groov VIEW USER'S GUIDE

Form 2027-250319—March 2025

OPTO 22

Your Edge in Automation.™

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groov View User's Guide
Form 2027-250319—March 2025

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Opto 22
Your Edge in Automation.

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Contents

1: Welcome

WHAT IS *groov* VIEW?

groov View is Opto 22's operator interface tool that is *simple*, *browser-based*, and *connected* to automation systems, software, databases, and devices of all kinds. We call it Mobile Made Simple®.

Simple: *groov* View requires only a web browser to connect to devices, build operator interfaces, and monitor and control them. *groov* View puts ready-made gadgets at your fingertips: just drag, drop, and tag. Create real-time trends up to 5 years; define events and operator notifications. Authorize users and groups. *groov* View makes it simple to build, deploy, and view effective, scalable operator interfaces.

Browser-based: To view your *groov* View interface, use any brand computer or mobile device with a current web browser, from smartphones and tablets, to laptops and computers, to a web-enabled big-screen TV. For mobile, get the free *groov* View app for Android® or iOS®. *groov* View can augment existing human-machine interfaces (HMIs) and SCADA systems by making specific data available to authorized users at any time and in any location. Use event notifications to alert selected personnel anywhere about system events based on one or more conditions.

Connected: In your *groov* View operator interface, you can use tags from all the sensors, equipment, and software connected to your *groov* EPIC®, *groov* Server™ for Windows®, or legacy *groov* Box™—which may be from a wide variety of manufacturers and software companies. Mix data and controls from all of these connected things in your operator interface in any way that suits your application. You can also test project ideas without connecting to a live machine or system using the built-in Data Simulator.

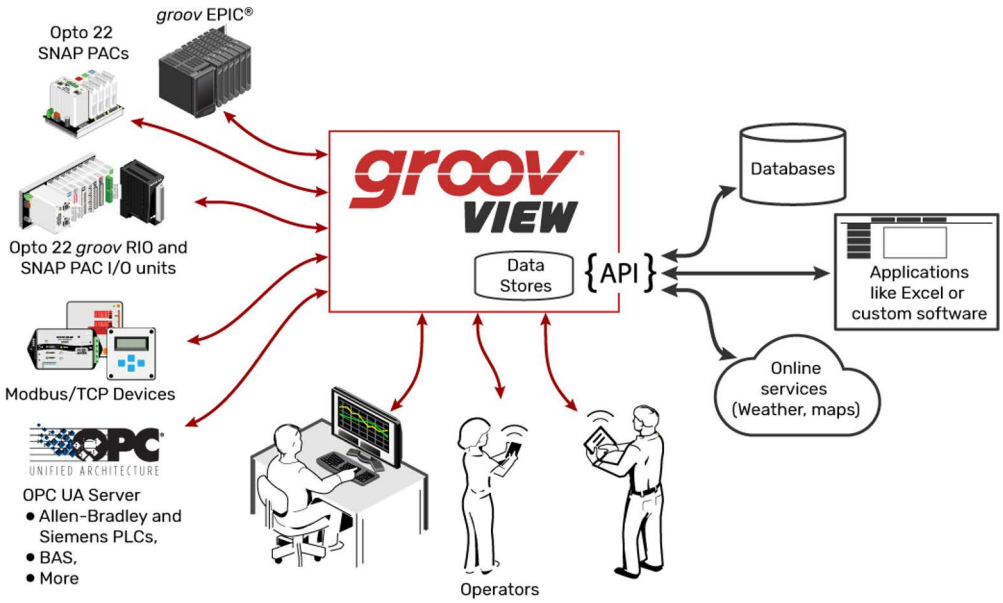
groov View brings key data from processes, sensors, OEM machines, manufacturing and building systems, software, databases, and online services into the hands of those who need it.

Connecting Data and Users

groov View connects to a variety of data sources and presents that data to users for visualization and action. Your *groov* View users may be human operators or software that uses the *groov* Data Store API.

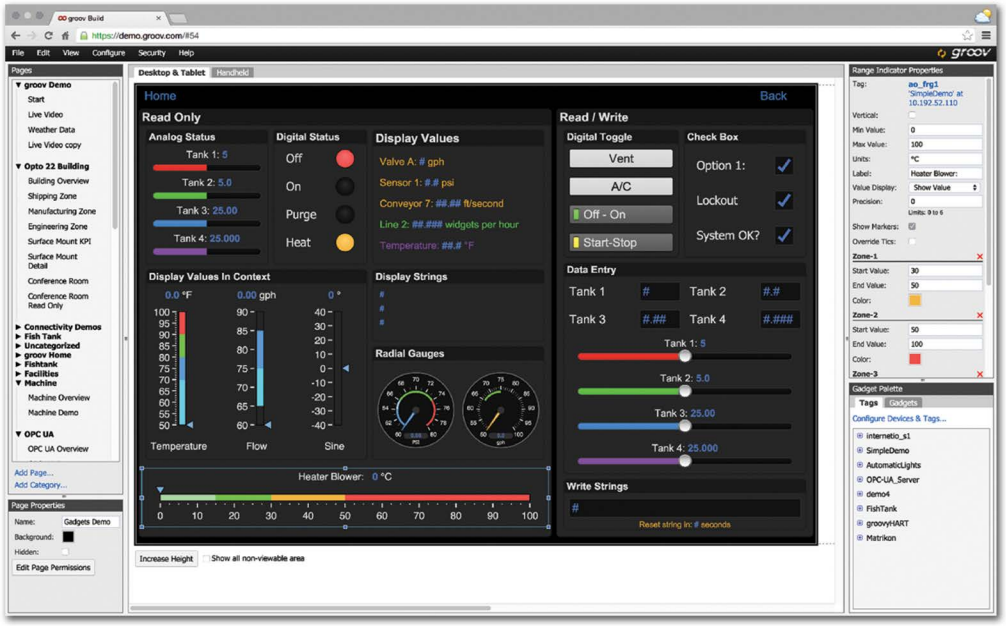
The image below shows how *groov* View connects data sources and users. Automation data sources are on the left; they interact directly with *groov* View. On the right are software users that write data to a *groov* Data Store or read data from that store via the API. (In a *groov* EPIC system or legacy *groov* Edge Appliance (*groov* Box™), you may also have Node-RED and Ignition Edge® OPC-UA® and MQTT tags as sources of data.)

At the bottom of the image are human operators who interact with your *groov* View interface. They can securely view and act on data from automation sources, Data Stores, and other sources that you determine. You manage all users and control what each one can see and do.



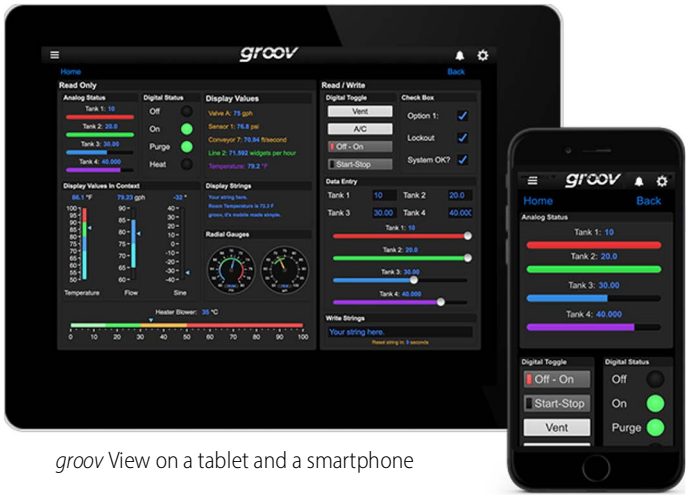
Build your Operator Interface

To build your *groov* View operator interface, you have a library of pre-built gadgets you can simply drag and drop onto the screen. Then, you import and use tags from systems and equipment including Modbus®/TCP devices, Opto 22 *groov* EPIC processors and *groov* RIO® modules, SNAP PAC™ controllers and I/O units, and many other manufacturers' systems, equipment, and databases. You can also manage user accounts and set up email or text message event notifications in Build mode.



View your Interface

The *groov* View operator interface you build resides on a *groov* EPIC processor, *groov* Server, or a legacy *groov* Box. Your human users access the interface using any device with a current web browser and a network connection to *groov* View running on one of those *groov* devices, or using the free *groov* View app on an iOS or Android smartphone or tablet.



groov View on a tablet and a smartphone

Mobile Device Apps

***groov* View for iOS** and ***groov* View for Android** are free native apps for your tablet or phone. You can run *groov* View in your browser, but these apps display your interface in full-screen mode.

View in browser View in app

These native apps add other advantages as well. You can add another layer of security by setting up passcodes in the app. If you have more than one *groov* View project, you can easily access all of them from the app. The iOS app is also ideal for OEMs and machine builders who want to use a tablet as an operator interface to a machine. You can lock the device so it runs only *groov* View.

Get *groov* View for iOS.
Get *groov* View for Android.

Comparing Build Mode and View Mode

The following chart shows some key points about building and viewing your operator interface.

	Build mode	View mode
Use for	Building an operator interface: • Connect to devices and systems • Build screens • Create events and notifications • Authorize users • Back up projects	Viewing an operator interface: • Monitor and control equipment/systems • View or change data
Who uses it	Authorized users: • An Admin has full control • An Editor can change pages but cannot authorize users	Authorized users: • An Operator can log in/out and change password • Kiosk users cannot log out or change password
Passwords and API keys	Password: • An Admin sets the username and password at first login to *groov* View. • An Admin user can assign usernames and passwords (and API keys, for software users) to all users.	Password: A username and password are assigned to each user by an Admin.

	Build mode	View mode

How to get there	1. Open a web browser. For the URL, enter:
	***groov* EPIC or *groov* Box**
	`https://[hostname]/` or
	`https://[IP address]/`
	***groov* Server**
	`https://localhost/` or
	`https://[Server's hostname or IP address]/`
	2. From *groov* View, click **Settings** (gear in upper right), and choose **Switch to Build mode**.
		***groov* EPIC**
		1. Open a web browser. For the URL, enter:
		`https://[hostname]/` or
		`https://[IP address]/`
		2. Click ***groov* View**.
		
		***groov* Box**
		Open a web browser. For the URL, enter:
		`https://[hostname]/` or
		`https://[IP address]/`
		
		***groov* Server**
		Open a web browser. For the URL, enter:
		`https://localhost/` or
		`https://[Server's hostname or IP address]/`
		
		On a mobile device, use the free *groov* View app for iOS or Android. Open the app and log in with your username and password.

How to get there in *groov* Find (Windows or Mac®)	For a *groov* EPIC or *groov* Box (does not apply to *groov* Server for Windows): • Click **Search For Devices**. • Find the label on the *groov* device that shows its serial number. • For *groov* EPIC, click ***groov* Manage** and then ***groov* View**. For a *groov* Box, click ***groov* View**.	[Not normally used]

Products that Include *groov* View

groov View is part of the *groov* EPIC processor, the PC-based *groov* Server for Windows software, and the legacy *groov* Edge Appliance (*groov* Box).

***groov* EPIC** (edge programmable industrial controller, part number GRV-EPIC-PR1 and GRV-EPIC-PR2) is a system for automation and industrial internet of things (IIoT) applications. *groov* EPIC provides real-time control, connectivity to industrial and IT equipment and systems, data handling at the edge of the network, and visualization for your system. Learn more about the *groov* EPIC system.

***groov* Server for Windows** (part number GROOV-SVR-WIN-BASE) provides visualization only and can be installed on a Microsoft® Windows® PC. Once installed, *groov* Server runs as a service on your computer.

***groov* Edge Appliance** (part number GROOV-AR1-BASE), also called the ***groov* Box**, is an industrially hardened appliance that provides connectivity, data handling, and visualization. It is a legacy product as of June 2021 and not recommended for new development. For new projects, choose the *groov* EPIC system.

No matter which of these *groov* products you use, your *groov* View operator interface can be viewed on almost any mobile device or computer. And, you can develop on one *groov* product and later move your project to another: for example, develop on *groov* Server and then move the project to *groov* EPIC.

For more information about:

- *groov* EPIC: see the *groov EPIC Processor Data Sheet* (form 2245).

- *groov* Server: see the *groov Server for Windows User's Guide* (form 2078).
- *groov* Box: see the *groov Box User's Guide* (form 2104).

SYSTEM REQUIREMENTS

To build operator interfaces with *groov* View, you need:

- Any computer with a web browser (does not need to be a Windows PC; see the Release Notes for *groov* View for currently supported browsers and operating systems)
- One of the following:
  - *groov* EPIC
  - *groov* Server for Windows
  - a legacy *groov* Box Edge Appliance (*groov* View version 4.4 and lower only)

You can connect to any of the following devices or services to get and send data:

- A Modbus/TCP device
- A database, online service, or software program to get data from or put data into a Data Store using the *groov* View API
- An Opto 22 *groov* EPIC processor or SNAP PAC controller (SNAP PAC S-series, R-series, or SoftPAC with firmware R9.2a or newer) running a PAC Control strategy
- An Opto 22 *groov* EPIC I/O unit
- An Opto 22 *groov* RIO module
- An Opto 22 SNAP PAC I/O unit
- (*groov* EPIC or legacy *groov* Box only) A database, cloud application, API, or serial device accessible via a Node-RED node. (For a *groov* Box, see requirements in the user's guide.)
- OPC UA-compatible automation system or equipment. Ignition® Edge® supplies an internal server and drivers for *groov* EPIC or a legacy *groov* Box. An external OPC UA server is required for *groov* Server; an external server and additional drivers may be required for your equipment.

NOTE: Browser-based groov View software works on a large number of device/operating system/browser combinations including HDTVs, smartphones, tablets, and computers. If a browser is causing issues, see the list of currently supported browsers in the groov View Release Notes. For Product Support, see page 7.

ABOUT THIS GUIDE

This user's guide teaches you how to build and view an operator interface with *groov* View.

This guide assumes that you have already set up your *groov* product, that you are already familiar with your personal computer's operating system, and that you know how to use your tablet or smartphone.

To set up *groov* EPIC, see the *groov EPIC User's Guide* (form 2267).

To install *groov* Server for Windows, see the *groov Server for Windows User's Guide* (form 2078).

To set up *groov* Box, see the *groov Box User's Guide for GROOV-AR1* (form 2104).

In this Guide

Chapter 1: Welcome introduces this user's guide and *groov* View.

Chapter 2: Building a Project walks you through building a sample project, and then describes how to create pages, add devices and tags, and configure gadgets.

Chapter 3: Managing groov View describes how to manage user accounts, back up and restore your project, and update *groov* View and your license.

Chapter 4: Gadget Reference provides details on how to configure gadget properties.

Chapter 5: Using Events and Notifications describes how to set up user accounts and event conditions in *groov* so that users can be notified about system status. Events can also be used as tags with gadgets.

Chapter 6: Viewing Your Operator Interface describes how to open and use a *groov* View HMI on any device with access to the Internet.

Chapter 7: Troubleshooting and Additional Help provides troubleshooting information and answers questions you may have about *groov* View.

Appendix A: IP Cameras describes the IP cameras that work with the Video gadget.

Appendix B: OPC UA Data Types Supported lists the OPC UA data types supported in *groov* View and the corresponding *groov* View names.

Appendix C: Data Simulator Tags lists the Data Simulator tags and briefly describes what they do.

OTHER *groov* RESOURCES

Get free online training for *groov* View and related products at training.opto22.com. For additional information on related products, visit the Opto 22 website: www.opto22.com.

PRODUCT SUPPORT

If you have any questions about *groov* View, you can call, fax, or email Opto 22 Product Support.

Phone: 800-TEK-OPTO
(800-835-6786 toll-free in the U.S. and Canada)
951-695-3080
Monday through Friday,
7 a.m. to 5 p.m. Pacific Time

Email: support@opto22.com

Opto 22 website: www.opto22.com

NOTE: Email messages and phone calls to Opto 22 Product Support are grouped together and answered in the order received.

When calling for technical support, be prepared to provide the following information about your system to the Product Support engineer:

- *groov* product you are using (*groov* EPIC, Server, or Box) and license
- *groov* version. In Build mode, select **Help** > **About**.
- A description of your system equipment:
  - Computer type, speed, memory, and operating system
  - Brand and model numbers for the controllers or devices you are monitoring and controlling through *groov*
- A description of the network
- Specific error messages or other diagnostic indications

2: Building a Project

This chapter describes the basic aspects of creating an operator interface in *groov* Build mode including how to create pages, add devices and tags, and configure gadgets. The operator interface you build resides on the *groov* EPIC processor or *groov* Box, or on the PC where *groov* Server is installed. Your authorized users can access it from a computer, smartphone, tablet, or other device with a web browser.

In this chapter:

OPENING BUILD MODE ON *groov* EPIC

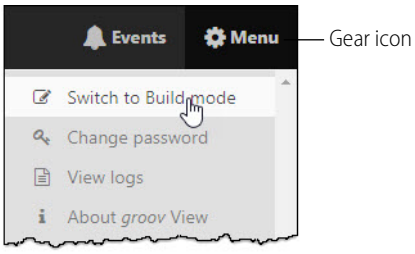
To create your *groov* View HMI, you must be on a computer. Once the HMI is built, you can use it on the *groov* EPIC processor's built-in high-resolution touchscreen.

These steps assume you have already installed and initialized your *groov* EPIC processor following the steps in the *groov EPIC User's Guide* (form 2267).

To open Build mode on a *groov* EPIC:

1. From a computer, log into the *groov* Manage Home screen.
2. Click the ***groov* View** button 

. *groov* View opens first in View mode.
3. Click **Menu** (gear icon) on the top right-hand side and click **Switch to Build mode**.



OPENING BUILD MODE IN *groov* SERVER FOR WINDOWS

When opening *groov* View for the first time in *groov* Server for Windows, make sure you follow the instructions in the *groov Server for Windows User's Guide* (form 2078).

To open Build mode in *groov* Server:

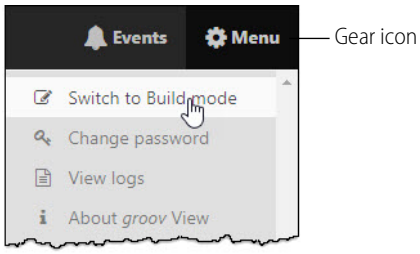
1. Open Google® Chrome®, Mozilla® Firefox®, or another supported browser (see the *groov View Release Notes* for current information), and do one of the following:
   - If *groov* Server is installed on the same computer, type `https://localhost` in the address bar of your browser.

   - If *groov* Server is installed on a different computer, type `https://` and the computer's hostname. For example, if the computer's hostname is RStarr-w10, you type `https://RStarr-w10`
     You can use the IP address of the host PC instead of the hostname. However, if the PC is on a network with DNS and DHCP, the IP address is subject to change.

   NOTE: If groov View does not open, see Chapter 7: Troubleshooting and Additional Help.

2. When *groov* View opens, log in.
   groov View opens first in View mode.
3. Click **Menu** (gear icon) on the top right-hand side and click **Switch to Build mode**.



OPENING BUILD MODE ON A LEGACY *groov* BOX

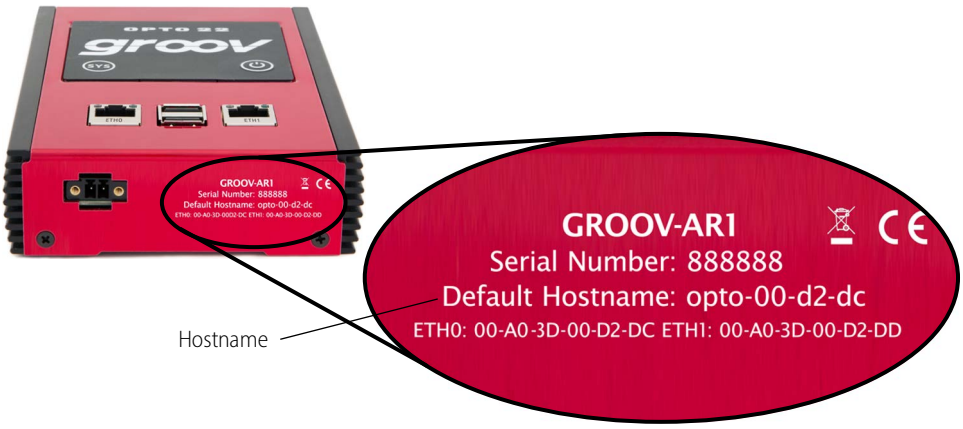
When opening *groov* View for the first time on a *groov* Box, make sure you follow the instructions in the *groov Quick Start for GROOV-AR1* (form 2103). For additional information, see the *groov Box User's Guide for GROOV-AR1* (form 2104).

NOTE: To use a URL hostname, your network must have a DNS. If it doesn't, see page 166 for information on how to use groov Find.

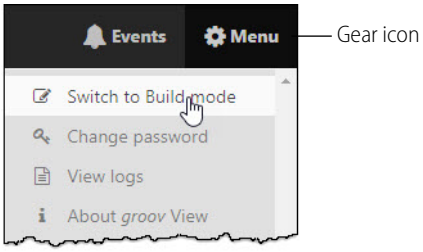
To open Build mode on a *groov* Box:

1. Enter `https://` followed by your *groov* Box's hostname as the URL. The hostname is printed on the bottom of the *groov* Box (see the following image).
   For example, if the hostname is opto-00-d2-dc, you type:
   `https://opto-00-d2-dc`

   NOTE: If you assigned a static IP address to the groov Box, use the IP address instead of the hostname.



2. When *groov* View opens, log in.
   groov View opens first in View mode.
3. Click **Menu** (gear icon) on the top right-hand side and click **Switch to Build mode**.

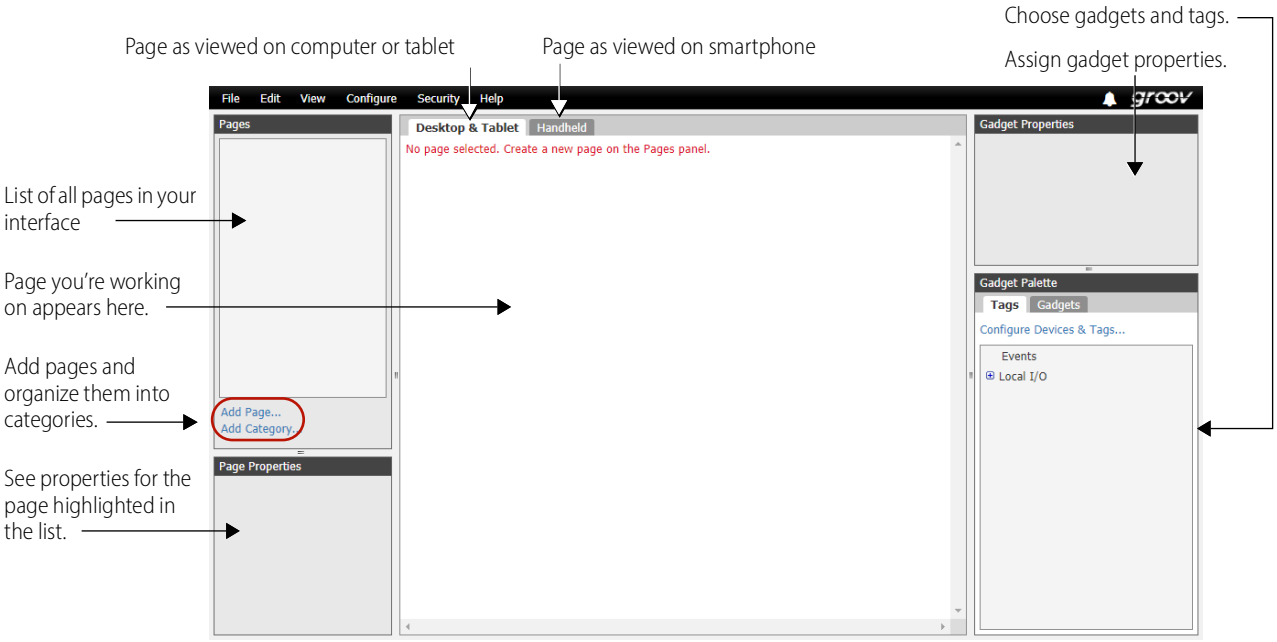


BUILDING A SAMPLE PROJECT

To get started, let's build a page using tags in the Data Simulator and then view it on the computer. Here's what we'll do:

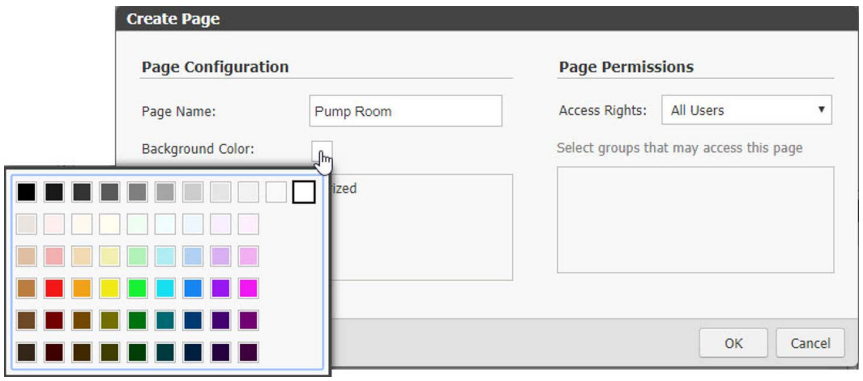
- Add a page
- Add a device (page 13)
- Add device tags (page 14)
- Add gadgets (page 14)
- Save the project (page 17)
- View the project on your computer (page 17)
- Explore (page 17)

When Build mode opens, you see the workspace where you'll build your operator interface:



Add a Page

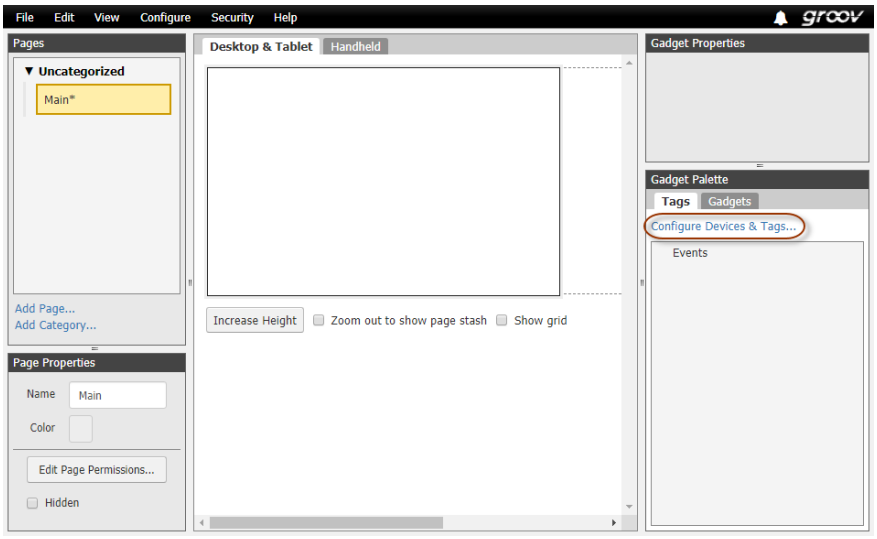
1. In the Pages panel on the left side of the workspace, click **Add Page**.



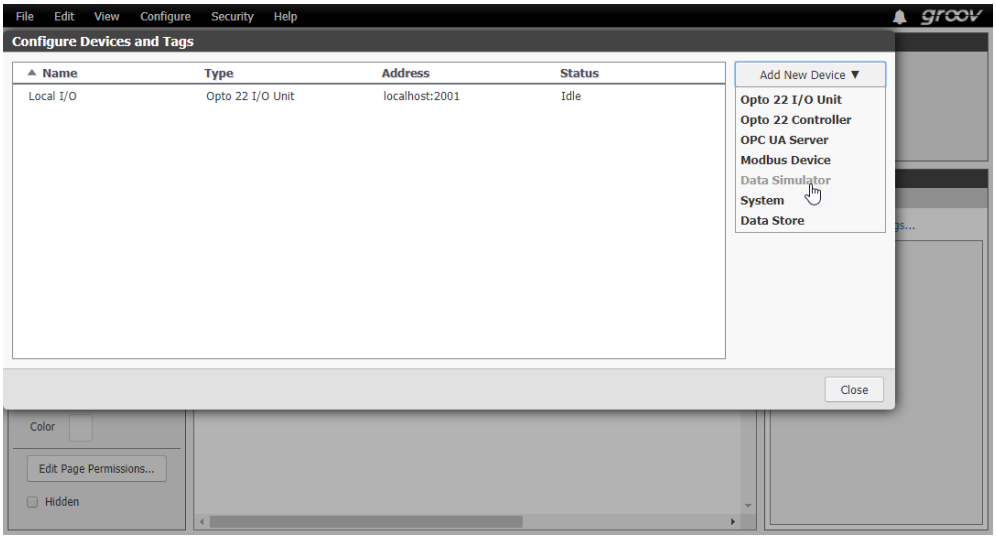
2. Enter a name for the page in the **Page Name** field.
3. Click the color block to choose a background color.
4. For now, leave the page as **Uncategorized**.
5. For now, leave **All Users** in the **Access Rights** field.
6. Click **OK**.
   The blank page appears in the center of the workspace.

Add a Device

1. In the Gadget Palette panel (lower right), click **Configure Devices & Tags**.



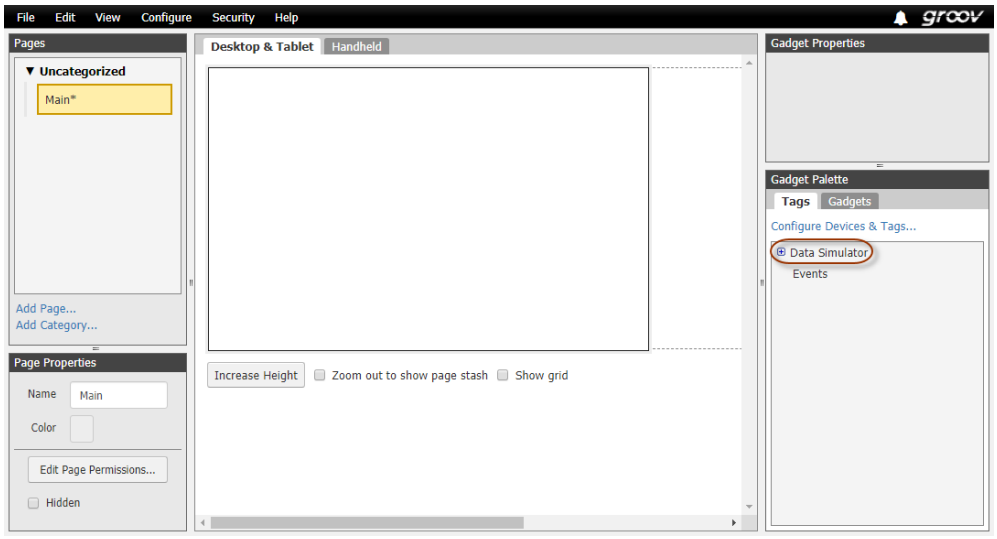
2. On the right side of the Configure Devices and Tags window, click **Add New Device**.
3. Select **Data Simulator**.



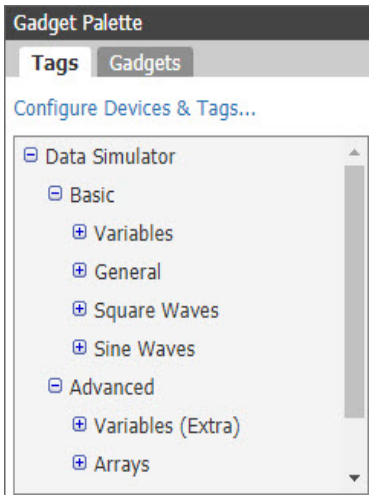
4. Click **Close**.

Add Device Tags

1. In the Gadget Palette panel, click the plus sign (**+**) next to **Data Simulator**.



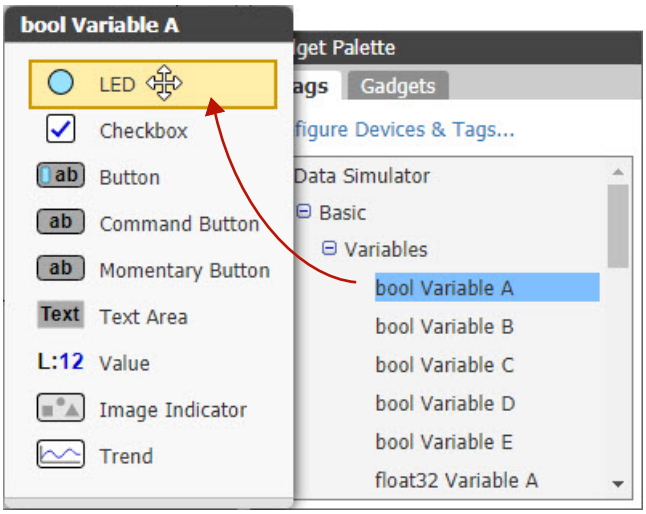
2. Click the plus signs (**+**) in the tree to see the tags in the device.



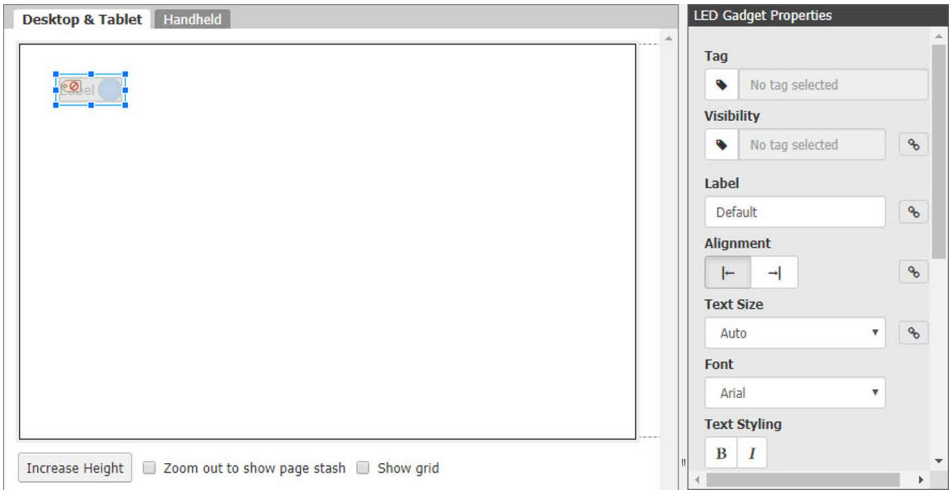
Add Gadgets

1. Expand the Data Simulator tree and click the **bool Variable A** tag.

A list appears showing all the gadgets that work with this tag.



2. Click the **LED** gadget and drag it to the page you are building.
3. Click the gadget to highlight it and notice that properties appear in the Gadget Properties panel (upper right).

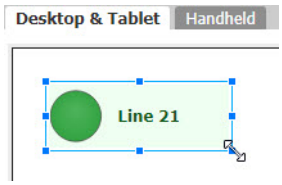


4. Scroll down to see all the possible properties you can choose and adjust. Enter the following properties and watch how the LED gadget changes after each one.

Property	You choose...	Result
Label	Line 21	Tag name is replaced with label.
Alignment	Right	Label moves to right of gadget.
Text Size	12	Label text becomes smaller (default is 16 pixels).
	Click	Button changes to show link broken. This means that the label text size you just chose (12) will affect only the Desktop & Tablet view, not the Handheld view.
Font	Verdana	Font on the label text changes.
Text Styling	B	Label text is boldfaced (thicker).

Property	You choose...	Result
Colors	Text: Deep Green	Text changes color.
	Background: Silver	Silver background appears in gadget area.
Graphic Size	Uncheck Auto and choose 6	LED becomes larger.
On/Off Colors	True: Dark Green	LED color changes.
	False: [Leave as is]	No change

5. Notice that part of the LED and its label text are hidden. Use your mouse to grab a corner handle on the gadget and expand it so everything is visible.



6. In the Gadget Palette, click **bool Variable A** again.
7. Click **Button** and drag it to the page next to the LED.
8. Click to highlight the button.
9. In the Gadget Properties area, enter the following:

Property	You choose...	Result
Confirm Writes	Check the box	When someone pushes this button, they arerequired to verify the button's action before it happens.
Display Mode	[Leave as Button]	No change
Label	Turn ON/OFF	Button text changes.
Text Size	12 Click link icon	Text becomes smaller on Desktop view. Text size remains the default on Handheld view.
Font	Verdana	Text font changes.
Text Styling	B	Text is boldfaced.
Colors	On indicator: Green	LED embedded in the button changes color.
	Off indicator: [As is (black)]	No change.
	Text: Deep Green	Text color changes slightly.
	Button: White	Button color changes.

10. With the button highlighted, use the handles to make it as large as the LED gadget so you can see all the text.

    Your page now looks something like this:

Save the Project

From the **File** menu, choose **Save All Changes and Switch to *groov* View**.

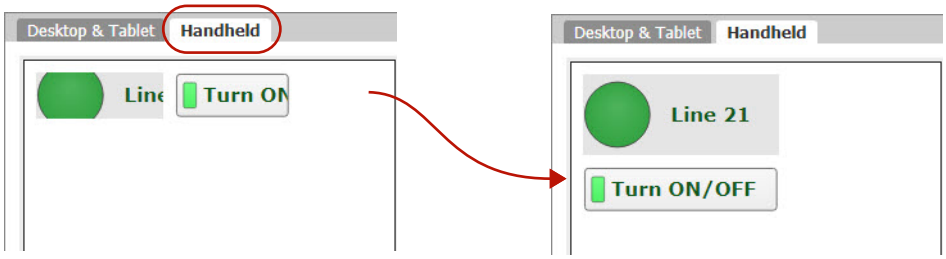
View the Project on your Computer

Your saved project opens in *groov* View.

Try it out! Click the button and see what happens.

Explore

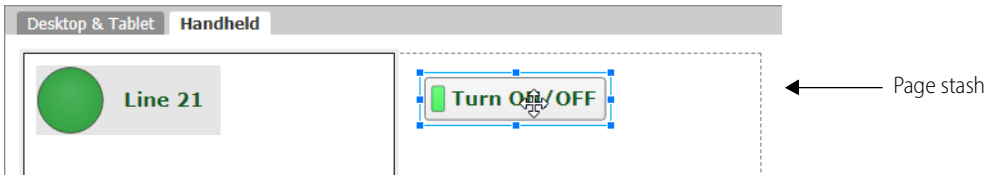
1. Go back to Build mode by clicking **Menu** in the upper-right corner of the window and choosing **Switch to Build mode**.
2. Click the **Handheld** tab (just above your page in the center of the workspace).
   While you were building your page in the Desktop & Tablet tab, *groov* View automatically put the same gadgets in the Handheld tab, which shows the page layout for a smartphone. However, you may want the page to look different on a phone. Maybe some data or controls are more important and should be at the top of the page, or maybe some don't need to be on the phone at all. In this tab, you can resize, rearrange, change, or delete gadgets to suit your needs.
3. Click to highlight each gadget and change its size and position the way you want.



Remember when you made the text size smaller (12 instead of 16) for both the LED and the button? You also broke the link between the two views for that property, which means you changed it for one view only. So, the text is smaller for Desktop & Tablet, but it remains at the default of 16 for Handheld.

You can make the two views different in other ways as well. For example, suppose you want smartphone users to be able to see the status of Line 21 but not be able to turn it on or off. You can stash the Turn ON/OFF button so it's not visible in the Handheld view.

4. In the Handheld tab, notice the area off to the right of the page with a dotted line around it. Drag the Turn ON/OFF button into this area, which is called the *page stash*.



The button still shows on a computer or tablet but is not visible on a smartphone. You can also stash gadgets in the Desktop & Tablet tab if you don't want them to appear on these devices, so you can customize the view on large and small devices.

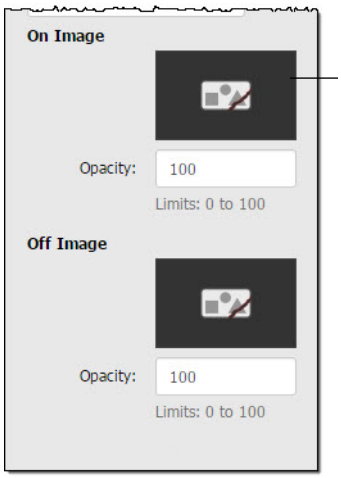
Let's explore some more.

Images

When we added the Turn ON/OFF button, one of the properties was Display Mode. Let's take another look at that now.

1. In the Desktop & Tablet tab, select the Turn ON/OFF button and look in the **Properties** panel.
2. For Display Mode, choose **Image**.

   Notice that instead of a simple button, you could skin the button with images: one image indicates that the button is On and the other that it is Off.



Click to open the Image Library and choose or add the On Image.

3. Click a broken image to open the Image Library, where you can add images to your project.

   All the images for your *groov* project are stored in the Library. You can add and delete images. You can use the same image in multiple places, and it is automatically updated every place it is used if you change it. Compatible file types for images are BMP, GIF, PNG, JPG, and SVG. For more on the Image Library, see page 88.

   Here's what the Image Library looks like before you add any images:

4. For now, click **Cancel** to exit the Image Library. In the Properties panel, change **Display Mode** back to **Button**.

Round Gauge

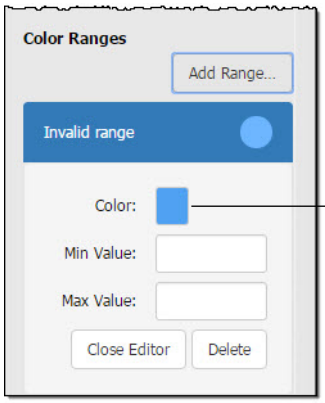
Let's look at a gauge.

1. In the Gadget Palette, expand the tag tree again. Under **Basic** > **Variables**, choose **float32 Variable A**.
2. In the gadget list, click **Round Gauge** and drag it to your page.
3. Highlight the new gadget and look at its properties. To understand all the options, see "Round Gauge Gadget" on page 126. But for now, change only the following:

Property	You choose...	Result
Range	Min value 0, Max value 100	The gauge changes to show 0-100.
Units	Gallons	"Gallons" appears below the numeric value on the gauge.

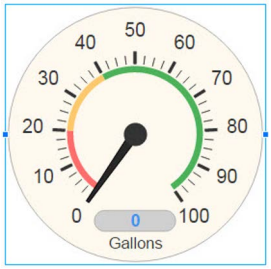
Property	You choose...	Result
Precision	0	Value will be shown in whole numbers (no digits after the decimal point).
Colors	Needle: Black Background: Dark Orange	Colors change on the gauge.

4. Scroll down to Color Ranges and click **Add Range**.



5. Click the blue rectangle and choose **Red**.
6. Enter `0` for **Min Value** and `20` for **Max Value**.
7. Click **Add Range** to configure another range: choose **Orange**, enter `20` for **Min Value**, and enter `40` for **Max Value**.
8. Click **Add Range** to configure another range: choose **Dark Green**, enter `40` for **Min Value**, and enter `100` for **Max Value**.

   Your gauge now looks like this:



This gauge is easy for an operator to understand at a glance. Anything in the green range is OK, but if the needle dips down into the red, you have a problem.

The numeric value appears in blue at the bottom of the gauge.

What's Next?

Now that you have an idea of what *groov* View can do, you can get to work on your real project.

To connect to your systems and equipment, see these sections:

- "Add a Modbus/TCP Device" on page 35
- "Add an Opto 22 Controller" on page 29
- "Add an OPC UA Server" on page 45

To add more pages, see "Working with Pages" on page 21.

To learn **more about gadgets**, see "Editing Gadgets" on page 74. For help with choosing **gadget properties**, see Chapter 4: Gadget Reference on page 107.

To set up **users and passwords** and control who accesses your *groov* interface, see "Managing User Access" on page 81.

To **notify** authorized people when events occur, see Chapter 5: Using Events and Notifications on page 135.

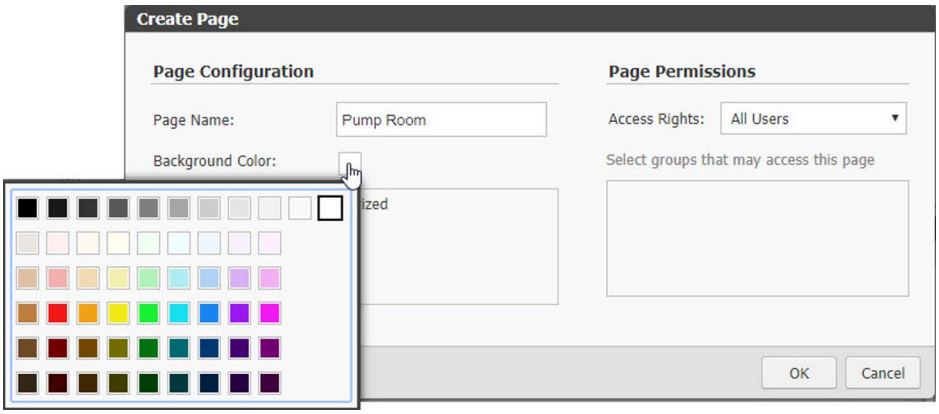
WORKING WITH PAGES

Your operator interface can consist of one or many pages depending on your application's needs. You may have separate pages for different functions, different people, or different locations. You use the Page Navigator gadget to provide a link so users can go from one page to another.

Add Pages

1. In Build mode, click **Add Page** in the Pages panel on the left side.

2. Type a name for the page.
3. If you wish, choose any of the following options:
   - Click the **Background Color** square to choose a color for your page.



   - If you have added page categories (see page 94), select a category for this page.
   - Limit access rights based on user security level (see "Create a User" on page 82). Or, if you want only specific users to see this page, choose **Limited Access**. If the page is Limited Access and you have already added user groups (see page 81), select the groups that should see this page.
4. Click **OK**.

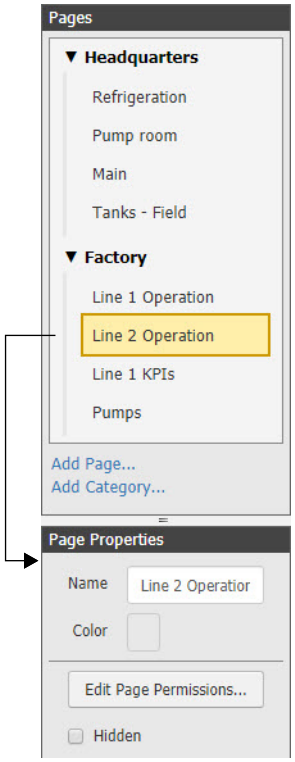
   Your new page appears in the middle of the workspace.

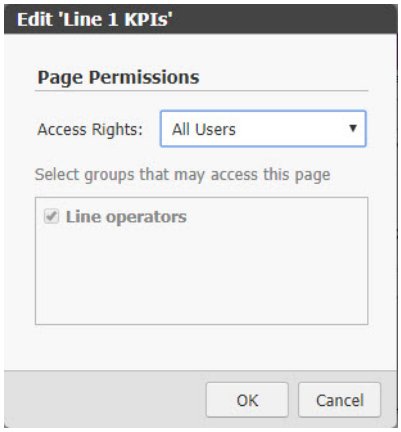
Change Page Properties

You can change an existing page's name, permissions, or other properties.

NOTE: When you import a page, any permissions limitations it may have had are not imported. If you want the page to be limited, you must change its permissions after importing.

1. In the Pages panel on the left side of the workspace, click the page you want to change.
   In the Page Properties panel just below, you see the current page properties. (Both panels are shown at right).
2. Change **Name** or background **Color** as needed.
3. To hide the page so no users can see it, check **Hidden** (useful when you are building a new page).
4. To change user permissions for the page, click **Edit Page Permissions**.





   You can limit access rights based on user security level (see "Create a User" on page 82). Or, if you want only specific users to see this page, choose **Limited Access**. If the page is Limited Access and you have already added user groups (see page 81), select the groups that should see this page.
5. Click **OK**.

Page Size, Grid, and Layout Tools

groov View gives you tools to help place your gadgets where you want them while building your HMI. These tools include a grid, rulers, and guides that you can make visible in Build mode if you wish.

How the Grid Works

When you place or move gadgets on the page in Build mode, they automatically snap to a grid so they are aligned. When users view your HMI, this grid is scaled to meet the size of the browser window's viewport, so that gadgets appear in an appropriate size for the device.

The width of the grid depends on the device it's viewed on. For Desktop and Tablet devices, the grid is 96 units wide; for Handheld devices, the grid is 32 units wide. To determine a gadget's position in the browser viewport at runtime, *groov* View calculates a pixel size for a grid unit based on the width of the viewport. The grid unit size is calculated by dividing the viewport's size in pixels by the width of the active layout in grid units (96 or 32) and rounding down to the nearest integer.

As you resize your browser window, *groov* View adjusts the grid unit size and re-renders gadgets at new sizes as necessary. Because the gadget position calculation rounds down, you may see a small space at the side or bottom of the window.

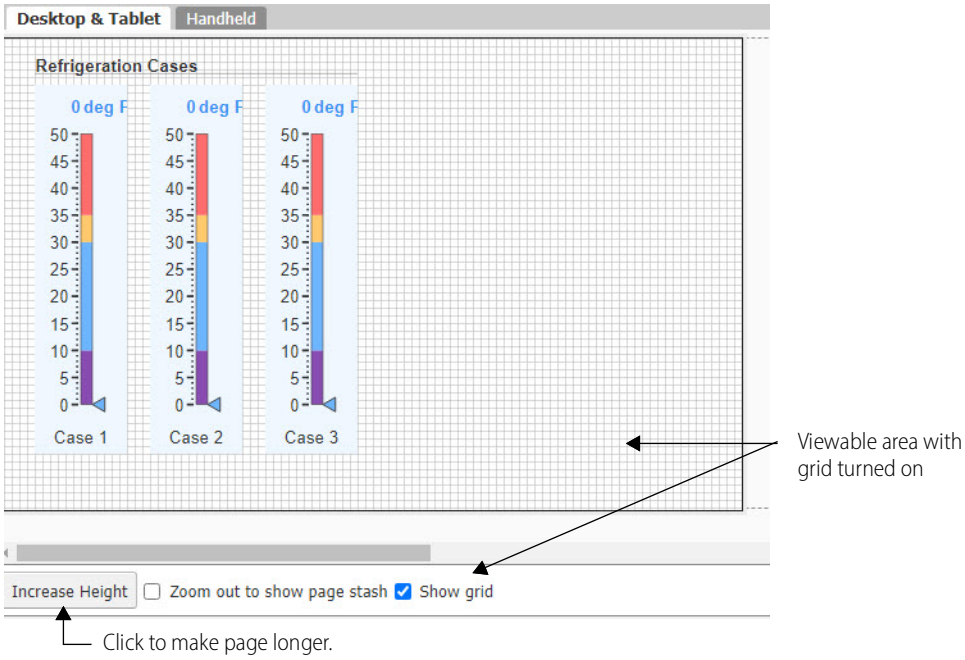
Making Pages Larger

Since the width of your page is fixed at 96 or 32 grid units, pages cannot scroll horizontally. However, you can make pages as long as you want.

When you need more room on a page, click the **Increase Height** button at the bottom of the work area. If you switch to another page and then return, the page shrinks to fit the content or returns to the default page size, whichever is larger.

