and translations.
2. Open the destination system's translation file in a text editor, then paste into it the key terms that you copied. Remove any duplicate key terms.

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Document revision history

Important changes to this document are listed below. Minor changes such as typographical or formatting errors are not listed.

Date	Topic	Change description	Code*
5/22/24	Setting up BACnet Broadcast Management Devices (BBMDs)	Added BACnet SC specifics	X-TS-MM-J-MM
	Manual commands	Updated bbmd write entry	X-TS-MM-J-MM
	To add a privacy notice to the login page	New topic	X-D
2/7/24	Manual commands	Added "bbmd writeaddresses" command Specified that "bbmd write" command only supports ipv4 addresses	X-PM-RD-E-OC
	Daylight Saving tab	Updated file import procedure	X-AE-WD-E
	Operators and operator groups	Specified not to use Administrator or Installer as the actual login name	C-PM-RD-E
	Registering and downloading your i-Vu® Pro license	Updated website menu paths	X-TS-OC-E
2/8/23	To add a custom logo to reports	Updated navigation instructions for Carrier	C-D
	To control equipment using an interactive zone control	New topic	X-D-VD
	Overview of the ACxelerate Automated Commissioning Tool	Updated procedure in "Task 2. Run Test"	AC-PM-RM-R-TC
	Semantic tagging for ACxelerate	Added Hot Water Source, ACx Supply Fan Speed, For points in Hot water system	
	Semantic Built-in Tags rules for Point Tags	Added ACx Supply Fan Speed, ACx HWS Temp	
	To initiate Configuration and Design	Minor wording, removed unused rows, added HW Sup Temp and Fan Speed.	
	To schedule Run Test	Added bullet point	
	To view the analysis	Clarified procedure and updated graphic	
	Fan power box	Added note	
6/17/22	To set up site properties	New topic	C-D
	Defining i-Vu® Pro paths > Relative path	Added ~instance(#) expression	X-PM-RD-R
	Manual Commands	Shortcut keys updated	X-TS
3/15/22	Step 2: Obtain a CA certificate	Changed i-Vu to ivu in step 1a	C-TS-CO-E
	To download and install Keystore Explorer	Specified that instructions are for Keystore Explorer 5.5.0 or later	X-PM-LO-E
	To create or replace a BACnet/SC device's operational certificate	Changed .p7r response file to .cer response file	
	To sign a BACnet/SC certificate signing request using Keystore Explorer	Updated procedure for Keystore Explorer 5.5.0	
	To create a BACnet/SC Certificate Authority using Keystore Explorer	Clarified procedure	
	Custom reports > To add a column	Added "+/- Date Range" row to table	X-AE-DD-O
6/8/21	Using the WebCTRL application > To start the i-Vu® Pro system	Changed system path from "i-Vu_Pro_x.x" to "i-VuProx.x"	C-TS-OC-E
	Alarms > Send SNMP Trap		

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Important changes to this document are listed below. Minor changes such as typographical or formatting errors are not listed.

Date	Topic	Change description	Code*
	Operator Access > To change My Settings		
	Setting up networks > To test the HTTP connection		
	Working the drivers in the i-Vu® Pro interface > To change or upgrade a driver		
	Working with touchscreen or BACview® files in the i-Vu® Pro interface > To select a different screen file		
	Setting up a system in the i-Vu® Pro interface > My Settings		
	Setting up a system in the i-Vu® Pro interface > Security tab		
	Options for running the i-Vu® Pro system > To install i-Vu® Pro Server service		
	Options for running the i-Vu® Pro system > To stop or uninstall i-Vu® Pro Server service		
	Setting up a system for non-English languages > To create and implement a translation file		
	Network security > Step 2: Obtain a CA certificate	Changed system path from "i-Vu_Pro_x.x" to "i-VuProx.x". Replaced "i-Vu Pro" in step 1b with "i-Vu"	
	Setting up BACnet/SC network communication > To create or replace a BACnet/SC device's operational certificate	Changed tab name from Configuration to Connections	X-AE-SS-E
	Setting up BACnet/SC network communication > To replace a BACnet/SC network's Certificate Authority	Changed "every device on the network" to "every BACnet/SC device on the network"	X-PM-CY-O
5/18/21	To set up a BACnet/SC connection in the i-Vu interface	Updated procedure	C-D-D
	Manual Commands	Updated autopilot location command	X-PM-TC-O-TC
	To set up TLS using a Certificate Authority (CA) Certificate	Removed Internet Explorer®	X-PM-TC-O-TC
	Install the certificate	Removed Internet Explorer® and added Edge®	
	Setting up BACnet/SC network communication > To replace a BACnet/SC network's Certificate Authority	Updated procedure to match BACnet/SC Setup Guide	X-PM-LO-E
	Setting up BACnet/SC network communication > To create or replace a BACnet/SC device's operational certificate	Renamed topic from "To set up a BACnet/SC Keystore", updated procedure to match BACnet/SC Setup Guide	X-PM-LO-E
	Network security > To sign a BACnet/SC certificate signing request using Keystore Explorer	Updated procedure to match BACnet/SC Setup Guide	X-PM-LO-E
	Network security > To create a BACnet/SC Certificate Authority using Keystore Explorer	Updated procedure to match BACnet/SC Setup Guide	X-PM-LO-E

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Date	Topic	Change description	Code*
	Setting up BACnet/SC network communication > To monitor certificate expiration	New topic	X-PM-LO-E
	Setting up a system in the i-Vu® Pro interface > Scheduled Tasks tab	Removed "Enable time synchronization..." row, added "BACnet/SC Certificate expiration" row	X-PM-LO-E
	To change My Settings	Removed Internet Explorer®, added Edge®	X-PM-TC-O-TC
	Zooming in and out	Removed Internet Explorer® reference	X-PM-TC-O-TC
3/24/21	ACxelerate automated commissioning	Updated flowchart graphic for clarity in Overview	X-PM-RD-E
		Clarified NOTE in Dual duct VAVs	C-TS-CP-E
		Replaced Cool Request with Linkage, clarified ACx online connectivity requirements and Design step in To initiate Configuration & Design	C-TS-CP-E
		Removed Cool Source Tree method in Before you begin checklist	C-TS-CP-E
3/8/21	ACxelerate automated commissioning	Updated all ACxelerate topics for v8.0	X-PM-TC-O-RM
	Manual commands	Added "Reads X-Forwarded-For Header" to "Web Server"	X-AE-TC-O-LM

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