Displaying the Grid

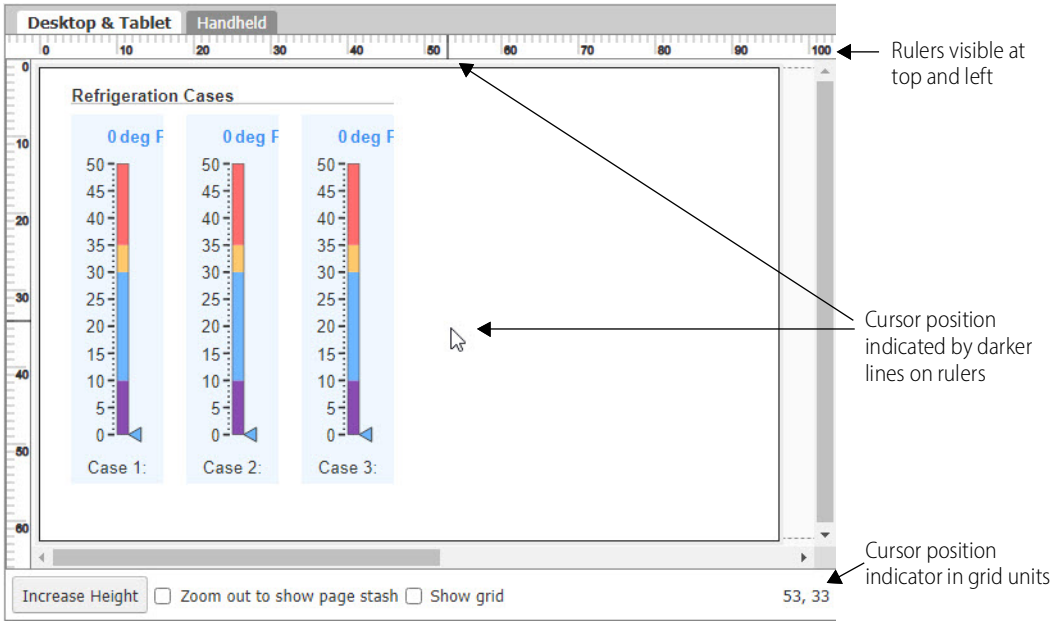
Seeing the grid can help you line up gadgets as you place them on the page. To show the grid, check **Show grid** at the bottom of the work area, or click **View** > **Show Grid** from the top menu bar.



Displaying Rulers

Rulers along the top and left sides of your page can also help you lay out your gadgets consistently. To see the rulers, click **View** > **Show Rulers** from the top menu bar.

When rulers are visible, darker lines on the ruler show your mouse's current position. Also, a coordinate indicator in the lower-right corner of the workspace tells you where your mouse is in grid units.

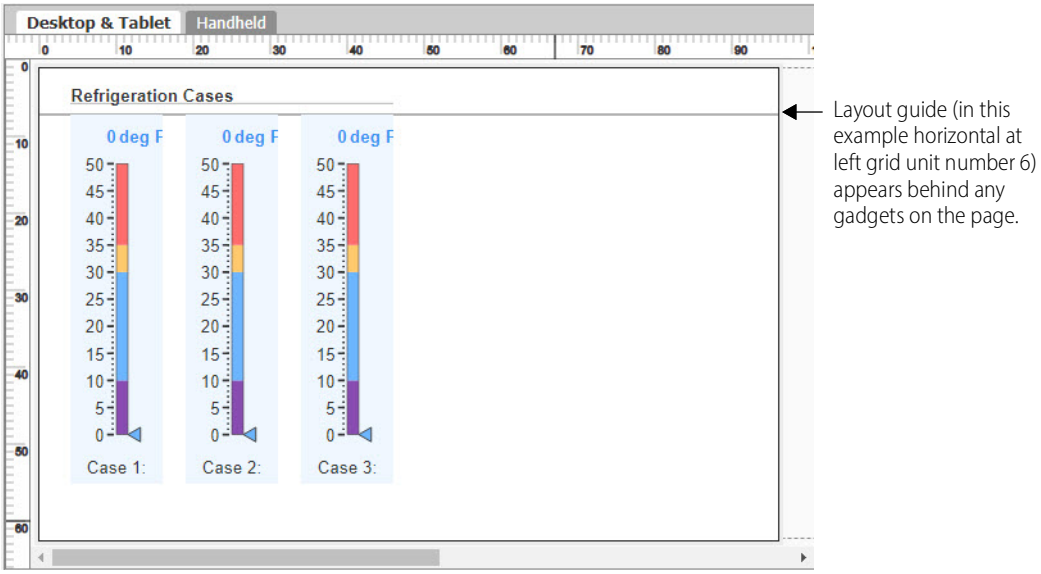


Using Layout Guides

Layout guides help you position your gadgets consistently. The guides can remain in place in Build mode but are not visible in View mode. Each layout (Desktop or Handheld) for each page has its own set of guides. Guides can help you easily set up a template because when you duplicate a page, its guides are duplicated with it.

1. If rulers are not visible, click **View** > **Show Rulers** from the top menu bar so you can see grid units.
2. To add a layout guide, click **View** > **New Guide** from the top menu bar.
3. In the dialog box, choose a horizontal or vertical guide. Look at the left or top ruler and determine where you want the guide to appear. Enter the grid unit number for the guide's initial position on the page.

   The guide appears as a line on the page behind any gadgets.



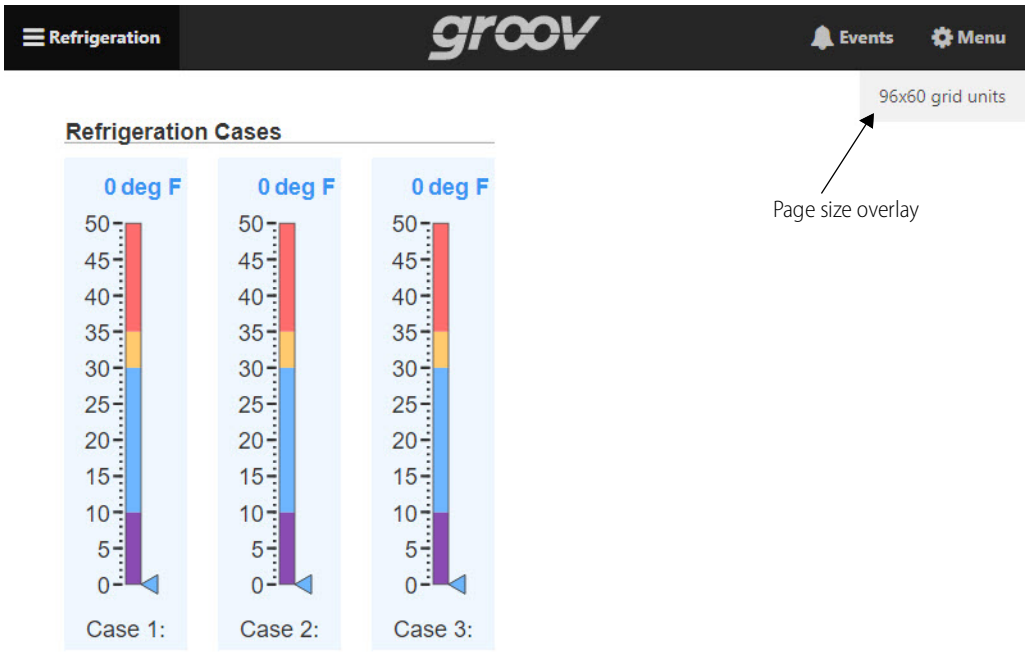
- **To move** the guide, click and drag it.

- **To delete** the guide, right-click it and click **Delete**.
- **To delete all guides**, choose **View** > **Clear Guides**.

Fitting Designs on a Page (Page Size Overlay)

Because devices, operating systems, and browsers vary widely, it can be difficult to know for sure that all your gadgets will fit the way you want on your users' screens. If you know the device your users will use, however, a debugging page size overlay can help.

1. In Build mode, choose **File** > **Save all changes**.
2. In the device your users will use (tablet, phone, smart TV, or PC), open *groov* View (see "Opening View" on page 151). Make sure the device's browser is at the size your project will be viewed (for example, full screen or maximized).
3. Leave that page open on your target device and open Build mode on your desktop.
4. Choose **Configure** > **Project Settings**.
5. Scroll down to the View Mode box and check **Show page size overlay**.
6. Scroll to the top and click **Save Settings**.
7. Close the Project Settings window.
8. Back in your target device, watch until you see an overlay in the upper right corner that displays the current visible page size in grid units (see the following image).



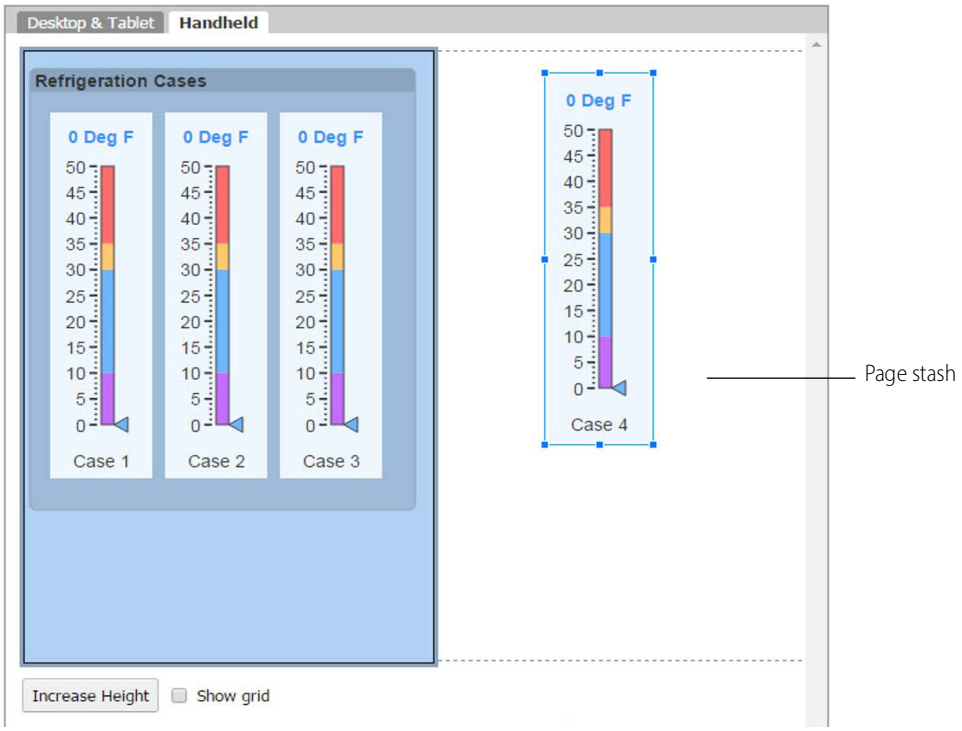
In this example, the visible portion of the page is 96 units wide (the standard width for a desktop layout) and 60 grid units high.

9. Back in Build mode on your desktop workstation, add a horizontal layout guide at position 60 to indicate the bottom of the visible page.

Use the Page Stash

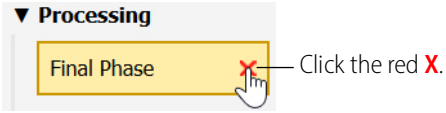
The workspace for each page has a *page stash* where you can put gadgets that are not yet part of the project. For example, if you don't want a gadget to appear in the Handheld layout, you can move it to the page stash; the gadget still appears in the Desktop & Tablet layout.

To see the page stash in the Desktop & Tablet view, select **Zoom out to show page stash** at the bottom of the work area. In the Handheld view, the page stash is always visible to the right.

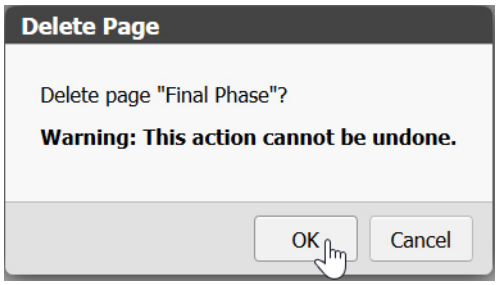


Delete a Page

1. In the Pages panel on the left, hover over the page or category name, and click the red **X** that appears.

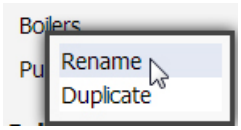


2. To verify, click **OK**.



Rename a Page

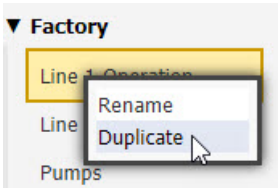
1. In the Pages panel, right-click the page name and select **Rename**.



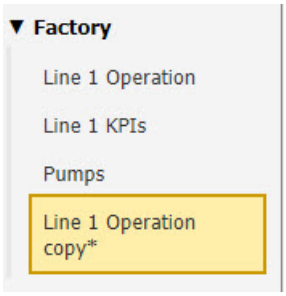
2. Enter a new label, and press Enter or left-click in the work area.

Duplicate a Page

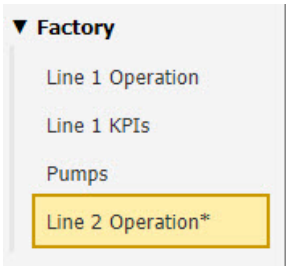
1. In the Pages panel, right-click the name and select **Duplicate**.



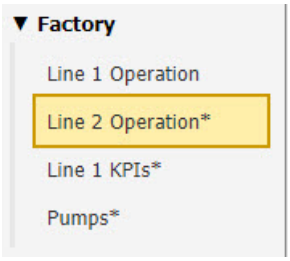
A copy appears in the same page category.



2. Right-click the copy and select **Rename** to give the page a new name.



3. If you want, you can drag it to a new position in the list or to a different page category.



Export and Import Pages

You can move pages from one *groov* project to another by exporting and importing them. When you export, only the page layout with gadgets is exported. Associated tags, images, and page navigators are not exported. In addition, if you limited viewing permissions to specific user groups, those limitations are not exported.

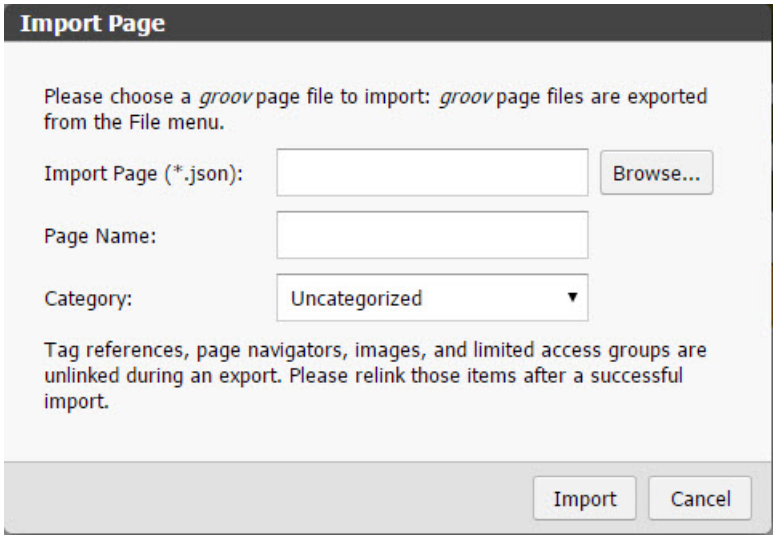
The export file is downloaded to your PC with a date and time stamp as its filename.

Exporting a Page

1. In Build mode, choose **File** > **Export Page**.
   The file is immediately downloaded with a filename that looks something like this:
   `Groov_Page_D04242017.T211956.json`
2. Save the file with a filename you recognize in the location you want. Make sure you retain the `.json` file extension.

Importing a Page

1. Open the *groov* project you want to import the page to.
2. Choose **File** > **Import Page**.



   a. Click **Browse** and find the file you exported.
   b. In the **Page Name** field, enter the name for the page in this project.
   c. (Optional) Choose a category for the new page.
3. Click **Import**.

A new page is created in the project containing the gadgets and layout from the imported page.

4. Complete the new page by:
   - Adding tags for each gadget
   - Replacing any images
   - Adding page navigators appropriate for this project
   - Editing page permissions
5. Save the page.

WORKING WITH A DEVICE

When you first open *groov* View, only tags for the Data Simulator are available for use. Any other device, system, or software you want to monitor, control, or exchange data with using your *groov* View operator interface—including the *groov* EPIC, Server, or Box itself—must be added to *groov* View as a *device*. When you add the device, you also add its tags so that you can connect the tags to the *groov* View gadgets to make them operational.

With any *groov* View project, you can add as many *groov* EPIC processors and I/O units, *groov* RIO I/O units, SNAP PAC controllers and I/O units, Modbus devices, and Data Stores as you like. You can also add an OPC UA Server—either the internal Ignition Edge® OPC UA server in *groov* EPIC or *groov* Box, or an external OPC UA server with any *groov* product. In addition, any events you create (see Chapter 5: Using Events and Notifications) automatically appear as tags in a device named Events.

NOTE: Devices cannot talk with each other directly. For example, a Modbus/TCP device cannot write data to a Data Store; an Opto 22 controller cannot read groov System data. However, you can use Node-RED in groov EPIC, groov RIO, or groov Box to create a logical flow that exchanges data between devices that have Node-RED nodes. For more on Node-RED, see nodered.org, developer.opto22.com, and these user's guides:

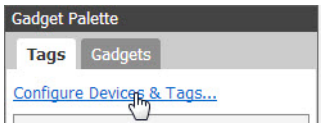
- *groov EPIC User's Guide (form 2267)*
- *groov RIO User's Guide (form 2324)*
- *groov Box User's Guide for GROOV-AR1 (form 2104)*

This section includes:

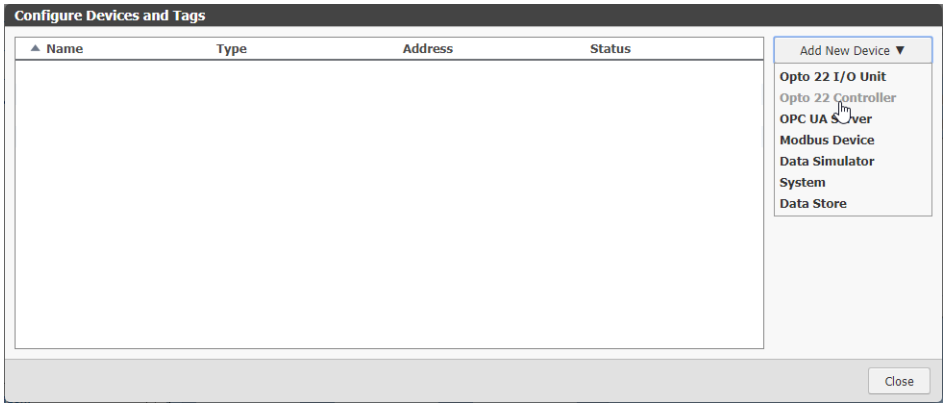
Add an Opto 22 Controller

Follow these steps to add an Opto 22 controller—either a *groov* EPIC processor or a SNAP PAC controller—that the operator interface will communicate with. When you add a controller and the `.idb.txt` file associated with the strategy that runs on the controller, the strategy's tags become available in *groov* View for you to use. Repeat the steps to add additional Opto 22 controllers.

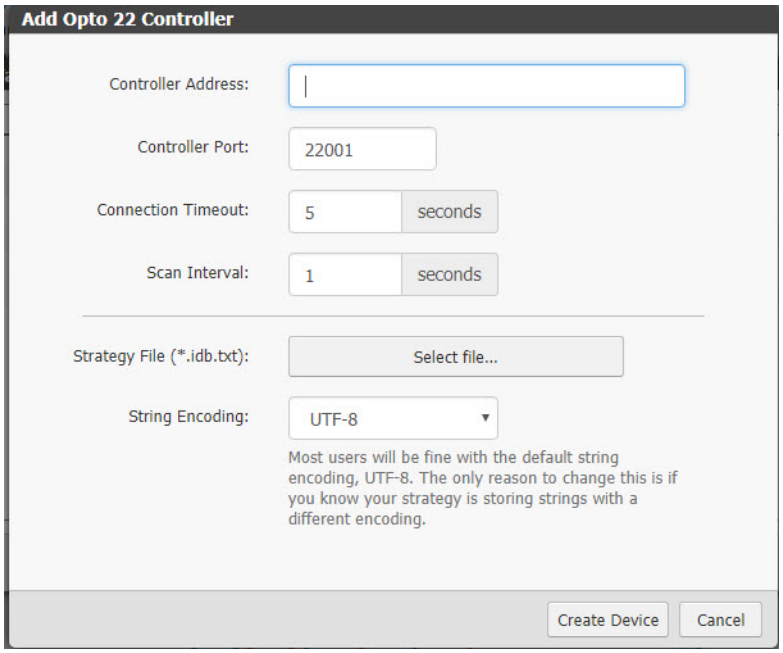
1. In the Tags tab under Gadget Palette on the right side, click **Configure Devices & Tags** (or choose **Configure** > **Devices and Tags** from the top menu bar).



2. Click **Add New Device** and select **Opto 22 Controller**.



3. Enter the following details:



   a. **Controller Address:** Enter the hostname or IP address of the controller running the strategy you want to use. For a SoftPAC controller, use the full name of the computer running SoftPAC as in this example:

      `JAlvarez-w10.ACME.com`

   b. **Controller Port**, **Connection Timeout**, **Scan Interval**, and **String Encoding:** Change if necessary for your application.

c. **Strategy File:** Click **Select file** to locate the `.idb.txt` file you want to use, select the file, and click **Open**.

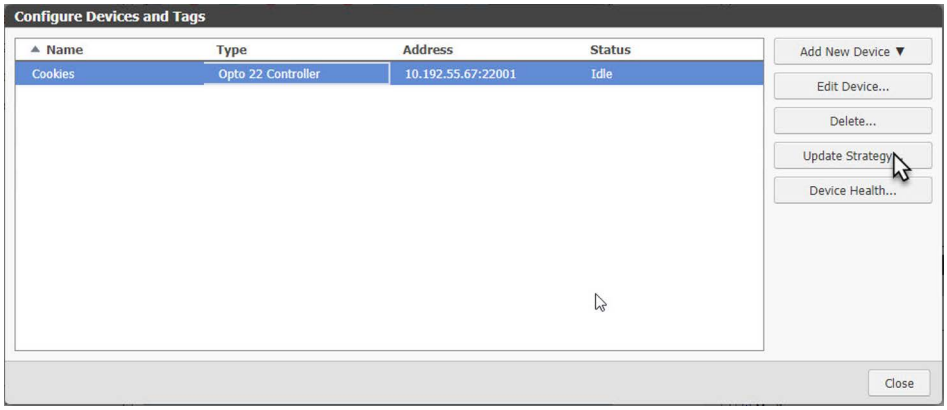
NOTE: When PAC Control compiles a strategy, it automatically generates an `.idb.txt` file and places it in the same directory as the strategy. If you are setting up groov on a computer other than the one used to develop the PAC Control strategy, copy the `.idb.txt` file into a directory that is accessible to the computer you are using to set up groov.

4. After you complete your changes, click **Create Device**.
   Build imports the `.idb.txt` file. In the Gadget Palette, you see the name of your strategy and the IP address of your Opto 22 controller.
5. Click the plus signs (**+**) to expand the tree and see all the tags.

Updating a Strategy

If a controller's strategy has been changed, you need to update it in *groov* View by importing its new `.idb.txt` file.

1. Select **Configure** > **Devices and Tags**.
2. Highlight the controller you want to update, and click **Update Strategy**.



***CAUTION**: Be very sure you are updating the correct strategy. If you use the wrong one, all of the controller tag connections can break. This is critical because re-importing the correct strategy does not fix the broken gadgets. You can only fix the connections by restoring your project with a recent backup.*

3. Browse to the strategy you want to use, select the new `.idb.txt` file, and then click **Open**.

   NOTE: The `.idb.txt` file is in the same directory as the strategy. If groov is on a different computer than the strategy, copy the `.idb.txt` file into a directory accessible to the computer you are using for groov.

4. Click **Close** to close the Configure Devices and Tags window.

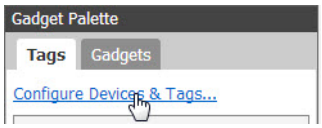
Add an Opto 22 I/O Unit

Your *groov* View operator interface can read tags from the OptoMMP memory map in the following I/O units:

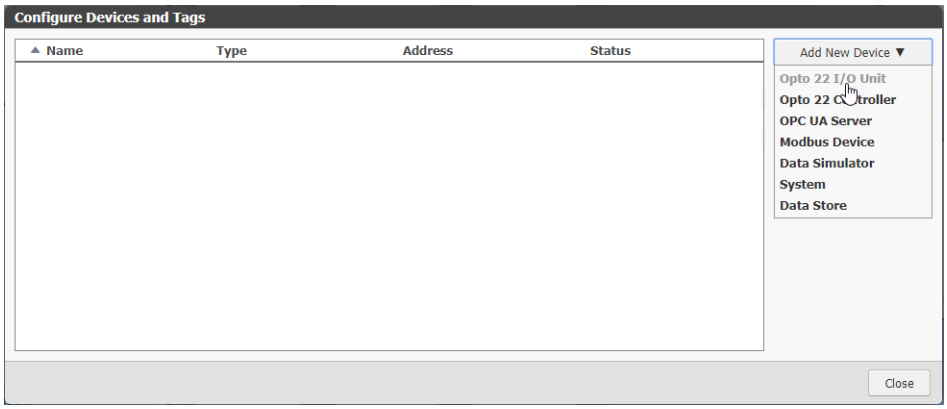
- A *groov* EPIC I/O unit or a *groov* RIO unit. Before adding it to your *groov* View project, configure the points in PAC Control or *groov* Manage.
- An Opto 22 SNAP PAC I/O unit. Before adding it to your *groov* View project, configure the I/O modules and points in PAC Control or PAC Manager.

When you add an I/O unit, the unit's memory map tags become available in *groov* View. Some memory map address tags are automatically imported (called *Auto tags*), and you can manually configure others. The following instructions add the Auto tags.

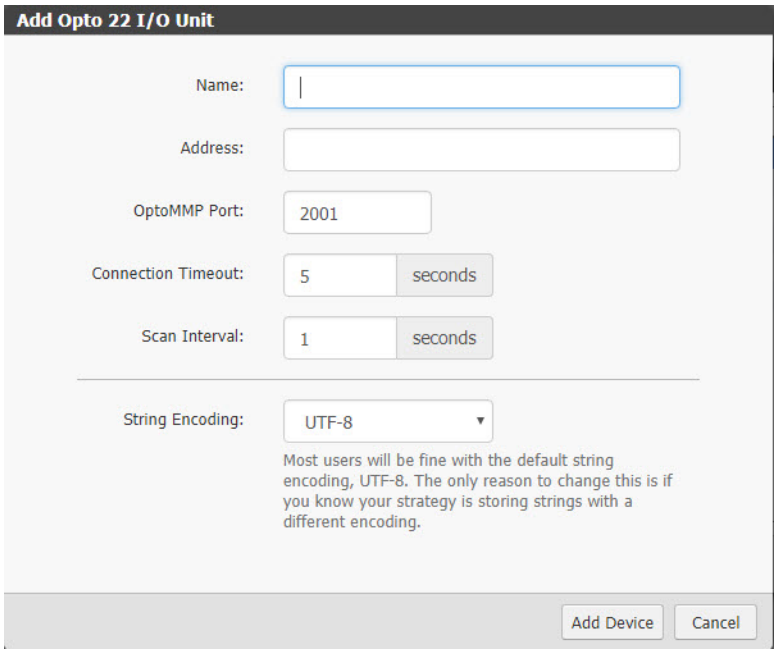
1. In the Tags tab under Gadget Palette on the right side, click **Configure Devices & Tags** (or choose **Configure** > **Devices and Tags** from the top menu bar).



2. Click **Add New Device** and select **Opto 22 I/O Unit**.



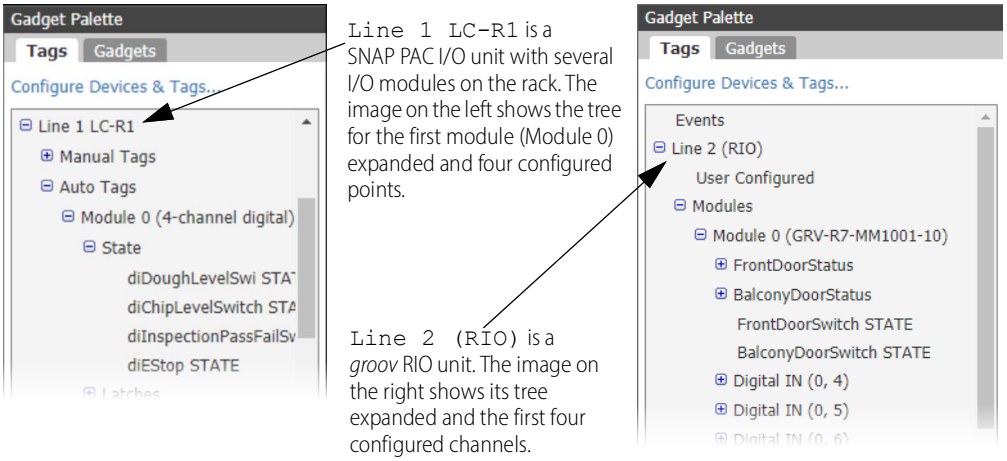
3. Enter the following details:



   a. **Name:** Enter a name for the I/O unit.
   b. **Address:** Enter the IP address or hostname of the I/O unit.
   c. **OptoMMP Port:** Leave at the default of `2001` (unless you have changed it on the I/O unit).

d. **Connection Timeout**, **Scan Interval**, or **String Encoding:** Change if necessary for your application.

4. Click **Add Device**.
5. In the Gadget Palette, notice the name of your I/O unit. Click the plus signs (**+**) to expand the tree and see all the tags that were automatically imported. The following images show two examples.



NOTE: For SNAP PAC I/O units, empty module slots on the I/O unit may appear as digital modules in the tree.

If the tag you need is not there, you can add individual OptoMMP memory map address tags. See "Adding OptoMMP Memory Map Addresses Manually" on page 34.

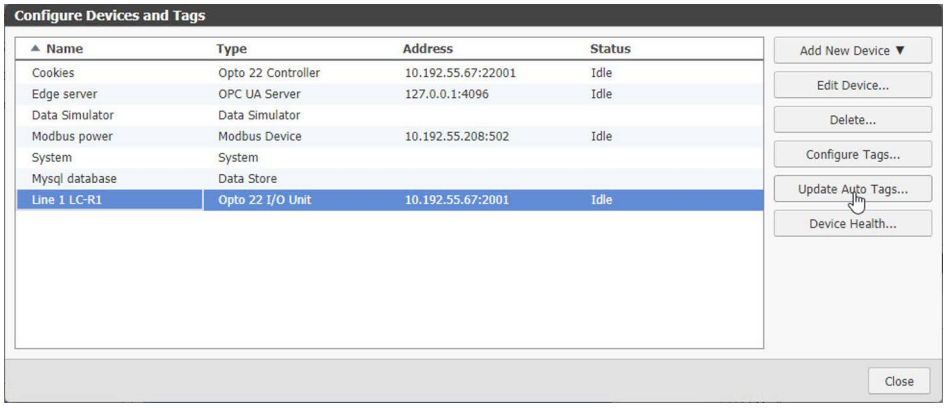
Updating Auto Tags

If you add an I/O module to an I/O unit, to add the Auto tags for the new module:

- For *groov* EPIC I/O units, collapse (**-**) and then expand (**+**) the tree to see the new tags.
- For SNAP PAC I/O units, if you configured the points on the new module prior to adding it in *groov* View (for example, through PAC Manager), then you can collapse (**-**) and then expand (**+**) the tree to see the new tags.

If you remove an I/O module from the I/O unit, remove the missing tags from their associated gadgets, and then update or remove those gadgets:

1. In the Gadget Palette, click **Configure Devices & Tags**.
2. Highlight the name of the I/O unit in the list of devices.



3. Click **Update Auto Tags**. A report lists any deleted tags.
4. Click **Update Auto Tags** to confirm that you want to disconnect the deleted tags from their associated gadgets.
5. Click **Close** on the Configure Devices and Tags window.
6. Update or remove the associated gadgets.

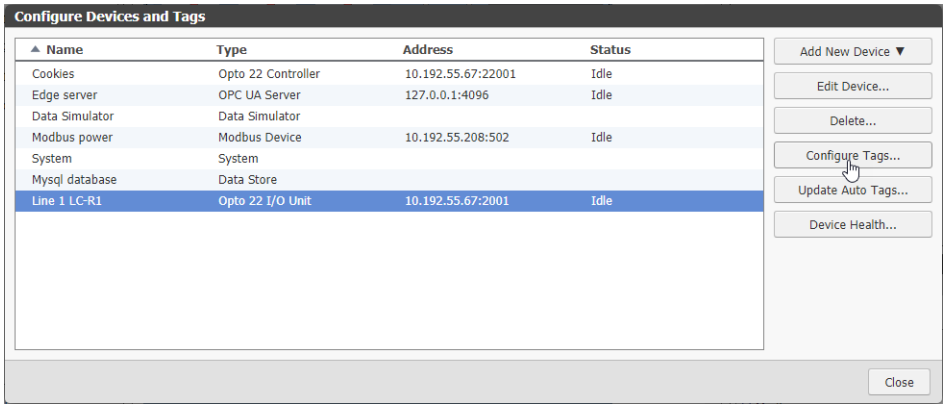
Adding OptoMMP Memory Map Addresses Manually

To do this, you need to know the **memory map address** and **data type** for the tag you want. You can find these in the *OptoMMP Protocol Guide* (form 1465) or:

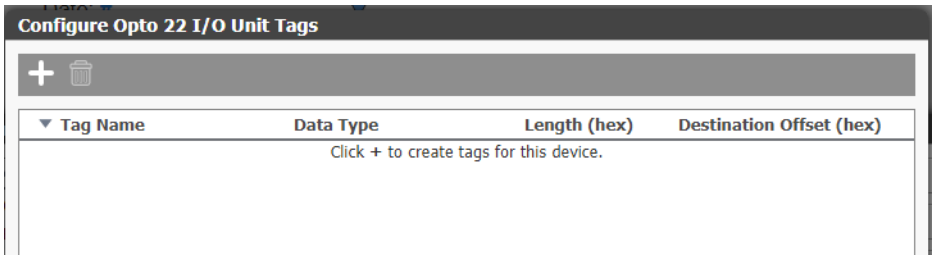
- For *groov* EPIC I/O units or *groov* RIO units, you can find memory map addresses through *groov* Manage. Navigate to the **I/O** > **I/O Services** > **MMP Calculator** page.
- For SNAP PAC I/O units, you can find memory map addresses by connecting to the I/O unit through PAC Manager and then click **Tools** > **Inspect**.

Be aware that your *groov* View interface cannot show hexadecimal values. Hex values are shown as their decimal equivalents in your interface.

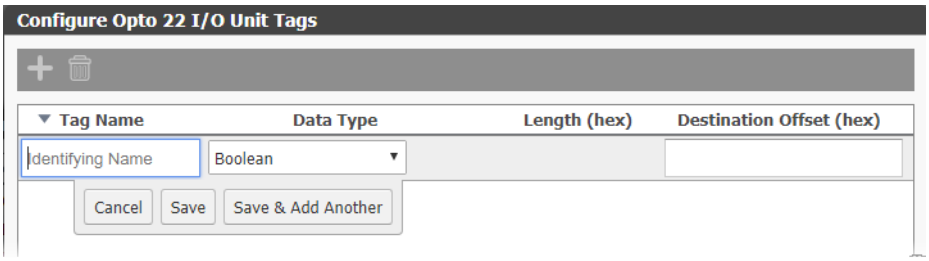
1. In the Gadget Palette, click **Configure Devices & Tags**.
2. Highlight the name of the I/O unit in the list of devices and click **Configure Tags**.



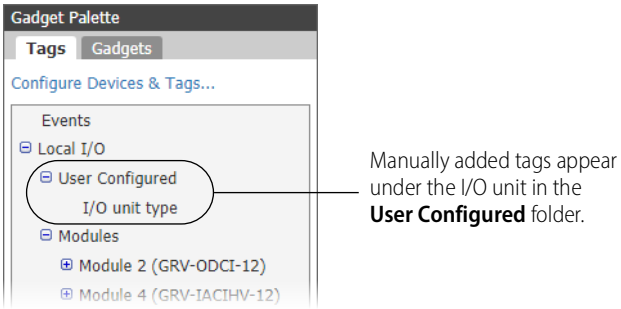
3. Click the plus sign (**+**) in the upper left of the Configure Opto 22 I/O Unit Tags window.



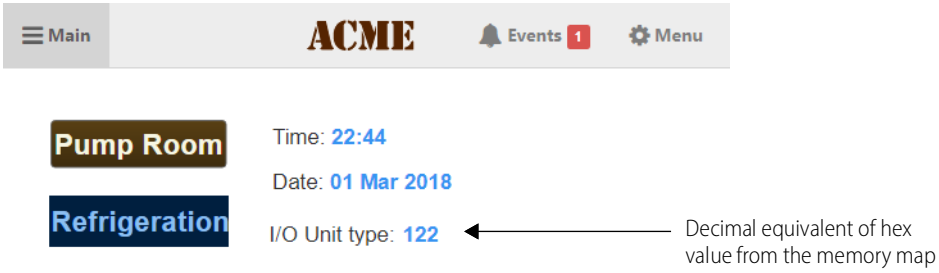
4. Enter a name for the tag in the **Tag Name** field.
5. Choose the correct data type from the **Data Type** drop-down list.



6. In the **Destination Offset (hex)** field, enter the complete memory map address with no spaces. For example, for Unit Type, you would enter `FFFFF0300020`.
7. Click **Save**, or click **Save & Add Another** to configure more tags manually.
   In the Gadget Palette, the tag appears under the I/O unit's name in the **User Configured** folder.



You can use manually added tags just like any other tag in your *groov* View interface. In this example, you see that the hex value returned from the Unit Type memory map address is shown in the interface as its decimal equivalent:

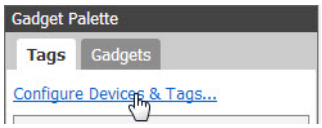


Add a Modbus/TCP Device

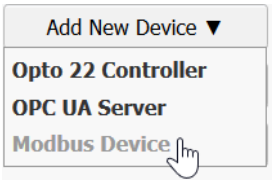
Modbus is an open protocol widely used in automation and other industries. Although it was originally designed for a serial network, Modbus has since been adapted to work over Ethernet as well. Over Ethernet, the protocol is called Modbus/TCP. *groov* has a communication driver that allows *groov* to act as a Modbus/TCP master and communicate with Modbus/TCP slave devices that have an Ethernet connection. Note that *groov* does not support communication with serial devices via a Modbus serial-to-TCP gateway due to high latency in serial networks.

Follow these steps to add tags for a Modbus/TCP slave device for use in the operator interface.

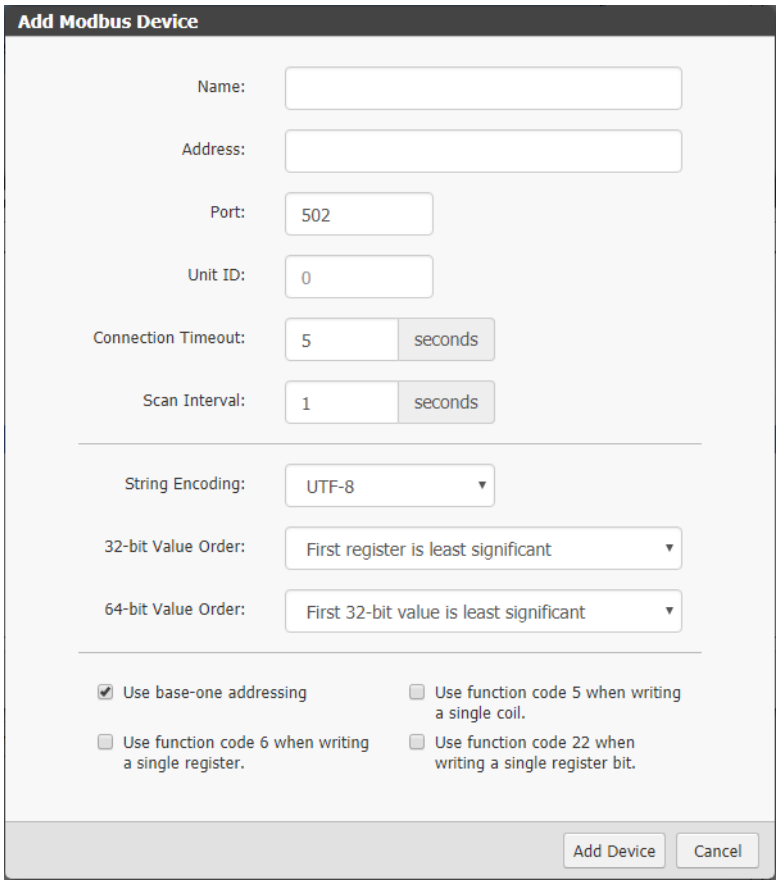
1. In the Tags tab under Gadget Palette on the right side, click **Configure Devices & Tags** (or choose **Configure** > **Devices and Tags** from the top menu bar).



2. Click **Add New Device** and select **Modbus Device**.



3. Enter the following details:



a. **Name:** Enter a name to identify this Modbus device.

b. **Address:** Enter the Modbus device's IP address or hostname. A hostname is converted to an IP address by the DNS server.

   Your device may have a static IP address, which you can find in the device's documentation. The device may also come with software that allows you to set its IP address or view the address assigned to it by a DHCP server.

c. **Port:** The standard Modbus port is `502`. Some Modbus devices may use a different port. Refer to your device's documentation to determine which port number it uses.

d. **Unit ID:** Typically used to address individual devices or memory segments located at a single IP address.

Check your device's documentation to determine whether the slave ID is required for any reason. If it is not, leave this box at the default of 0.

e. **Connector Timeout**, **Scan Interval**, and **String Encoding:** Change these only if your application requires it.

f. **32-bit** and **64-bit Value Order:** The Modbus protocol does not specify memory mapping. As a result, devices that store multi-register data types store the data differently. Use these settings to set the byte order of the data coming from your Modbus device for data types that span more than one 16-bit register/address. See your device's documentation to determine whether either of these settings needs to be changed. The device's manual may use terms like high or low order or registers, or MSB (Most Significant Bit) or LSB (Least Significant Bit).

NOTE: Setting either of these settings incorrectly may result in garbage values for the affected data types. If you receive data that makes no sense, try changing these settings.

– *32-bit: First register is least significant*: For 32-bit data types that span two 16-bit registers, this indicates that the first (lower) register read contains the *least significant byte* (LSB).

– *64-bit: First 32-bit value is least significant part of 64-bit values*: For 64-bit data types that span four 16-bit registers, this indicates that the LSB is contained within one of the first two registers read.

Example: Assume register values are:

– register 1 = A
– register 2 = B
– register 3 = C
– register 4 = D

Here's how data appears based on your settings:

Settings		Results	
32-bit	**64-bit**	**32-bit value from registers 1 & 2**	**64-bit value from registers 1-4**
Second register	Second 32-bit value	AB	ABCD
First register	Second 32-bit value	BA	BADC
Second register	First 32-bit value	AB	CDAB
First register	First 32-bit value	BA	DCBA

4. Check the following settings:

NOTE: Be sure to check the documentation that came with your Modbus device for additional information about these settings. For more information about Modbus function codes, see www.modbus.org/docs/Modbus_Application_Protocol_V1_1b.pdf.

– **Use base-one addressing**
If your device documentation specifies zero-based addressing or you simply prefer zero-based addressing, you can uncheck this option to make tag addressing easier.

– **Use function code 06 when writing a single register**
If your device does not support Modbus function code 06 (0x06, Write Single Register), uncheck this option. If it is not checked, *groov* uses function code 16 (0x10 Write Multiple Registers) for single-register writes.

If this option is checked and your device does *not* support function code 06, you may receive errors. The error occurs with writes to any tag having a data type sized 16 bits or smaller.

- **Use function code 05 when writing a single coil**
  If your device does not support Modbus function code 05 (0x05, Write Single Coil), uncheck this option. If it is not checked, *groov* uses function code 15 (0x0F, Write Multiple Coils) for single coil writes.
  If this option is checked and your device does *not* support function code 05, you may receive errors.
- **Use function code 22 when writing a single register bit**
  If your device supports Modbus function code 22 (0x16, Mask Write Register), you can check this option to optimize writes. (Using function code 22 makes writes faster and ensures that the write operation is atomic.)
  If this option is not checked, *groov* uses other functions to first read the whole register, modify the bit, and then write to the whole register.

  NOTE: Keep this option unchecked for an Opto 22 SNAP PAC controller or brain.

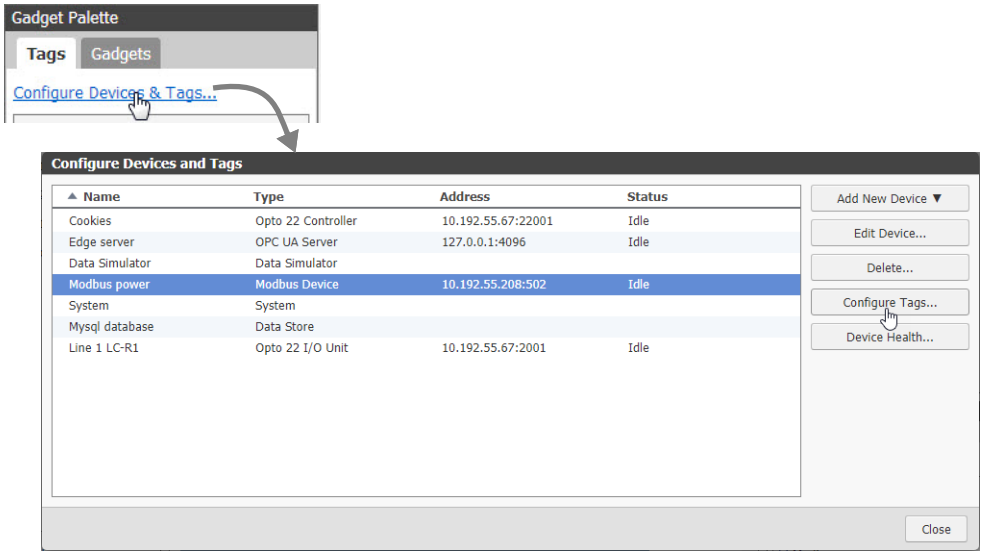
5. When finished, click **Add Device**.
   The Modbus device appears in the list of configured devices.

Next, add tags either manually (see page 38 below) or by importing them from a file (page 44).

Adding Modbus Tags Manually through *groov* View

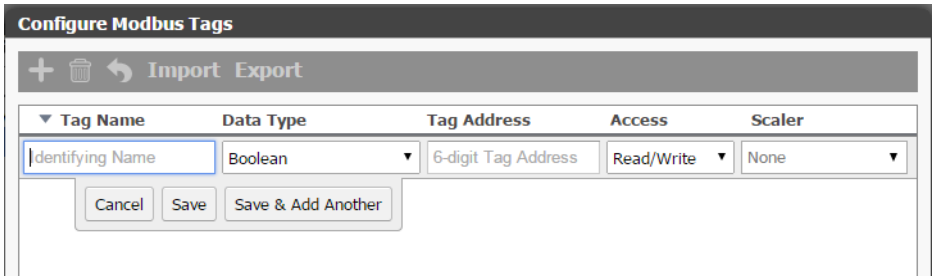
Use the following steps to manually add Modbus tags in Build mode. You can also add Modbus tags by importing them from a file. See "Importing Modbus Tags from a CSV File" on page 44.

1. In the Tags tab under Gadget Palette on the right side, click **Configure Devices & Tags** (or choose **Configure** > **Devices and Tags** from the top menu bar).
2. Highlight the Modbus device and click **Configure Tags**.



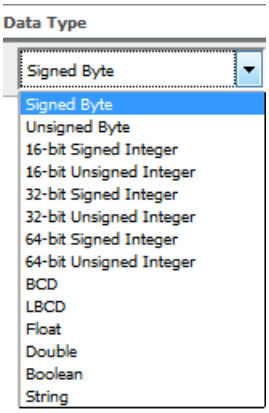
3. Click the **Add** button .

4. Enter the following details:



a. **Tag Name:** (Required) Give the tag a descriptive name.

b. **Data Type:** (Required) Select the tag's data type. If your Modbus/TCP device's registers contain multiple status or command bits or bit fields in a single register, choose **Boolean** to access individual bits.



c. **Tag Address:** (Required) The Tag Address Builder helps you construct valid tag addresses. After you see what a valid tag address looks like, you can enter the addresses manually in the text box to save time. Available options depend on the data type.

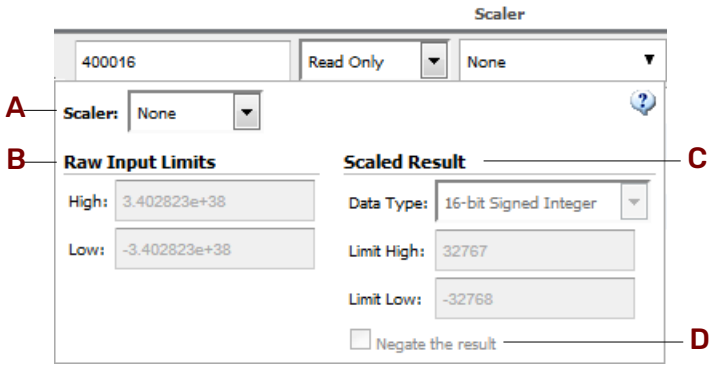
- **Address Type:** Identifies which memory segment is accessed. Discrete Inputs and Coils are single-bit registers that represent Boolean values only. Input and Holding Registers are 16-bit registers that can be used for any data type.
  Data types larger than 16 bits are mapped onto consecutive registers, starting at the register located at Start Address. Coils and Holding Registers are default Read/Write while Discrete Input and Input Registers are Read Only.
  To access individual bits in a register, choose **Input Registers** (Read Only) or **Holding Registers** (Read/Write).
- **Start Address:** Specifies where the tag value starts in memory. Strings may span multiple registers. Data types larger than 16 bits always span multiple registers.

To configure 0- or 1-based addressing, click **Edit Device** on the previous dialog box (Configure Devices and Tags) and then click the **Access Config** tab.

- **String Length:** Determines how many registers are accessed to read or write the full string. Strings are composed of ASCII characters (1 byte), so a single register may hold up to 2 characters.
- **Byte Order:** Specifies how the characters are ordered within each register. H–>L indicates that the first character, when read left to right, starts at the most significant bit (MSB) and the last character ends at the least significant bit (LSB). If you are unsure about order, you can play with this setting to determine which one works.
- **Bit Index:** Identifies the bit within a register to be accessed. Valid bit values are 0–15.
- **Array Size:** To access multiple (contiguous) values of this data type using the same tag, set this size to 2 or more (up to a maximum of 65535 depending on the data type).
  For example, if you want to access 10 contiguous floats that start with the specified Tag Address, set Array Size to 10.
  String arrays are not supported.

d. **Access:** (Optional) The options available depend on the data type. If you omit this value, the tag assumes the register type default setting.

e. **Scaler:** (Optional) Use the Scaler if a read/incoming value spans a much larger data range than you require or to convert from one unit of measure to another. If you use this option, you must provide all components.



A **Scaler**

- **None:** The raw input value is not modified in any way.
- **Linear Scaler:** The raw input value is mapped linearly from the specified input range to the specified output range and data type. To flip the sign of the result (negative to positive or positive to negative), select **Negate the result** (**D**).

Here is the function used to scale the input:

```
Output = (((Scaled High - Scaled Low) / (Raw High - Raw Low)) * (Raw Value - Raw Low)) + Scaled Low
```

- **Square Root Scaler:** The raw input value is mapped from the specified input range to the specified output range and data type using the following function:

```
Output = (√ ((Raw Value - Raw Low) / (Raw High - Raw Low)) * (Scaled High - Scaled Low)) + Scaled Low
```

B **Raw Input Limits**

- **High/Low:** The High and Low Raw Input Limits must be within the range of values that the tag data type can store.

C **Scaled Result**

- **Data Type:** Select an available data type. Not all Modbus data types are valid output types for scaled values, so some data types are not listed.
- **Limit High and Limit Low:** These values must be within the range of values that the scaled output data type can store.

D **Negate the result:** Select this option to flip the sign of the result (negative to positive or positive to negative).

5. Click **Save**, or click **Save & Add Another** to configure more Modbus tags manually.

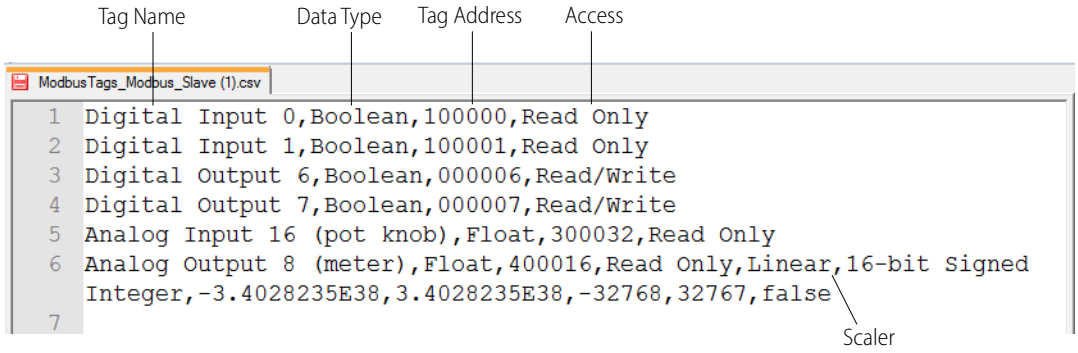
Creating a Valid Modbus Tags Import File (CSV)

You can create a valid comma-separated values (CSV) file (`.csv` extension) that contains Modbus tags for importing. See also "Exporting a Modbus Tags Import File (CSV)" on page 43.

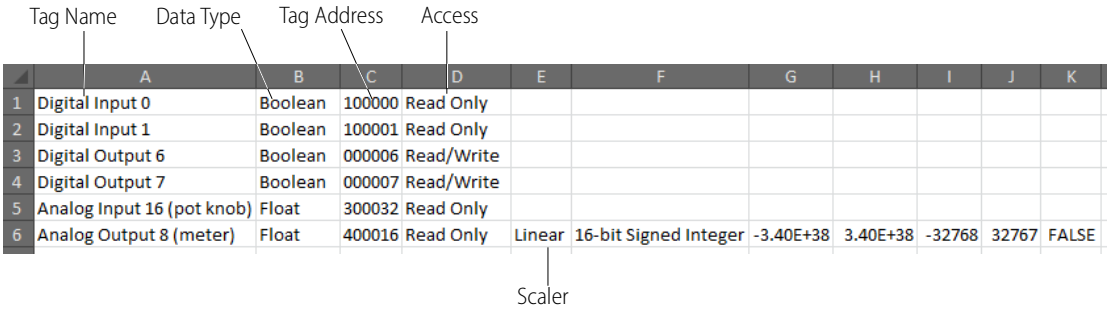
A valid Modbus CSV file contains one tag per line and has this form:

```
Tag Name, Data type, Tag address [, [Read/Write setting] [, Value scaler
name, Scaled output data type, Input limit low, Input limit high, Output
limit low, Output limit high, Negate]]
```

When viewed in a text editor, a CSV file containing Modbus tags might look like this:



Here is the same file viewed in Microsoft Excel:



Tag Name: (Required) Give the tag a descriptive name.

Data Type: (Required)

Tag Address: (Required) Use a basic 6-digit address (exception: if you access individual bits within a register, the address includes 6 digits plus a point and the bit number, for example: 302000.12).
The first digit defines the register type:

0 = Coil

1 = Discrete Input

3 = Input Register

4 = Holding Register

The next five digits are the start address:

- For devices with a base 0 addressing, the start address range is 0–65535.
- For devices with a base 1 addressing, the start address range is 1–65536.

NOTE: The start address is decimal by default but may be expressed in hexadecimal format. For hex:
- Place an "H" or "h" character in front of the entire address (for example, H30009F).
- Follow the H with the address type byte plus a 0 (zero).
- Then show the hex address using 4 hex bytes. The most significant digit will always be 0.
Examples: 000001, 400203, H10FFFF

Registers 0 (Coils) and 1 (Discrete Input) are single bit registers and may be used for *Boolean data types only*. All other data types must use one of the 16-bit register types (3 or 4).

There are limits on the tag start address. The following formula is used to determine if the tag address is within bounds of the registers:

```
OK if: 65536 <= Start Address + (ArraySize * Data Type Byte Size) / 2
```

For the String data type: Use the basic address followed by a " . " and then a decimal number in the range 2–240 to designate the number of characters in the string. Use either an "L" or "H" to designate character ordering within the registers. Only ASCII characters are supported (1 byte each); therefore, each 16-bit register can contain up to 2 characters. "L" indicates a Low-to-High byte ordering (the first character contains the LSB) and "H" indicates the opposite.

Examples: 300001.20H, H4000F9.120L

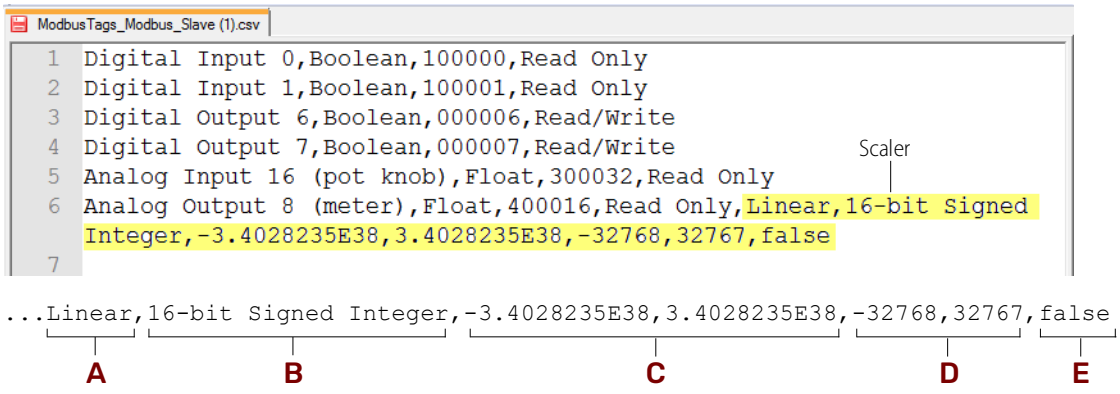
For all other data types: Data types other than strings may be represented as arrays using a basic address followed by a space, an opening bracket "[", a positive integer value in the range 2–65536, and a closing bracket "]".

Examples: 100003 [50], 300045 [20])

The array starts at the start address and extends through the designated number of elements. The start address + array size may not exceed 65536 registers. The size of the data type must also be factored in because many data types span multiple registers.

Access: (Optional) This setting must match one of the options available for this data type in Build mode (for example, Read/Write, Read Only). It is not case sensitive. If this value is omitted, the tag assumes the register type default setting. If a value scaler is set, the Read/Write setting must be provided or have an empty place reserved for it with commas (Tag address, ,Value scaler).

Scaler: (Optional) If this option is used, all components must be provided.



A **Scaler Name**: The scaler name must be None, Linear, or Square Root. The name is not case sensitive. The Scaler allows you to modify and control raw data values. There are many reasons why a scaled value may be useful or necessary. For example, if a raw value spans a much larger data range than you require or if you need to digitize an analog value that comes in as a floating point number. Below are the available scaling functions.

None: The raw input value is not modified in any way.

Linear: The raw input value is mapped linearly from the specified input range to the specified output range and data type. Selecting "Negate the result" causes the sign of the result to be flipped (negative to positive or positive to negative). Below is the function used to scale the input:

```
Output = (((Scaled High - Scaled Low) / (Raw High - Raw Low)) * (Raw Value - Raw Low)) + Scaled Low
```

Square Root: The raw input value is mapped from the specified input range to the specified output range and data type using the function below:

```
Output = (√ ((Raw Value - Raw Low) / (Raw High - Raw Low)) * (Scaled High - Scaled Low)) + Scaled Low
```

B **Data Type**: The scaled result data type must match one of those offered in the UI. Not all Modbus data types are valid output types for scaled values so check Build mode to see the current list of types.

C **Raw Input Limits**: The Low and High Raw Input Limits must be within the range of values that the tag data type can store.

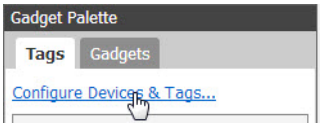
D **Limit Low and Limit High**: Must be within the range of values that the scaled output data type can store.

E **Negate the result**: True or False. Causes the sign of the result to be flipped (negative to positive or positive to negative).

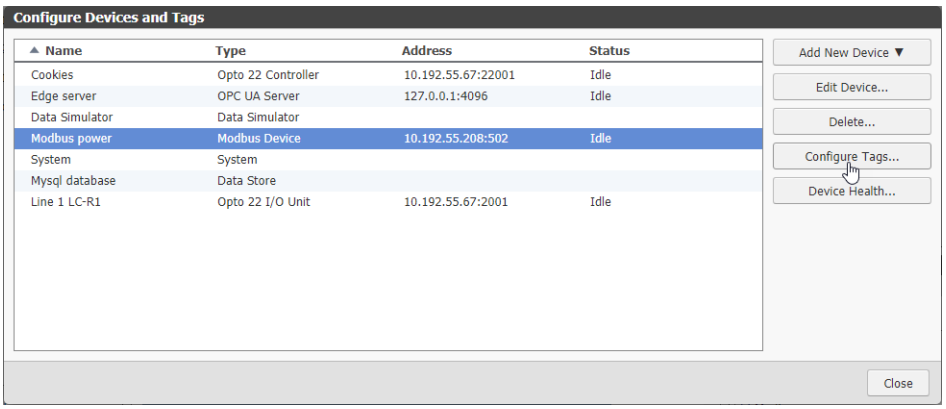
Exporting a Modbus Tags Import File (CSV)

If you already have tags attached to the device, you can export a CSV file containing all of the device tags. Exporting some pre-configured tags is the fastest way to see what a valid tag CSV file looks like.

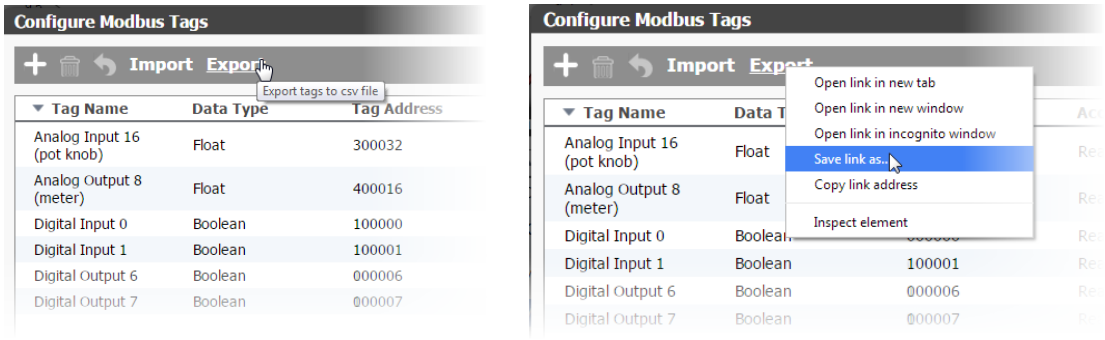
1. In the Tags tab under Gadget Palette on the right side, click **Configure Devices & Tags** (or choose **Configure** > **Devices and Tags** from the top menu bar).



2. Highlight the Modbus device and click **Configure Tags**.



3. Click **Export** to send the CSV file to the default downloads directory. Or, right-click **Export** and select **Save link as** to choose the target directory.
4. Click **Save**.

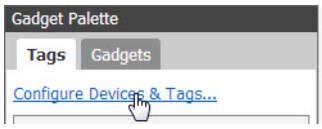


A CSV file with the Modbus device tags is created and downloaded to the default or designated directory.

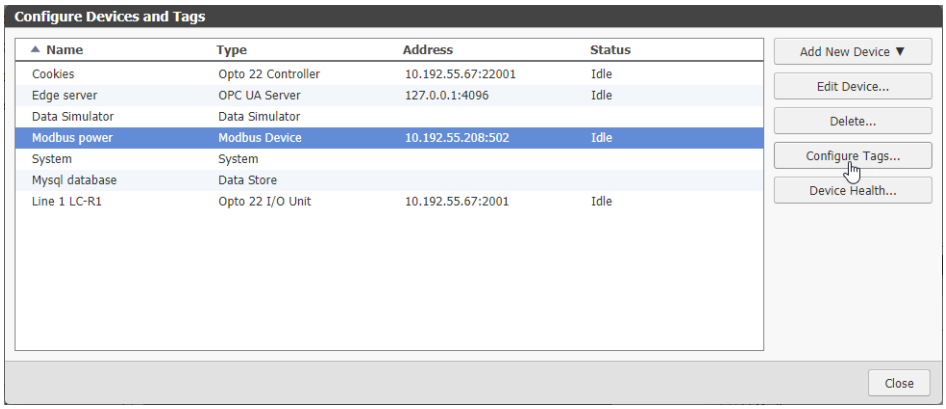
Importing Modbus Tags from a CSV File

If you have a properly formatted CSV file containing Modbus tags you want to use, you can import the tags directly into *groov*. See also "Creating a Valid Modbus Tags Import File (CSV)" on page 41.

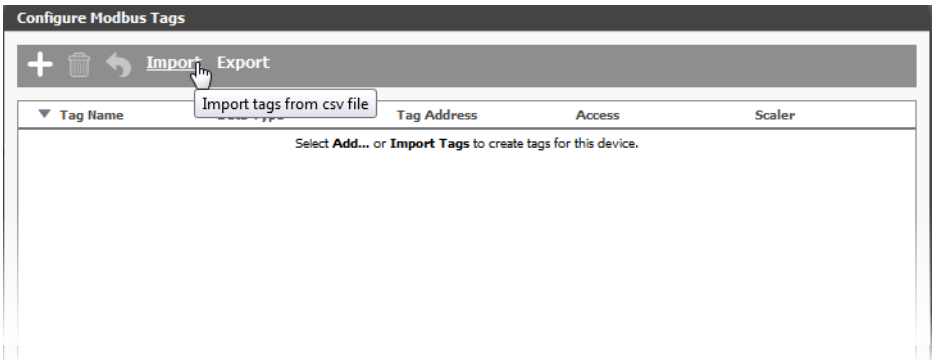
1. In the Tags tab under Gadget Palette on the right side, click **Configure Devices & Tags** (or choose **Configure** > **Devices and Tags** from the top menu bar).



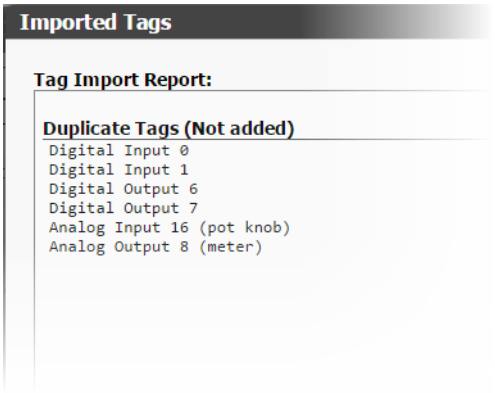
2. Highlight the Modbus device and click **Configure Tags**.



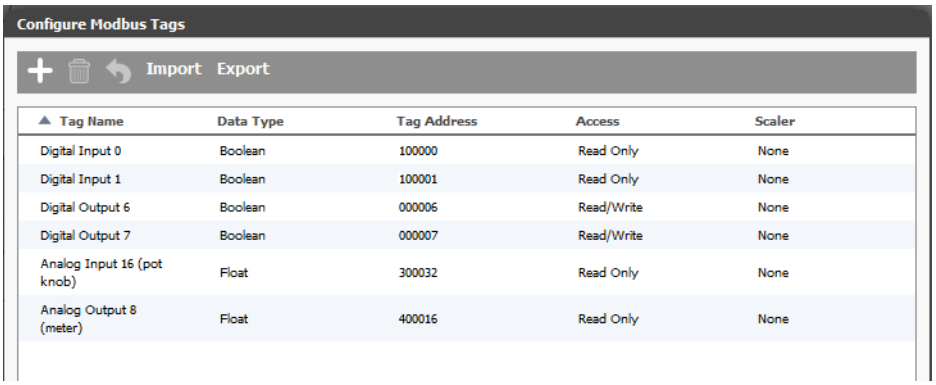
3. Click **Import**.



4. Browse to a valid CSV file and click **Open**.
   A Tag Import Report appears.



5. Click **Close**. The tags appear in *groov*.



Add an OPC UA Server

Equipment that is neither a Modbus/TCP device nor manufactured by Opto 22 can still be monitored and controlled in *groov* View if it is an OPC UA-compatible hardware device or if you have an OPC UA server.

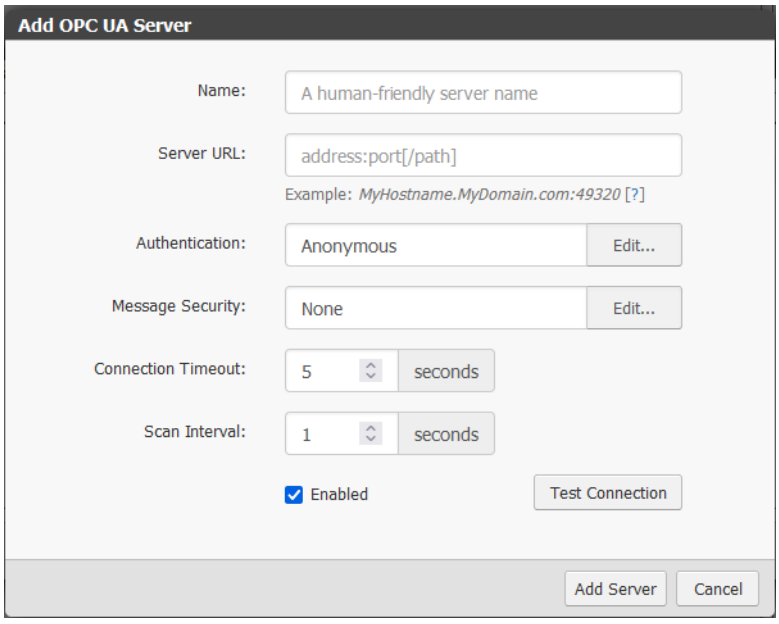
You can add both internal and external OPC UA servers, and you can use multiple servers in the same *groov* View project:

- **Internal server:** If you have a *groov* EPIC or a *groov* Box, you can use the internal Ignition Edge OPC UA server and drivers for Allen-Bradley®, Siemens® S7, and other systems. See the *groov EPIC User's Guide* (form 2267) or the *groov Box User's Guide* (form 2104) for more information.
- **External server:** You can also use external OPC UA servers. For cybersecurity, use servers that comply with one of the security profiles defined in the OPC-UA specification (section 6.6).

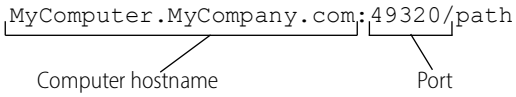
To add an OPC UA-compliant server or equipment to *groov* View:

1. In the Tags tab under Gadget Palette on the right side, click **Configure Devices & Tags** (or choose **Configure** > **Devices and Tags** from the top menu bar).

2. Click **Add New Device** and select **OPC UA Server**. The Add OPC UA Server window appears.



3. Enter the name of the OPC UA server in the **Name** field.
4. In the **Server URL** field:
   a. If you're adding the internal Ignition Edge server in *groov* EPIC or the *groov* Box, enter:
      – For Ignition Edge version 7: `127.0.0.1:4096`
      – For Ignition Edge version 8: `127.0.0.1:6254`
   b. For any external server, use the following format to enter the IP address or hostname of the computer where the OPC UA server is installed and the port. You can also enter the path of the OPC server endpoint.



Check your server for the correct values.

Example server URLs

10.20.30.40:49320

10.20.30.40:49320/Path

MyServer:49320

MyServer:49320/Custom/Path

MyServer.MyDomain.com:49320

MyServer.MyDomain.com:49320/Path

Default ports

Different OPC UA servers use different ports. Here are the default ports for some servers:

CODESYS Controller: 4840

groov EPIC Data Service: 14840

KEPServerEX: 49320

TOP Server: 49380

Ignition OPC UA: 4096 (Ignition 7) or 62541 (Ignition 8)

MatrikonOPC UA Wrapper: 21381

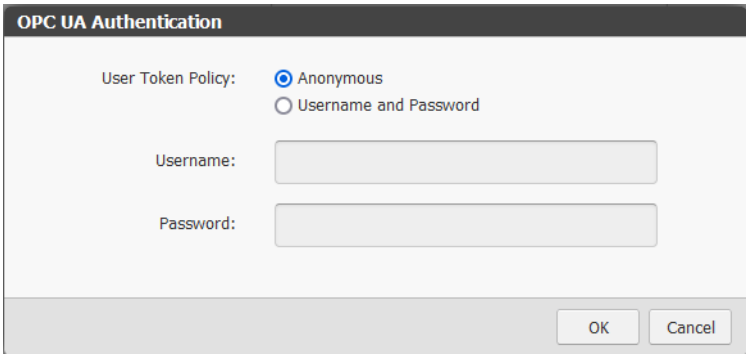
MatrikonOPC Universal Connectivity Server: 4846

5. If you're adding the internal server, skip to step 12. For an external server, continue.

   The defaults for the **Authentication** and **Message Security** fields (**Anonymous** and **None** respectively) provide no security for an external OPC UA server. Follow step 6 through step 11 to change these fields to meet the server's profile requirements for secure connections.

6. If you don't know your server's **User Token Policy** (authentication) options but can connect to it, click **Test Connection**.

7. Next to the **Authentication** field, click **Edit**.



   If your connection was successful, the user token policies your server supports are available to choose. If one is not available (for example, if the server doesn't allow anonymous connections), it is grayed out.

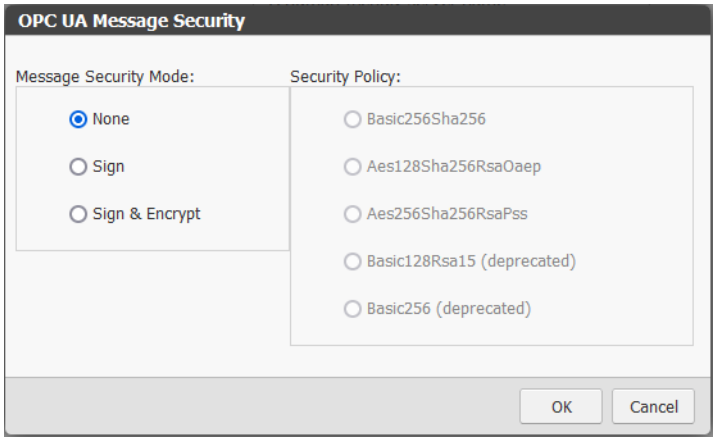
8. Select **Username and Password**, enter them in the fields, and click **OK**.

9. Again, if you don't know your server's **Message Security** options but can connect to it, click **Test Connection**.

   a. If a message says that the server does not trust the client certificate, follow instructions in the server documentation to accept *groov* View's certificate.

b. If the client (*groov* View) does not trust the server's certificate, select one of the following options in the Certificate Trust dialog box:
   - Click **Trust** to add the Server's Certificate to the Trusted Server List.
   - Click **Reject** to add the Server's Certificate to the Rejected Server List. (A rejected certificate can be trusted later and vice versa.)

10. Next to the **Message Security** field, click **Edit**.



If your connection was successful, you can select **Sign** or **Sign & Encrypt**, and the security policies your server supports are available to choose from in the right-hand column. Grayed out options are unavailable.

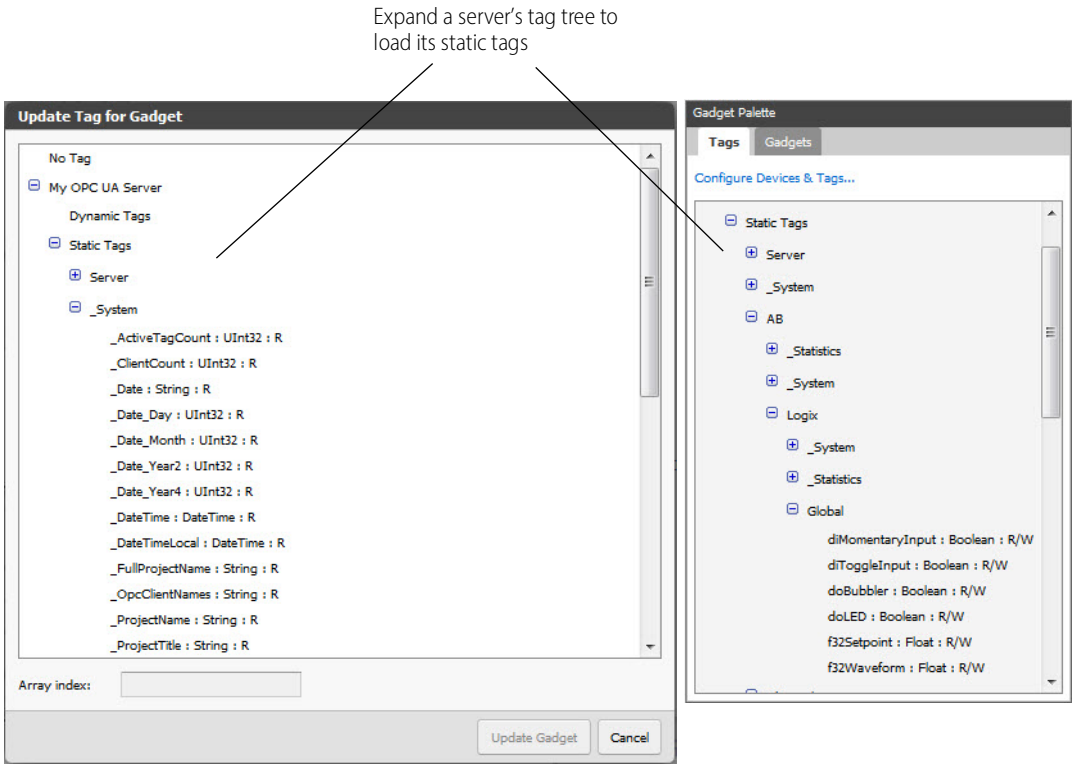
11. Select the **Message Security Mode** and **Security Policy** options that your server supports and you want to use. Click **OK**.

12. Change the **Connection Timeout** or **Scan Interval** fields only if required for your application.

13. Click **Add Server**.

Using Static Tags

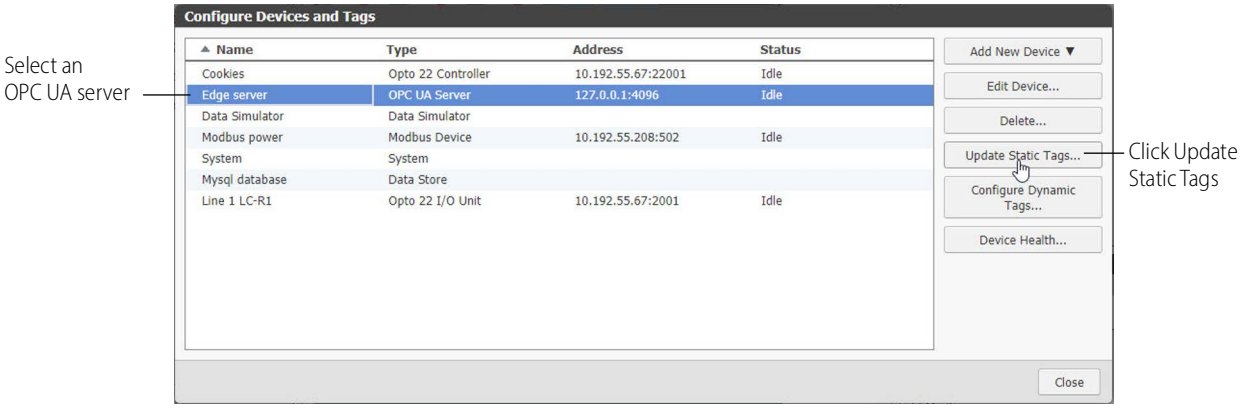
When you add an OPC UA Server, *groov* View accesses the controller's *static* tags and makes them available so that you can directly browse the tags on the server. *groov* View keeps the server's tag hierarchy and displays the tags in a tree format. As long as you are connected to the server, you can browse to find the tag you need in the Gadget Palette or by clicking the dynamic link next to **Tag** on a gadget's properties panel. The tags load automatically as you expand the tree. For more information about tags and folders for an internal Ignition Edge OPC UA server, see the *groov EPIC User's Guide* (form 2267) or the *groov Box User's Guide* (form 2104).



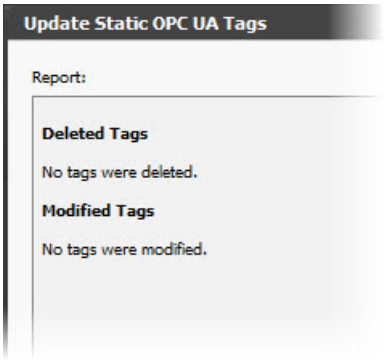
Updating Static Tags

If you know that static tags have changed or if a link to a tag is broken, you can update the static tags on an OPC UA server. When you update the static tags, *groov* View displays a report that lists any deleted or modified tags so that you can choose different tags as necessary.

To update static tags, select an OPC UA server in the Configure Devices and Tags window and click **Update Static Tags**.



Any deleted or modified tags are listed in the Update Static OPC UA Tags dialog box.



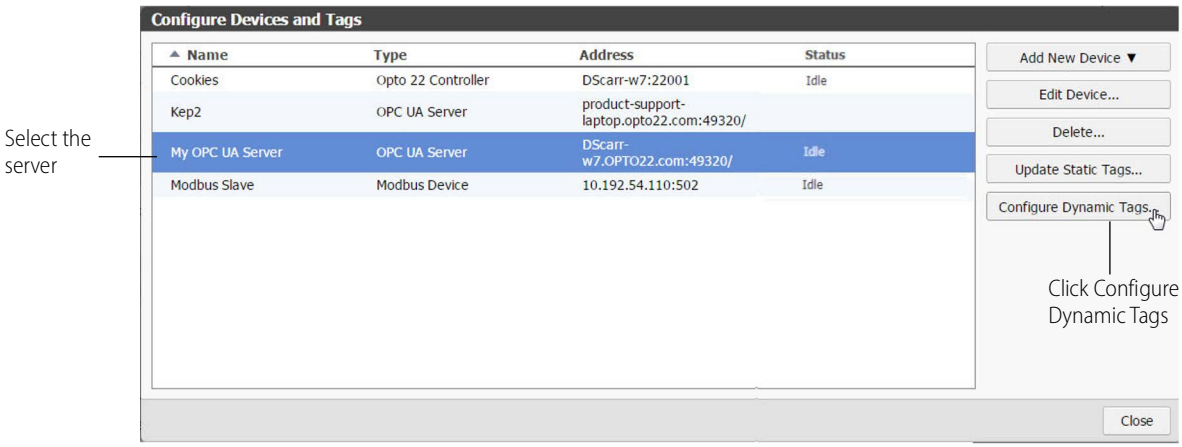
Using Dynamic Tags

NOTE: This section on dynamic tags does not apply to the internal Ignition Edge OPC UA server in groov EPIC or the groov Box. See the groov EPIC User's Guide (form 2267) or the groov Box User's Guide (form 2104) for how to configure individual tags in the Edge server.

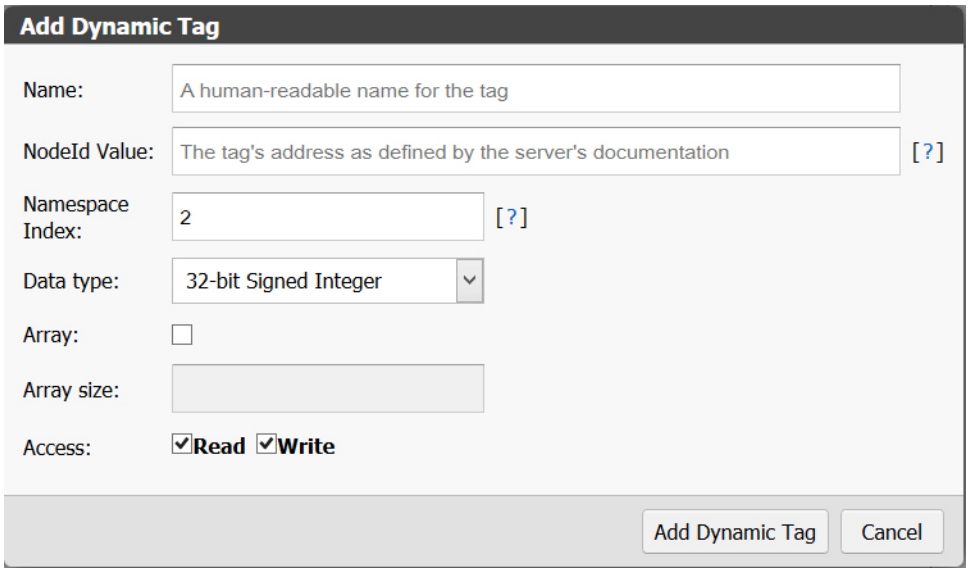
Dynamic tags are tags used with an external OPC UA server that you enter manually one at a time in *groov* View. They are not configured on the OPC UA server. Dynamic tags allow you to add as many or as few tags to *groov* View as you want, making it easier to find the tag you want.

To add dynamic tags:

1. In the Configure Devices and Tags window, select the OPC UA server, and click **Configure Dynamic Tags**.



2. In the Configure Dynamic Tags dialog box, click **Add**.
3. In the Add Dynamic Tag dialog box, enter a tag name in the **Name** field and select the **Data Type**. Make sure the data type selected in *groov* View matches the type retrieved from the device.
4. If this tag is an array of objects with the same data type, select **Array** and enter the array size.
5. For **Access**, choose the **Read** or **Write** attributes as needed.
   Leave this dialog box open while you identify the **NodeId Value** in the next step.



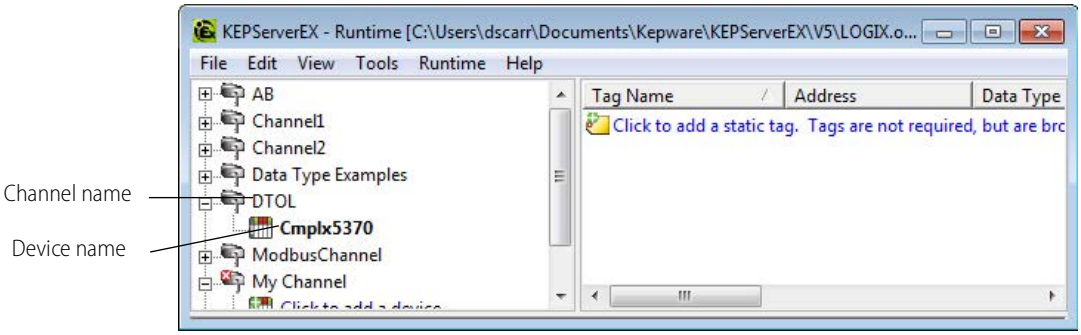
6. To find the NodeId Value for your device, open your OPC UA server configurator and find the configured device associated with this tag.

   You'll find part of the NodeId information here. The remainder comes from the device itself. The addressing syntax is different for each type of device, so you'll need to check the OPC UA server's documentation for this tag's device type.

   As an example, here's how you find the NodeId for a Rockwell Automation® Logix tag on a KEPServerEX™ 5 server:

   a. Open the KEPServerEX 5 Runtime configurator.

   b. Locate the device and tag from which the dynamic tag in *groov* will obtain data.



   Use this format for the **NodeId Value** field:

   [Channel name].[Device name].[Tag group name].[protocol specific address]

   So now you can extract the information you need from the server's configurator and the device itself:

   [Channel name]=**DTOL**

   [Device name]=**Cmplx5370**

   [protocol specific address]=**Program:MainProgram.i32Counter@Long**

   NOTE: The protocol-specific address is obtained from the device. If you have a Kepware® server, the help file provides the protocol-specific addressing information. To access help for a specific tag, click the device name in the Kepware configurator, choose **Properties**, *and click the* **Help** *button.*

In this example, the "@Long" portion specifies the data type as an unsigned 32-bit integer. This forces the server to report data to this type. If the default data type on the Kepware server is different from the tag's data type, the link fails in groov unless you specify the data type in the **NodeId Value** *field. For more information on your specific data type, see the server's documentation.*

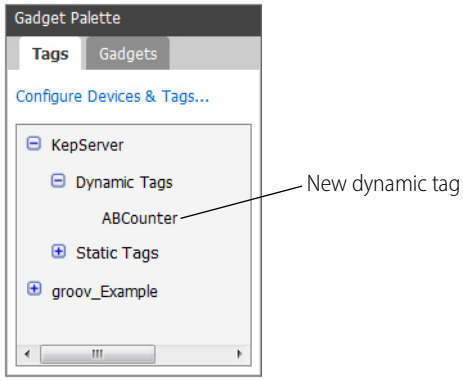
Putting it all together, here's the NodeId Value for this dynamic tag:

DTOL.Cmplx5370.Program:MainProgram.i32Counter@Long

7. Return to the Add Dynamic Tag dialog box in *groov* Build mode, enter the value in the **NodeId Value** field.
8. In most cases, the **Namespace Index** field should stay at 2. However, for some servers (such as Ignition by Inductive Automation) you should change the Namespace Index to 1.

   A tag's Namespace Index is an integer (0 or higher) that tells *groov* how to find the tag on the server.
9. Click **Add Dynamic Tag**.
10. Close the open dialog boxes.

    The new dynamic tag appears in the Gadget Palette.



Now you're ready to add gadgets to a page using the new tags you just created. For instructions, see "Adding Gadgets" on page 72.

After you add some gadgets and associated tags to them, select **File** > **Save All Changes and Switch to *groov* View**. It might take a few moments for the OPC UA connection to be established and live values to appear.

Configuring the Windows Firewall for an OPC UA Server

Use this section only if:

- You are using *groov* Server for Windows and the OPC UA server is installed on a different computer, OR
- You are using an external OPC UA server with the *groov* Box.

Do not use this section for the following:

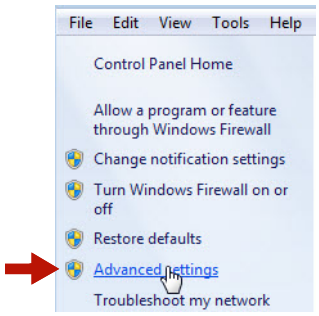
- Native OPC UA server in *groov* EPIC.
- Internal Ignition Edge server in *groov* EPIC or *groov* Box.

If your OPC UA server is not on the same computer as *groov* View, inbound traffic to the OPC UA server needs to be able get through the firewall on the port used by the server. To allow access through the firewall requires adding an *inbound rule* to the Windows Firewall on the computer where the OPC UA server is installed.

As an example, the following instructions describe how to add the inbound rule for port 49320, which is the default port for the KEPServerEX 5 server.

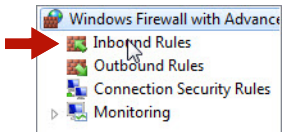
1. After you have successfully installed the server, open the Windows Control Panel.

2. If Control Panel items appear as icons, click **Windows Firewall** (or **Windows Defender Firewall** in later Windows versions). If they appear as categories, click **System and Security** and then click **Windows Firewall** (or **Windows Defender Firewall**).
3. In the left panel, click **Advanced settings**.

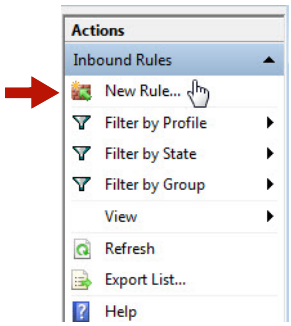


The Windows (Defender) Firewall with Advanced Security dialog box opens.

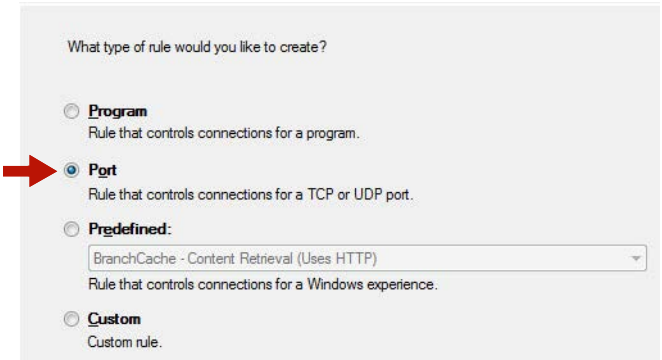
4. In the left panel, click **Inbound Rules**.



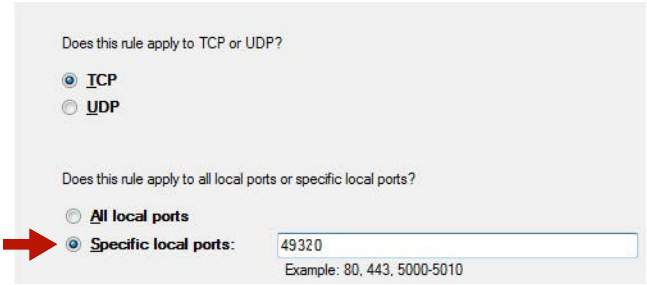
5. In the right panel, click **New Rule**.



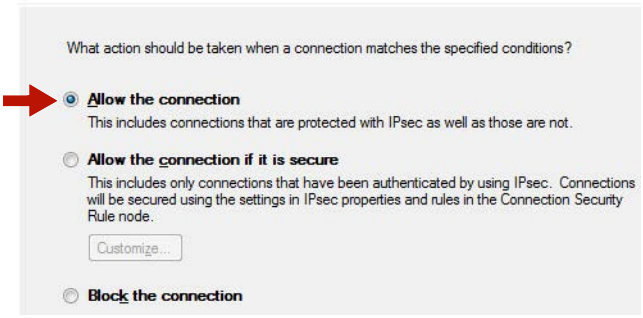
6. For Rule Type, select **Port** and click **Next**.



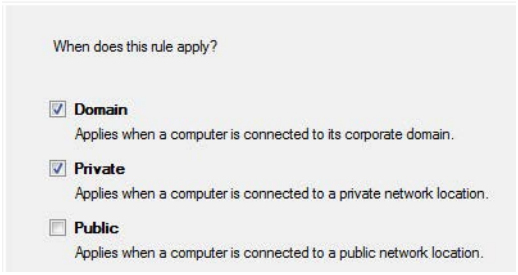
7. For Protocol and Ports, keep the default selected for TCP/UDP, select **Specific local ports**, enter `49320` (the default Kepware port), and click **Next**.



8. For Action, select **Allow the connection** and click **Next**.



9. For Profile, select **Domain** and **Private**, and click **Next**.



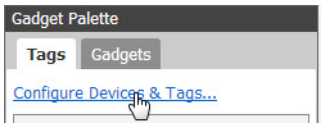
10. In the **Name** field, enter a descriptive name such as "Kepware OPC-UA Server."
11. Click **Finish**.
12. Exit the Windows (Defender) Firewall and Control Panel dialog boxes.

Add System Tags

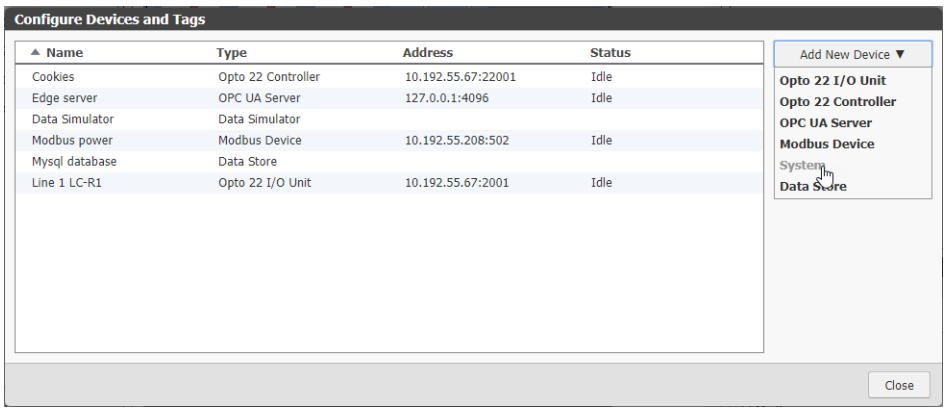
You can get tags for information about a *groov* product itself (called *System tags*) and use them in your mobile interface. For example, you might want to show operators the current time and date, or an Admin page might include system uptime, number of current user sessions, and so on. To make these tags available, you add a new System device.

To add System tags:

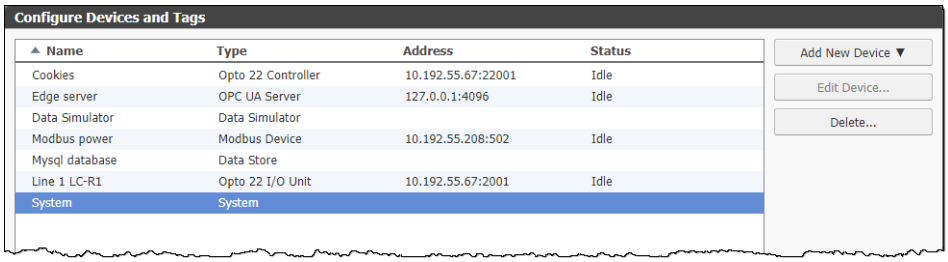
1. In the Tags tab under Gadget Palette on the right side, click **Configure Devices & Tags** (or choose **Configure** > **Devices and Tags** from the top menu bar).



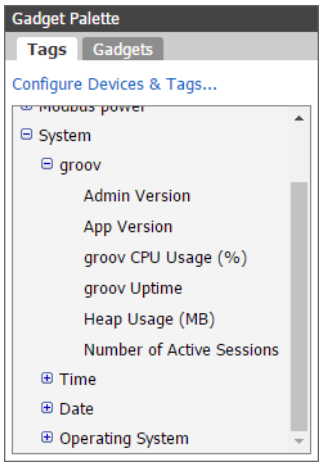
2. Click **Add New Device** and select **System**.



System now appears in the list of devices.



3. Click **Close**, and notice that System tags are added in the Gadget Palette.
4. Click the plus signs (**+**) to expand the tree and see all the tags.



All possible tags are shown in the list, but some may not apply to your *groov* product. For example, *groov* Admin Version applies only to a *groov* Box, not to a *groov* EPIC or a *groov* Server.

The following table shows information about these tags.

NOTE: It's possible to choose an LED or Image Indicator gadget for Time or Date, but since time and date values are strings, you cannot set a numeric range for these gadgets. For example, you can set an LED to be blue at exactly 8:00 and black at any other time, but you cannot set it to be blue between 8:00 and 12:00.

System tags

Tag	Meaning
groov > Admin Version	(*groov* Box only) Version of *groov* Admin running on the Box. (This information is also available in *groov* View; click the gear icon and choose **About**.)
groov > App Version	Version of *groov* View software running on this *groov* product. (This information is also available in *groov* View; click the gear icon and choose **About**.)
groov > groov CPU Usage (%)	Current CPU usage by the *groov* View software on either the *groov* EPIC processor, the PC where *groov* Server is running, or the *groov* Box, shown as a percentage. A negative value means the current CPU usage is not available.
groov > groov Uptime	How long *groov* View software has been running.
groov > groov Heap Usage (MB)	Amount of memory allocated within *groov* View software. Normal values depend on the size of your *groov* View project.
groov > Number of Active Sessions	Number of user sessions currently viewing your *groov* View interface. Typically the number of current users, but one user logged in through two devices or browsers is counted twice.
Time >	Time of day. For *groov* Server, the time on the PC *groov* Server runs on. For *groov* EPIC or a *groov* Box, see the product's user's guide to set time, set time zone, or synchronize with a time server. Choose the format you want. HH indicates a 24-hour clock; hh indicates a 12-hour clock.
Date >	From the *groov* EPIC processor, the PC *groov* Server runs on, or the *groov* Box. Choose the format you want. MM means the month is shown in digits; MMM means the month is written out. For example, DD MMM YYYY might appear as 26 Jul 2017.
Operating System* > System CPU Usage (%)	Current CPU usage for the whole system, shown as a percentage. A negative value means the current CPU usage is not available.
Operating System* > System Uptime	How long the hardware (the *groov* EPIC processor, the PC *groov* Server runs on, or the *groov* Box) has been running.

* Operating System refers to the hardware the *groov* View software runs on, either the *groov* EPIC processor, the PC that *groov* Server runs on, or the *groov* Box.

Add a Computed Tag

A *computed tag* is a tag you create that is the result of a JavaScript function performing a calculation on one or more source tags. A source tag can be a tag from another device or a data store. For example, you might want to create a computed tag to:

- Convert a temperature value from Fahrenheit to Celsius
- Sum the number of gallons in multiple tanks to get a total value

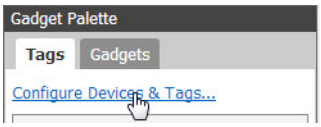
You need to know JavaScript to create computed tags. (Many references and training are available online such as W3Schools.) The data type of the final output of the JavaScript function (which becomes the data type of the computed tag) can be boolean, integer, float, or string.

Creating a Computed Tag

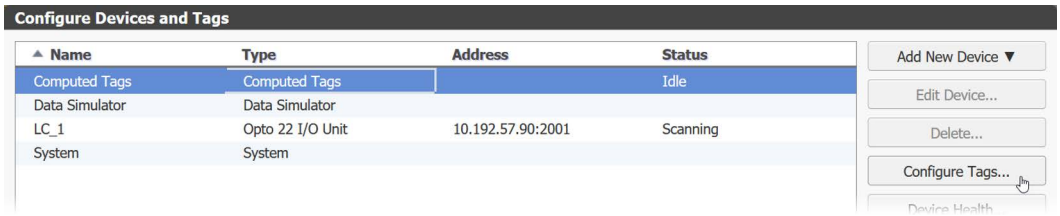
Before you create a computed tag, make sure you add the devices or data stores that contain the source tags.

To create a computed tag:

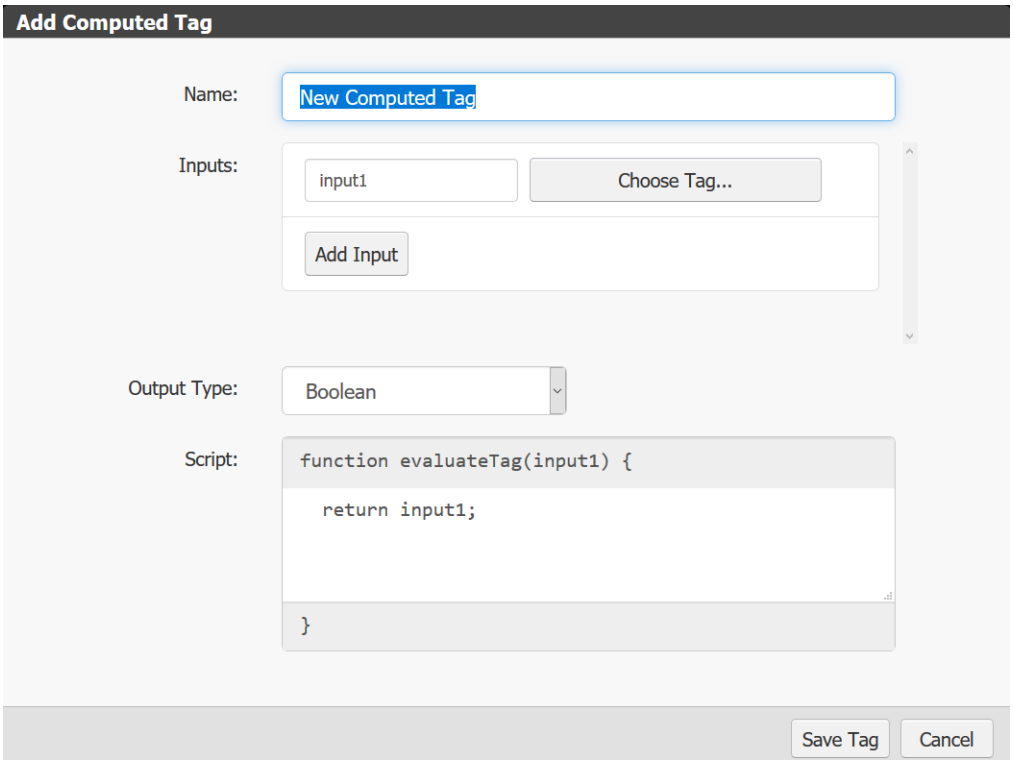
1. In the Tags tab under Gadget Palette on the right side, click **Configure Devices & Tags** (or choose **Configure** > **Devices and Tags** from the top menu bar).



2. Highlight **Computed Tags** and click **Configure Tags**.



3. Click **Add New Tag**. The Add Computed Tag window appears. (For a description of the fields, see page 65.)



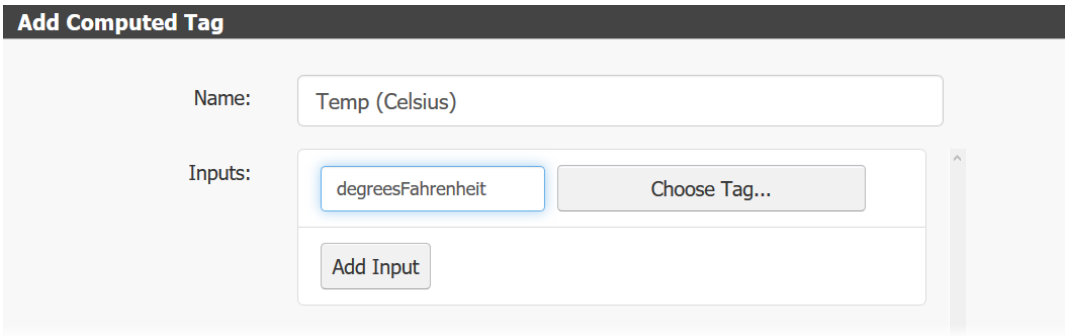
4. In the **Name** field, type a name for the computed tag.

In the next few pages, we will create two computed tag examples to help explain the instructions. The first one (converting a source tag) will be named `Temp (Celsius)`. The second one (summing several source tags) will be named `Sum All Tanks`.

To create a computed tag that converts a source tag to another value:

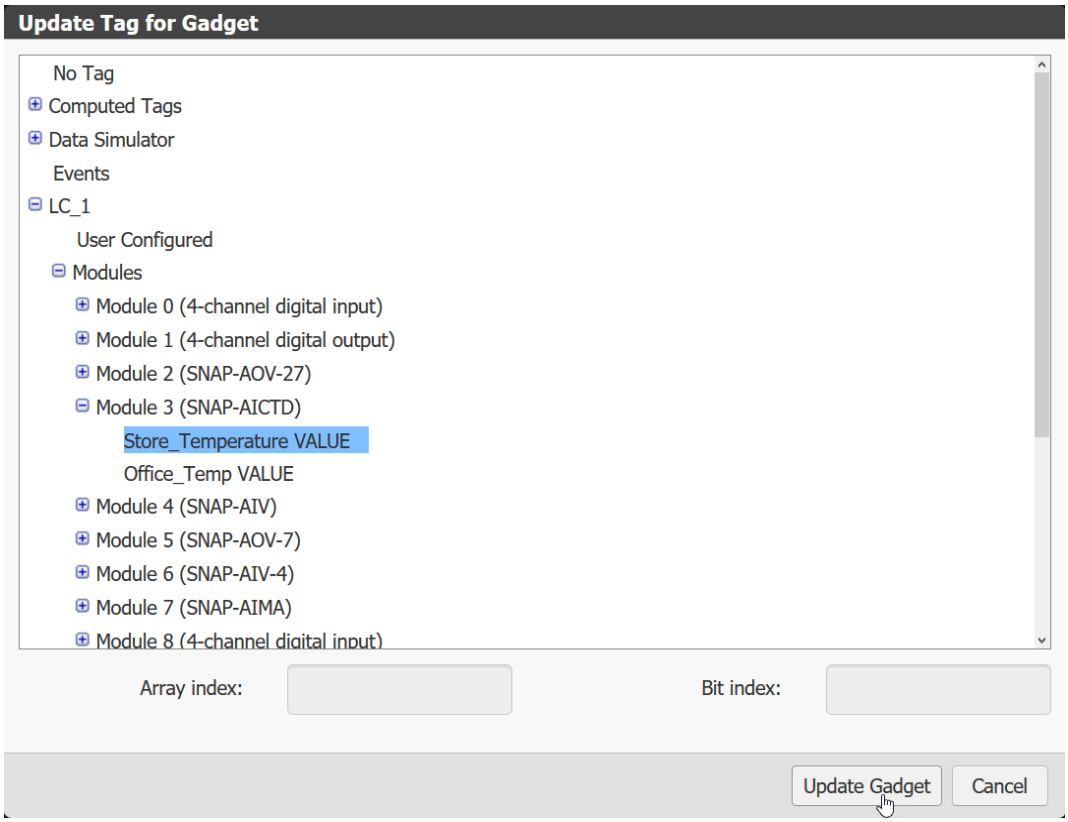
a. Click the text box of the **Inputs** field (by default, the text box has the word `Input` followed by a number). Type in a name that identifies the source tag in the JavaScript function.

This name must comply with the syntax rules of pre-Javascript 1.5, which limits the range of characters to ASCII. In the following example, we named the input `degreesFahrenheit`.



b. Click **Choose Tag**, navigate through the Update Tag for Gadget window to find your desired tag, select the tag, and click **Update Gadget**.

In the following image, we selected the **Store_Temperature** tag as the source for `degreesFahrenheit`.

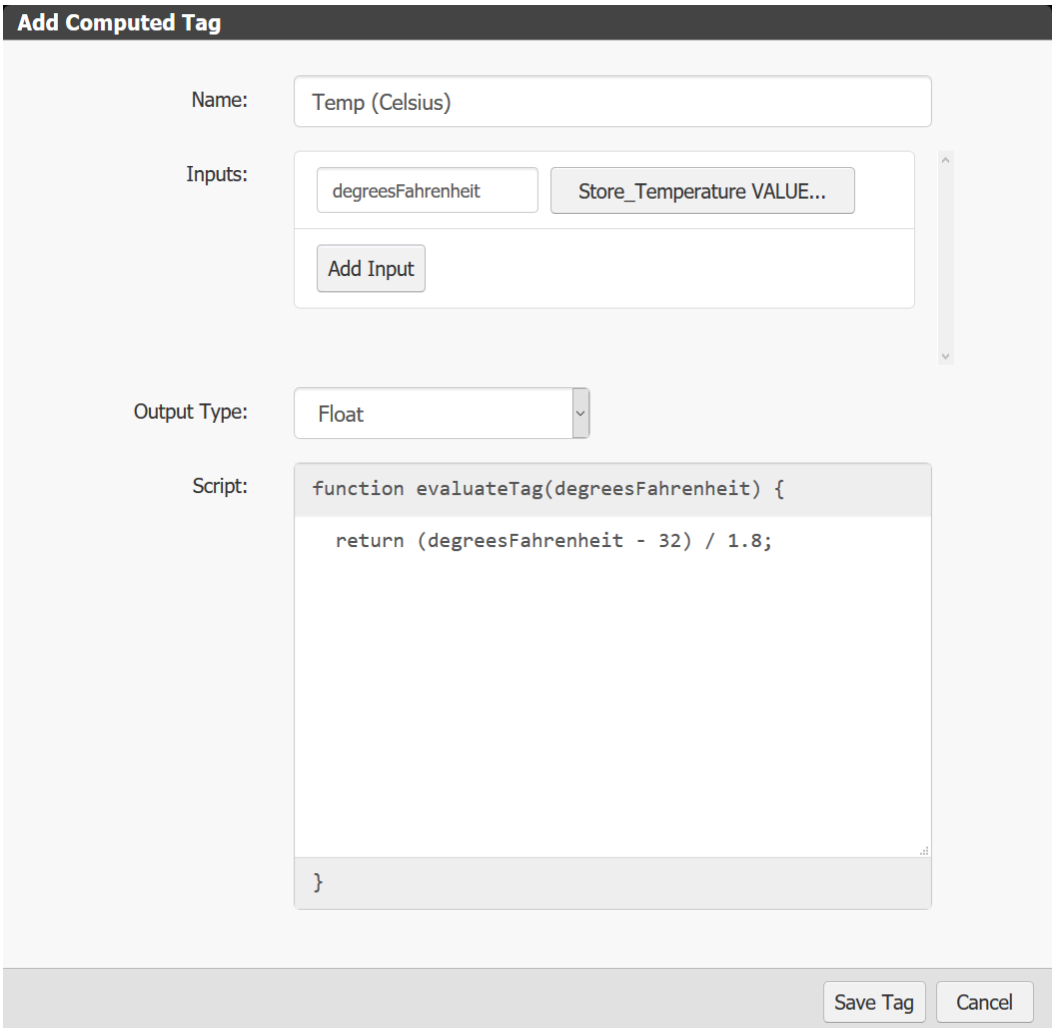


c. From the **Output Type** drop-down, select the data type that your JavaScript function will return. This is the data type of the computed tag and determines which gadgets can use it. For the temperature example, we selected **Float**.

d. In the **Script** field, click in the white space to type in the JavaScript function that converts the source tag to your desired output, making sure the data type it returns matches the selected **Output Type**.

In the example we started in step a, we can convert the store temperature from Fahrenheit to Celsius with the following function: `return (degreesFahrenheit - 32) / 1.8;`

The following image shows the completed window:

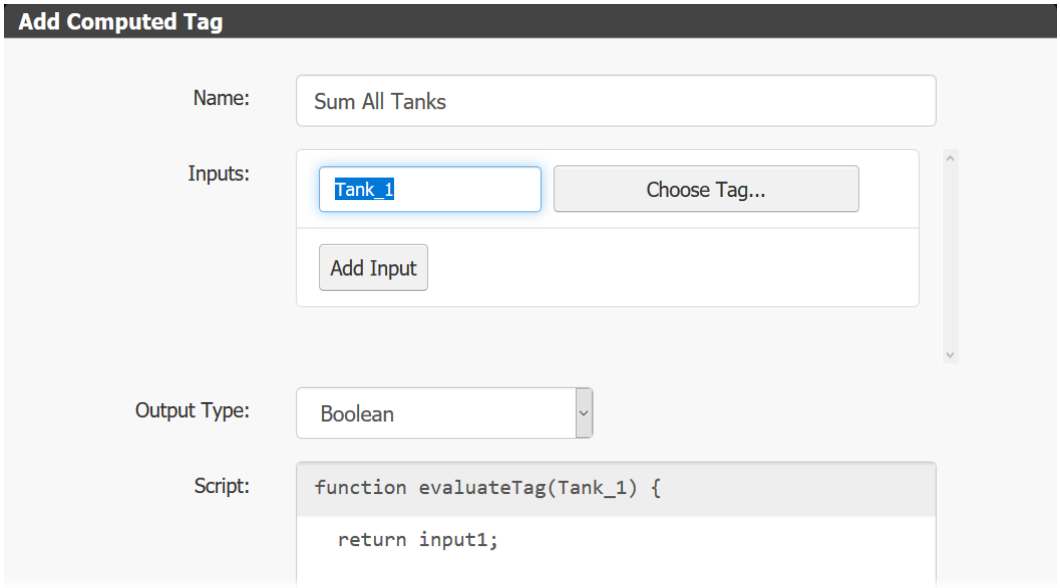


e. Click **Save Tag**.

To create a computed tag that uses multiple source tags:

a. Click the text box of the **Inputs** field (by default, the text box has the word `Input` followed by a number). Type in a name that identifies the source tag.

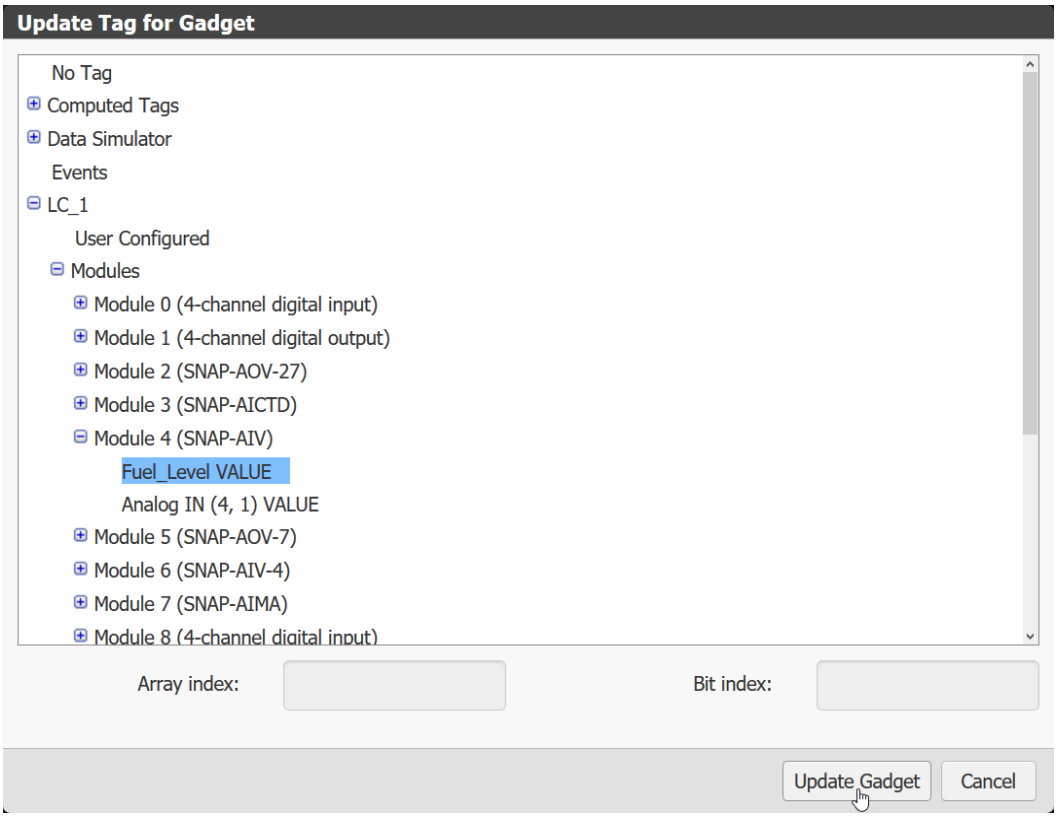
This name must comply with the syntax rules of pre-Javascript 1.5, which limits the range of characters to ASCII. The following image shows the name we assigned to the first input: `Tank_1`.



b. Click **Choose Tag**.

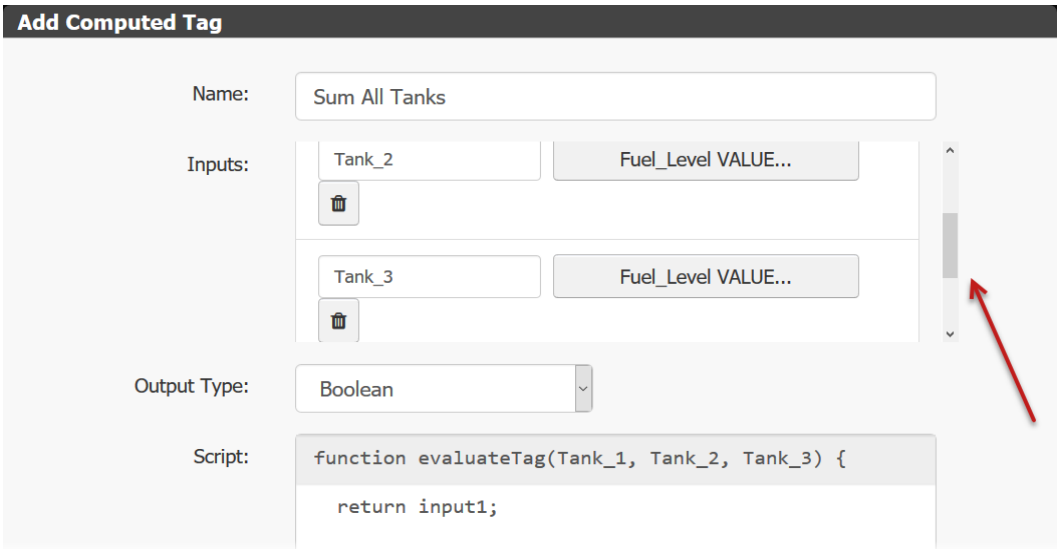
c. Navigate through the Update Tag for Gadget window to find your desired tag and select it

d. Click **Update Gadget**.



e. In the Add Computed Tag window, click **Add Input** to add another input. Repeat the previous steps to configure the new input with a name and another source tag. Repeat this step until you have added all your source tags.

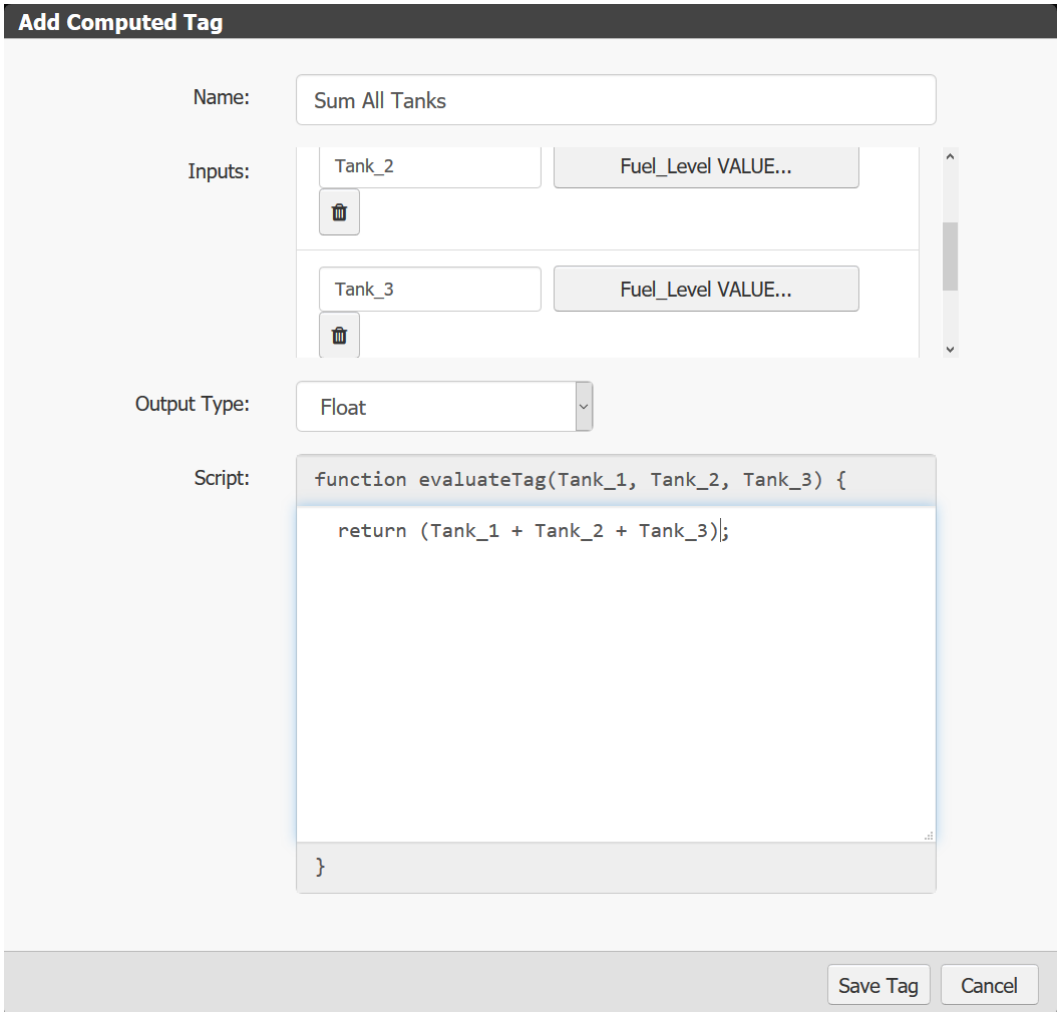
The viewable area of the **Inputs** field is limited, so if you specify more than two inputs, you have to scroll through the box to see the other inputs. The following image shows the scroll bar to the right of the **Inputs** field:



f. From the **Output Type** drop-down, select the data type that your JavaScript function will return. This is the data type of the computed tag and determines which gadgets can use it. For this example, we selected **Float**.

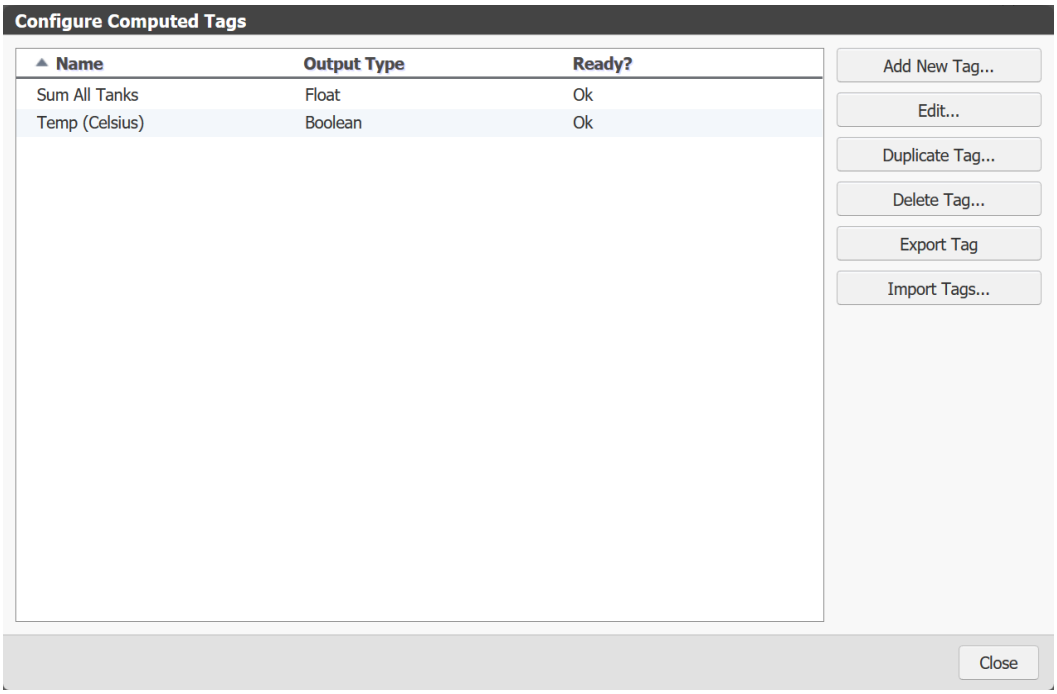
g. In the **Script** field, click in the white space to type in the JavaScript function that manipulates the source tags into your desired final value, making sure the data type of the final value matches the selected **Output Type**.

For our example, adding the three inputs gives us the desired final value:



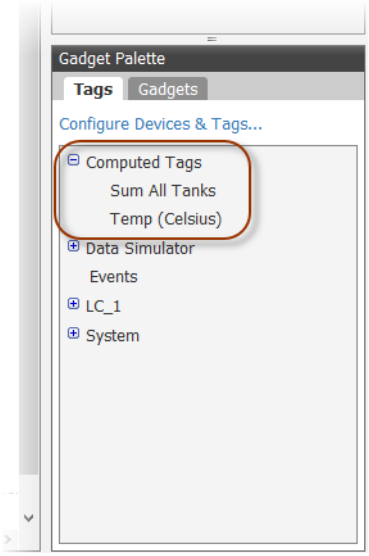
h. Click **Save Tag**.

After you have finished creating a computed tag, the tag appears in the Configure Computed Tags window.

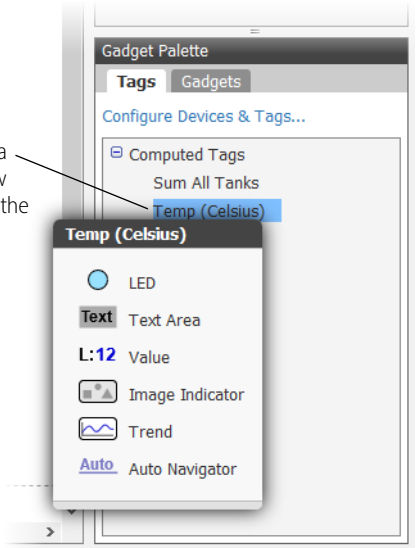


5. Click **Close** to close the Configure Computed Tags window.
6. Click **Close** to close Configure Devices and Tags window.

In the Gadget Palette, you can expand the Computed Tags branch to view the computed tags you created as well as click a tag to view the gadgets you can use with it:

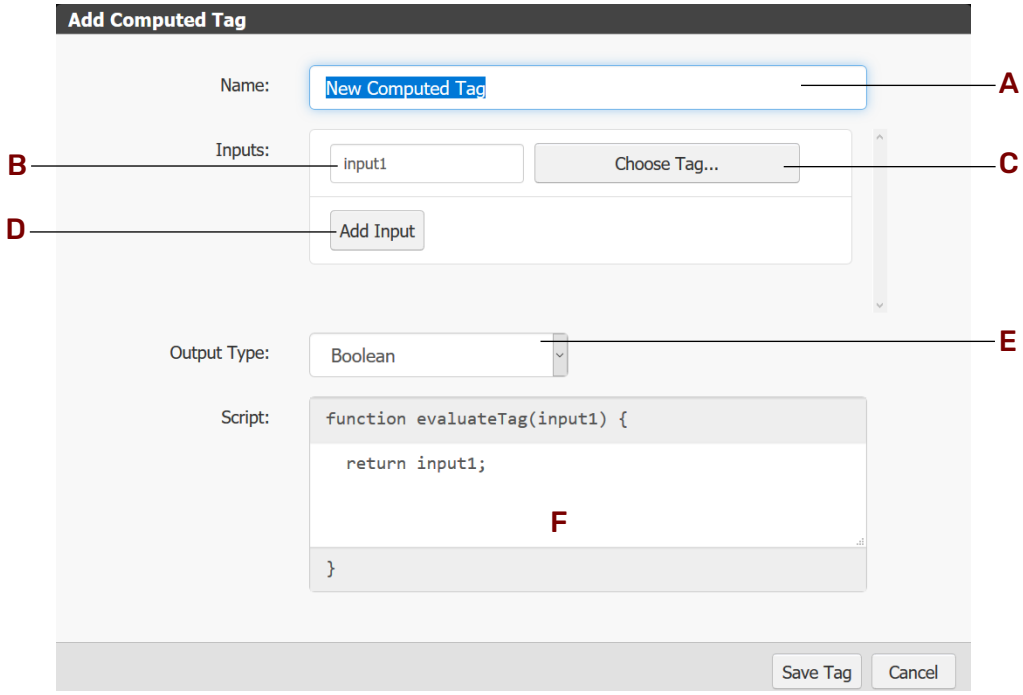


Click on the name of a computed tag to view gadgets that can use the tag.



Add Computed Tag Window

Here is an overview of the fields for this window:



A Name for the computed tag. *groov* View displays this name under the **Computed Tags** branch of the tag tree.

B Name of the input to the JavaScript function. This name must comply with the syntax rules of pre-Javascript 1.5, which limits the range of characters to ASCII. *groov* View updates the first line (in gray) of the **Script** field with this name.

C Click **Choose Tag** to identify the source tag for this input.

D Click **Add Input** if you need to add more than one input.

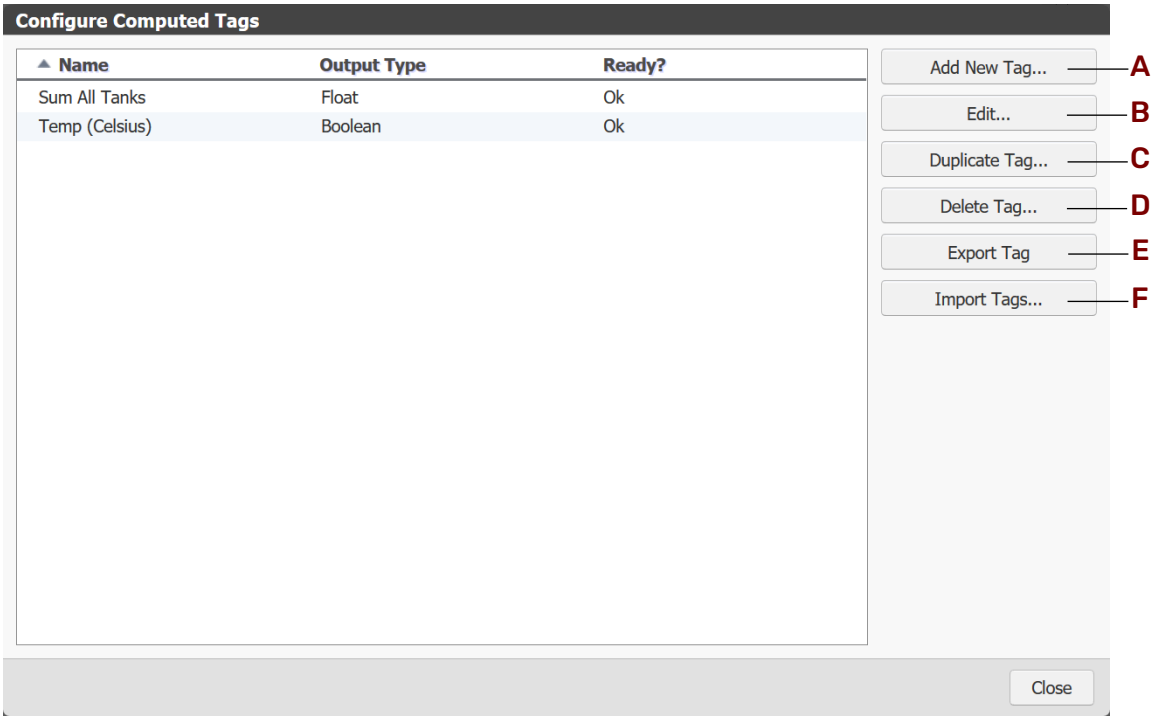
E Select the data type of the computed tag. This determines which gadgets can use it.

- Boolean
- Integer
- Float
- String

F Click in the white space of the **Script** field to add your JavaScript. You cannot edit the first line (in gray) of this field. If you want to change any of the names in the first line, edit the corresponding input.

Configure Computed Tags Window

You can add, edit, duplicate, delete, export, and import computed tags through the Configure Computed Tags window:



A For instructions on how to add a computed tag, see "Add a Computed Tag" on page 57.

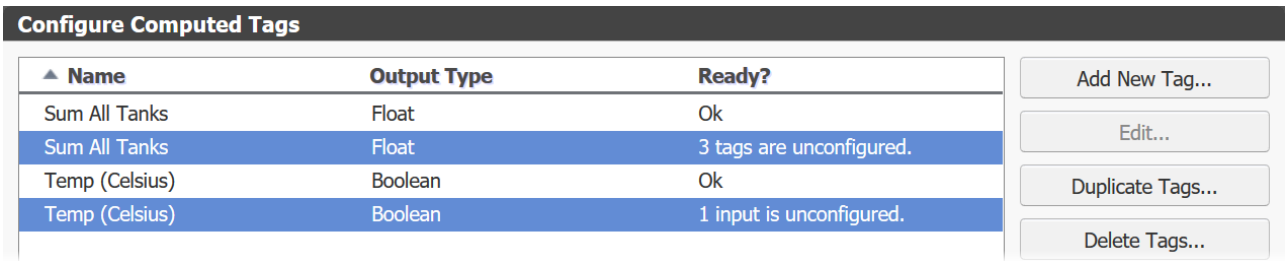
B Select a tag from the list on the left and click **Edit**.

C Select a tag and click **Duplicate Tag**. *groov* View makes a copy of the tag and lists it immediately below the original tag.

D Select a tag and click **Delete Tag**. To confirm, click **Delete Tag**.

E Select all the tags you want to export and click **Export Tag**. In the Save As window, navigate to the folder where you want to store the file. To change the name, type the new name in the **File Name** field. Click **Save**.

F Click **Import Tags**. In the Open window, navigate to the folder where the file is stored. Select the file and click **Open**. *groov* View imports the tags found in the file and adds them to the Configure Computed Tags window, highlighting them and indicating any changes you need to make. In the following example, two tags were added that need inputs configured:



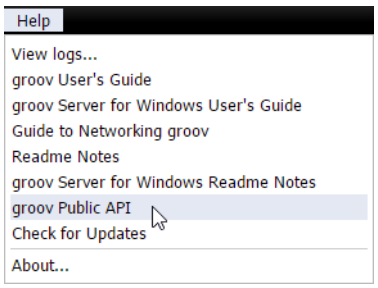
Select a tag and click **Edit** to make the changes needed.

Add a Data Store

A Data Store provides a way in which users of your *groov* View operator interface can interact with data from an online service, a database, or another software application. For example, your company's SQL database could place production or maintenance data into a *groov* Data Store for users to see, or your *groov* View users could enter production or service data for the database to pull in.

Your application uses the ***groov* View REST API** to either put data in *groov* View or get data from *groov* View.

To see the full *groov* View REST API, in Build mode choose **Help** > **groov Public API** as shown at right. You can also find the API on developer.opto22.com.

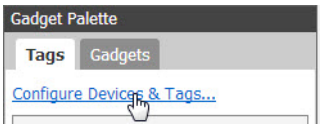


You add a Data Store for each application that will interact with *groov* View, and then add the tags you want the application to read or write to.

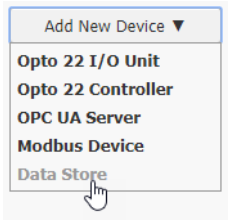
NOTE: A groov View Data Store is another device in groov View like a Modbus/TCP serial device or a SNAP PAC controller. Devices cannot talk with each other directly. For example, a SNAP PAC cannot read data from a Data Store. However, you can use Node-RED in groov EPIC or the groov Box (or on your PC) to create a logical flow that exchanges data between devices that have Node-RED nodes. For more on Node-RED, see nodered.org and the user's guide for your groov EPIC or groov Box.

To add a Data Store in *groov* View:

1. In the Tags tab under Gadget Palette on the right side, click **Configure Devices & Tags** (or choose **Configure** > **Devices and Tags** from the top menu bar).

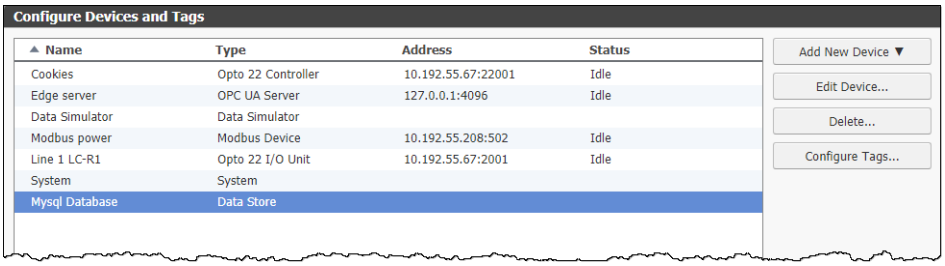


2. Click **Add New Device** and select **Data Store**.

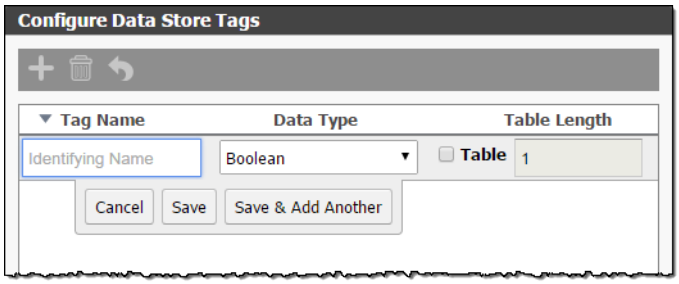


3. Give the Data Store a name and click **Create**.

   The Data Store appears in the list of devices.



4. Highlight the Data Store and click **Configure Tags**. Click the **Add** button in the upper left.



5. Enter the following tag attributes:

   Tag Name: (Required) Give the tag a descriptive name.

   Data Type: (Required) Select the data type that will be written to or read from this tag.

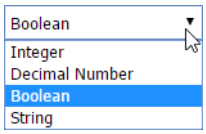
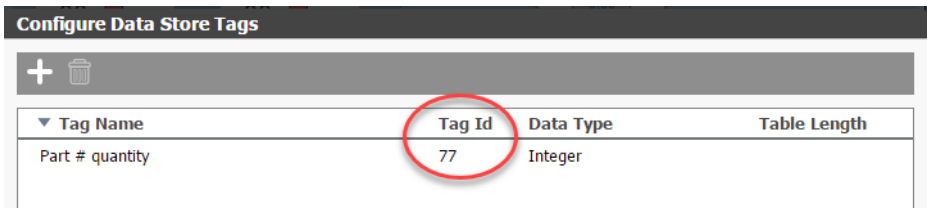


   Table: (Optional) If the tag is an array, check **Table** and enter the table length. From a practical standpoint, table length can be whatever you need (within the limits of your system's capacity).

6. Click **Save** or click **Save & Add Another** if adding another tag.
7. When your tag appears in the list, note the **Tag Id**; you use it when accessing the tag.

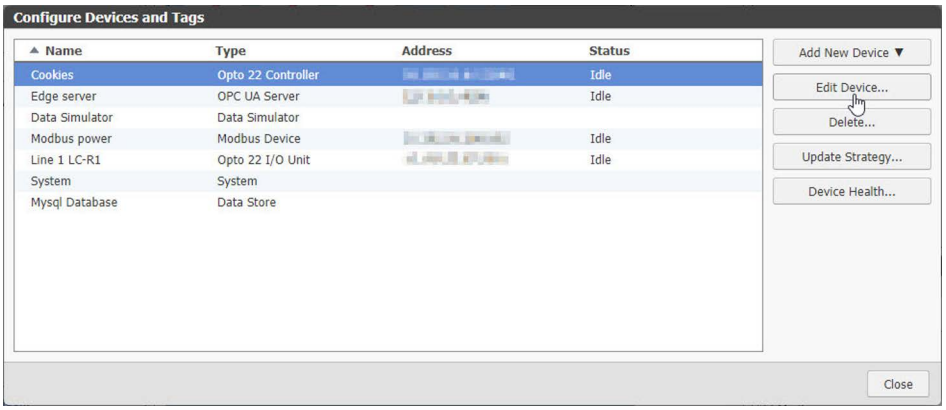


8. When you finish adding tags, click **Close**. Click **Close** again and notice that your Data Store appears in the Gadget Palette with the name you gave it. Click the plus sign (**+**) to see the tags in the store.

Edit Device Information

If a device's hostname or static IP address has changed, you need to edit the hostname or address in Build mode. You can also change other information for a device such as its port, timeout, or scan interval.

1. In the Tags tab under Gadget Palette on the right side, click **Configure Devices & Tags** (or choose **Configure** > **Devices and Tags** from the top menu bar).
2. Select the device and click **Edit Device**.

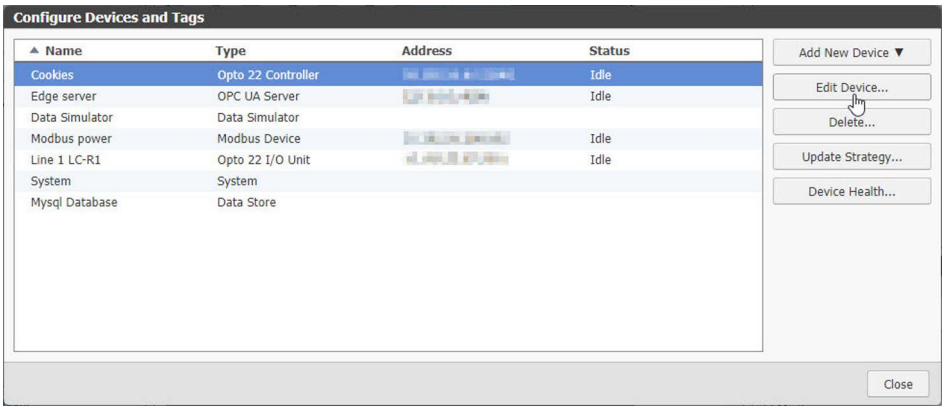


3. Change the information as needed and click **Edit Device**.
4. Close the Configure Devices and Tags window.

Disable Communication to a Device

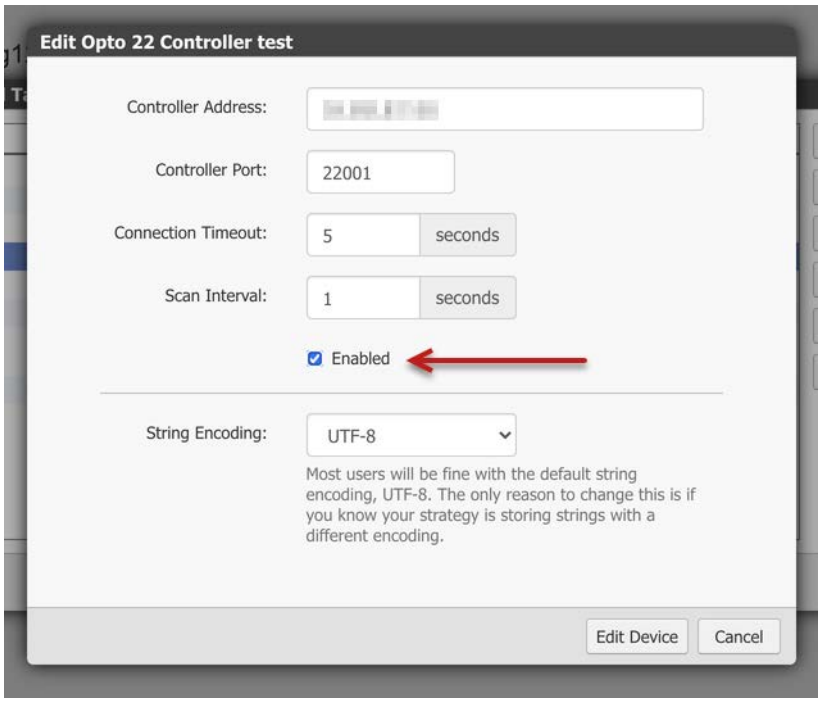
Disabling communication to a device can be helpful in situations where a device incurs communication costs or for testing when a device is not installed yet or is not available. You can disable communication during time periods when you don't need to communicate to the device.

1. In the Tags tab under Gadget Palette on the right side, click **Configure Devices & Tags** (or choose **Configure** > **Devices and Tags** from the top menu bar).
2. Select the device and click **Edit Device**.



3. Click the **Enabled** box to remove the check mark.

   For example, the following image shows the location of the **Enabled** box in the "Edit Opto 22 Controller" dialog box.



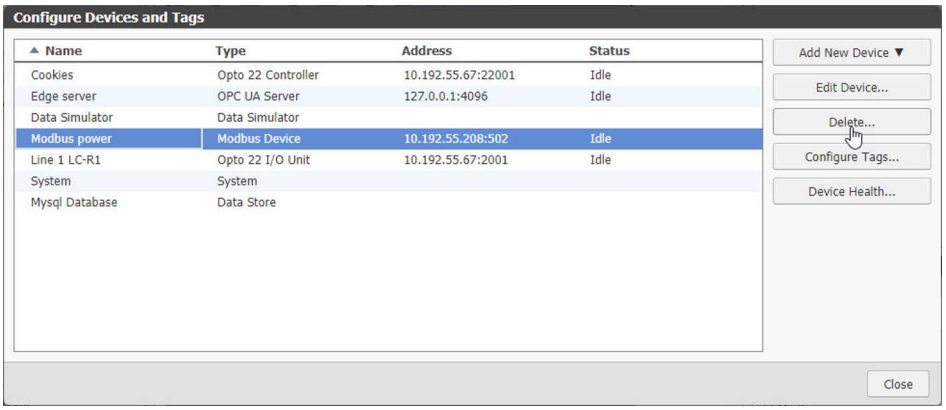
4. Click **Update Device** to close the Edit Device window.

When you return to View mode, any gadgets that refer to tags from that device display an error message similar to the following:

Delete a Device

You can a remove a device from your project. However, be aware that any tags from the removed device are removed from all gadgets.

1. In the Tags tab under Gadget Palette on the right side, click **Configure Devices & Tags** (or choose **Configure** > **Devices and Tags** from the top menu bar).
2. Highlight the device you want to remove and click **Delete**.

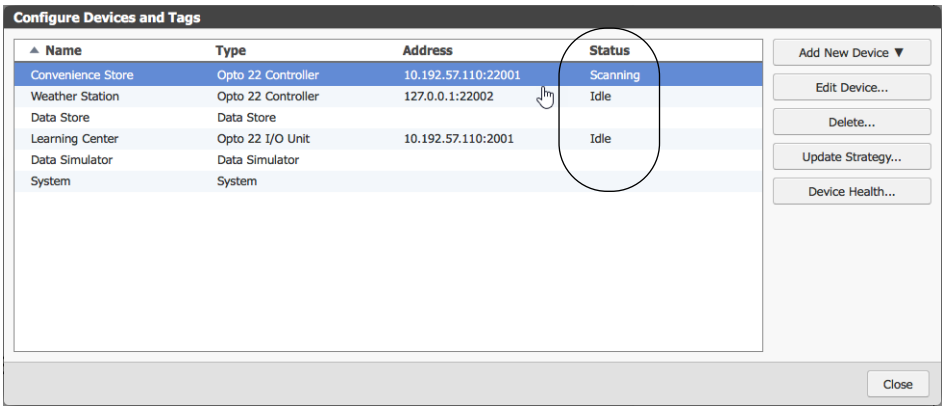


3. Click **Delete Device**.
4. Close the Configure Devices and Tags window.

View Device Health

The Configure Devices and Tags window shows you the status of each device connected to *groov* View.

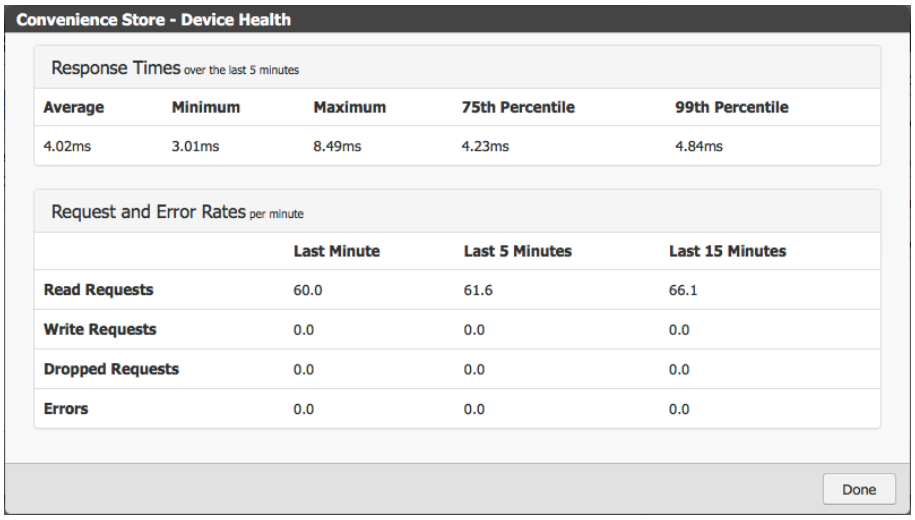
1. In the Tags tab under Gadget Palette on the right side, click **Configure Devices & Tags** (or choose **Configure** > **Devices and Tags** from the top menu bar).
2. Highlight the device you're interested in and notice the **Status** column:



Possible status notations are:

Status	Meaning
Idle	*groov* View is not currently connected to the device; nothing is being scanned on it.
Scanning	*groov* View is reading tag data from the device: everything's working fine.
Degraded	*groov* View is reading tag data from the device, but it isn't responding fast enough to keep up with all requests.
Error	*groov* View encountered an error while connecting to the device. This status usually means the device is offline, or there's a network issue.

3. To see more information about this device, click **Device Health** on the right.



Response Times—Tracks how long a device takes to fully respond to a request. A typical request would be reading a batch of tags (up to 20 at a time) or writing a single tag. Response Times are tracked over the last 5 minutes and show **Minimum**, **Maximum**, and **Average** response times. Values in the **75th** and **99th** percentiles mean, for example, 75% of your requests finish in the reported time.

Request and Error Rates—Tracks the number of read and write requests sent to the device over the last 15 minutes, and reports the average requests per minute over the last 1, 5, and 15 minutes. Read requests typically involve more than one tag while writes are typically one tag at a time.

Dropped Requests result from too many requests in the queue. If the queue is too full, the oldest read requests may be dropped. If **Dropped Requests** are more than 1.0 for the last minute, device health status changes to **Degraded**.

Errors indicate connection errors and are also reflected in the health status column until either the connection is successful or the device no longer needs to be scanned (for example, if no one is viewing a page that includes tags from that device).

ADDING GADGETS

There are two basic methods for adding a gadget and associating a tag. You can start with a gadget and add a tag to it. Or you can start with a tag and then add the tag's gadget.

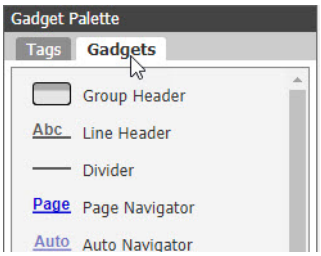
See "Method 1: Add a Tag to a Gadget," page 72

See "Method 2: Add a Gadget to a Tag," page 73

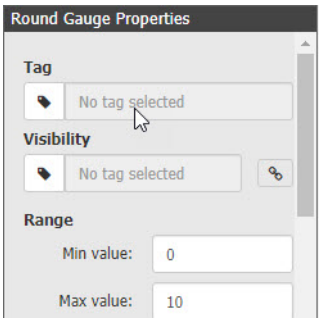
Method 1: Add a Tag to a Gadget

To add a tag to a gadget:

1. Select the **Gadgets** tab in the **Gadget Palette**.



2. Double-click a gadget or drag it to the work area.
3. Select the gadget in the work area.

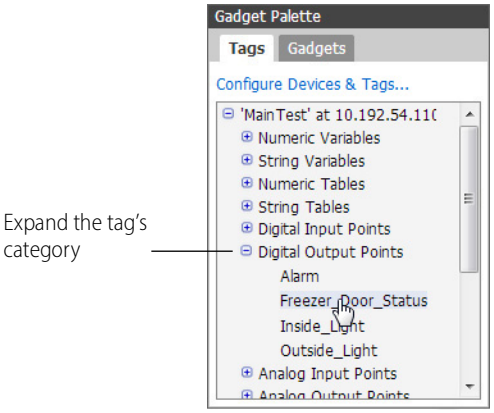


4. In the **Gadget Properties** panel (upper right), click the tag icon next to **No Tag Selected**.
5. In the Update Tag for Gadget window:
   a. Click the plus signs (**+**) to browse to the tag you want to use.
   b. Select the desired tag.
   c. Click **Update Gadget** (or double-click the tag in the list).
6. Configure the gadget's properties. See "Configure Gadget Properties" on page 75.
7. Choose File > Save All Changes.

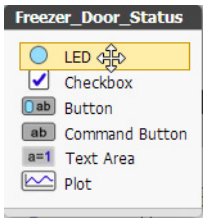
Method 2: Add a Gadget to a Tag

To add a gadget to a tag:

1. Click the **Tags** tab in the **Gadget Palette** panel.
2. Click the plus signs (**+**) to expand the tree and locate the tag you want.



3. Click the tag to see a list of gadgets that work with the selected tag.



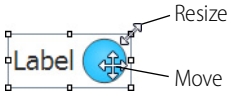
4. Double-click a gadget or drag it to the work area.
5. Configure the gadget's properties. See "Configure Gadget Properties" on page 75.
6. Select **File** > **Save All Changes**.

EDITING GADGETS

You can edit gadgets such as resizing, moving, and configuring them.

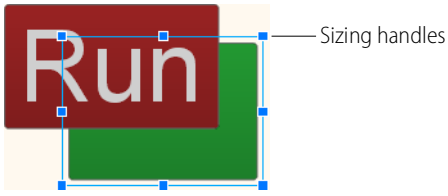
Resize and Move Gadgets

When you resize or move gadgets in either the Desktop & Tablet layout or the Handheld layout, the change does *not* affect the other layout. See "Optimizing Layouts" on page 77 for more information on layouts.

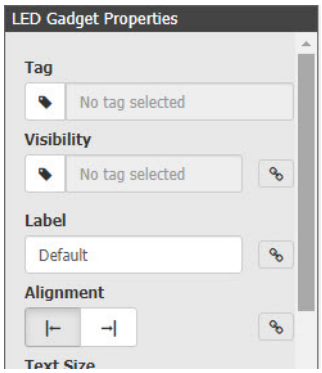


- To move a gadget, grab it with the left mouse button and drag it. To move multiple gadgets, click on an empty part of your page and drag a box around the gadgets, or hold down the CTRL key while selecting gadgets.
- To resize a gadget, click it, grab a graphic handle, and drag to the new size.

  If a gadget is behind another gadget, you can make its sizing handles available by clicking on an exposed portion of the gadget.



Configure Gadget Properties



To configure a gadget, click the gadget to display its **Properties** panel (in the upper right corner of the workspace).

Each gadget has its own specific properties. For example, part of the LED Gadget Properties panel is shown at right.

See Chapter 4: Gadget Reference for information on specific gadget properties.

Properties and Layouts

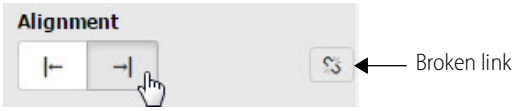
Any property with a link icon next to it can be changed in one layout (Desktop & Tablet, or Handheld) without affecting the other layout. See "Optimizing Layouts" on page 77 for more information on layouts.

Depending on the gadget, you can change the gadget's visibility, label name, text size, alignment, color of text and its background, value precision, indicator colors, orientation (vertically or horizontally), and more.

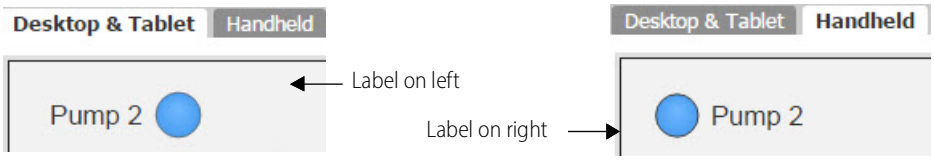
For example, suppose you want a gadget's label to appear on the left side of the gadget in the Desktop & Tablet layout, but on the right side in the Handheld layout. To change it:

1. Click the **Desktop & Tablet** tab and click the gadget you want to change.
2. In the **Properties** panel, make sure **Alignment** is to the left.

3. Click the link icon so it changes to a broken link , indicating that changes to this property affect only the current layout.
4. Click the **Handheld** tab and click the same gadget.
5. In the **Properties** panel, notice that the link is broken and change **Alignment** to the right.



6. Check both tabs to see how the label on this LED appears in the two layouts:



Languages in Buttons and Labels

When adding text to a gadget, *groov* has full Unicode support and uses very common fonts such as Arial with broad support for most languages.

—Button gadget

Cut and Paste Gadgets

- **To cut or copy** a gadget: right-click it and select **Delete**, **Duplicate**, **Copy**, or **Cut** from the menu.
- **To paste** a copied or cut gadget: left-click the workspace, right-click, and select **Paste** from the menu.
- **To select more than one gadget** at a time: hold down the CTRL key as you click them, or draw a box around multiple gadgets.
- **Duplicated gadgets** appear at the bottom of both the Desktop and Mobile views. If you select more than one gadget to duplicate—for example a label and an LED—the duplicated gadgets maintain their relative positions.

As indicated in the popup menus, you can also use keyboard shortcuts for Copy (CTRL + c), Cut (CTRL + x), and Paste (CTRL + v). You can also choose **Copy**, **Cut**, or **Paste** from the **Edit** menu.

Make a Gadget Visible Based on a Tag

You can change a gadget's visibility in *groov* View based on:

- **An integer variable.** A value of 0 hides the gadget and any non-zero value shows the gadget. To indicate which integer variable:
  a. Click the **Tag** symbol.
  b. Navigate through the **Update Tag for Gadget** window to select the integer variable.
  c. Click **Update Gadget**.
- **A boolean tag.** A value of 0 hides the gadget and a value of 1 shows the gadget. To indicate which boolean variable:
  a. Click the **Tag** symbol.
  b. Navigate through the **Update Tag for Gadget** window to select the integer variable.
  c. Click **Update Gadget**.
- **The bit of an integer variable or element of an integer table.** A value of 0 hides the gadget and a value of 1 shows the gadget. To indicate which bit:
  a. Click the **Tag** symbol.
  b. Navigate through the **Update Tag for Gadget** window to select the integer variable or integer table (array).
  c. Specify the bit:
     – For integer variables, specify the bit number in the **Bit** field.
     – For an element of an integer table, specify the element number in the **Array index** field and the bit number in the **Bit** field.
  d. Click **Update Gadget**.

Move a Gadget to the Front or Back

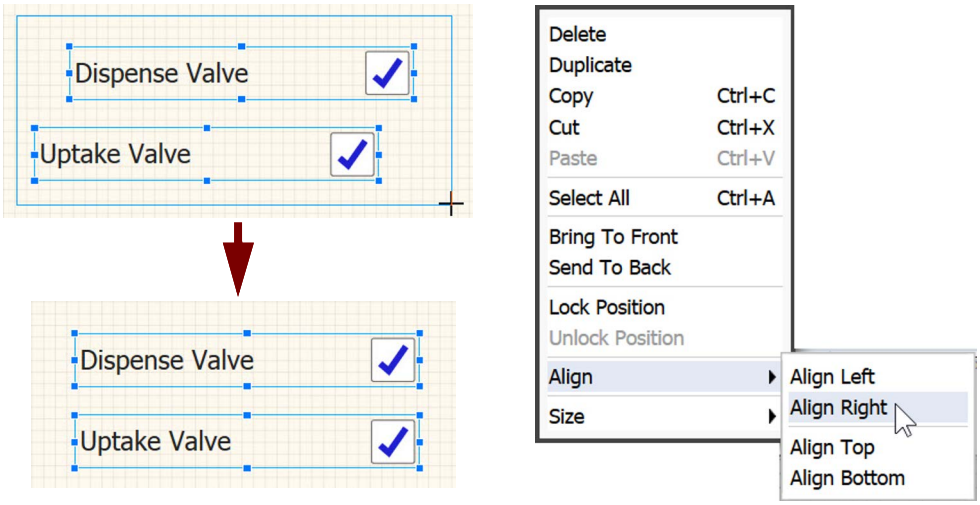
If gadgets overlap and you want to change the order of the stack, right-click a gadget and select **Bring To Front** or **Send To Back** from the popup menu.

If you don't want a gadget to move, choose **Lock Position** from the popup menu.

You can also select **Bring To Front**, **Send To Back**, or **Lock Position** from the **Edit** menu.

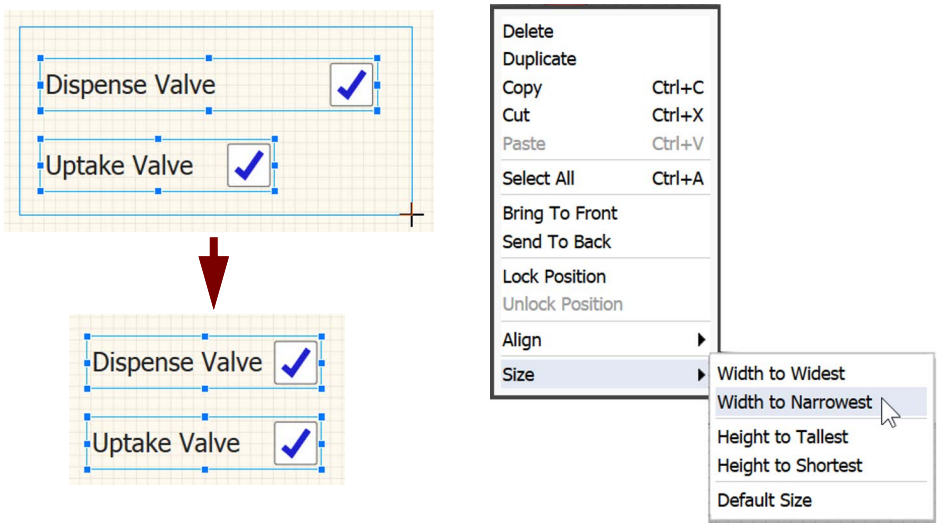
Align Gadgets

To align multiple gadgets, click on an empty part of your page, drag a box around the gadgets (or hold down the CTRL key while selecting them), right-click, and choose the alignment type. The **Align** commands are also available in the **Edit** menu.



Adjust the Size of Multiple Gadgets

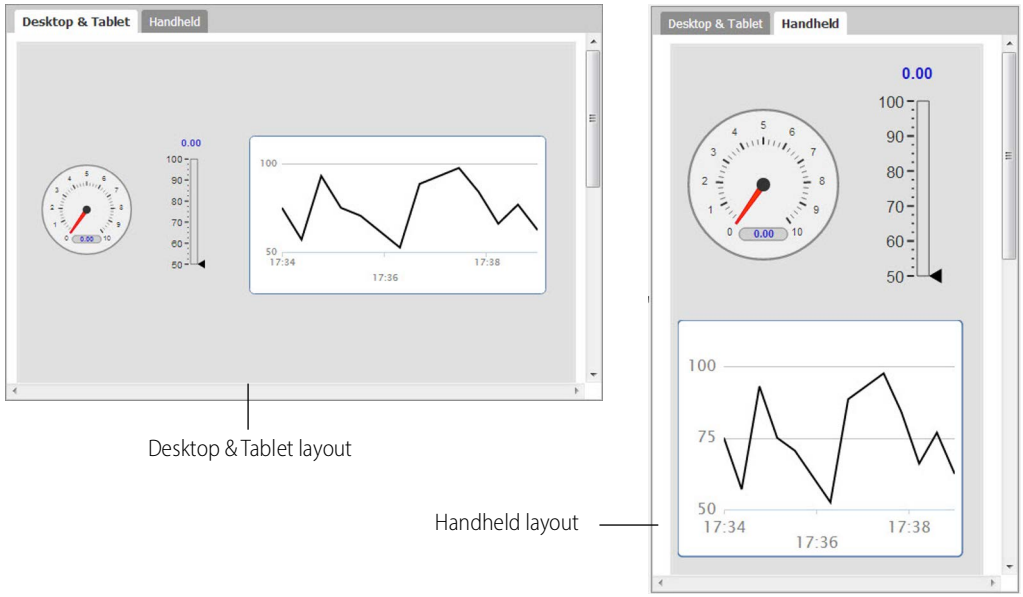
To make multiple objects the same size, drag the cursor around the gadgets (or hold down the CTRL key while selecting them), right-click, and choose how to size them. The **Size** commands are also available in the **Edit** menu.



OPTIMIZING LAYOUTS

In Build mode, there are two different layouts: *Desktop & Tablet* and *Handheld*. The Desktop & Tablet layout shows you how gadgets will appear when viewed on a computer monitor or a tablet. The Handheld layout is for viewing on a smaller handheld device such as a smartphone.

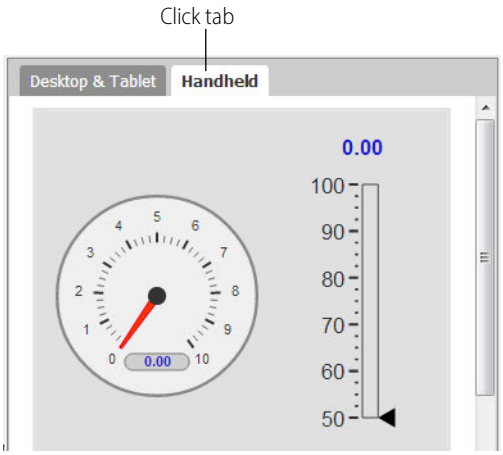
groov View automatically shows the appropriate layout for the device being used. Or, if you are using the *groov* View app for iOS or Android on a mobile device, you can choose which layout to view.



If most of your users will view your *groov* operator interface on a smartphone, you may want to start building your project in the Handheld layout tab. No matter where you start, you can adjust both layouts to optimize them for the people who will use them.

For any given page, by default both layouts contain identical gadgets and properties, but you can make the layouts different in several ways.

To work on a layout, click the tab for either **Desktop & Tablet** or **Handheld** at the top of the page.



You can switch between tabs as needed to make each layout the way you want. You can:

- Change a gadget's size and position in one layout without affecting the other one. For example, you can move the most important gadgets to the top in the Handheld layout. See "Editing Gadgets" on page 74.
- Hide a gadget in one layout and show it in the other. See "Use the Page Stash" on page 26.

- Change the size, color, and alignment of gadget text in one layout (for example, to fit more on a smaller screen). Be careful not to make text too small to read or the controls too small to use with your finger. See "Properties and Layouts" on page 75.
- Show a different gadget label on one layout than on the other. See "Properties and Layouts" on page 75.
- Orient a gadget horizontally in one layout and vertically in the other. See "Properties and Layouts" on page 75.

Each gadget has individual properties that may limit or expand what you can do with it in a layout. See Chapter 4: Gadget Reference for information on each gadget.

3: Managing *groov* View

This chapter describes how to manage user accounts, back up and restore your project, update *groov* View and your license, and more.

In this chapter:

MANAGING USER ACCESS

When you build or change your *groov* View project, you have specific ideas in mind about which people will use the mobile operator interface and which software applications will have access to *groov* data. Managing these people and applications—your *groov* View users—is the key to maintaining security. Here are some examples:

People—You may want a line operator to monitor and control equipment on the line while a supervisor can see widget production but has no control over the equipment. Or, you may want a central station to monitor equipment at remote sites, and field technicians to control it from a tablet.

Software—It's not just people who may need access to data in *groov* View. You may also want software applications to access the data in a *groov* Data Store using the *groov* API (application programming interface). For example:

- A company database could write daily sales totals for managers to see on their phones.
- A custom application written in C++, .NET, JavaScript, or another programming language could share operational data from remote automation equipment, which then appears to technicians in *groov* View.
- A cloud data service like AT&T® M2X® or Amazon Web Services® (AWS) could provide data on trucks and freight containers to logistics personnel.

- A Node-RED flow you build could tweet status to operators when pressure is unusually low. For more information on Node-RED, see the *groov EPIC User's Guide* (form 2267) or the *groov Box User's Guide* (form 2104).

Software clients that need to access data in *groov* View must be added as users in Build mode. We recommend that each software client be assigned a unique username, password, and API key. That way, if multiple software applications are using the API and one becomes compromised, the others can still operate securely.

Because security is a top priority, **restrict access** to your *groov* View data and interface—or to parts of it—to make sure that only authorized people and software can use it, and only in the ways you intended. Here are three ways you can manage access:

- **Create an account for each user.** Each person or software application that uses your *groov* View operator interface or accesses its data must have an account with a username and password. When people use your *groov* View interface, their passwords are encrypted. When applications access *groov* View data, they must use their assigned API key to verify their identity.

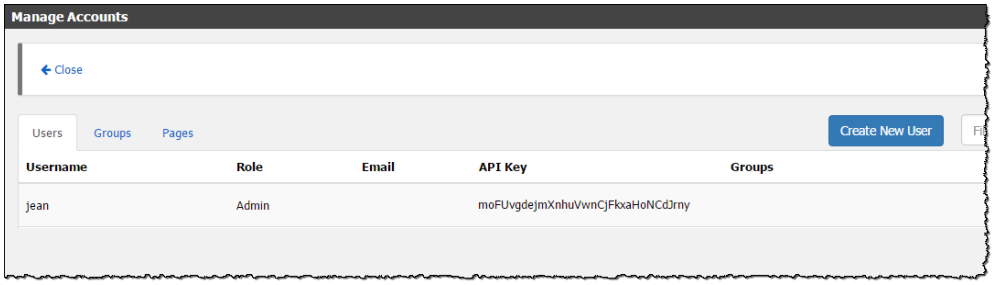
  Make sure all users understand the importance of security, keep their passwords and API keys safe, and understand how to change them.

  For instructions, see "Create a User" below.
- **Create user groups to control page access.** With multiple users, groups are an easy way to define who sees which pages. For example, you could create one user group for central station monitoring personnel and two groups for field technicians, and then assign each user to the correct group. The *Central Station* group sees pages showing all remote sites for monitoring. The *Field Technicians West* group sees pages with controls for their geographic area; the *Field Technicians East* group sees similar pages for their area. For instructions, see "Manage User Groups" on page 86.
- **Create pages for specific purposes.** If a line operator needs to monitor and control equipment, but a supervisor only needs to monitor it, create two pages—one for each purpose. The operator's page includes controls while the supervisor's doesn't. For instructions, see "Working with Pages" on page 21.

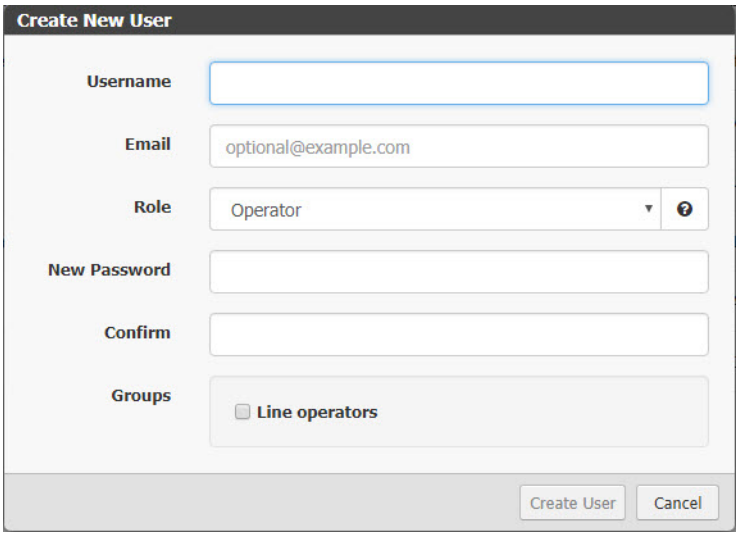
Create a User

You must be an Admin user to create or change users.

1. In Build mode, choose **Configure** > **Accounts**.
2. Click the **Users** tab.



3. Click **Create New User**.

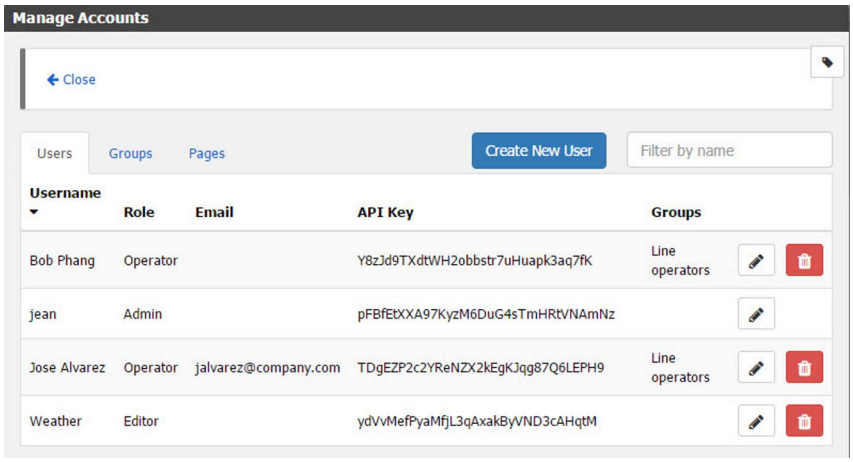


4. Enter a **Username** for the new user.
5. If this user will receive email notifications from *groov* View, enter the email address to use.
   See Chapter 5: Using Events and Notifications.
6. Select a **Role** based on the security level for this user (**Admin**, **Editor**, **Operator**, or **Kiosk**).
   For example, if you want a user to be able to log in and out of *groov* View and change their password, choose the **Operator** security level. If you want a user to use View but not be able to log out or change their password, choose **Kiosk**.
   For software users, choose **Admin** or **Editor**. Lower levels cannot access a *groov* Data Store.
   This table shows the privileges available for each security level:

		Security Level			
		Admin	Editor	Operator	Kiosk
Privilege	Use and interact with the gadgets in *groov* View	●	●	● *	● *
	Log out and back in, and change their password in *groov* View	●	●	● *	
	Use Build mode to add devices, make or change pages, & set groups on pages	●	●		
	Use the *groov* API to securely access data in a *groov* Data Store	●	●		
	Create users and groups, assign users to groups, and generate new API keys	●			

* Only for the user groups an Operator or Kiosk user belongs to. See page 86.

7. For Operator or Kiosk users, if you have already configured groups, select the groups the user belongs to.
   Groups are used to restrict access to particular pages. For example, if a page is restricted to members of the group called *West Wing*, then an Operator or Kiosk level user must be in the West Wing group to access that page. See "Manage User Groups" on page 86.
8. Click **Create User**.
   The user appears in the list.

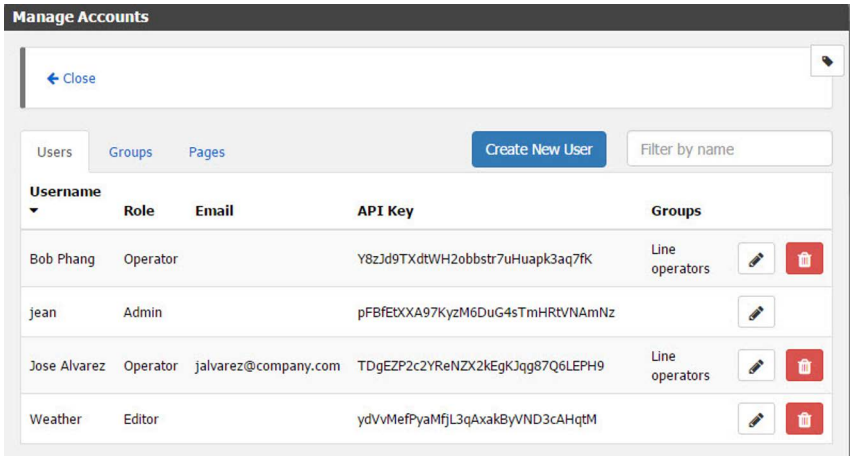


9. Give the username and password (for a person) or API key (for software) to the user.
   API keys are automatically generated. To change an API key, see "Change a User's Settings" below.

Find a Software User's API Key

You must be an Admin user to see API keys.

1. In Build mode, choose **Configure** > **Accounts**.
2. Click the **Users** tab.

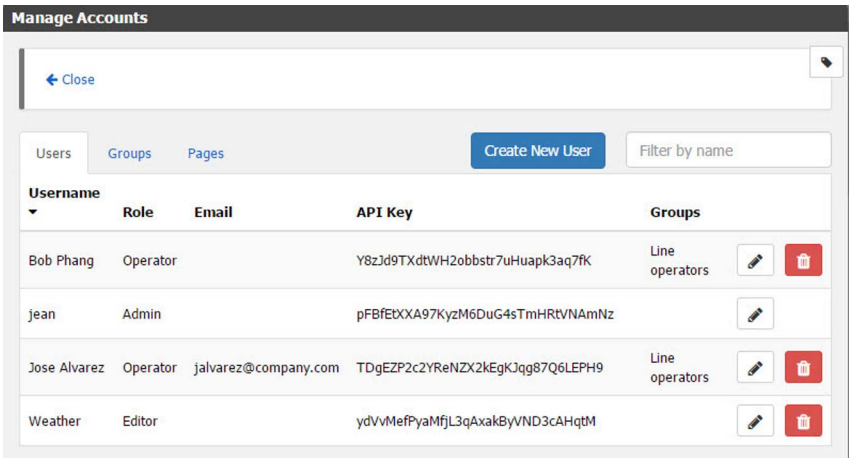


3. Find the user in the list (if you have a long list of names, use the **Filter by name** field to help). Read across from the **Username** to the **API Key** column.

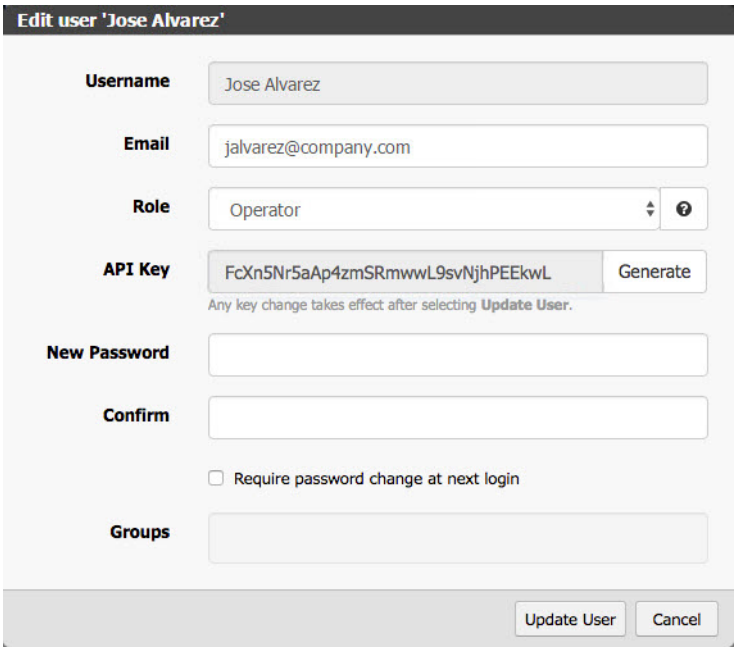
Change a User's Settings

You must be an Admin user to change user settings.

1. In Build mode, choose **Configure** > **Accounts**.
2. Click the **Users** tab.



3. Find the user you want to change (if you have a long list of names, use the **Filter by name** field to help).
4. Click the edit button | in line with the user's name.



5. Change the user's settings as needed. (See more information in "Create a User" on page 82.) Note two things you can do here that weren't available when you first created the user:
   - **API Key** (applies to software users)—Click **Generate** to assign a new API key (you cannot create your own). After you update this user and return to Manage Accounts, you can see the new API key. The old key is automatically disabled.
   - **Password change**—You can assign the user a new password here, or check the box if you want to force the user to change their password the next time they log in. (Note that the user's current password is not visible. There is no way to retrieve a user's current password, but you can assign a new one or require them to change theirs.)
6. Click **Update User**.

Delete a User Account

You must be an Admin user to delete a user account.

A deleted user will no longer be able to log in.

1. In Build mode, choose **Configure** > **Accounts**.
2. Click the **Users** tab.
3. In the list, find the user you want to delete (if you have a long list, you can use the **Filter by name** field to find it).
4. Click the trash can button in line with the user's name.
   A confirmation message appears.
5. Click **OK** to confirm.

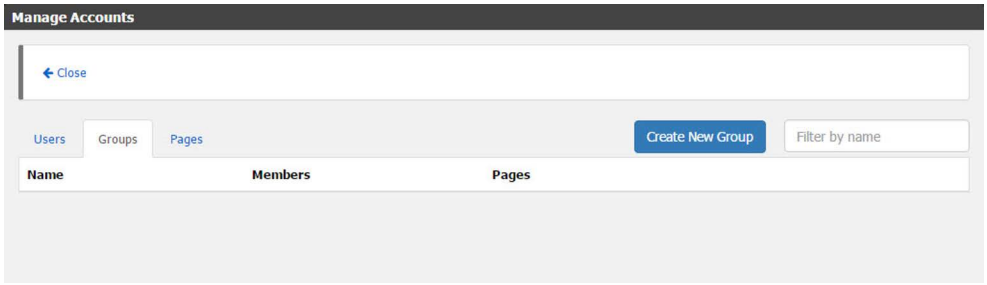
Manage User Groups

You must be an Admin user to create or change groups.

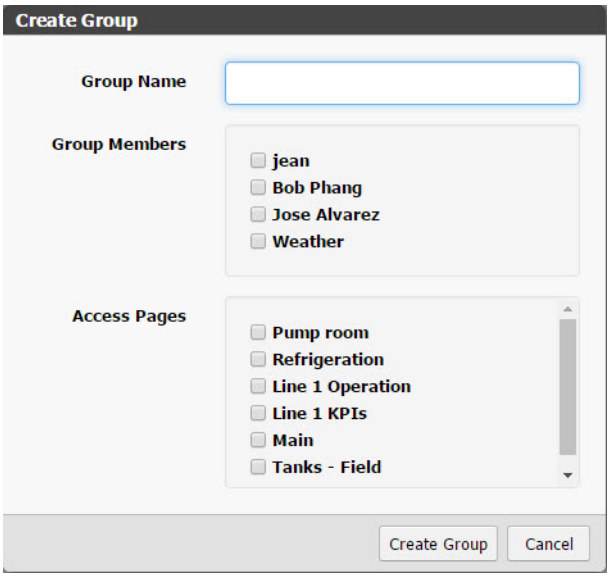
Groups are used to restrict access to particular pages for Operator and Kiosk level users. For example, if a page is restricted to members of the group called *West Wing*, then an Operator or Kiosk level user must be in the West Wing group to access that page.

To work with groups:

1. In Build mode, choose **Configure** > **Accounts**.
2. Click the **Groups** tab.



- To delete an existing group, find the group name in the list (if you have a long list, you can use the **Filter by name** field to find it). Click the trash can button in line with the group name.
- To create a new group, click **Create Group**.
- To edit an existing group, find the group name in the list and click the edit button in line with the group name.



3. Enter or change the **Group Name**, select the users to be included in the group, and select the pages this group should see.

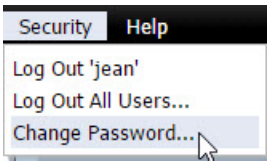
   NOTE: You must have already designated page permissions as Limited Access, or the page will not appear here. To change a page's permissions, cancel this dialog box. In **Manage Accounts**, *click the* **Pages** *tab. Find the page you want to change and click the edit button in line with the page name. Under* **Access Rights**, *choose* **Limited Access**. *For more information about page permissions, see "Change Page Properties" on page 21.*

4. Click **Create Group** (or **Update Group**).

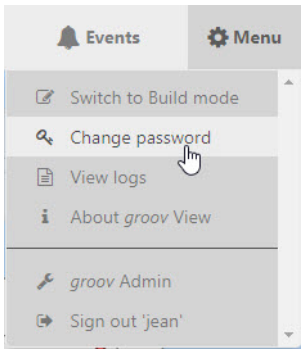
Change a User's Password

How passwords are changed depends upon the user's security level.

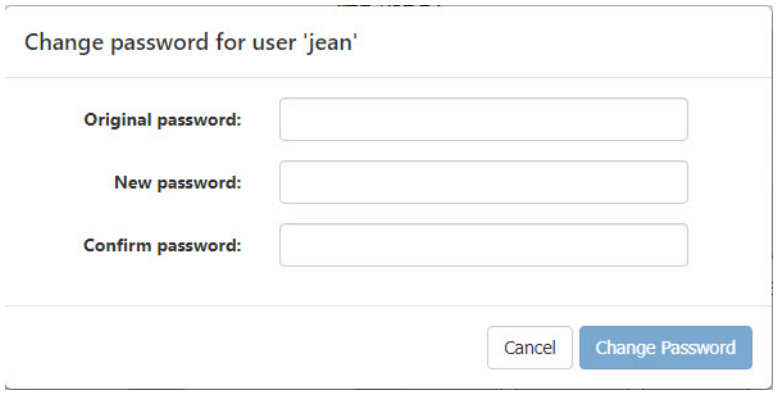
- An Admin level user can change any user's password; see "Change a User's Settings" on page 84.
- Admin and Editor level users can change their own passwords in either Build or View.
- Operators can change their passwords in View.



Changing your password in Build mode:
Choose **Security** > **Change Password**.



Changing your password in View:
Click the gear icon and select **Change Password**.

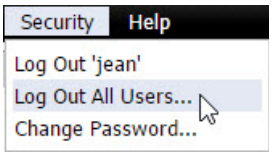


Fill in the form with the old and new passwords; then click **Change Password**.

Log Out Users

An Admin user can log out all logged-in users in one step. The users will no longer get gadget updates, write values, or change pages.

In Build, choose **Security** > **Log Out All Users**.



MANAGING IMAGES IN THE IMAGE LIBRARY

All images you use in your *groov* View project are stored in the *Image Library*. You can use the same image in any number of places in your project, and if you change the image, it is updated everywhere it appears.

groov View accepts many different kinds of images, including photos, drawings, and logos with file types of BMP, GIF, PNG, JPG, and SVG. You can even use an animated GIF. For best performance, use images no larger than 2000 x 2000 pixels at 72 dpi with 8-bit color information, or a total of less than 300 KB in size per image.

You can upload images you make or obtain yourself and any of the drawings in the SVG Library on the Opto 22 website. If you have Microsoft Visio 2003, you can also make a compatible image using any of our free Visio libraries.

You can use images in a variety of ways:

- Use multiple images in the Image Indicator to show status or value (see page 125).
- Put your logo in the caption bar at the top of the page (see Groov View Styling in "Changing the General Project Settings" on page 98).
- Orient your users by showing an image of the location or device they're monitoring.
- Skin a button with an image (see page 117, page 118, and page 119).
- Use an image as a link to another page or internet location (see page 110).

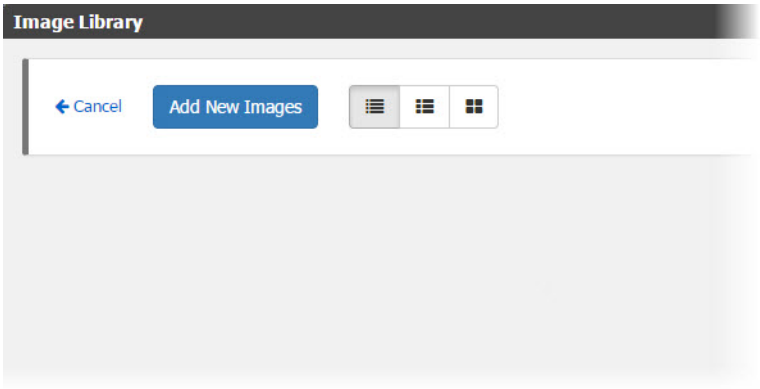
One caution: It's easy to overdo the use of images. Make sure you don't clutter your operator interface with unnecessary graphics. Animations are especially distracting for users and should be avoided. Use images that will help your users, not distract them from what's important on the screen.

Add Images

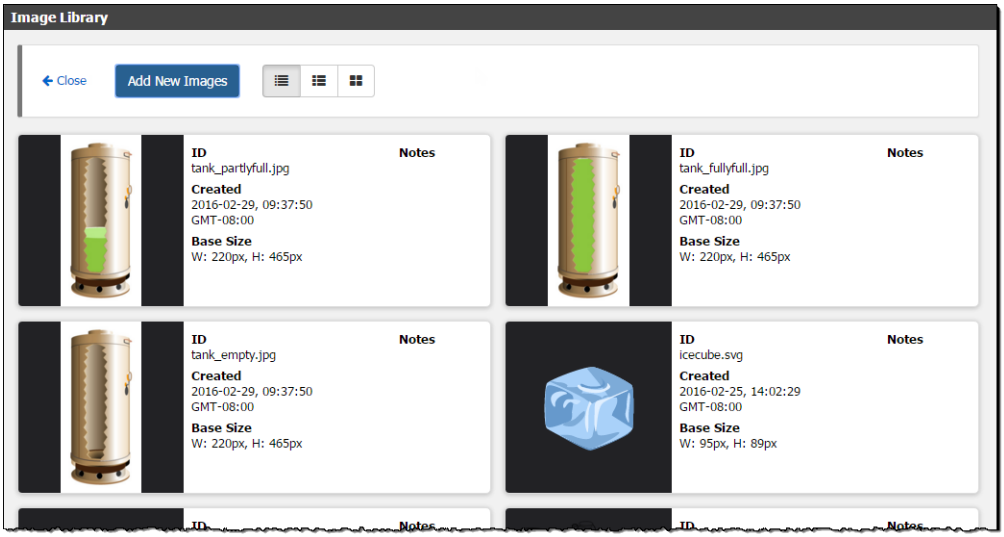
You can add images to the Image Library directly, or you can add them while you're assigning properties to gadgets.

Adding Images Directly to the Image Library

1. In Build mode, choose **Configure** > **Image Library**.



2. Click **Add New Images** and browse to the location of the image(s) you want (or drag the image(s) from their current location into the Image Library).



3. (Optional) Click inside the **Notes** area to add your own notes about the image.

Adding an Image to a Gadget

To add an image while setting the gadget's properties:

1. Make sure the gadget is highlighted.
2. In the **Properties** panel (upper right), click **Add Image** or (depending on the gadget) choose **Display Mode** > **Image**, and click the broken image button.
3. In the Image Library, select the image you want (or click **Add New Images**, browse to the image, click **Open**, and then select it in the Library).

   The library closes and you return to the main workspace to choose image properties. See Chapter 4: Gadget Reference for details on each gadget.

Change Image View

To see more details about the images in the library, or to view more images in the same space, choose a different view at the top of the library.

Image details view (default)

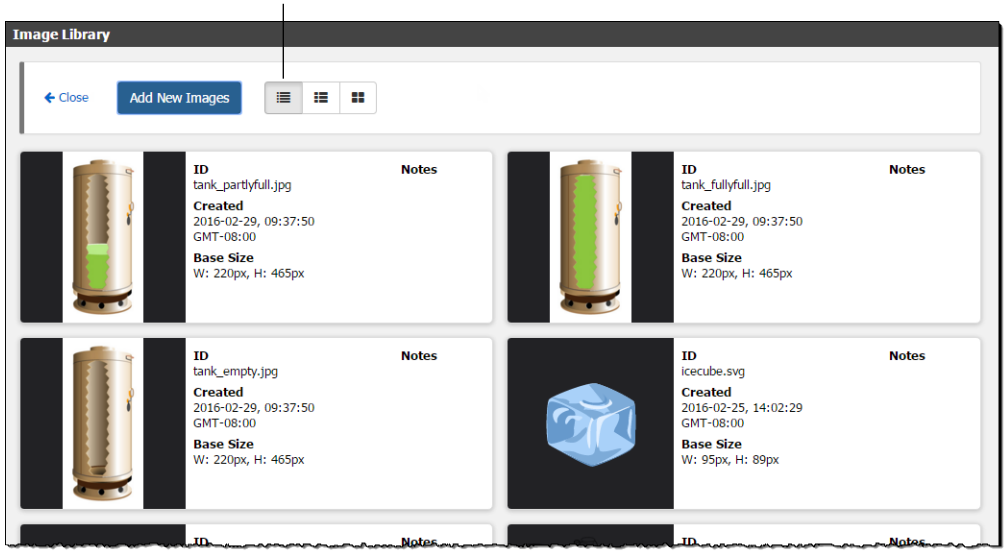
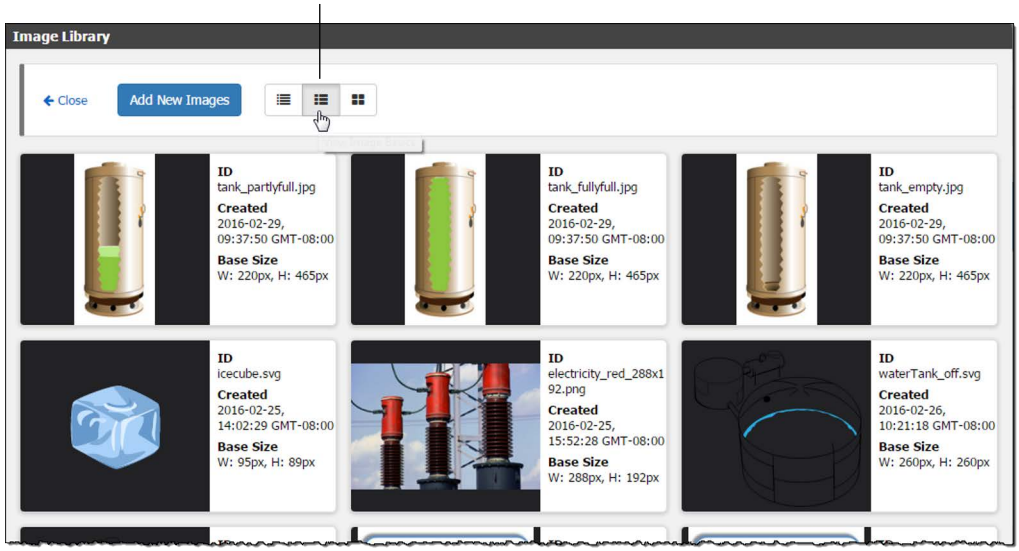
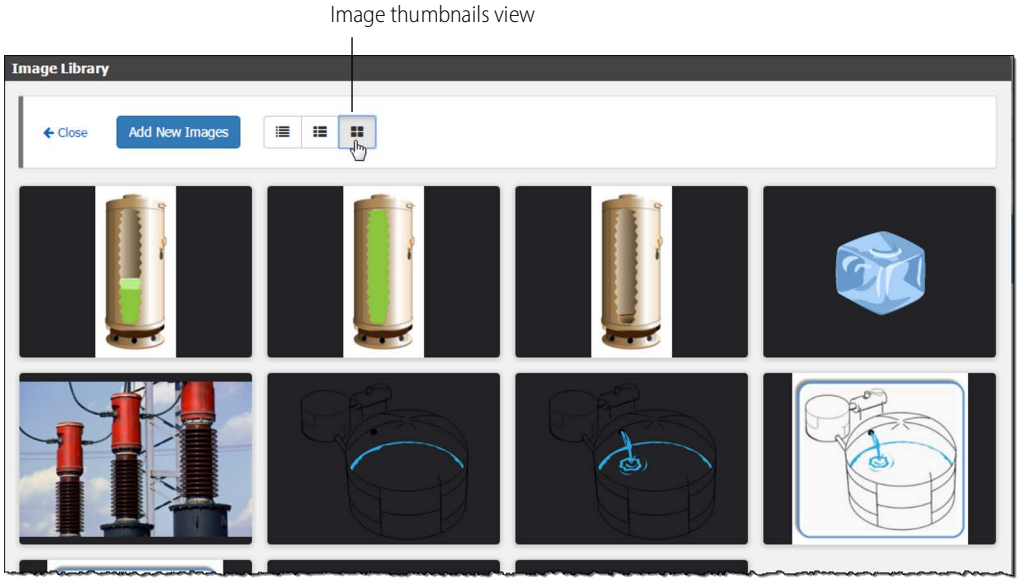


Image basics view



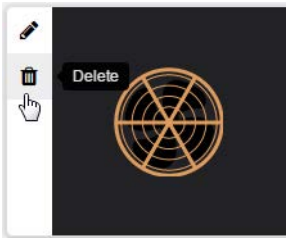


Change an Image

If you change an image, you can upload the new version to replace the older one in the Image Library. You must have already made the change to the image in another software program.

1. Choose **Configure** > **Image Library** and locate the image you want to change.
2. Click the pencil icon at the left of the image and browse to the new version of the image.
3. Click **Open** to replace the image.

Delete an Image



1. Choose **Configure** > **Image Library** and locate the image you want to delete.
2. Click the trashcan icon at the left of the image.
   The image is deleted.

MANAGING SECURITY CERTIFICATES

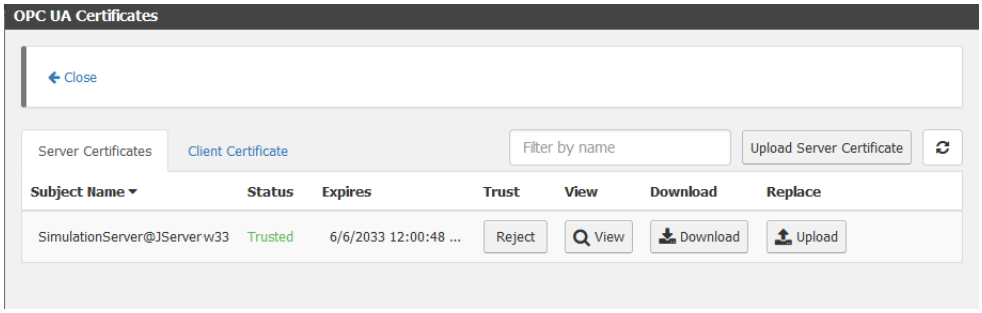
Secure connections to OPC UA servers are supported in *groov* View R4.5 and higher. Some OPC UA servers offer security options; some require them. (See "Add an OPC UA Server" on page 45 for more information.) If you choose Message Security levels **Sign** or **Sign & Encrypt** for server connections, the server and the client (*groov* View) must trust each other's security certificates.

For more information on security certificates, see "Managing the SSL Security Features" in the *groov EPIC User's Guide* (form 2267).

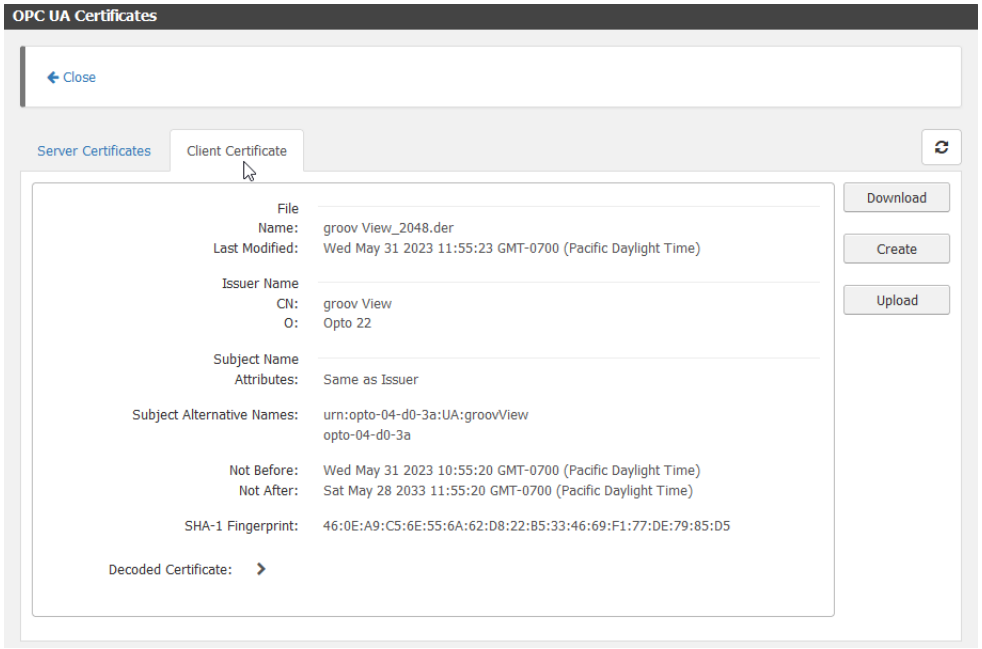
You can manage server and *groov* View client certificates in Build mode.

To manage security certificates in Build mode:

1. Choose **Configure** > **Certificates**.



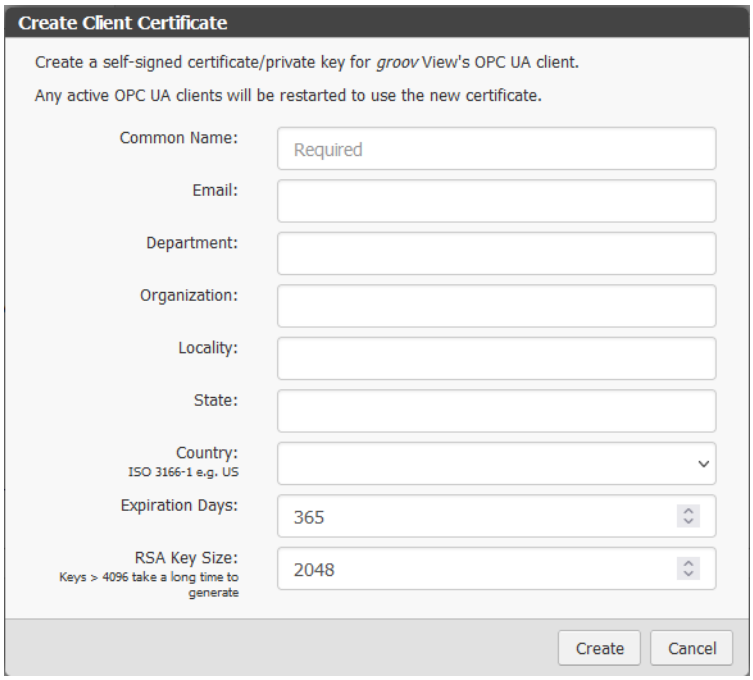
2. Manage server certificates in this tab:
   - To reject a certificate with a **Trusted** status, click **Reject**. Or, to trust a certificate with a **Rejected** status, click **Trust**.
   - To see a server's certificate, click **View**.
   - To add a certificate, click **Upload Server Certificate**, navigate to the certificate's location on your PC, and click **Open**. To replace an existing certificate, click **Upload** in the **Replace** column.
   - To refresh this window, click .
3. To manage the *groov* View client certificate, click the **Client Certificate** tab.



   You see the current certificate used by *groov* View's OPC UA client.
4. To download the certificate, click **Download**.
5. To manually create a new self-signed certificate and private key, click **Create**.

   The default self-signed certificate is generic. You may want to add specific identifying details such as company name or email, so that when a remote server receives the *groov* View client certificate, the administrator of the remote server can see exactly who that certificate belongs to. Learn more about this identifying information at: https://knowledge.digicert.com/generalinformation/INFO1745.html

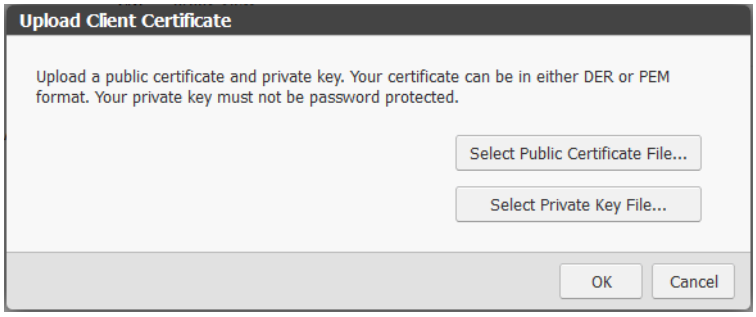
The Create Client Certificate dialog box opens:



a. Complete all fields.
(These fields conform to standards in RFC 5280: Internet X.509 Public Key Infrastructure Certificate.)

b. Click **Create**.
The new certificate and private key replace the previous one, and the *groov* View OPC UA client is restarted.

6. To upload a public certificate and private key that you have saved on your PC, click **Upload**.



a. Click the buttons to load the certificate and private key from your PC.

b. Click **OK** to submit the files to the server for validation.
If the files are valid, the new certificate appears in the **Client Certificate** tab. If they are not valid, errors appear in the dialog box.

ADDING A PAGE CATEGORY

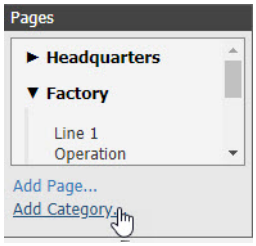
If you have a large project, you can organize pages in the operator interface by creating categories and assigning pages to them.

For example, if you have a multi-story building, you could make a category for each floor, and then add pages to it that apply only to that floor. Or, categories can represent individual machines, rooms, or any number of things.

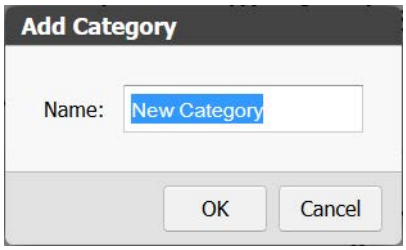
When you create a new category, make sure to add at least one page to the category. Otherwise, the category is deleted automatically when you save and open View. For more, see "Working with Pages" on page 21.

To add a page category:

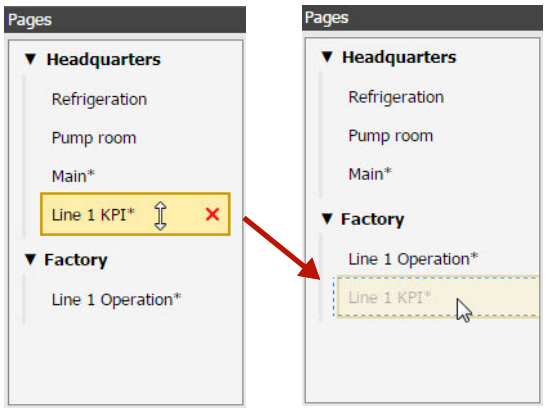
1. In Build mode, click **Add Category** under **Pages** on the left side.



2. Type a new name for the category.
3. Click **OK**.



4. To put existing pages in the new category, in the **Pages** panel, use your mouse to drag and drop them below the new category name.



Drag existing pages below the new page category.

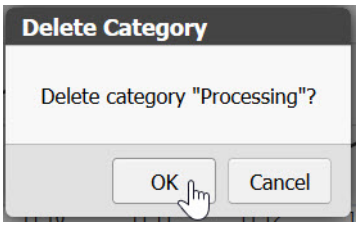
Delete a Category

The process for deleting a category is similar to deleting a page. However, you can only delete a category that does not have any pages assigned to it. To delete a category with pages, first move or delete the pages, and then delete the category.

To delete a category:

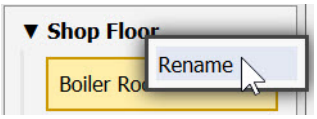
1. Hover over the page or category name you want to delete in the **Pages** panel
2. Click the red **X** that appears.

3. Click **OK**.



Rename a Category

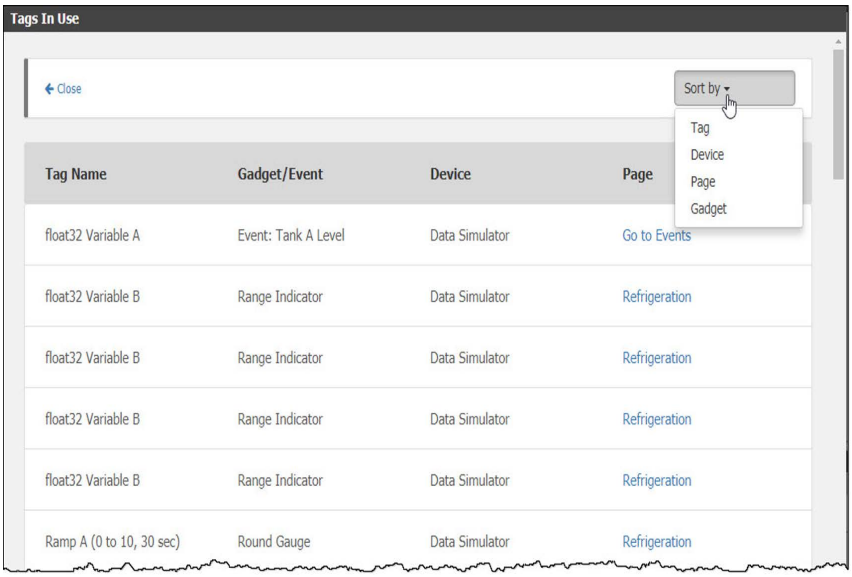
1. Right-click the name and select **Rename**.



2. Enter a new name and press the Enter key (or left-click in the work area).

VIEWING THE TAGS IN USE

To see all the tags being used in your project, select **View** > **All Tags**. The Tags in Use dialog box shows the tags in use, the gadget or event they are used in, the device, and the page in your *groov* View project.



Click **Sort by** in the upper right to sort tags alphanumerically by tag name, device, page, or gadget.

In the **Page** column, you can click the page name to go to the page. To return, choose **View** > **All Tags** again.

VIEWING LOG MESSAGES

groov View continually logs messages about what it's doing, including all activity that occurs while you are using *groov* View as well as events and event notifications. Seeing these messages in the *Log Viewer* can help you troubleshoot issues or track *groov* View progress. All messages are logged, but you can choose what you want the Log Viewer to show.

All users can view events. For instructions, see "Viewing Events" on page 139.

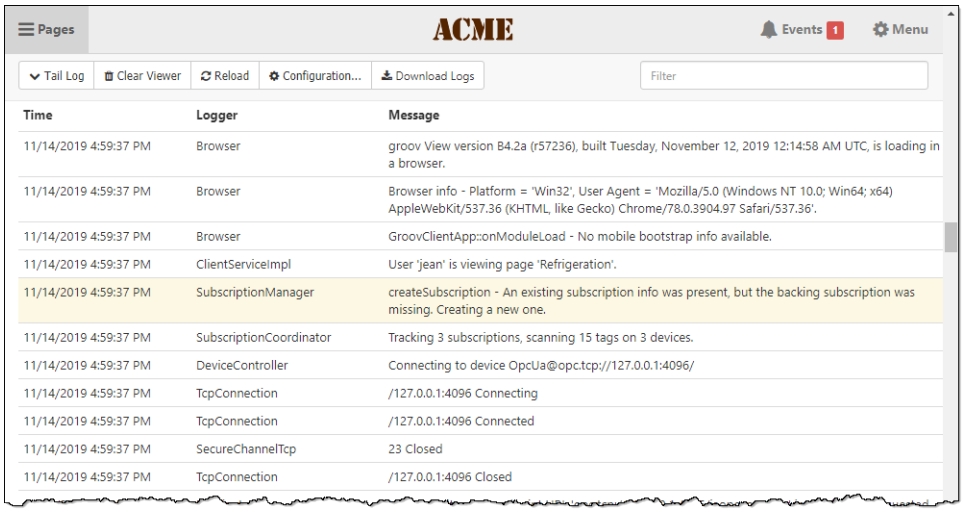
Only Admin or Editor level users can see the Log Viewer.

To open the Log Viewer:

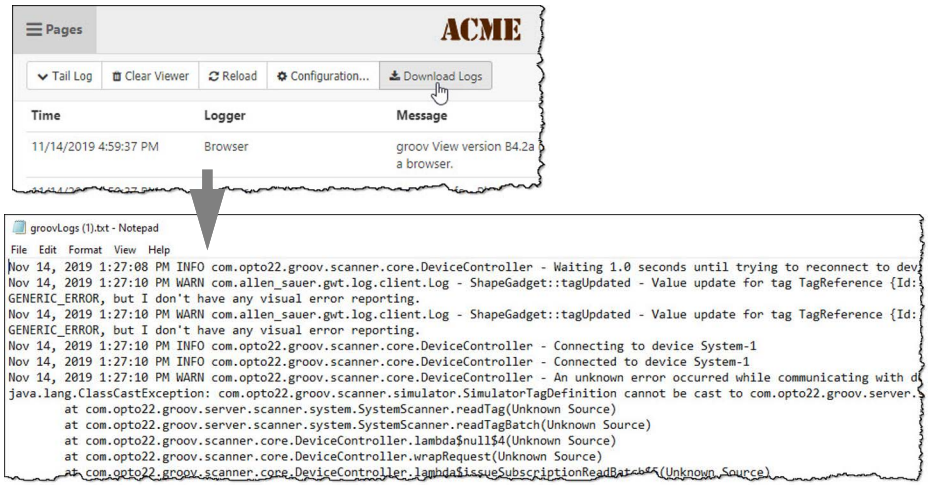
- From Build mode, choose **Help** > **View logs**. (Note that the Log Viewer opens in View mode in a new tab; to return to Build mode, close the tab.)
- From View mode, choose **Menu** > **View logs**.

The Log Viewer opens in a new browser tab, showing the 500 most recent messages. New messages are added to the Viewer as they occur and continue to be added until you close the Viewer. If you reopen it later, it again shows the 500 most recent messages; older messages do not appear.

To view older messages, scroll to the top of the log and click **Fetch older entries**. Each time you click it, the viewer shows an additional 100 of the older messages.



To save all messages to a text file, click **Download Logs**. You can open the text file in Notepad or save the text file. Downloading the logs saves all of the messages—not just the ones currently in the Viewer. The downloaded file may also include additional information for some errors, which is not shown in the Log Viewer.



To clear the messages currently in the Log Viewer window, click **Clear Viewer**. This action does not clear all logged messages; you can see them again by clicking **Reload** or clicking **Download Logs** to retrieve them.

To filter messages in the window, such as for a key word within the message, type the word or phrase in the **Filter** field. The list immediately changes to show only those messages. To see older messages from the filtered list, click **Fetch older entries**.

To diagnose problems when working with Opto 22 Product Support, the support engineer may ask you to click the **Configuration** button to display a file that provides special features. Follow instructions from the engineer to modify the file.

Modifications to this file change the priority level of the data shown. When changes to the file are saved, logs having a priority below the selected level are not shown. For example, selecting **WARN** excludes all **INFO**, **DEBUG**, and **TRACE** level logs from the display. Here are the possible levels:

- **TRACE:** Extremely fine-grained information. This level is primarily for diagnosing problems with the help of Opto 22 Product Support.

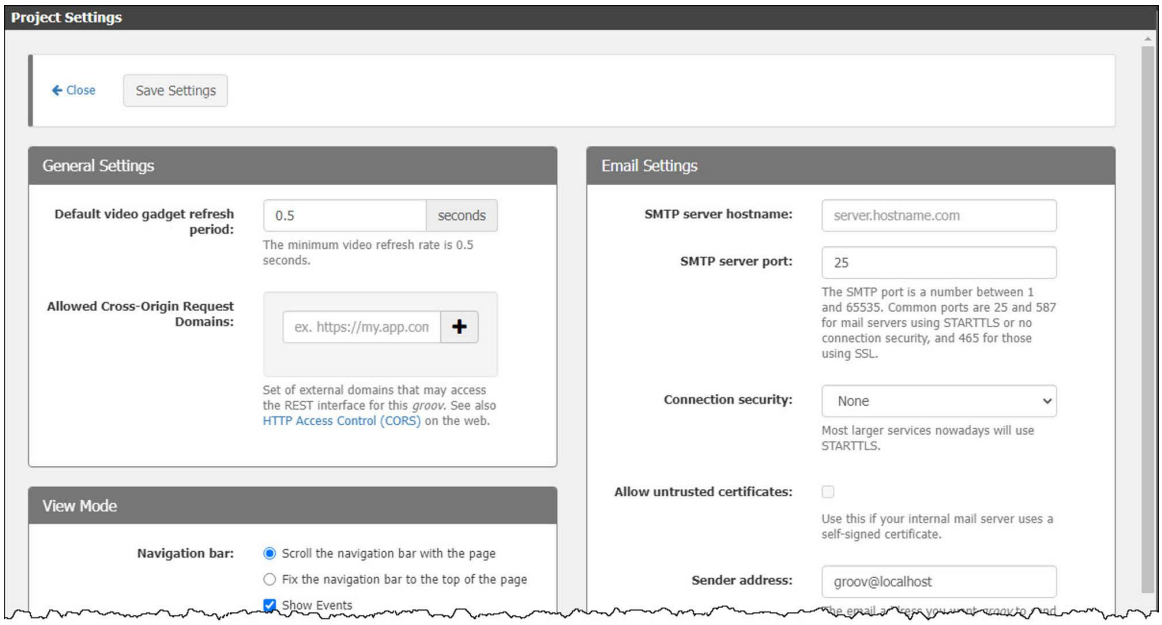
- **DEBUG:** Fairly fine-grained information. Primarily for diagnosing problems with the help of Opto 22 Product Support.
- **INFO:** Messages about the general progress of the app.
- **WARN:** Information about unusual situations that may indicate a problem in *groov* View or that *groov* View is improperly configured.
- **ERROR:** Errors within *groov* View that typically don't affect how the program runs.
- **FATAL:** Problems that cause *groov* View to crash.

CHANGING THE GENERAL PROJECT SETTINGS

This section describes the **General Settings** for your project. To set up a *groov* View email account and configure the **Email Settings**, see "Setting Up Notifications" on page 141.

To configure the general project settings:

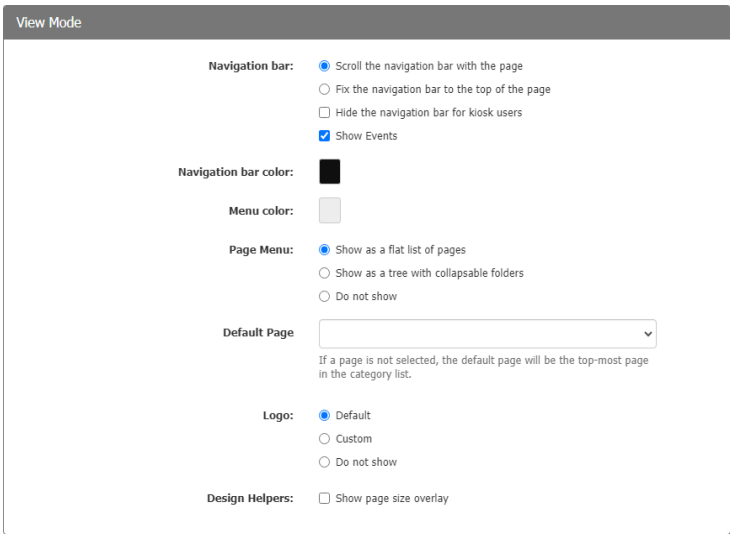
1. In Build mode, choose **Configure** > **Project**.
   The Project Settings window appears.



2. Under **General Settings**, configure the following options:
   - **Default video gadget refresh period**—Sets how often in seconds *groov* View refreshes the image from an IP camera. Use this option to set the default refresh period for video gadgets. The minimum video refresh rate is 0.5 seconds. Every instance of the video gadget uses this refresh period unless a different refresh period is set for an individual instance. To set an individual instance, see "Video Gadget" on page 112. For more information about how to use this setting, see "Changing the Video Gadget Refresh Period" on page 175.
   - **Do not expire Kiosk user login sessions** [Option not shown in the above image. Only for *groov* Server and *groov* Box; for *groov* EPIC, use *groov* Manage.]—Use this setting if you want Kiosk users to never be logged out. This is helpful for TVs or other displays not associated with a particular user that need to remain on for long periods of time. Normally, a login lasts two weeks. If you have Kiosk users, also see "Automatic Refresh" on page 153.
   - **Allowed Cross-Origin Request Domains**—If you have developed a JavaScript application that uses the REST API for *groov* View and runs on a different domain, you may need to enter that

domain here to allow it to access *groov* View data. For more information, see the *groov* REST API/cors section on the Opto 22 Developer website.

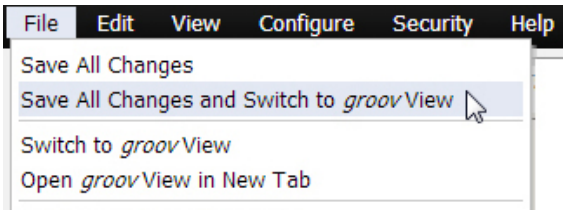
3. To change the behavior and look of your *groov* View project (navigation bar, page menu, colors, logo, and so on), scroll down to the **View Mode** box.



4. Configure the following options:
   - **Navigation bar**
     Scroll or *Fix*—Choose whether the navigation bar at the top of the page scrolls off the top of the page when your user scrolls down, or stays fixed at the top of the page.
     Show Events—To keep users from seeing Events, uncheck this box to hide the Events icon at the top right of the page.
   - **Navigation bar color** and **Menu color**
     Click the box to change the default colors to match your brand or taste. Choose colors from the samples shown.
   - **Page Menu**
     Choose how the Page menu appears in your HMI. If you choose **Do not show**, users can see only the first viewable page. All other pages are not available to view (unless the first page includes a link to another page).
   - **Logo**
     Choose whether to show the default *groov* View logo, add your own custom logo, or show no logo. To add your own logo, click **Custom** and then click **Choose Image**. In the Image Library, locate or upload the image you want to use. A logo larger than 135 x 35 pixels is resized smaller.
   - **Design Helpers**
     See "Fitting Designs on a Page (Page Size Overlay)" on page 25 for an explanation and steps to use this option.
5. Scroll to the top and click **Save Settings**.
6. Click **Close**.

SAVING YOUR PROJECT AND OPENING *groov* VIEW

To save your project, click the **File** menu and select one of the following.



Save All Changes—Saves your latest changes, but it does not update any open iterations of View.

Save All Changes and Switch to *groov* View—Saves your latest changes and opens an updated *groov* View. All new and updated pages for *groov* View are automatically updated and refreshed for all users.

Switch to *groov* View—Opens *groov* View without incorporating any changes you have made since your last save.

Open *groov* View in New Tab—Use this option if you want to have both Build and View modes open at the same time in separate tabs.

To back up your *groov* View project, see the next section.

BACKING UP AND RESTORING YOUR PROJECT

You should back up *groov* View frequently because there is no automatic backup. During backup, your project is saved to a file on your computer. *groov* View project backups are interchangeable among *groov* EPIC, *groov* Server, and the *groov* Box. For example, you can restore to *groov* EPIC a project you backed up from a *groov* Box or vice versa.

If you have two *groov* View installations of different versions and you want to move a project to the older version, you may only be able to do this between lettered versions. For example, moving a project from a *groov* Box at R3.4b to a *groov* Server at R3.4a should be OK, but moving from R3.4 to R3.3 is not likely to work. For the best experience, keep your *groov* View software at the same release if you can.

If you are using a *groov* Box, you can also back up using *groov* Admin. For more information, the *groov Box User's Guide for GROOV-AR1* (form 2104).

IMPORTANT: *Your groov View project files are not encrypted or masked in any way. This means that most of the project information in them (except for the groov View user passwords) can be read, including:*

- *SMTP account info (includes password)*
- *User email accounts (does not include the groov View user passwords, which are securely encrypted before being stored)*
- *Device addresses*
- *Tag address information (PAC tag names, Modbus addresses, OPC node-id, etc.)*

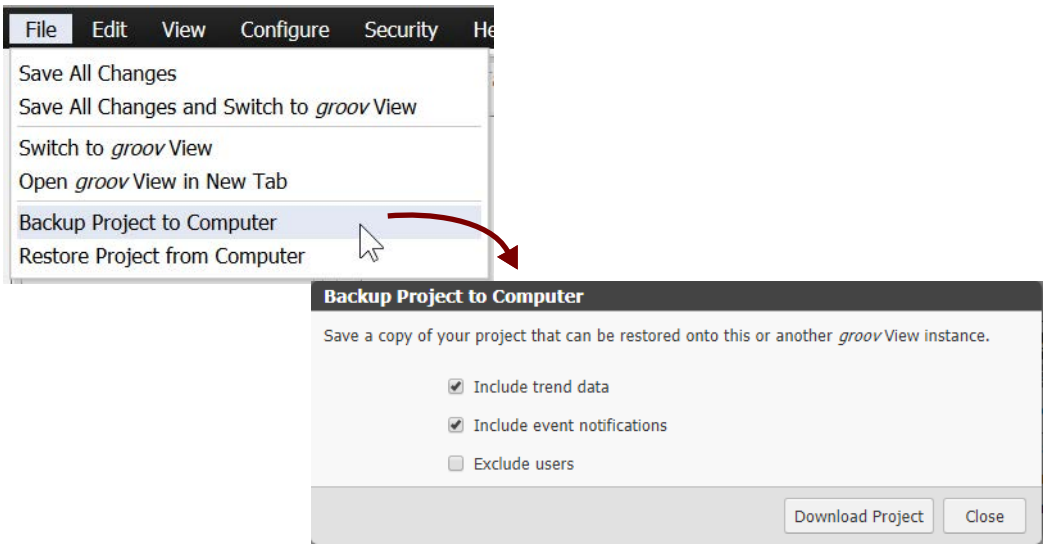
Opto 22 recommends that you secure your backup files using file- or disk-based encryption provided either by the operating system or other software/hardware.

Also, be aware that if you send project files to Opto 22, our personnel will have access to the information listed above.

Back Up Your Project

To back up your project:

1. Choose **File** > **Backup Project to Computer**.



2. Check the boxes to include trend data and event notifications in the backup or to exclude user data.

   For example, if you are sending the backup to Opto 22 Product Support for help with an issue, you might want to exclude user data.

3. Click **Download Project**.

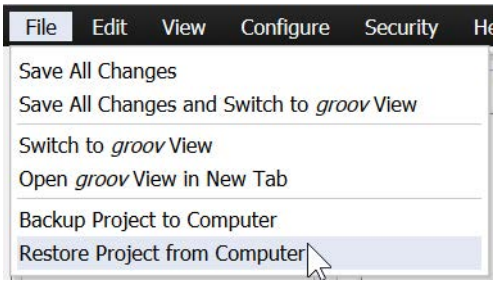
A backup file is downloaded to your computer.

Restore Your Project

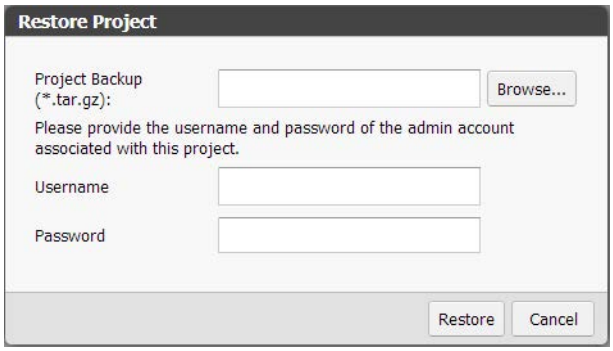
To restore your project from a backup file:

CAUTION: *Restore your project only if you have to. You will lose all work done since the last backup, and all users will be logged out.*

1. Select **File** > **Restore Project from Computer**.



2. In the Restore Project dialog box, browse to the location of your `tar.gz` backup file.



3. Enter the username and password for the Admin account.
4. Click **Restore**.
   The following warning appears.

5. To proceed, click **OK**.
   When the restoration process is complete, the restored project opens in *groov* View.

RESETTING YOUR *groov* PROJECT

If you need to start a new project, you can reset your project. Resetting deletes all your devices, pages, and trend data, so you can start over fresh. This feature is useful for system integrators or others who work on multiple projects for different customers or locations.

To reset your project:

1. Back up your existing *groov* View project (see page 100).
2. Choose **File** > **Reset Project**.
   You return to a blank project. You can start a new project or choose **File** > **Restore Project from Computer** to restore a project you backed up earlier.

UPDATING *groov*

You are eligible to receive *groov* View updates as long as your license is active. Updates add new capabilities and fix issues that may arise.

Each *groov* View installation (each EPIC or Box or Server) is treated independently; updates are valid for a specific *groov* View installation only.

To see your version of *groov* View:

- In Build mode, choose **Help** > **About**.
- In View, click the gear icon and choose **About**.

Check for Updates

To check for updates:

1. Log in to manage.groov.com.
2. Click **Manage**.
3. Find your *groov* product in the list and click the **Manage** button next to its name.
4. If you have not installed one of the latest updates, click the filename to download the file.

In a *groov* Box or *groov* Server, if updates are available, an icon appears next to the *groov* logo in the upper-right corner of Build mode. (This icon does not appear in a *groov* EPIC.)

Click the updates icon (or select **Help** > **Check for Updates**). The Check for Updates dialog box opens to show you what updates are available. Follow the on-screen instructions to download an update file or view a list of changes in the latest *groov* View Release Notes (readme).

To install an update file, follow the instructions below for your *groov* product.

Install Updates on *groov* EPIC

To install updates on a *groov* EPIC processor, use *groov* Manage on a computer. The update uses a single file to update *groov* View, PAC Project, CODESYS, Node-RED, Ignition Edge, *groov* Manage, and firmware for the EPIC processor. Installing the update requires careful planning. Follow instructions in the *groov EPIC User's Guide* (form 2267).

Install Updates on *groov* Server for Windows

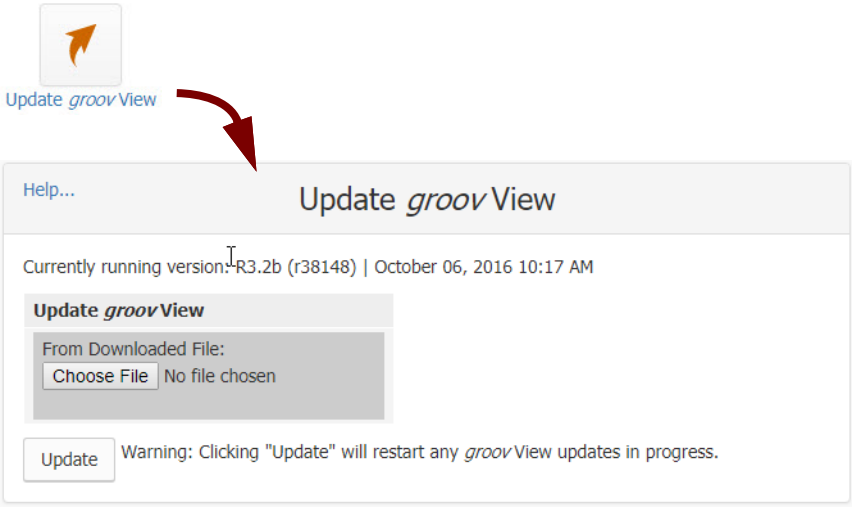
1. Back up your *groov* View project (page 100).
2. Double-click the downloaded update file and run the installation.

Install Updates on a *groov* Box

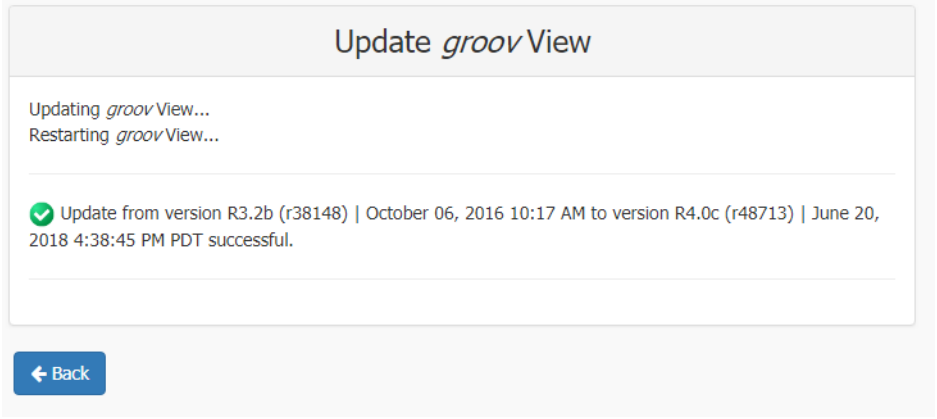
To install updates on a *groov* Box, use *groov* Admin. For more information about *groov* Admin, see the *groov Box User's Guide for GROOV-AR1* (form 2104). For the GROOV-AT1, see form 2077.

To update *groov* Admin or Ignition Edge, follow steps in the *groov Box User's Guide for GROOV-AR1* (form 2104). To update *groov* View, follow these steps:

1. Back up your *groov* project (page 100).
2. To open Admin from Build mode, select **Configure** > ***groov* Admin**.
3. Click **Quick Start**.
4. Click the **Update *groov* View** button.



5. Click **Choose File**.
6. Navigate to the update file you downloaded and click **Open**.
7. Click **Update**.
   Wait while the application is installed and restarted automatically, which may take several minutes. When the operation is complete, a success message appears.



UPDATING YOUR LICENSE/RENEWING *groov* MAINTENANCE

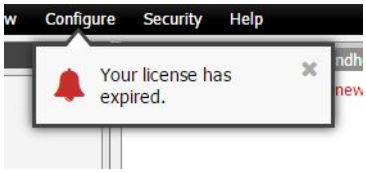
NOTE: This section applies to groov Server for Windows and groov Box only. It does not apply to groov EPIC.

To install *groov* View updates on *groov* Server for Windows or a *groov* Box, your license must be up to date. You may need to download and install a new license. For more information, see the *groov Maintenance Technical Note* (form 2130).

IMPORTANT: *You must be logged into groov Build mode as an Admin to update your license. (If you're using a groov Box, make sure you use the Admin username and password for groov View, not for the Box.)*

To check the enabled options and expiration date, select **Configure** > **Licensing** (this menu item appears only if you are logged into Build mode as an Admin user). The expiration date appears under **License type**.

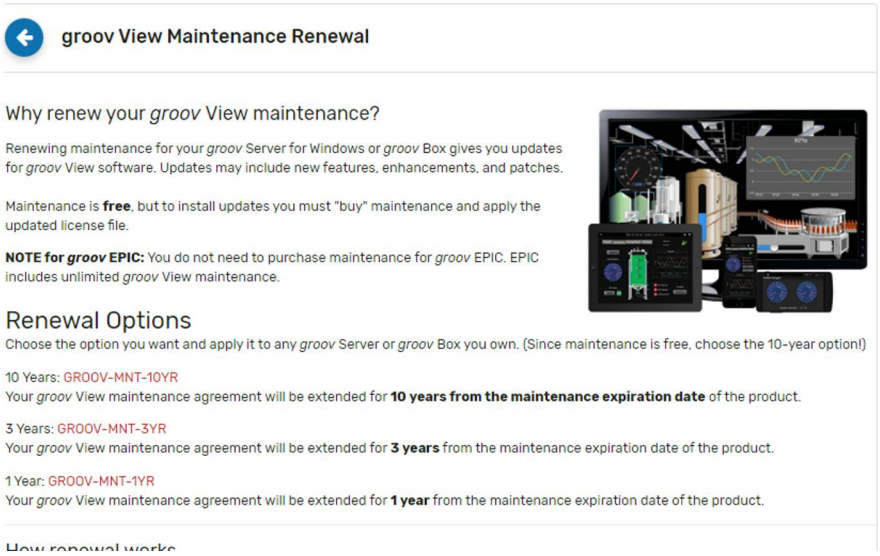
When your license is about to expire, we send a reminder to the email account you used when you first purchased this *groov* Server or Box. Also, a small notice appears when you first open Build mode to remind you to renew. Once the license has expired, you'll see a similar notice:



Click in the middle of the notice to go to the Licensing dialog box and renew your license. If you're not ready to renew, click the gray **x** to dismiss the notice.

Renew Your License

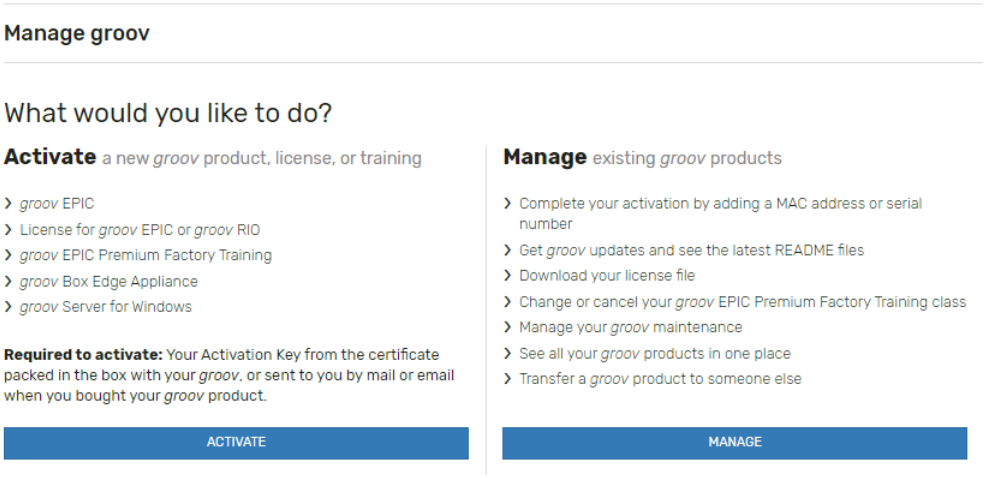
1. Log into manage.groov.com and click **Manage**.
2. Locate your *groov* product in the list.
3. Click its **Maintenance Expiration Date** (in red) to see renewal options.



4. Under Renewal Options, click the part number for the length of time you want to renew. (Because renewal is free, we recommend **GROOV-MNT-10Y**, which renews maintenance for ten years.)

   International customers: *Please contact your local Opto 22 Distributor to purchase a renewal.*

5. Add the product to your cart or call your distributor to order.
   When the order is complete, you receive an email or printed certificate with the *Activation Key* for the renewal. The Activation Key in your email or printed certificate is not specific to an individual *groov* product; you can apply it to any *groov* Server or *groov* Box you own.
6. When you have your Activation Key from the email or printed certificate, go to manage.groov.com.
7. Log in using the email address and password you used when you first activated your *groov* product.



8. Click the **Activate** button. Follow instructions on the screen to enter your Activation Key and apply the maintenance renewal to your *groov* Server or Box. **Choose carefully** to make sure it's the right one.
9. In your *groov* product's Profile page, click **Download License File** and save the file to your computer.
10. In *groov* Build mode, return to the License Management dialog box (**Configure** > **Licensing**) and click the **Select License File** button.
11. Browse to the new license file, highlight it, and click **Open**.
    An Upload Successful message appears in the License Management dialog box.
12. Click **Close**.
    Your renewal is complete.

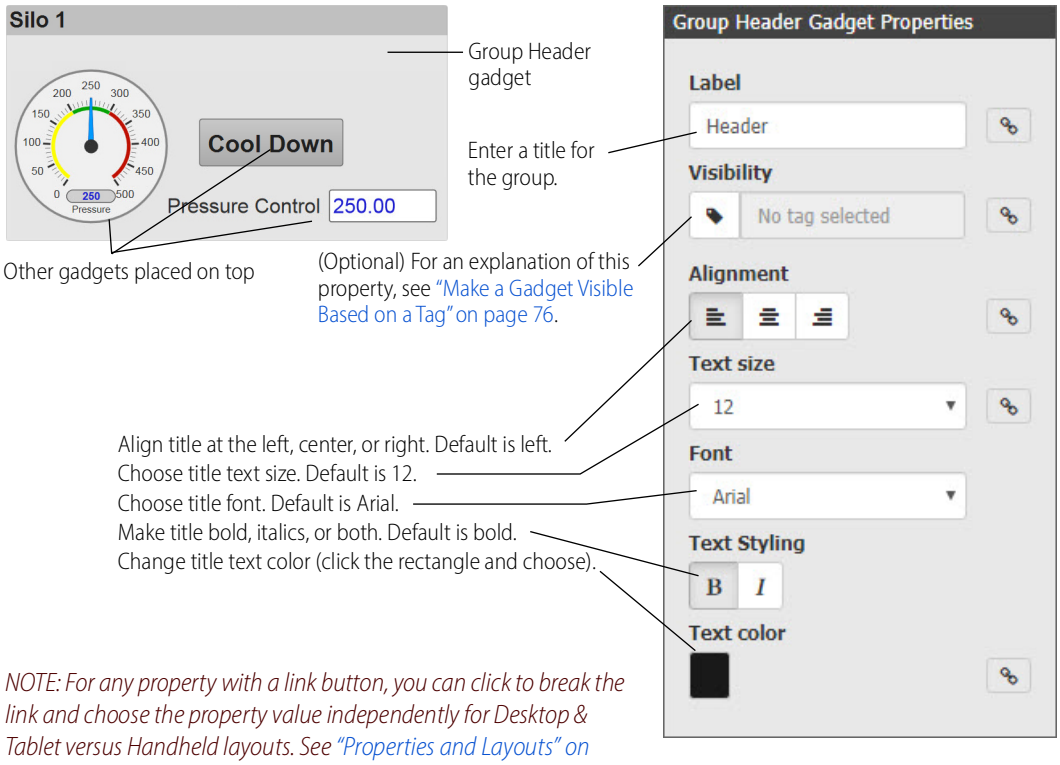
4: Gadget Reference

Build mode provides a collection of gadgets that allows you to create a graphical, on-screen operator interface. This chapter provides details on how to configure gadget properties.

GROUP HEADER GADGET

Use the **Group Header** gadget to visually define a group of objects. Group related gadgets in the same area and place a Group Header as a box behind them. The box ties them together visually so operators know at a glance that they are related.

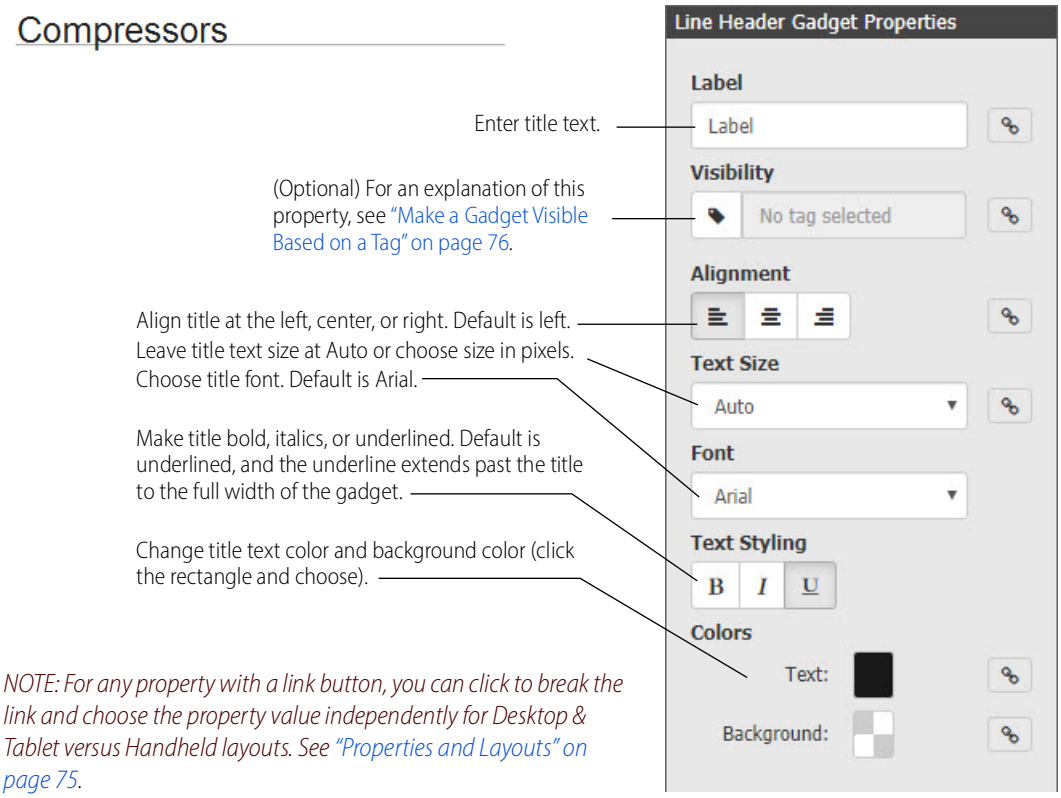
TIP: If you need to move a Group Header (or any other gadget) behind another gadget, right click it and choose **Send to Back**.



NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

LINE HEADER GADGET

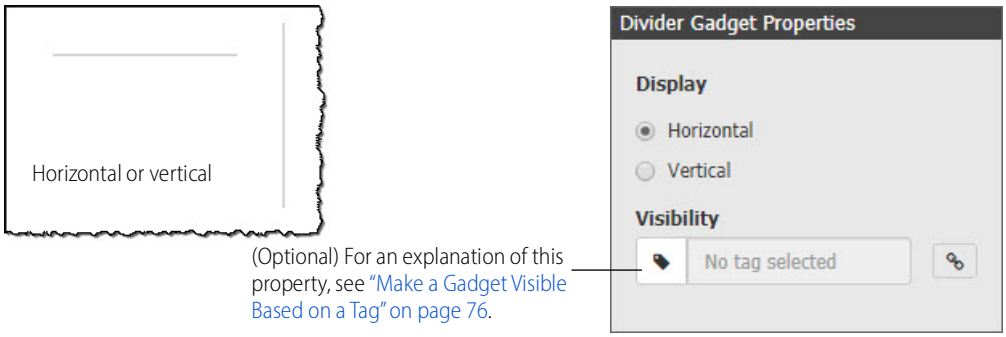
Use the **Line Header** gadget to provide a label or title for organizing gadgets on a page.



NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

DIVIDER GADGET

The **Divider** gadget provides a simple gray horizontal or vertical line to separate groups of objects. You can make the divider longer or shorter by selecting the object and dragging its handles.

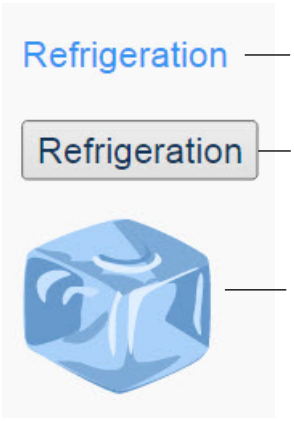


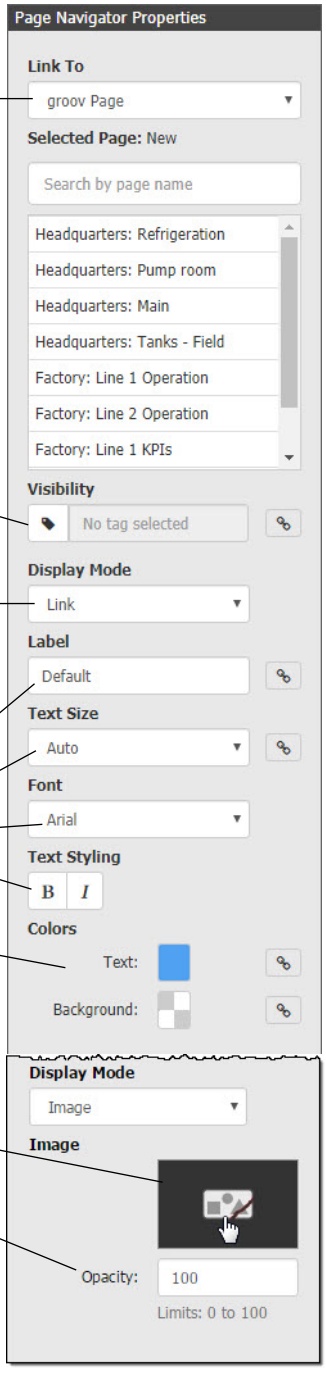
PAGE NAVIGATOR GADGET

Use the **Page Navigator** gadget to link to another page in the project, to *groov* View Event Status or Event Logs, or to a webpage. The gadget can be displayed as a text link, a button, or an image.

- To link to a page in your *groov* View project, select the page from the list or search on the page name (or partial name).
- To link to Event Status or Event Logs, choose it from the **Link To** drop-down list.
- To link to a webpage, choose **Web Page** in the **Link To** drop-down list, and enter a full URL (for example, https://opto22.com).

Page navigator gadget Display Modes





Choose where the link goes.

(Optional) For an explanation of this property, see "Make a Gadget Visible Based on a Tag" on page 76.

Choose whether to show the link as text, a button, or an image.

For a link or a button:
Enter the text for the link.
Leave link text at Auto or enter size in pixels.
Choose title font. Default is Arial.
Make title bold, italics, or both. Default is neither.
Change title text or background color (click the rectangle and choose).

For an image:
Click the broken image button and choose an image from the Image Library (see page 88).

To change how transparent an image is, enter a value between 0 and 100. Zero is completely transparent (invisible); 100 is completely opaque.

NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

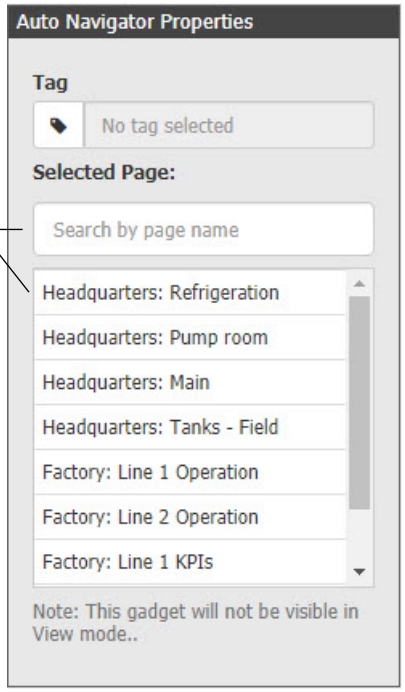
AUTO NAVIGATOR GADGET

Use the **Auto Navigator** gadget to automatically move *all* viewers of the page this gadget is on to another page in the project. Note that this gadget is *invisible* in *groov* View. When the Boolean tag it is connected to becomes true, the page automatically changes.

Remember that if you need a more complex condition, you can create an Event for the condition and use the Event tag as the trigger. For more on creating and using Events, see Chapter 5: Using Events and Notifications.

From the list, select the page that should appear when the tag becomes true. You can search on the page name (or partial name) if you have a long list.

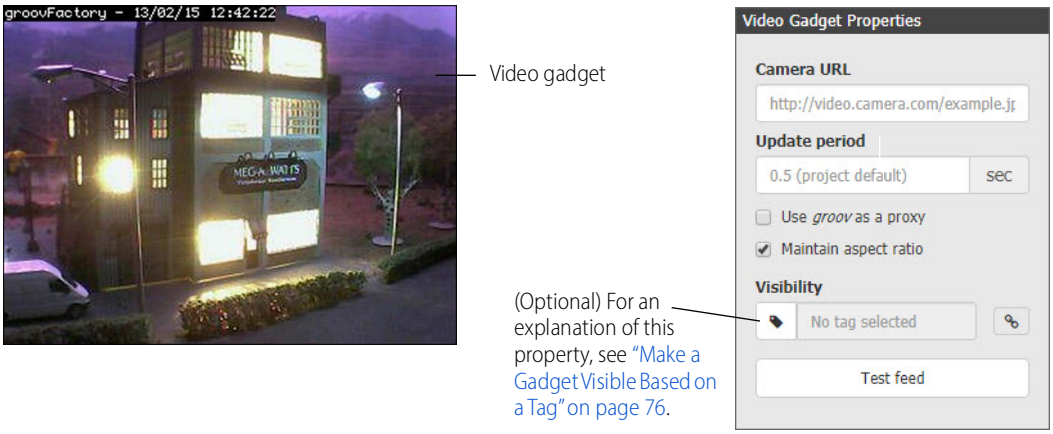
Remember: this gadget is invisible to your *groov* View users.



VIDEO GADGET

The **Video** gadget displays iFrame-type video images from an IP camera; it does not interact with controller points/variables.

For information about entering a URL and setting up IP cameras, see the appendix on page 173 and your IP camera or server documentation.

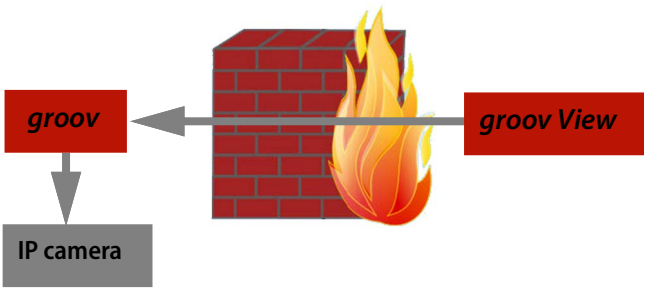


Camera URL—Enter the URL of an IP camera or video server that provides access to your IP camera's static image feed. If you are using a video server, use the server's URL. For more information about entering a URL, see the appendix on page 173.

Update Period—Set how often in seconds *groov* View updates the image from an IP camera for this individual video gadget. To set the default update period for all video gadgets, see "Changing the General Project Settings" on page 98. For more information about this setting, see "Changing the Video Gadget Refresh Period" on page 175.

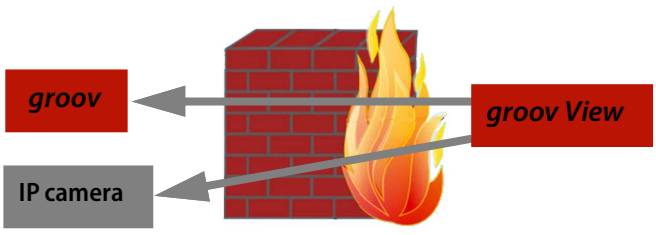
Use *groov* View as a proxy—Provides a secure reverse proxy service for the video gadget. This service is useful when viewing from outside a firewall.

When the box is checked, the video gadget requests video from *groov* View, which authenticates and forwards the request to the IP camera, eliminating the need to configure the firewall for each IP camera.



In this case, *groov* View polls the IP camera over the local network at the set update period (in seconds) and buffers the images. When you look at your *groov* View project, you will see the images over the same secure connection as the rest of your *groov* View project.

When the box is *not* checked, the video gadget requests video directly from the IP camera. You must configure the firewall to allow the video feed for each IP camera.

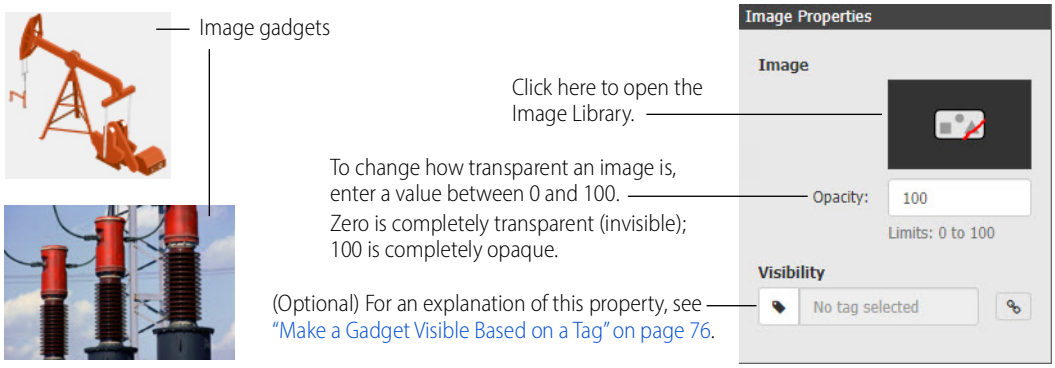


Maintain aspect ratio—Check the box to keep the video at the same height-to-width ratio when the video gadget is resized.

Test Feed—Click the button to test the live IP camera feed in Build.

IMAGE GADGET

Use the **Image** gadget to place an image in your project. See more about using images in "Managing Images in the Image Library" on page 88.

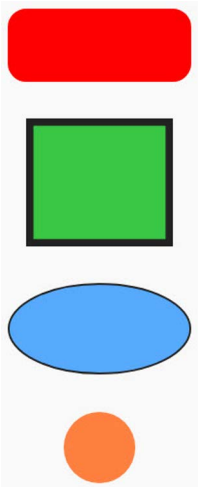


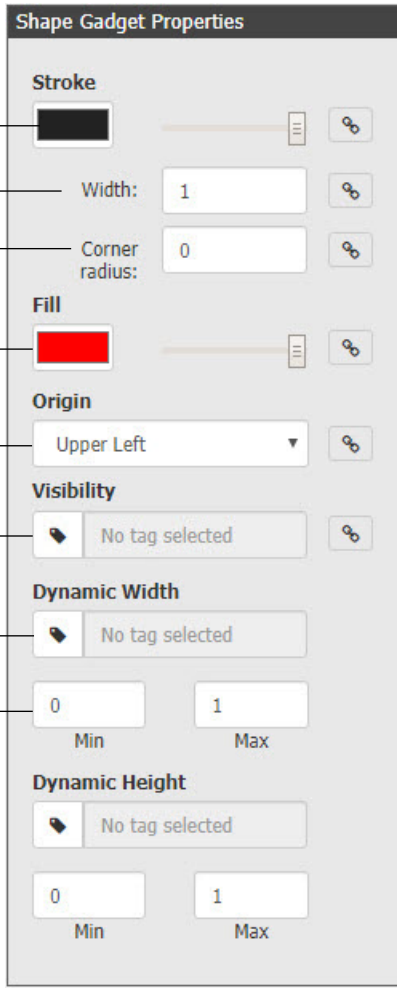
RECTANGLE AND OVAL GADGETS (SHAPE GADGET)

Use the **Rectangle** gadget to place a square or rectangle shape in your project, and use the **Oval** gadget to place a circle or oval. Both are essentially the same **Shape** gadget with most of the same properties.

You can choose any color for the shape's edge (**Stroke**) and body (**Fill**), and choose how transparent they are. You can also round a rectangle's corners.

You can use this shape for any purpose: alone or in combination with other shapes or other gadgets. In addition, you can set the width and/or height of the shape to change dynamically based on a tag. For example, you could use a shape to indicate the level in a tank.





Choose the color for the edge of the shape. To change its transparency, move the slider. Far left is completely transparent (invisible); far right is completely opaque.

Enter the width of the **Stroke** (edge).

To round a rectangle's corners, increase the **Corner radius** value. Zero = square corners.

Choose the color for the inside of the shape. To change its transparency, move the slider.

Choose where the shape is drawn from. If you enter dynamic width or height, this is the starting point of the shape's expansion.

(Optional) For an explanation of this property, see "Make a Gadget Visible Based on a Tag" on page 76.

To make the shape change in width, height, or both based on a tag's value, choose the tag. Next, enter the minimum and maximum width or height for the shape (typically the **Min** and **Max** values of the tag).

A rectangle or square expands from the **Origin** point.

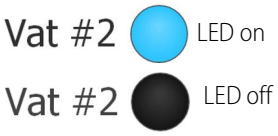
A circle or oval expands from its center, but the center is placed at the **Origin** point and the rest of the circle is cut off. For example, a circle with an **Origin** of **Upper Left** creates a quarter circle. A circle with an **Origin** of **Center** creates a complete circle.

You can use these shapes next to each other or on top of each other to create more complex shapes and indicators.

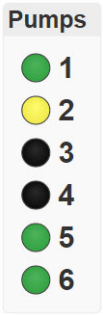
LED GADGET

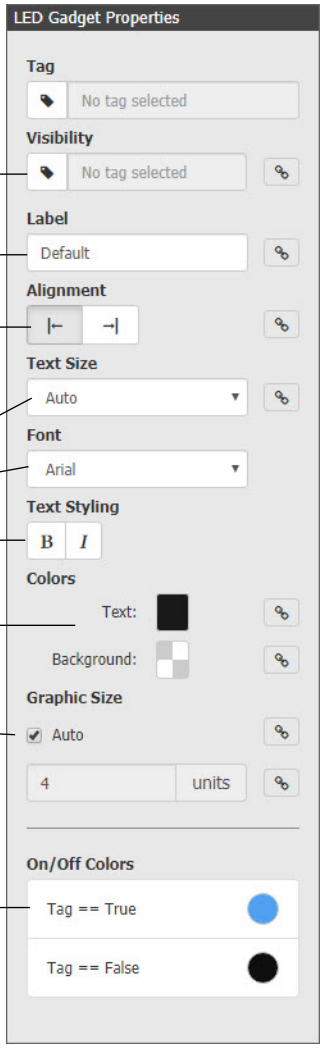
An **LED** is a read-only gadget that typically indicates the state of a numeric value. It can be used with Boolean tags (on/off, true/false), with numeric values with multiple colors to indicate an exact value or a range, or with string values with multiple colors to indicate an exact match. For Boolean tags, the LED is off when the value is 0 and on when the value is non-zero.

On and Off states for a blue LED



LEDs with multiple colors





(Optional) For an explanation of this property, see "Make a Gadget Visible Based on a Tag" on page 76.

Enter a label for the LED.

Align label on the left or right side of the LED. Default is left.

Leave label text at Auto or enter size in pixels.

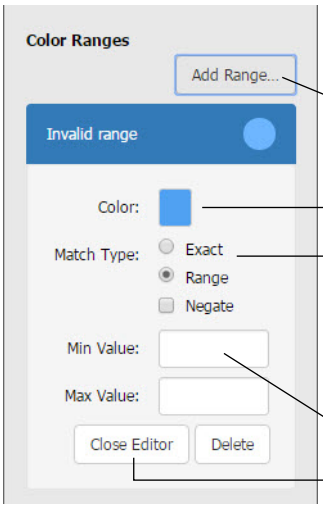
Choose label font. Default is Arial.

Make label text bold, italics, or both. Default is neither.

Change label text or background color (click the rectangle and choose).

Leave graphic size at Auto or choose size in page grid units.

For a Boolean tag:
Click the colored circle and choose colors to indicate LED is on (True) or off (False).



For a non-Boolean tag:
Click the **Add Range** button to set colors for each range.

Choose the range color.

Choose when the color should appear:
Exact: Color appears for the specified value.
Range: Color appears for any value within a range.
Negate: If checked, color appears if value is *outside* the specified value or range.

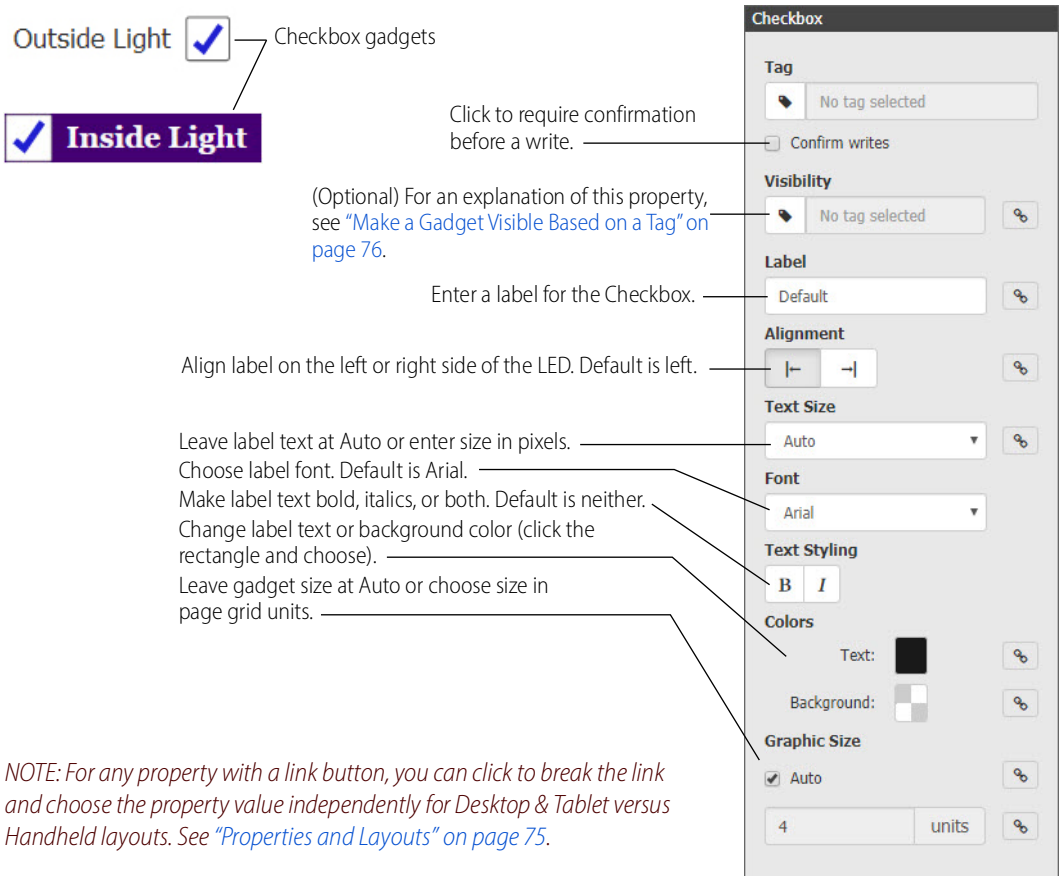
Enter a specific value for **Exact**, or the start and end values for **Range**.

Click to close editor for this range.
To add another, click **Add Range**.

NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

CHECKBOX GADGET

The **Checkbox** gadget is a read/write binary input that your user can toggle on or off by selecting the box. Off = zero, On = non-zero.

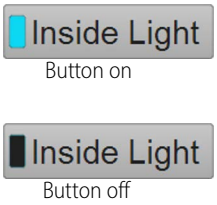


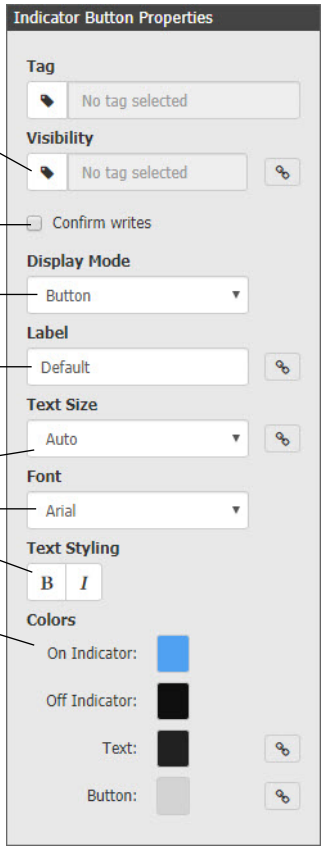
NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

INDICATOR BUTTON GADGET

The **Indicator Button** gadget is a read/write binary button that your user can toggle on or off by clicking it. Off = zero, On = non-zero. This gadget can be displayed as a button (with an integral color to show status) or as two images (one for On and one for Off). See more about using images in "Managing Images in the Image Library" on page 88.

Button display—configurable color





(Optional) For an explanation of this property, see "Make a Gadget Visible Based on a Tag" on page 76.

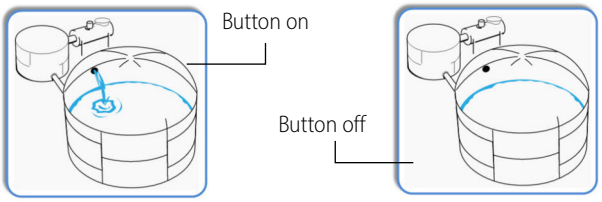
Click to require confirmation before a write.

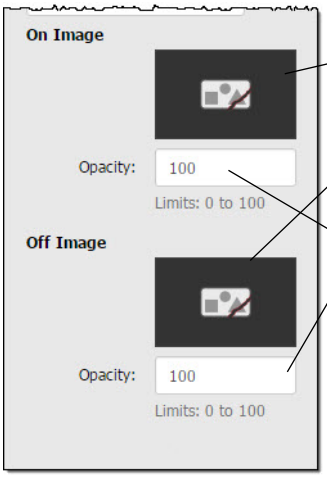
Choose whether to display a button or images.

For a button, enter a label for the Checkbox.

For a button:
Leave label text at Auto or enter size in pixels.
Choose label font. Default is Arial.
Make label text bold, italics, or both. Default is neither.
Change colors for On/Off indicator, button text, and button background (click the rectangle and choose).

Image display





For an image:
Click here to open the Image Library and choose an image to show when the button is On.
Choose a second image for when the button is Off.

Opacity: To change how transparent an image is, enter a value between 0 and 100. Zero is completely transparent (invisible); 100 is completely opaque.

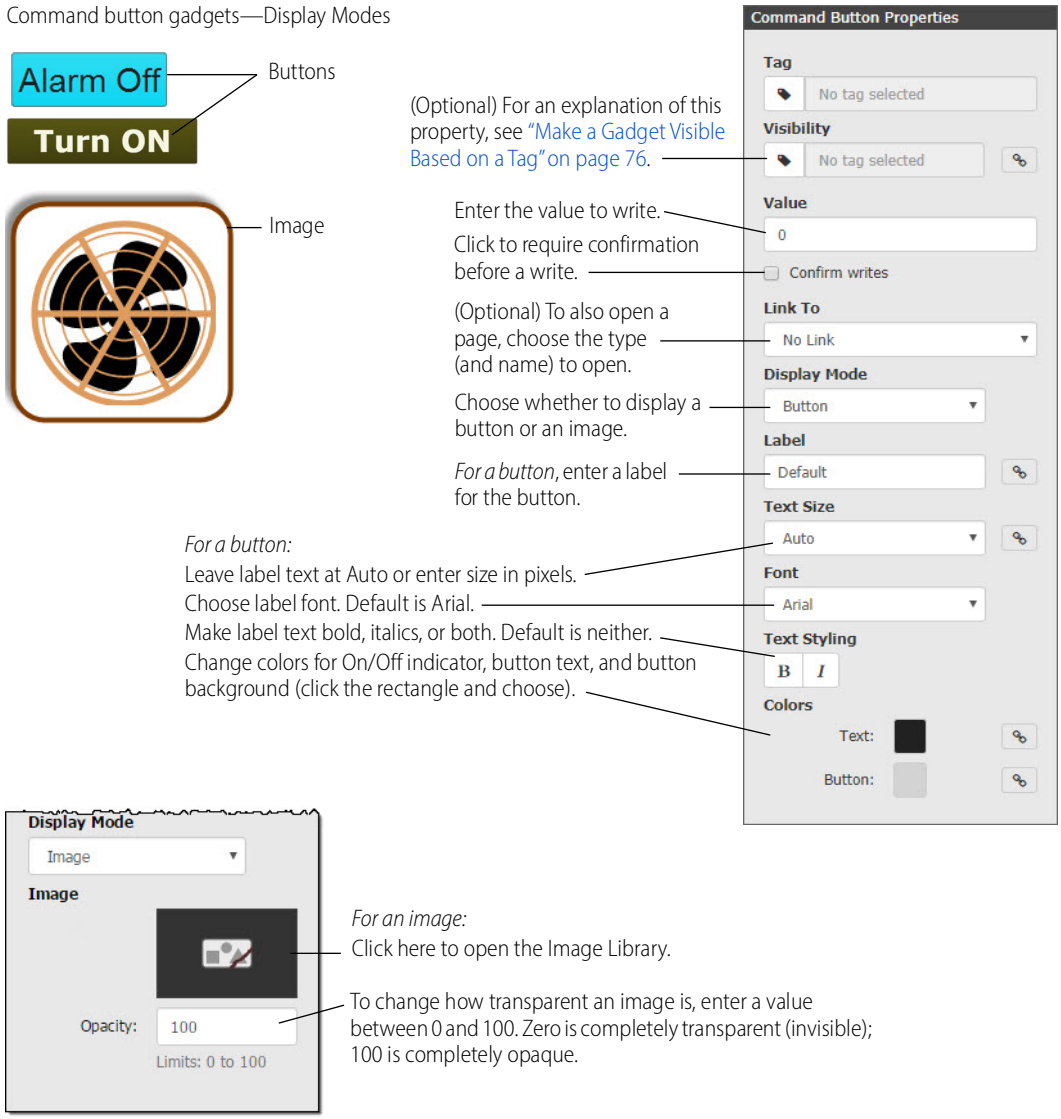
NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

COMMAND BUTTON GADGET

The **Command Button** gadget sends a value to a numeric or string variable. The value is sent once when the button is pressed.

Optionally, in addition to writing a value, the button can also immediately navigate to a *groov* View page (a page you've created, the Event Status page, or the Event Logs page) after successfully writing the value. The target page opens in the same window.

This gadget can be displayed as a button or as an image. See more about using images in "Managing Images in the Image Library" on page 88.



NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

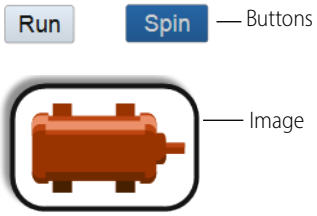
MOMENTARY BUTTON GADGET

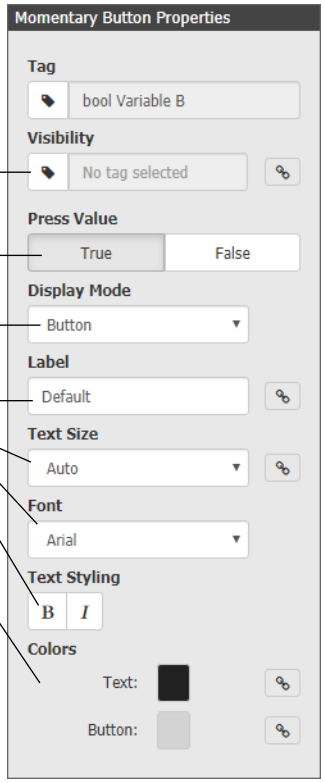
The **Momentary Button** gadget simulates a normally open button. It writes a value once when it is pressed, and another value when released. This gadget might be used to drive a motor to raise and lower a crane, or to start and stop a drill. You can choose to display the button as a button or as an image. See more about using images in "Managing Images in the Image Library" on page 88.

For a Boolean tag, select either **True** or **False** for the **Press Value**.

For integers and floats, enter both a Press Value and a Release Value. Optionally, you can also enter a **Toggle Value**. When a Toggle Value is entered, the Press Value and Toggle Value are written alternately once per second while the button is pressed. The Press Value is always written first. When the button is released, the Release Value is written.

Momentary button gadget—Display Modes



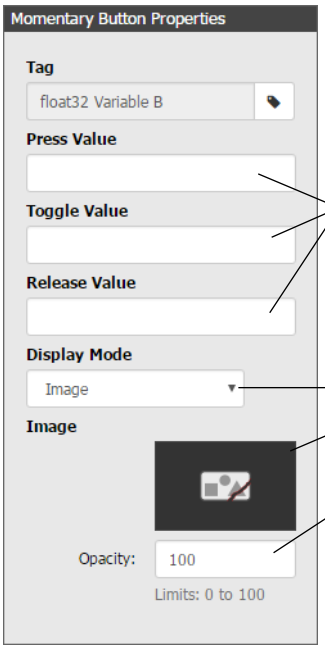


(Optional) For an explanation of this property, see "Make a Gadget Visible Based on a Tag" on page 76.

For a Boolean tag, select either **True** or **False**.

Choose whether to display a button or an image.

For a button:
Enter a label for the button.
Leave label text at Auto or enter size in pixels.
Choose label font. Default is Arial.
Make label text bold, italics, or both. Default is neither.
Change colors for button text and background (click the rectangle and choose).



For an integer or float, select a **Press Value** and a **Release Value**, and optionally a **Toggle Value**.
A Toggle Value can help you detect a communication failure. Use controller logic to detect the failure while the button is pressed and to implement a failsafe if needed.

Choose whether to display a button or an image.

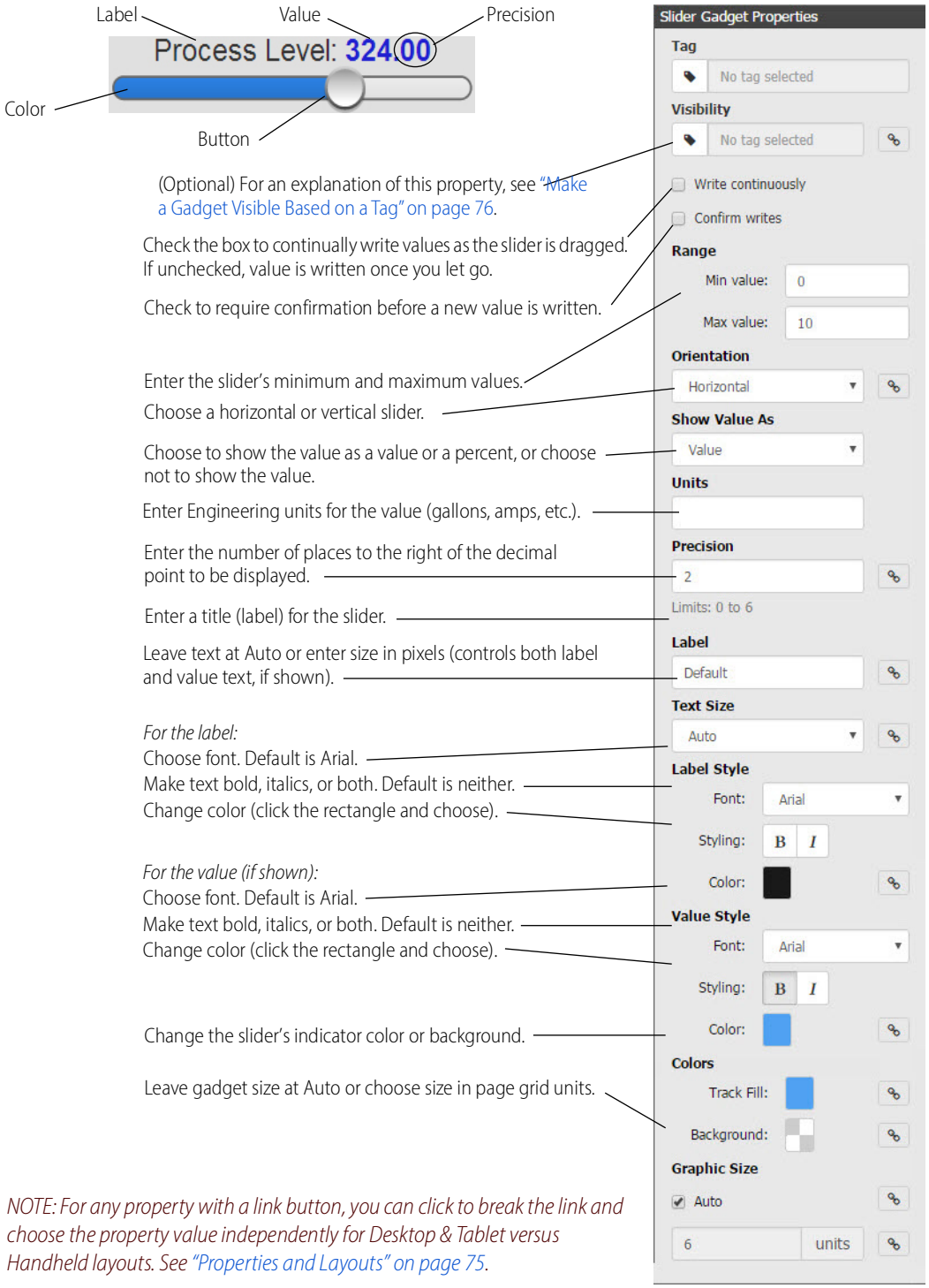
For an image, click here to open the Image Library.

To change how transparent an image is, enter a value between 0 and 100. Zero is completely transparent (invisible); 100 is completely opaque.

NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

SLIDER GADGET

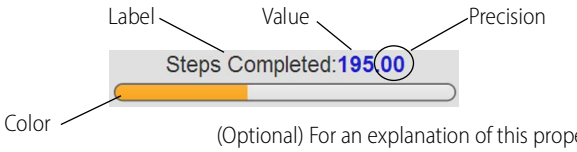
The **Slider** gadget is a read/write gauge that displays an analog or float-type value using a horizontal or vertical bar that fills to indicate the present position or value. This gadget is the same as the Level Indicator gadget (page 121) except that a user can grab and move the slider button to change the value and write it to the controller. You might use this gadget for room temperature setpoints, alarm values, PID settings, etc.

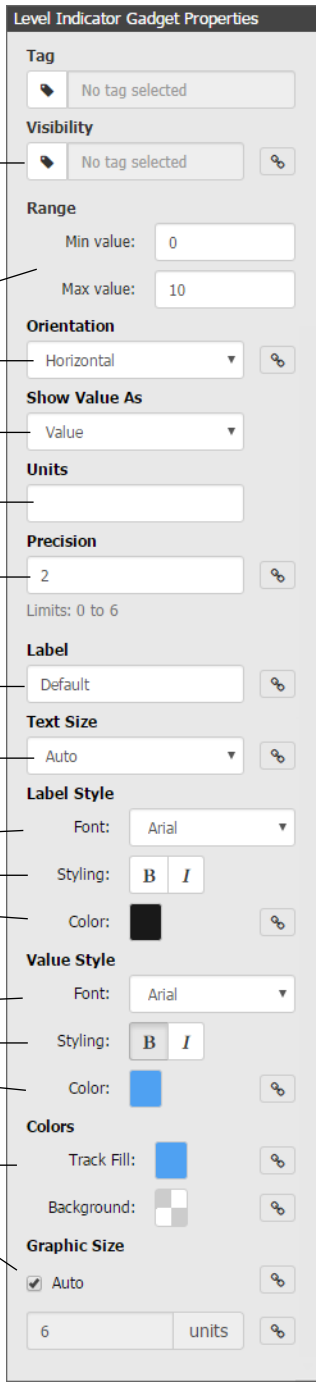


NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

LEVEL INDICATOR GADGET

The **Level Indicator** gadget is a read-only gauge that displays an analog or float-type value using a horizontal or vertical bar that fills to indicate the present position or value. You might use this gadget for a fuel gauge or a noise-level indicator, for example.





(Optional) For an explanation of this property, see "Make a Gadget Visible Based on a Tag" on page 76.

Enter the slider's minimum and maximum values.

Choose a horizontal or vertical slider.

Choose to show the value as a value or a percent, or choose not to show the value.

Enter Engineering units for the value (gallons, amps, etc.).

Enter the number of places to the right of the decimal point to be displayed.

Enter a title (label) for the slider.

Leave text at Auto or enter size in pixels (controls both label and value text, if shown).

For the label:
Choose font. Default is Arial.
Make text bold, italics, or both. Default is neither.
Change color (click the rectangle and choose).

For the value (if shown):
Choose font. Default is Arial.
Make text bold, italics, or both. Default is neither.
Change color (click the rectangle and choose).

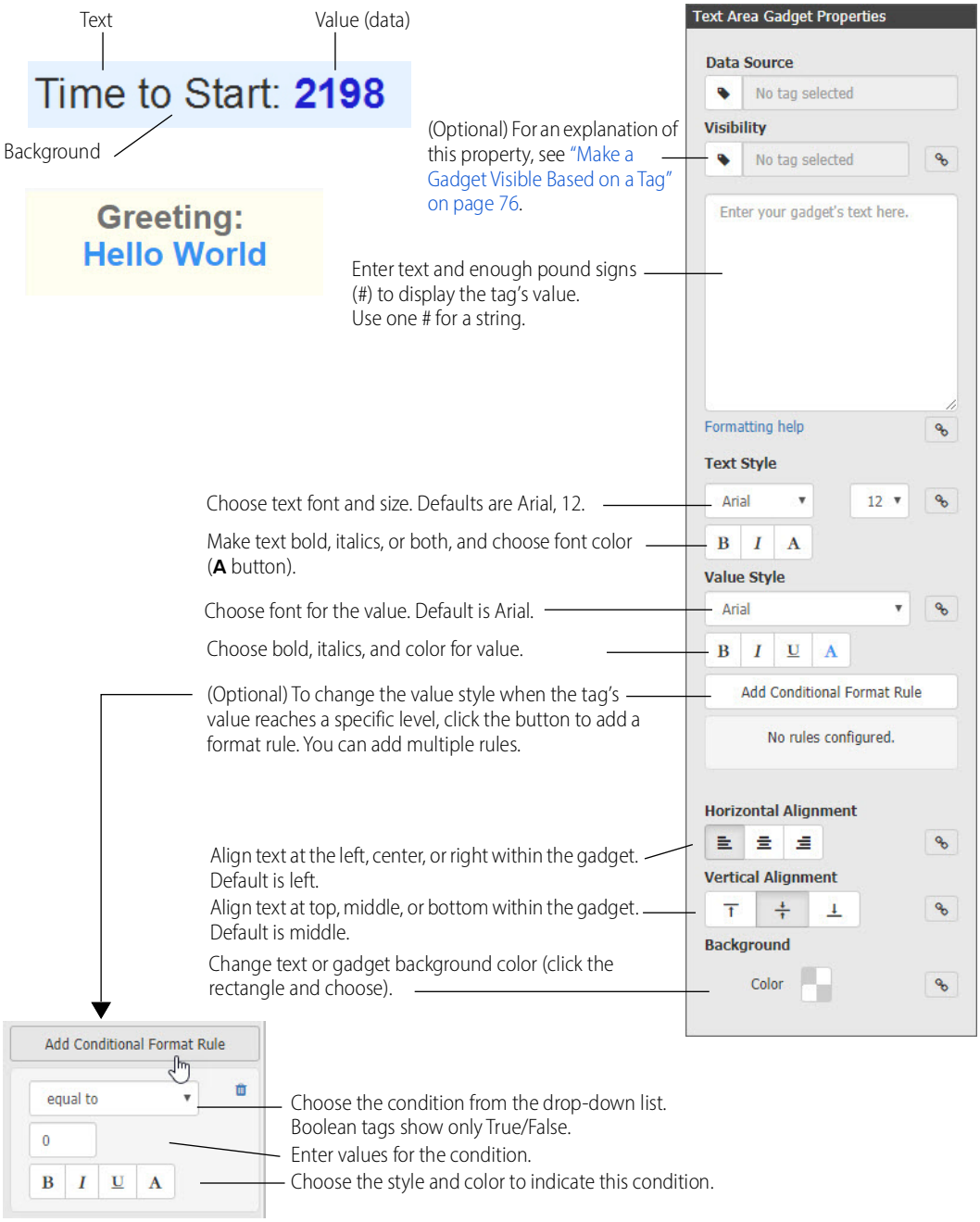
Change the slider's indicator color or background.

Leave gadget size at Auto or choose size in page grid units.

NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

TEXT AREA GADGET

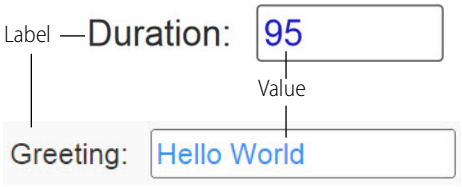
The **Text Area** gadget is a read-only gadget for displaying numerical or string data. Enter text just as you want it to appear, and use enough pound signs (#) to accommodate numeric data to be displayed. For example, ##.# could display 35.0, and ###.## could display 350.86. For string data, just use one #.

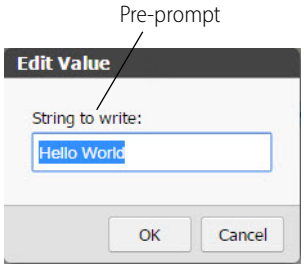


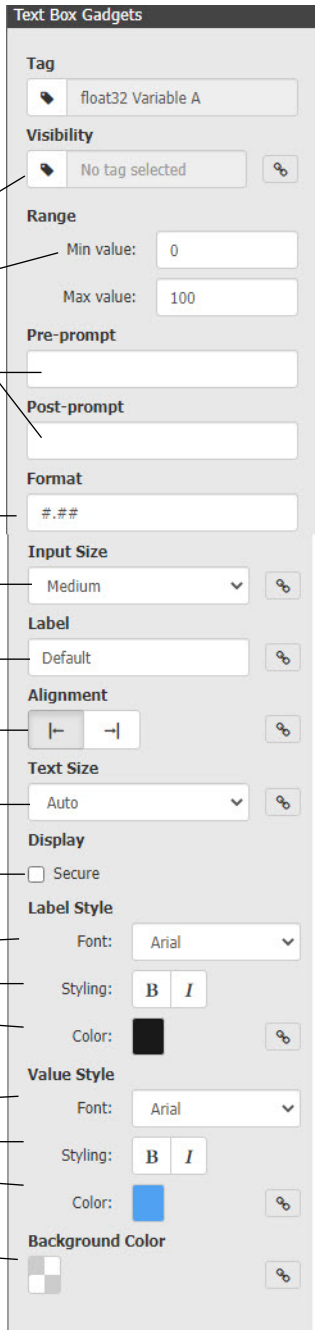
NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

TEXT BOX GADGET

The **Text Box** gadget is a write-only field that your user can change to send numerical or string data. When the user clicks in the Text Box, a dialog box appears for entering data. For example, when entering a password for security, data the user enters can appear on screen as asterisks only. Data is sent when the **OK** button is clicked or tapped.







(Optional) For an explanation of this property, see "Make a Gadget Visible Based on a Tag" on page 76.

For numerical data, enter the minimum and maximum values your user can enter.

Enter pre- and post-prompts for the Edit Value dialog box. The pre-prompt appears above the value they enter. The post-prompt appears below it, for example to indicate units.

Enter the format of the text your user should enter. For a string, use one #.

Select a text box size for user input. If you choose Unlimited, you cannot enter a label.

Enter a label (title) for the Text Box.

Align the label at left or right side of value. Default is left.

Leave text at Auto or enter size in pixels (controls both label and value text).

To have input appear on the screen as asterisks, check this box.

For the label:
Choose font. Default is Arial.
Make text bold, italics, or both. Default is neither.
Change color (click the rectangle and choose).

For the value (if shown):
Choose font. Default is Arial.
Make text bold, italics, or both. Default is neither.
Change color (click the rectangle and choose).

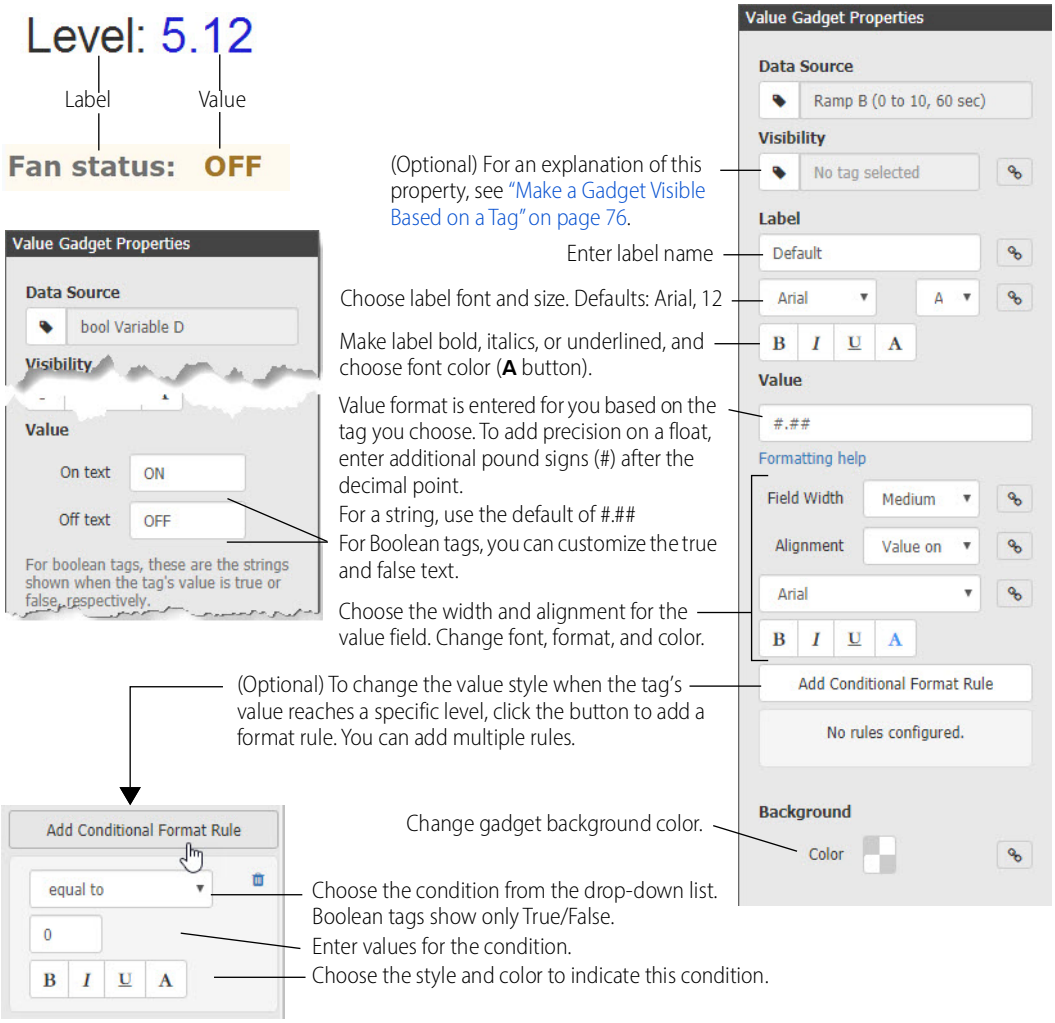
Change gadget background color.

NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

VALUE GADGET

The **Value** gadget is a read-only gadget for displaying numerical or string data. It has a uniform width to make it easy to line up multiple gadgets. The text format changes depending on the tag type, so you don't have to configure it manually. For example, a float-type tag will have #.## while an integer tag will have just #.

If you use a Boolean tag, you can use the default ON and OFF text for true and false values, or enter your own labels such as Running and Stopped. In the **Label** field, enter text just as you want it to appear.



NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

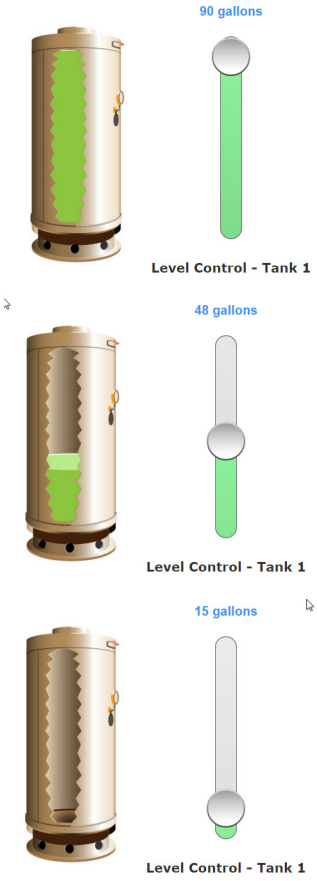
IMAGE INDICATOR GADGET

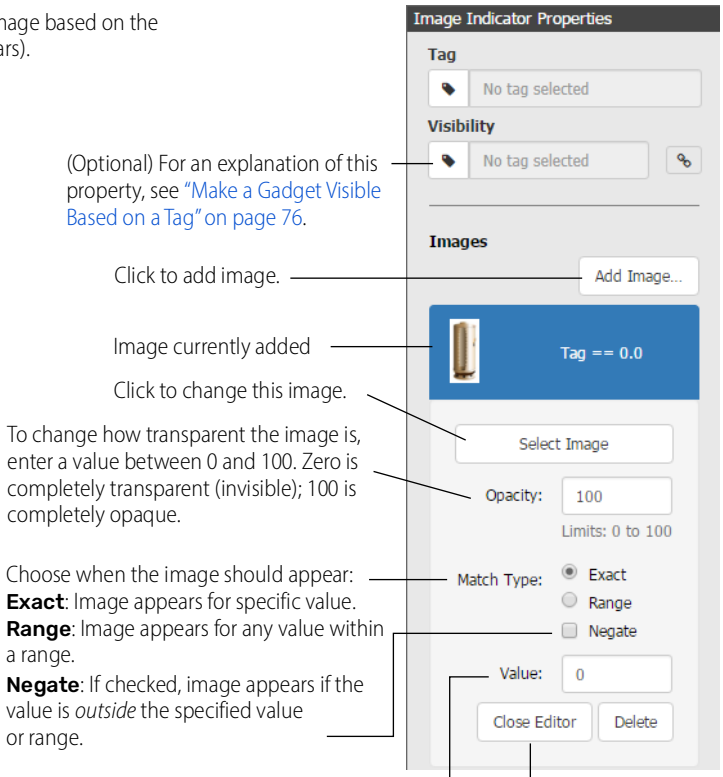
With the read-only **Image Indicator** gadget, you can use multiple images to represent the changing values of a tag. For example, you can use one image to indicate that a pump is on and one to indicate that it is off, or show different images of a tank depending on how full the tank is.

The Image Indicator can be used with Boolean tags (on/off, true/false) with numeric values with multiple images to indicate an exact value or a range, or with string values with multiple images to indicate an exact match.

You choose each image you want to use from the Image Library and assign the status or value range to that image. (See "Managing Images in the Image Library" on page 88.)

Image Indicator gadget changes the image based on the value of the tag (only one image appears).





(Optional) For an explanation of this property, see "Make a Gadget Visible Based on a Tag" on page 76.

Click to add image.

Image currently added

Click to change this image.

To change how transparent the image is, enter a value between 0 and 100. Zero is completely transparent (invisible); 100 is completely opaque.

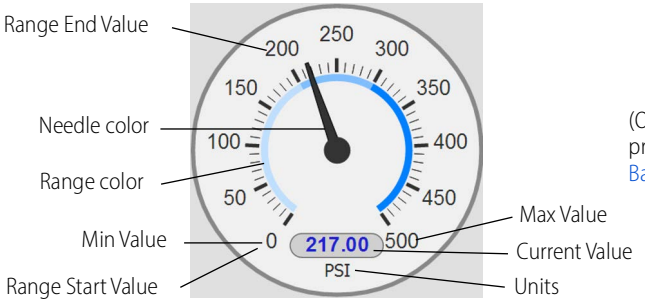
Choose when the image should appear:
Exact: Image appears for specific value.
Range: Image appears for any value within a range.
Negate: If checked, image appears if the value is *outside* the specified value or range.

Enter exact value; or for a range, enter minimum and maximum values.

Click to close editor for this image.
Click **Add Image** again to add the next image.

ROUND GAUGE GADGET

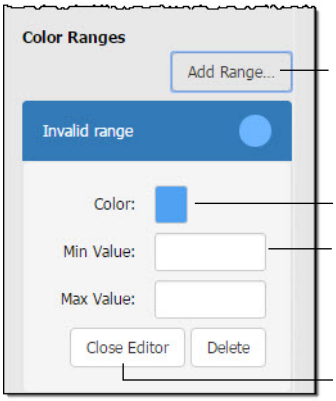
The **Round Gauge** gadget is a read-only gauge that displays an analog or float-type value using a rotating needle and decimal numerical display to indicate the present value. Possible uses include water or gas pressure gauges, the speed of a conveyor belt, and so on.



NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

More on Markers

For both major and minor intervals, if you use the default (0), *groov* View calculates the optimum number and spacing of tic marks to show on the gauge. If the **Custom** intervals you enter create more than 200 tic marks (major and minor combined), *groov* View overrides your entries and sets the number and spacing so markers and values are legible. (Your **Custom** entries still appear in the **Properties** panel but are not used.)



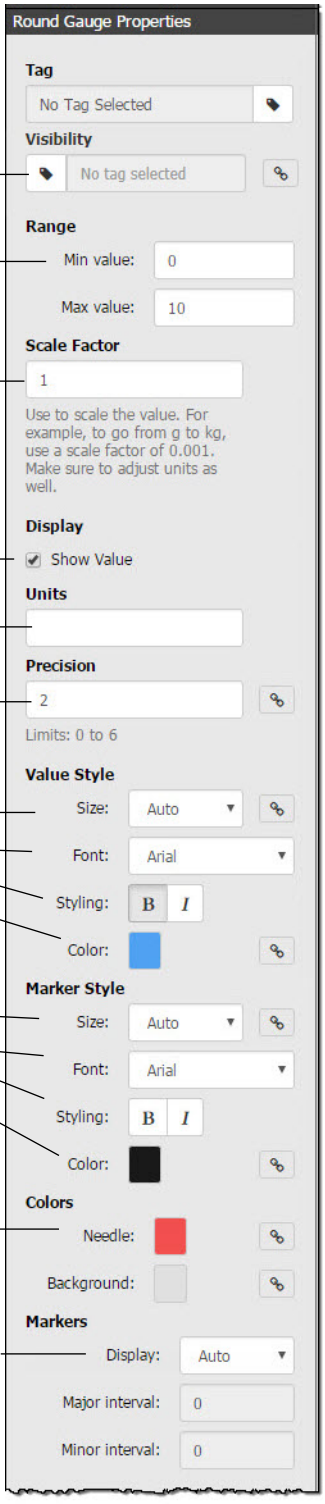
Panel continued from right.

Click here to add a color as a range indicator on the gauge.

Choose the range color.

Enter the start and end values for this range. These must be not more or less than the gauge's min and max values.

Click to close editor for this range. To add another, click **Add Range**.



(Optional) For an explanation of this property, see "Make a Gadget Visible Based on a Tag" on page 76.

Enter the gauge's minimum and maximum values.

If the value is very large (for example, 50,000 kilograms), you can scale the value so numbers are more readable.

Check to display the value in the gadget.

Enter Engineering units (gallons, PSI, etc.).

Enter the number of places to the right of the decimal point to be displayed.

For the current value:
Leave at Auto or choose size.
Choose font. Default is Arial.
Make text bold, italics, or both. Default is bold.
Change color (click the rectangle and choose).

For the markers around the gauge:
Leave at Auto or choose size.
Choose font. Default is Arial.
Make text bold, italics, or both. Default is neither.
Change color (click the rectangle and choose).

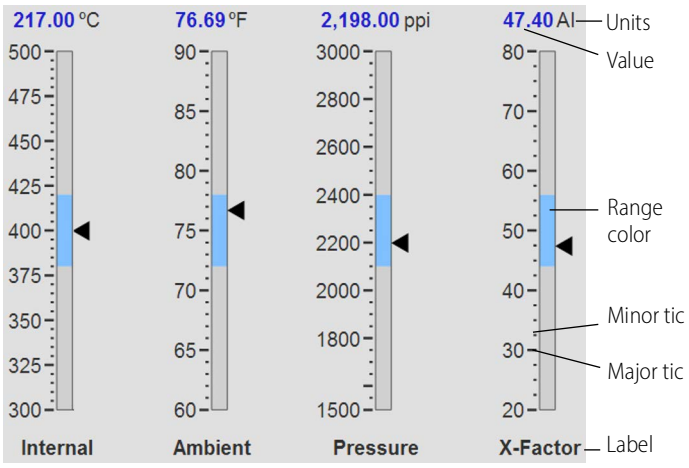
Choose colors for the needle and the gauge's background.

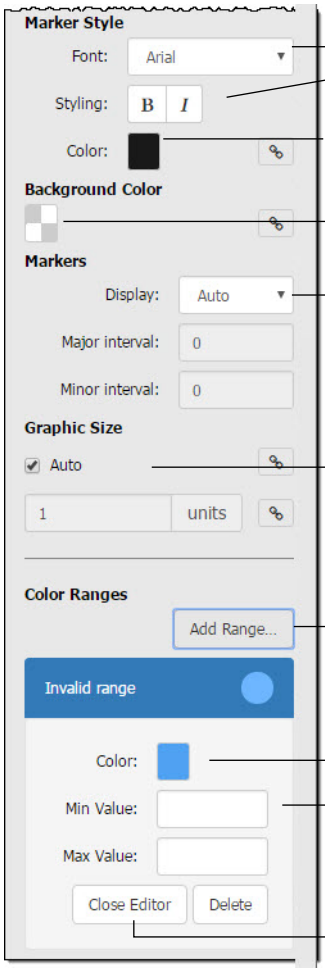
Choose **Custom** to override the default tic marks. See descriptions above left.

Panel continues at left.

RANGE INDICATOR GADGET

Use the **Range Indicator** gadget to show on a horizontal or vertical scale where data appears in a range of numbers. This gadget is commonly used as a thermometer, but it can indicate any kind of data within a range. If you arrange several of these together on a page, an operator can tell at a glance if a machine is operating correctly or see the status of several similar devices.





For the markers on the gauge:
Choose font. Default is Arial.
Make text bold, italics, or both. Default is neither.
Change color (click the rectangle and choose).

Change background color for gauge.

Choose **Custom** to override the default tic marks. See "More on Markers" on page 128.

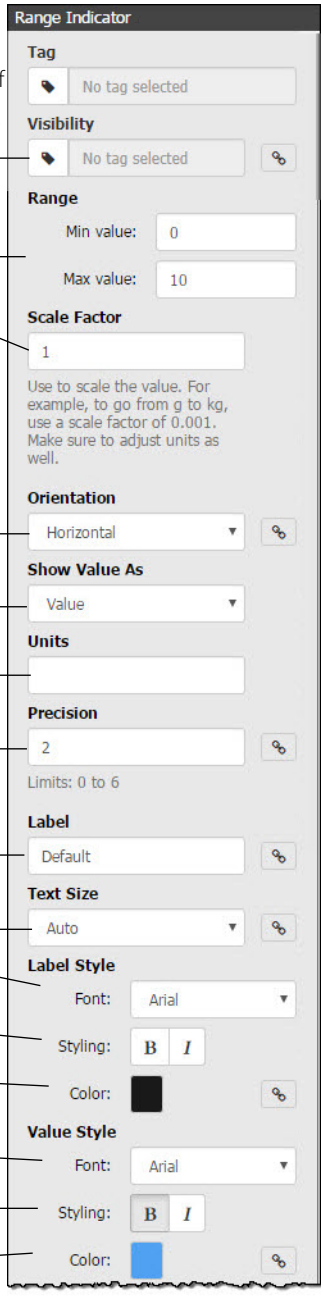
Leave gadget size at Auto or choose size in page grid units.

Click here to add a color as a range indicator on the gauge.

Choose the range color.

Enter the start and end values for this range. These must be not more or less than the gauge's min and max values.

Click to close editor for this range. To add another, click **Add Range**.



(Optional) For an explanation of this property, see "Make a Gadget Visible Based on a Tag" on page 76.

Enter the gauge's minimum and maximum values.

If the value is very large (for example, 50,000 kilograms), you can scale the value so numbers are more readable.

Select a horizontal or vertical gauge.

Choose to show the value as a value, a percent, or not to show it.

Enter Engineering units (for example, degrees, GPM, PSI).

Enter the number of places to the right of the decimal point to display.

Enter a label for the gauge.

For the label:
Leave at Auto or choose size.
Choose font. Default is Arial.
Make text bold, italics, or both. Default is bold.
Change color (click the rectangle and choose).

For the current value:
Choose font. Default is Arial.
Make text bold, italics, or both. Default is bold.
Change color (click the rectangle and choose).

NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

More on Markers

For both major and minor intervals, if you use the default (0), *groov* View calculates the optimum number and spacing of tic marks to show on the range indicator.

If the **Custom** intervals you enter create more than 200 tic marks (major and minor combined), *groov* View overrides your entries and sets the number and spacing so markers and values are legible. (Your **Custom** entries still appear in the **Properties** panel but are not used.)

TREND GADGET

Use the **Trend** gadget to create a trend that shows how a variable changes over time. You can configure up to 4 pens (variables) per trend, each with a different tag.

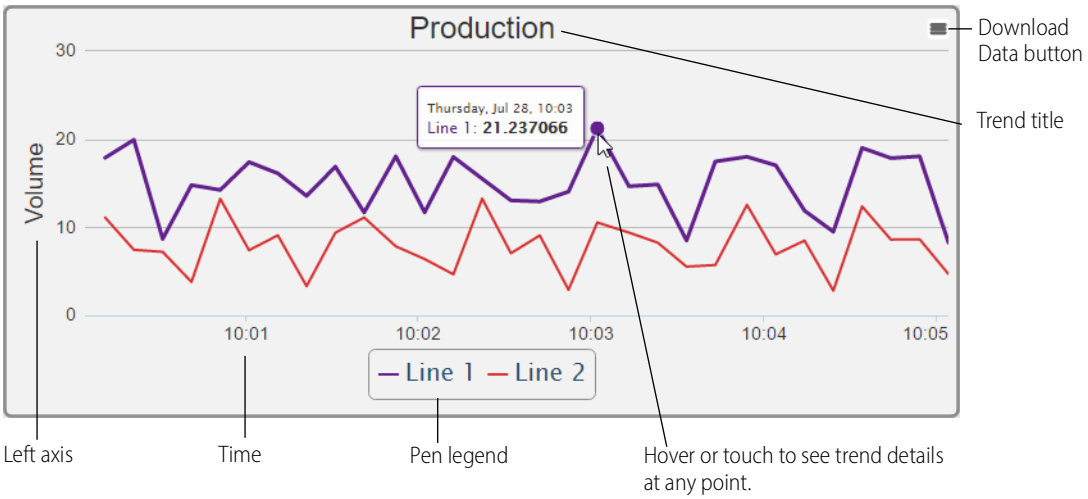
Trending starts in *groov* View when you save your changes. If a page contains a Trend gadget that has accumulated data, the Trend gadget immediately has data when the page is opened in View. The scanned values are retained if *groov* EPIC, *groov* Server, or the *groov* Box is restarted.

In *groov* View, you can download data from each pen to a CSV (`.csv`) file, which you can open in an application like Microsoft Excel. See "Download Data from a Trend" on page 133.

Classic or Interactive

When you configure the Trend gadget, you can choose between a *Classic Trend* or an *Interactive Trend*.

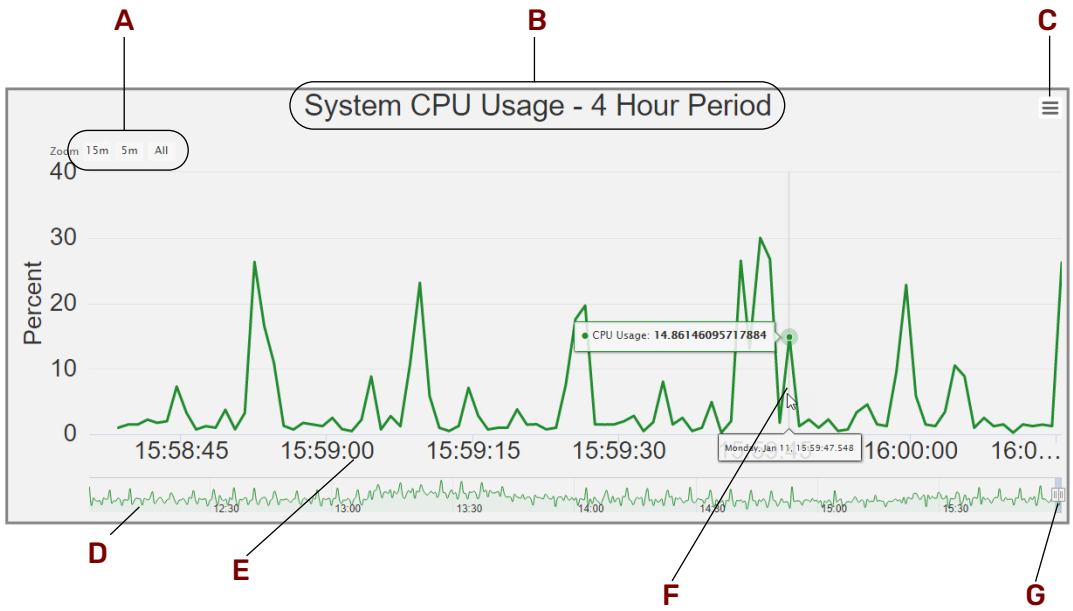
Classic Trend. For simple trends with a relatively small number of data points collected over a period of up to 7 days. You can hover over or touch a spot on the trend to see data for that time.



Interactive Trend. For showing a large number of data points or data over a longer period (up to 5 years). You can zoom in and out on the trend to see details. Because interactive trends can hold much more data, *groov* View provides additional navigation aids and manages the display of data differently than a classic trend.

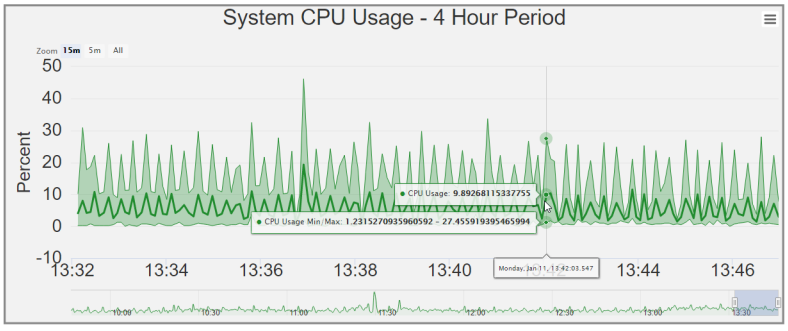
- *groov* View displays raw data as a line chart when the zoom level matches the rate that the data is sampled (sampling rate). This is the default zoom level when you switch from Build mode to View mode, so you will see a line chart when you switch to View mode.
- If you switch to a zoom level that is larger than the sampling rate, then *groov* View displays data that is averaged as well as minimum and maximum values. *groov* View displays the averaged values as a solid

line, with the minimum and maximum values creating a shaded region around the line (see **A** Zoom tabs below).



A **Zoom tabs.** Click a tab to zoom in on data. *groov* View generates these tabs and assigns the time period based on the trend's period.

- If you click on the tab with a time period that is close to the sampling rate, then *groov* View displays the trend as a line chart (like the one above).
- If you click on the tab with a time period that is larger than the sampling rate, then *groov* View displays an average with the minimum and maximum for each point. The trend will look like a line chart with additional shading around the line, like this one:



B **Trend title.** You create the title; for reference, you may want to include the trend period in the title.

C **Download Data button.** Downloads all data for the period, not just the current view. For more information, see "Download Data from a Trend" on page 133.

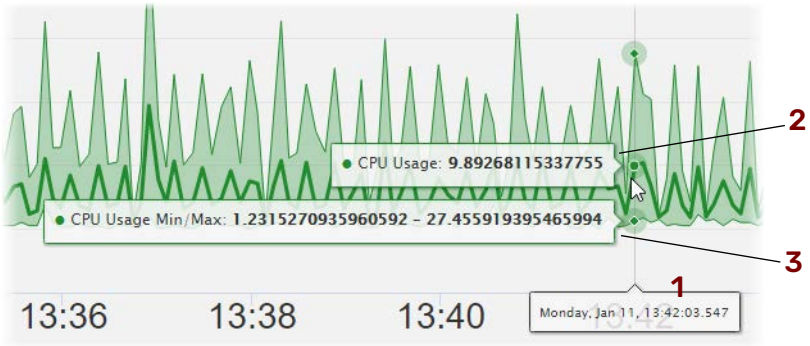
D **Navigator line.** Displays a thumbnail of the trend through one trend period, or as much as has been collected up to the current date/time.

E **Date and time scale.** Depending on the trend's period, it may show only time or only date.

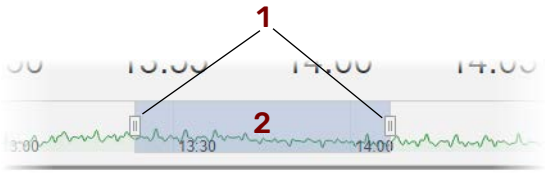
F **View details.** Hover or touch on the trend to see pen names and trend details at any point.

- If the period is close to the sample rate, *groov* View shows the raw data. The example at the top of the page shows the raw data of a data point taken on Monday, January 11, at 3:59 PM.

– If the period is larger than the sampling rate, then *groov* View shows three points of data: average, minimum, and maximum. (The example below shows the details of a data point taken on Monday, January 11, at 1:42 PM (**1**).) The box that points to the center data point (**2**) shows the average value. The box that points to the bottom data point (**3**) contains the minimum and maximum; the minimum value applies to the bottom data point and the maximum value applies to the top data point.



G **Data navigator.** Helps you adjust the amount of data you see on the screen. To zoom in or out, drag the handles on either side (**1**). To keep the same zoom level but see a different date/time, put your cursor in the center of the navigator (**2**) and drag it to the left or the right. Or just click or tap on another date/time on the navigator line to see the data at that date/time.



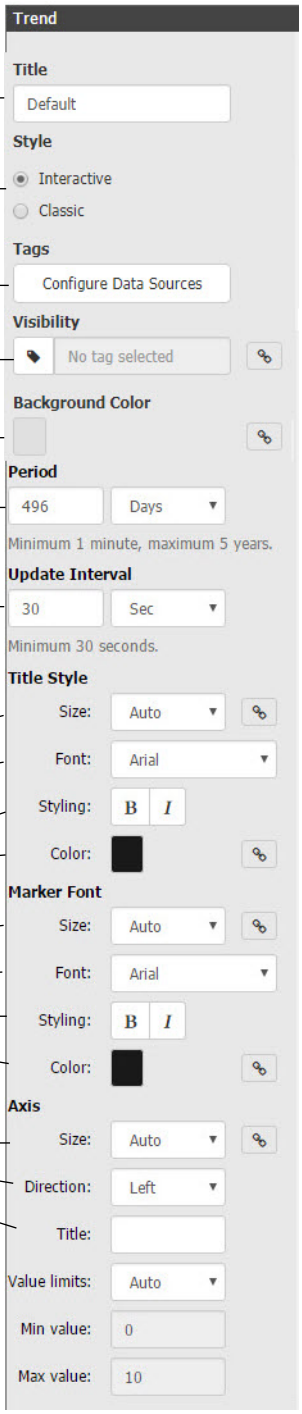
In the example at the top of page 129, you can click or tap 13:30 to see the same limited view of data around that time. This method works especially well on mobile devices where a finger may not fit inside the zoom section.

To return to the current date/time, drag the navigator to the right until it stops.

After you drag or tap, wait for the data to fill in.

Note that there is no room in the interactive trend for a pen legend. If your users view your *groov* View interface on a device (such as a TV) where they cannot hover over a data point, use the Text Area gadget (page 122) to add a legend next to the trend to indicate pen colors.

Trend Gadget



Enter a title for the trend. (For an **Interactive** trend, you can include the trend period in the title for reference.)

Choose the type of trend (see "Classic or Interactive" on page 128).

Click here to add pens. See "Configure Pens" below.

(Optional) For an explanation of this property, see "Make a Gadget Visible Based on a Tag" on page 76.

Choose the trend's background color.

Enter the **Period** (maximum 7 days for a Classic trend, 5 years for an Interactive trend).

Enter how often you want data captured. No data is captured between intervals. A red text box indicates that you have entered a value less than the minimum. The minimum varies based on the **Period** you entered.

Classic trends: A longer **Update Interval** uses less memory and may give better performance on a cell phone. Recommended interval is for a PC.

For the trend title:
Leave at Auto or choose size.
Choose font. Default is Arial.
Make text bold, italics, or both. Default is neither.
Change color (click the rectangle and choose).

For the markers:
Leave at Auto or choose size.
Choose font. Default is Arial.
Make text bold, italics, or both. Default is neither.
Change color (click the rectangle and choose).

For the axes:
Leave text size at Auto or choose size.
Select the axis you want to configure (left or right)
Enter the axis title. To enter a degree symbol, see Appendix D.

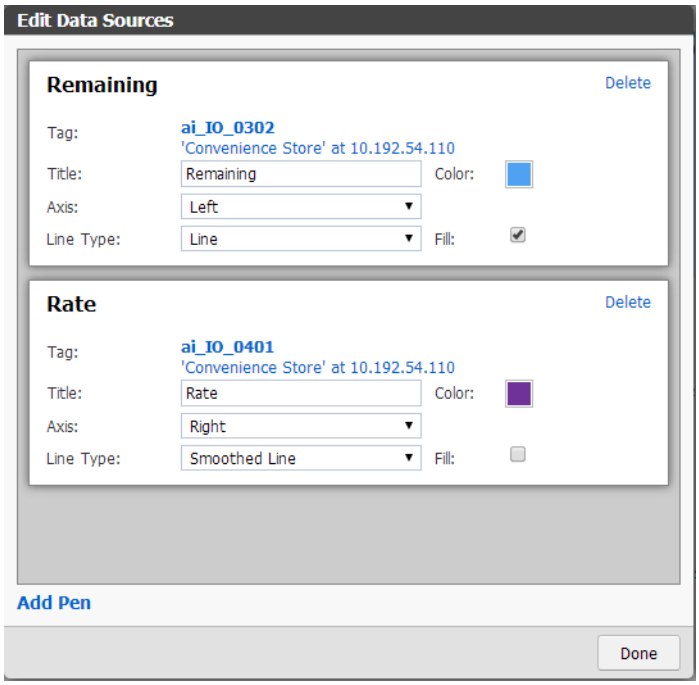
Choose **Custom** to set the minimum and maximum values that make sense for the configured tag (pen). **Auto** sets these values for you; in View the trend zooms in or out to accommodate the real-time range of the pen. Also see "Configure Value Limits and Min/Max Values" on page 132.

NOTE: For any property with a link button, you can click to break the link and choose the property value independently for Desktop & Tablet versus Handheld layouts. See "Properties and Layouts" on page 75.

Configure Pens

You can configure up to four pens for each trend. To add and configure a pen:

1. In the **Trend Properties** panel, click **Configure Data Sources**.
   The Edit Data Sources dialog box appears.



2. Select a tag.
3. Enter a title.
4. Depending on where you want the axis located for this pen, choose either **Left** or **Right** in the **Axis** field. Multiple pens can use the same axis.
5. Choose the line type.
6. Choose the color and whether you want to use a fill.
7. For each additional pen, click **Add Pen** and configure it as desired.
8. Click **Done**.

Z-Order. The pens are displayed in the order you configure them here. The first pen configured is on the bottom of the z-order, and the last one is on top. If you need to change the z-order, the quickest way is to change the tags configured for each pen. For example, if you want the bottom pen's tag to appear on top, re-configure the top pen with that tag and move the other tag to the bottom pen.

Configure Value Limits and Min/Max Values

The **Minimum Value** and **Maximum Value** change automatically even when **Value Limits** is set to **Custom**, because *groov* View automatically adjusts the actual scaling lines and labels for optimum readability. For example, they may change when you do any of the following:

- Change the size of the gadget in Build
- Adjust the size of your browser in either Build or View
- Switch from Build to View
- Change the minimum or maximum values on the other axis

Download Data from a Trend

You can download the data from any pen to a CSV (`.csv`) file, which can be used by other applications or opened in an application like Microsoft Excel. The file consists of a Java/JavaScript® timestamp and a value for each data update (determined by the trend's update interval) during the period of the trend.

For example, if you have a classic trend with a period of 24 hours and an update interval of 60 seconds, the data you download is for the latest 24 hours and shows a data value for each 60-second interval.

If you have an interactive trend with a period of 1 year and an update interval of 60 seconds, the data you download is for the latest year and shows a data value for each 60-second interval (a lot of data!). When downloading data from an interactive trend, remember:

- The download includes *all data for the trend's period,* not just the time period you're viewing.
- Data is for one pen only.

To download trend data:

1. In *groov* View, click the **Download Data** button in the upper-right corner of the trend and choose the pen you want.
2. When the file has been downloaded, save it in the location you want.

   If you open the file in Excel, it looks something like this:

	A	B	C
1	timestamp	value	
2	1.46981E+12	14.412952	
3	1.46981E+12	18.98415	
4	1.46981E+12	19.626297	
5	1.46981E+12	9.533747	
6	1.46981E+12	13.595965	
7	1.46981E+12	13.389323	
8	1.46981E+12	19.766735	
9	1.46981E+12	16.010696	
10	1.46981E+12	12.363201	
11	1.46981E+12	14.523704	

3. The value in the **Timestamp** column isn't really a date and time; it's actually just a number of seconds. You can use Excel to convert it to a number that Excel can then format into a date and time:
   a. For each row of data, copy and paste the following formula to an unused column in the spreadsheet. This formula converts the seconds into a (UTC time zone) date and time.

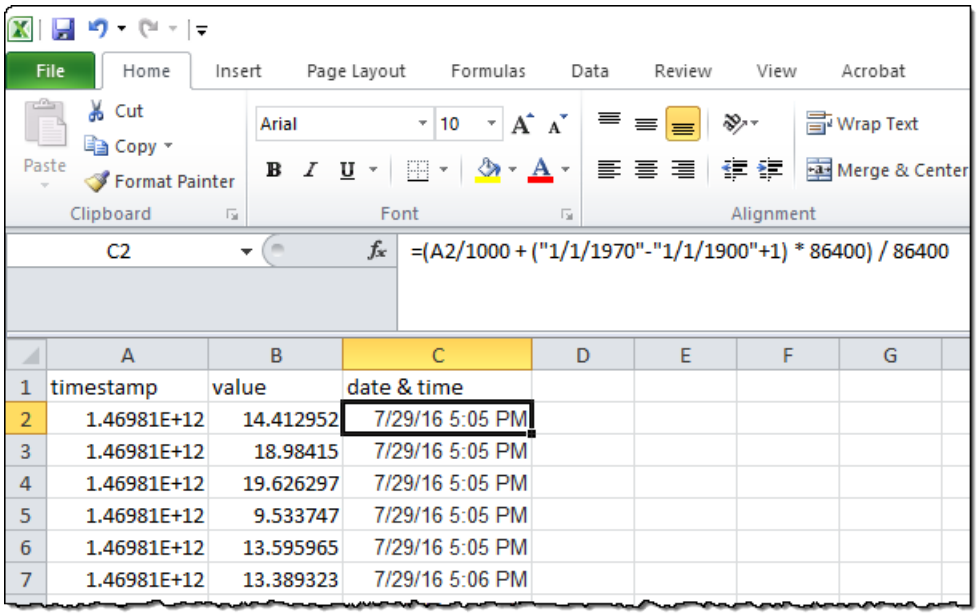
      `=(A2/1000 + ("1/1/1970"-"1/1/1900"+1) * 86400) / 86400`

      (Optional) To convert the UTC time to local time, add or subtract the number of hours that your time varies from UTC. For example, if your time zone is 10 hours ahead of UTC, you can use either of these formulas:

      `=(A2/1000 + ("1/1/1970"-"1/1/1900"+1) * 86400) / 86400` **+(10/24)**

      `=(A2/1000 + ("1/1/1970"-"1/1/1900"+1) * 86400) / 86400` **+TIME(10,0,0)**

   b. Next, use Excel's **Format Cells** feature to format the resulting number as a date value the way you want it displayed.



	A	B	C	D	E	F	G
1	timestamp	value	date & time				
2	1.46981E+12	14.412952	7/29/16 5:05 PM				
3	1.46981E+12	18.98415	7/29/16 5:05 PM				
4	1.46981E+12	19.626297	7/29/16 5:05 PM				
5	1.46981E+12	9.533747	7/29/16 5:05 PM				
6	1.46981E+12	13.595965	7/29/16 5:05 PM				
7	1.46981E+12	13.389323	7/29/16 5:06 PM				

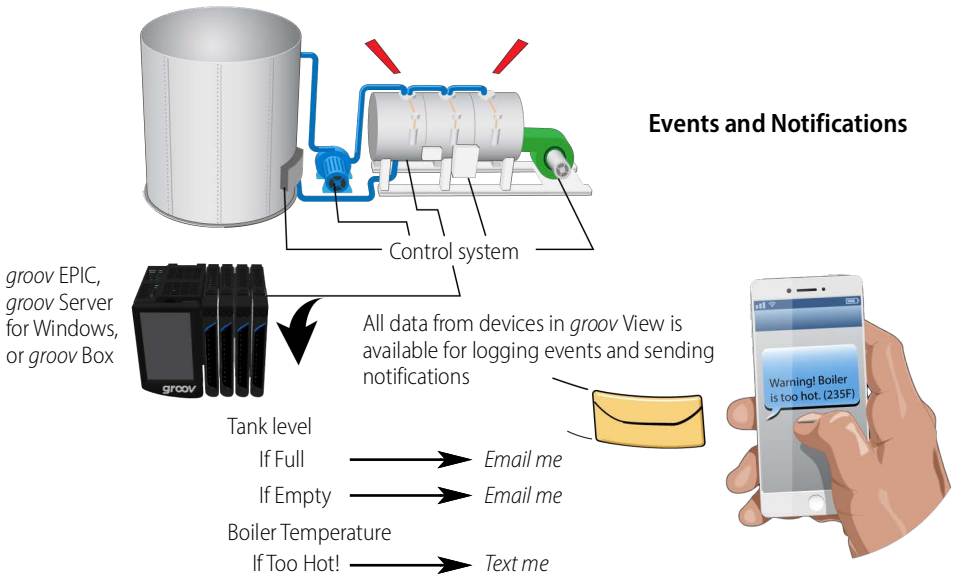
5: Using Events and Notifications

Use this chapter to set up event conditions in *groov* View and to view event logs. All events are logged, and authorized *groov* View users can see them from either View or Build mode (you can choose to hide them in View mode). In addition, all events appear as tags in the tag browser, so you can use an event as an input for a gadget.

This chapter also shows you how to set up optional email or text notifications when an event occurs. For example, if a machine's temperature is critical, you can create an event and notify a maintenance technician via email or text message when the machine overheats. The technician can click a link in the notification that leads to the *groov* View screen with more data about the machine.

You can customize messages, send them to groups or individuals, and include time/date stamps and other information. A notification can be sent when the event becomes active, inactive, or both.

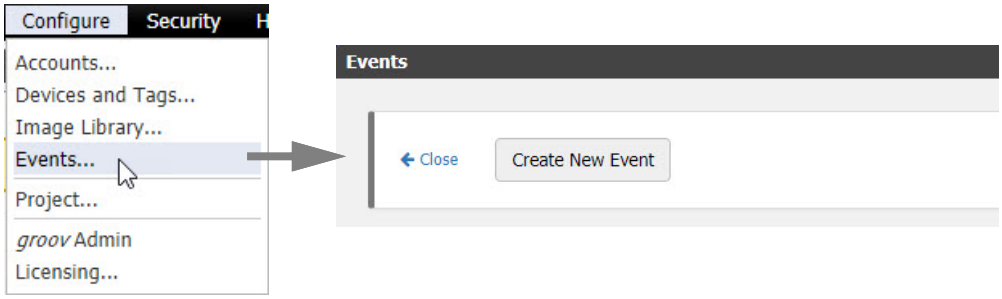
In this chapter:



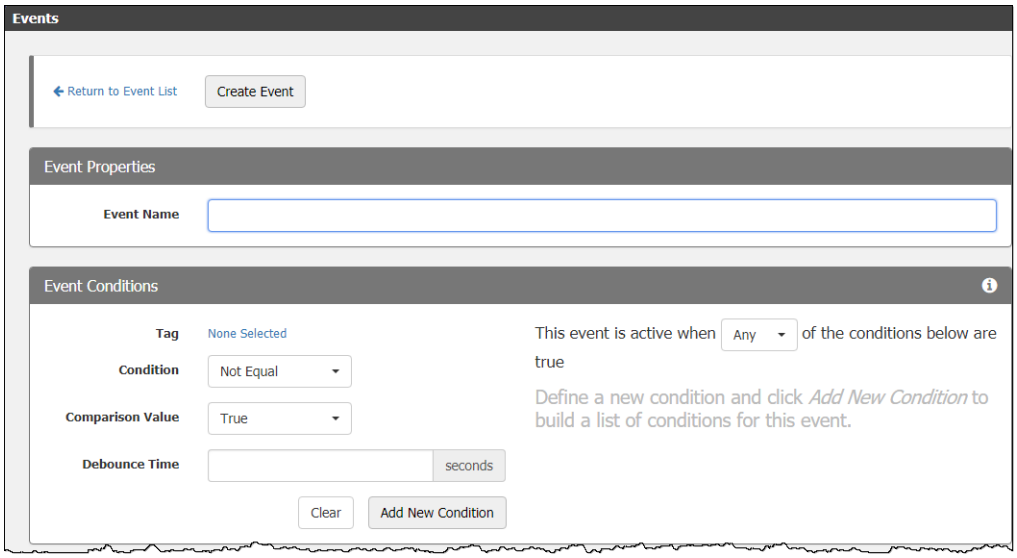
CREATING EVENTS

You can create events based on one or more conditions. To create an event:

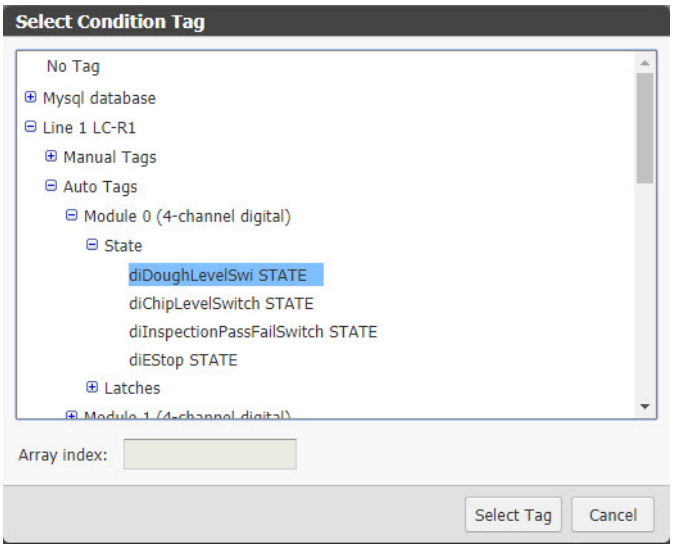
1. In Build mode, select **Configure** > **Events**.



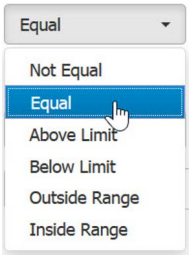
2. Click **Create New Event**.



3. In **Event Properties**, enter a name for the event.
4. Configure the following fields under **Event Conditions** to create one or more conditions that define the event (for help understanding the conditions and the fields to complete, click the **Info** icon):
   a. **Tag**—Click **None Selected**. In the Select Condition Tag dialog box, browse to a tag to monitor for this condition. If the tag is an array, also enter the array index. Then, double-click the tag or click **Select Tag**.



b. **Condition**—Click the drop-down menu and choose the condition type for the event. (For Boolean true/false or state tags, the condition **Equal** is chosen for you.)



For details on conditions, see "Event Condition Types Reference" on page 148.

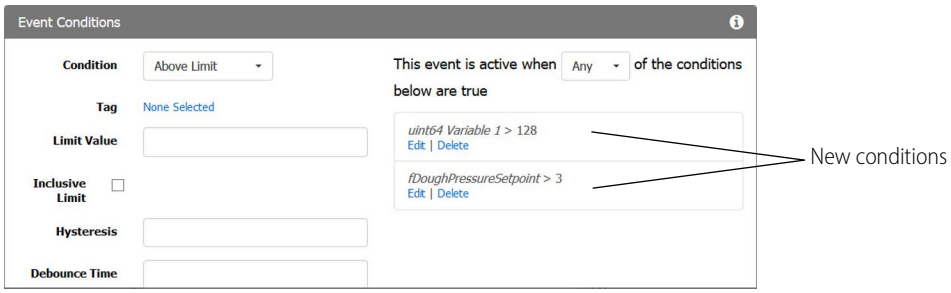
c. Complete additional fields as needed for the tag type and condition type you chose.

For example, choose **True** or **False** for state tags. For analog or numeric tags, enter a comparison value. For **Above Limit**, enter the limit and choose whether the event should occur when the value is greater than the limit or greater than or equal to the limit. For some cases, you may also want to enter hysteresis values or debounce times. For more information, see "Event Condition Types Reference" on page 148.

d. After completing the fields, click **Add New Condition** to save your entries. The new condition appears at the right (or below on a smaller screen).

NOTE: Be sure to click **Add New Condition**. *If no conditions appear, you'll receive an error message when you try to save the event.*

e. If you want the event to depend on additional conditions, choose another tag, complete the fields, and click **Add New Condition** again.

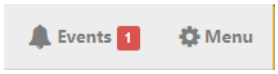


f. If the event depends on more than one condition, complete the **This event is active when...** sentence. Choose **All** if all of the conditions must be true to trigger the event. Choose **Any** if only one of them needs to be true to trigger the event. Also see "Using Multiple Conditions" on page 150.

5. (Optional) To show a custom message in the event log, scroll down to **Notification Messages**.
   The event message in the log (and in an email or text notification if you send one) contains default text to identify the event. Default text includes the event name, date/time, and whether the event began or ended. You can enter a custom message in this section if you wish.
6. Click **Create Event** to save the new event.
7. Click **Close** to return to the main workspace.

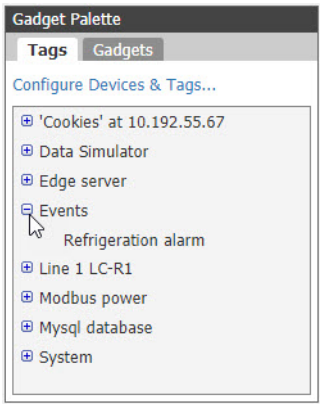
As soon as you save an event it is enabled, so if the event conditions become true it is logged. *groov* EPIC, *groov* Server for Windows, and the *groov* Box continually scan for the event tags and monitor for event conditions even if *groov* View is closed.

When an event occurs, the events icon in the upper-right corner of *groov* View changes, showing the number of events that have occurred. To view event status, click the icon. Also see "Viewing Events" on page 139.



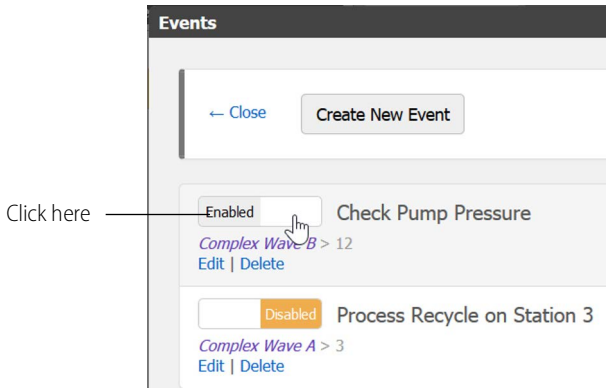
Use Events as Inputs for Gadgets

Once you have created an event, it becomes a read-only Boolean tag that you can use as an input for a gadget. To see these event tags, go to the **Gadget Palette**. Click the **Tags** tab, and then click the **Events** device (see image at right).



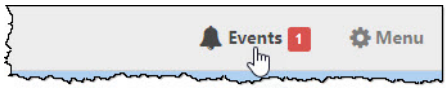
Enable and Disable Events

When a configured event is enabled, the event is logged (and notifications are sent if applicable) when the event conditions are met. To enable or disable an event, choose **Configure** > **Events** and find the event you want. Click its **Enabled**/**Disabled** button (see image below).



VIEWING EVENTS

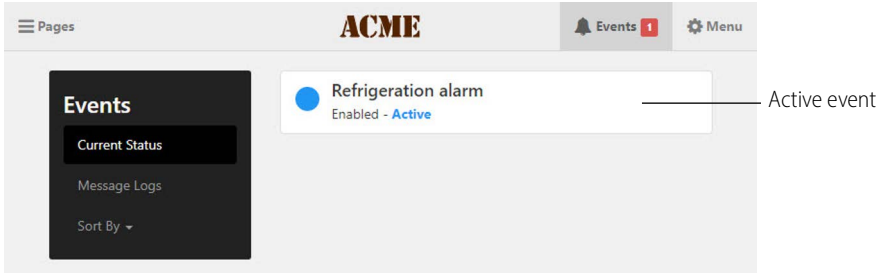
As soon as you create an event, it is enabled; when the event occurs, it is logged. To view, sort, and filter logged event messages, click the **Events** icon (the bell) in the top right corner of either Build or View mode.



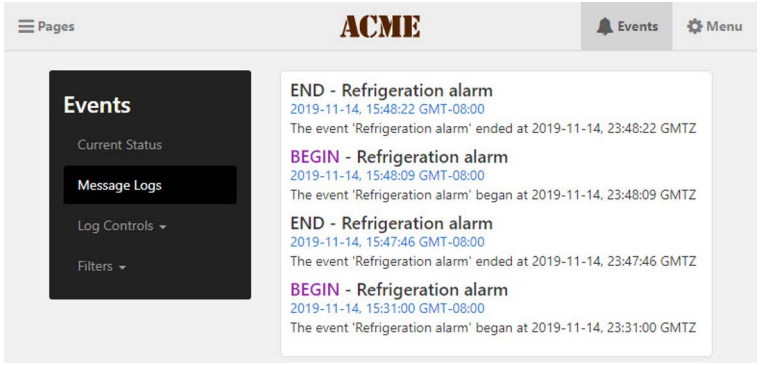
A list of configured events appears next to a menu of viewing options.

NOTE: If you don't want your users to see Events, you can choose to hide the Events icon in View mode. See "Changing the General Project Settings" on page 98.

To see the status of all events: choose **Current Status**. You see a list of configured events and whether they are active (meaning that the event conditions have been met) or inactive. The text and indicator turn blue for events that are active; black for inactive.

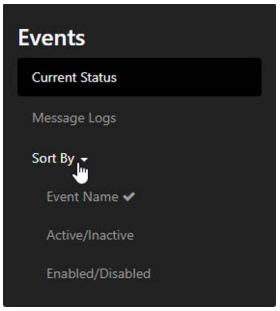


To see a list of all logged event messages: choose **Message Logs**.



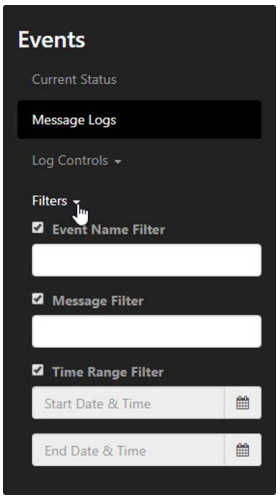
To sort logged event messages when looking at Current Status: click **Sort By** and choose one of the following:

- **Event Name**
- **Active/Inactive**
- **Enabled/Disabled**



An active event is one that is enabled and is occurring right now. You can enable or disable events in Build mode (see page 148).

To see only some events when looking at Message Logs: choose **Filters** and complete the fields.

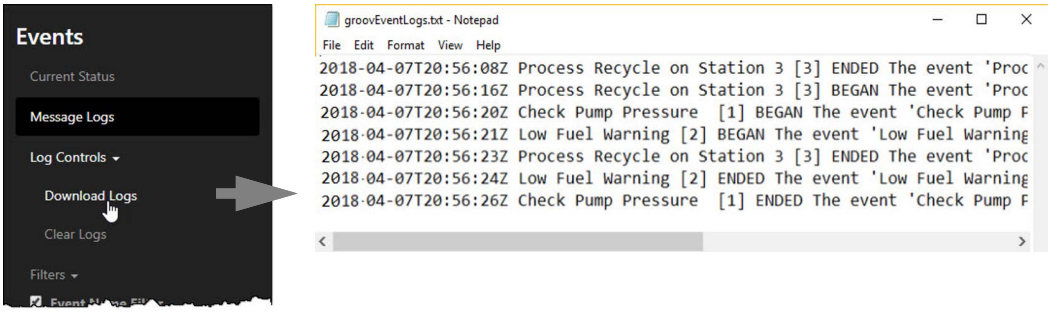


You can use one or a combination of these filters:

- In the fields for **Event Name Filter** and **Message Filter**, enter a text string.
- In the **Start** and **End** boxes for **Time Range Filter**, click in the field and select a date and time for each one.

To download a text file of all logged messages:, click **Log Controls** and choose **Download Logs**. You can open the text file in a text editor like Notepad or save the file for later viewing.

NOTE: If you are using the groov View REST API, you can also download logs to the API endpoint using any HTTP client in either standard text or JSON format. (For more information on the REST API, visit developer.opto22.com.)



To delete all event messages from the log: click **Log Controls** and choose **Clear Logs**. Only users with a security level of Admin can clear logs.

Event Message Log Capacity

groov View checks the size of the Event Message Log every 30 minutes. If it is more than 200 MB (typically over a million entries), the oldest 25% of entries are trimmed. If this occurs, a message is posted to the Log Viewer noting that the oldest entries have been removed. For more about the Log Viewer, see "Viewing Log Messages" on page 96.

SETTING UP NOTIFICATIONS

You can choose to notify one or more authorized *groov* View users when an event occurs, at the beginning of the event, at the end of the event, or both. These steps assume you have already created the event (if not, see "Creating Events" on page 136).

Follow these steps to set up notifications:

1. Set Up the *groov* View Email Account

This section sets up the account that *groov* View uses to send email and text notifications. Beginning in May 2022, for better security, most email accounts require you to generate and use a new application-specific password (called an *app password*) to send email in *groov* View. An app password is a long, randomly generated code that gives *groov* View permission to access your email account.

Follow the setup instructions for your email account:

- For accounts other than Gmail®, see the next section.
- For Gmail accounts, see page 142.

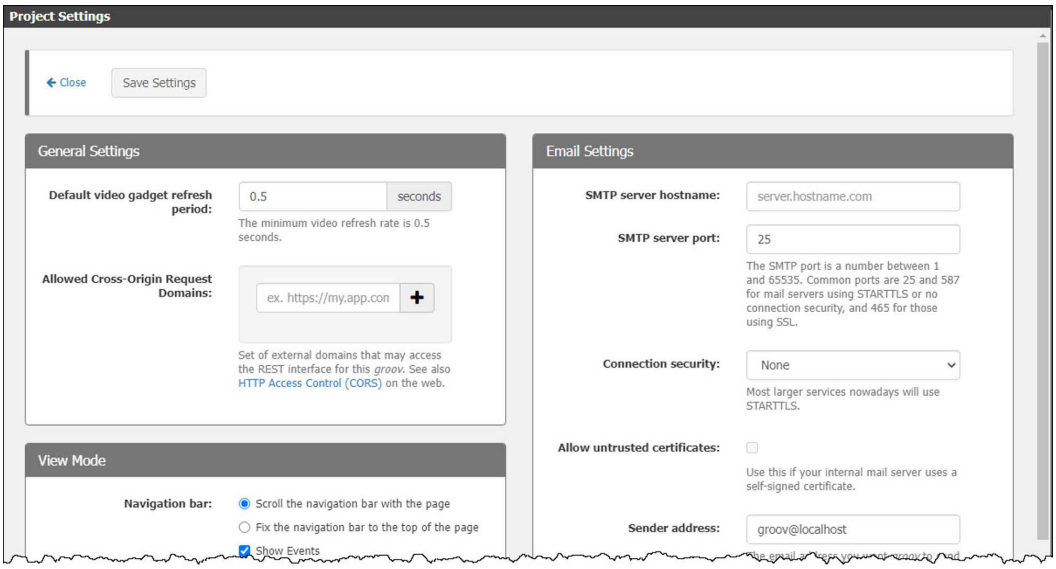
Setting Up the *groov* View Email Account (not Gmail)

The steps below are generally applicable, but check with your email account for specific details. For Yahoo® accounts, for example, see the complete configuration instructions in Yahoo Help.

1. Create an email account that's used just for this *groov* View.

   A separate email account makes it clear where the email is coming from, and it provides a record of all successfully sent notifications in the *Sent Mail* folder of the *groov* View account. (Currently, *groov* View does not buffer notifications that failed to send.)

   Also, by creating a separate account for this *groov* View, you can change email settings and not impact your business or personal email account settings.
2. On your email account's Security page, click **Generate app password** or a similar link.
3. For the app's name, enter `groov View`.
4. Generate the app password.
5. Keep the generated password in a secure place so you can use it for any device you want to allow to use the account. Also, keep the app password backed up and safe in case you need to restore factory settings or the backup file fails or is lost.
6. Follow any other instructions for your email account, then click **Done** or **Save**.
7. Back in *groov* View's Build mode, choose **Configure** > **Project**.



8. In the **Email Settings** section on the right, set up the *groov* View email account as follows:
   a. **SMTP server hostname**—Enter the SMTP server address.
   b. **SMTP server port**—Consider the following:
      – The SMTP port is a number between 1 and 65535. Common ports are 25 and 587 for mail servers using STARTTLS or no connection security, and 465 for those using SSL.
      – If you are outside a company network, you may need to try port 587. Other email servers might need different port numbers. Check with your IT group if you are using a company email server to send the emails.
   c. **Connection security**—Choose **STARTTLS** if you are using a large service such as Yahoo. Other email servers may need a different setting.
   d. **Allow untrusted certificates**—Check this if your internal mail server uses a self-signed certificate.
   e. **Sender address**—Enter the email address of the *groov* View account you created previously. Some services might ignore this.
   f. **Username**—Enter the username for the *groov* View email account.
   g. **Password**—Enter the app password you just generated for the *groov* View email account.
   h. **Send a test email**—Enter an email address that can receive a test email and can easily be checked.
   i. Click **Send Test Email** to test your connection settings.
      If a message in green letters appears that says Test message sent!, make sure it arrived in the inbox of the email account you sent the message to. If you see a red error message, try different settings in the *groov* View email account.
9. Scroll to the top, click **Save Settings**, and click **Close**.

Continue with step 2: "2. Set Up groov View Users to Receive Event Notifications" on page 145.

Setting Up the *groov* View Email Account Using Gmail

Follow these steps if you are using Gmail for the account *groov* View sends email from. If you are using an email service other than Gmail, see the more general guidelines starting on page 141.

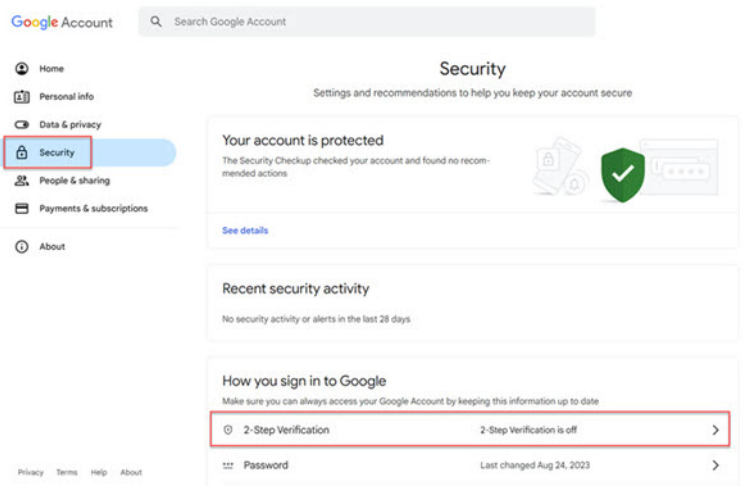
Creating a separate Gmail account for *groov* View makes it clear where the email is coming from and provides a record of all sent notifications in the Sent Mail folder of the *groov* View account. The Sent Mail folder thus

functions as a kind of automatic, cloud-based log file. Also, by creating a separate account for *groov* View, you can change email settings and not impact your company or personal email account settings.

If you have more than one Opto 22 device sending email notifications, you may decide to give each device its own email address. That way the person who receives the email knows immediately which device it came from, and incoming emails can be automatically sorted into folders.

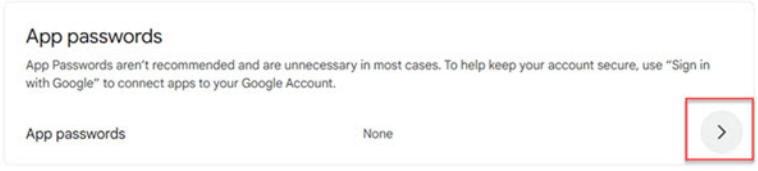
NOTE: Before you begin, ensure you have a phone number to receive a code when setting up Google's 2-step verification.

1. Go to https://accounts.google.com, and log into the existing account for your device (or you can create a new account).
2. In the left column, click **Security**.
3. Scroll down to the **How you sign in to Google** section, and click **2-Step Verification**. If prompted, enter your password.



4. If not already turned on, click **Turn on 2-Step Verification**. You may be prompted to enter your password again.
5. Set up the phone number for 2-step verification:
   a. When prompted (or click **Add Phone Number**), enter the phone number you want to use.
   b. Select **Text message** or **Phone call** from the drop-down menu.
   c. Click **Next** (bottom right).
   d. Enter the confirmation code received on the phone, and click **Verify**. This completes the 2-step verification setup.

   NOTE: Enabling 2-step verification automatically turns off the Less Secure Access setting. The app password replaces that access and is more secure.
6. On the 2-Step Verification page, scroll down to the App passwords section, and click the arrow (**>**) icon.

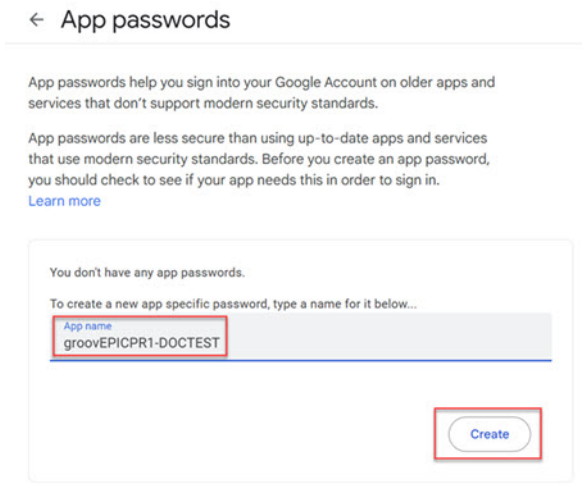


7. In the **App Name** field, enter a name for the device.

   Multiple devices can use the same password if they use the same address for sending email, in which case you can enter a generic name (such as *Opto 22 devices*). Or, you can assign individual passwords under separate device names.

   For example, suppose you are an OEM and are using the same email address for machines at all your customer sites. If you want to revoke email for one customer, you can go into your email account and simply turn off that customer's machine password rather than going on site or downloading new logic to turn off that machine feature.

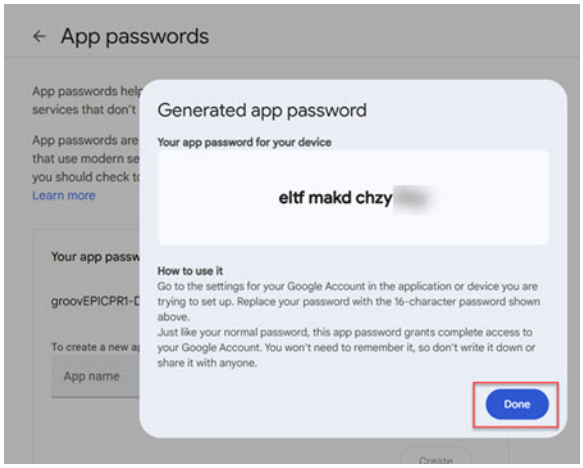
8. Click **Create**.



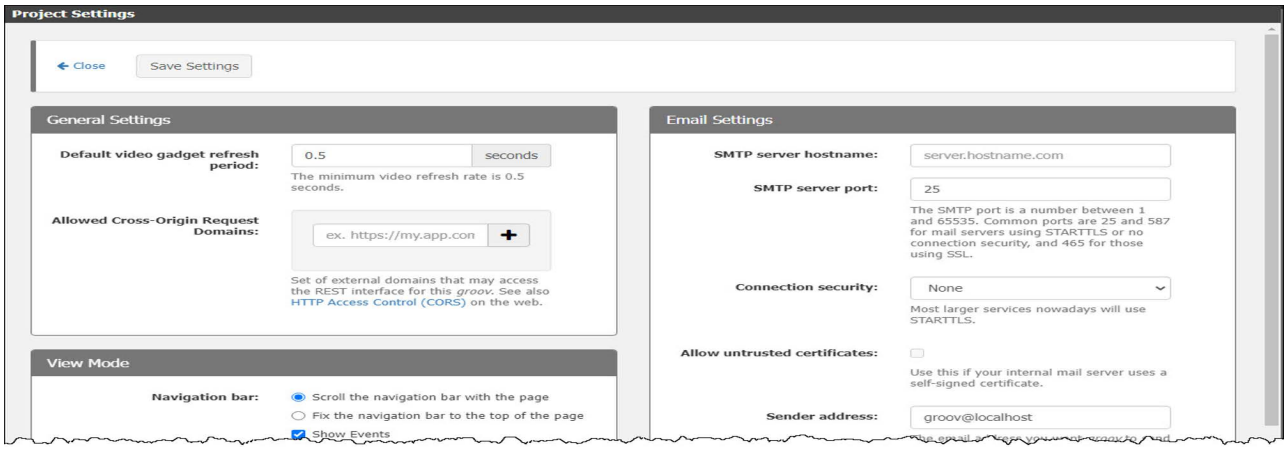
9. Contrary to the note on the page, **keep the generated password in a secure place**. You may need this app password when restoring factory settings or if the backup file fails or is lost. This is the only opportunity you have to obtain this app password. If you lose it, you will need to delete it and generate another.

   You can also use this app password for any device you want to allow to use this Google account. For example, you may have more than one PAC Control strategy that uses the same email account. You may also use the same app password for *groov* View events, Node-RED emails, and Google services.

10. Click **Done**.



11. Back in *groov* View's Build mode, select **Configure** > **Project**.



12. In the Email Settings window, set up the *groov* View email account as follows:
    a. **SMTP server hostname**—Enter *smtp.googlemail.com*.
    b. **SMTP server port—**Enter a number between 1 and 65535. For Gmail, common ports are 25 and 587.
        – If you are inside a company network, you probably need port 25.
        – If you are outside a company network, you may need port 587.
    c. **Connection security**—Choose **STARTTLS**.
    d. **Allow untrusted certificates**—Make sure this option is *not* selected.
    e. **Sender address—**Enter the Gmail address of the *groov* View account you created previously.
    f. **Username**—Enter the Gmail address (the same as the Sender address).
    g. **Password**—Enter the app password you just generated for the *groov* View Gmail account. (Note that this password is only for your devices; for sign-in by a human, you use the same password you used before.)
    h. **Send a test email**—Enter an email address that can receive a test email and can be easily checked.
    i. Click **Send Test Email** to test your connection settings.
    If a message in green letters appears that says Test message sent!, make sure it arrived in the inbox of the email account you sent the message to. If you see a red error message, try different settings in the *groov* View email account.
13. Scroll to the top, click **Save Settings**, and click **Close**.

Continue with the next section.

2. Set Up *groov* View Users to Receive Event Notifications

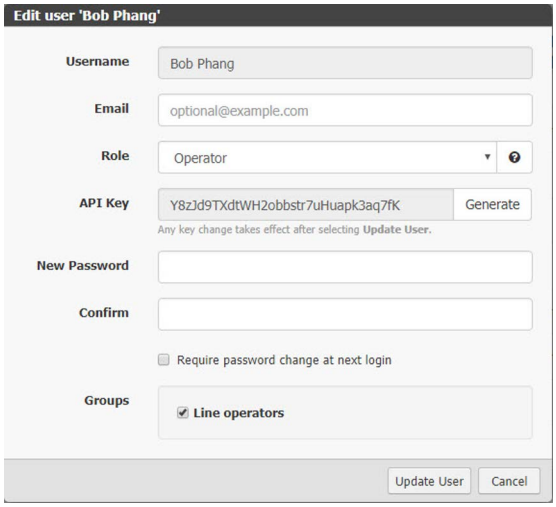
IMPORTANT: *Before setting up notifications, make sure you and your users understand any limitations and charges that may apply to those who receive text or email notifications. Limitations and charges vary by carrier, plan, and country.*

This section shows you how to set up email addresses for all *groov* View users who should receive event notifications as email or text messages.

Text message notifications are valuable when cell coverage is weak and you can receive only phone calls and plain text messages (SMS); even when your email client can't update, you can still get important notifications.

SMS messages are generally limited to 160 characters, but limits vary by carrier and country, so check with your local carrier.

1. In Build mode, choose **Configure** > **Accounts**.
2. Click the **Users** tab.
3. Select the user's name from the list.
4. Click the pencil (**Edit**) icon next to the name to open the Edit dialog box.



5. Enter one of the following in the **Email** field:
   - **For email notifications,** enter a valid email address. For example, *BPhang@foomail.com*.
   - **For text message notifications**, enter the user's phone number followed by the domain used by the carrier to send text messages to phones. For example, to send a text message to a Verizon® phone, use the recipient's mobile phone number followed by `@vtext.com`. If the phone number is 555-123-4567, you type `5551234567@vtext.com`

     For a list of carriers and email addresses, see the next section, "Email Addresses for Text Messaging."

   NOTE: if you want the same person to get both email and text message notifications, you need to create two user accounts: one for email and one for texts.

6. Click **Update User**. Notice that the email or text address is now shown in the list of users.

Email Addresses for Text Messaging

By using an email-to-SMS (Short Message Service) email address you can send a text message notification from *groov* View. Check with your carrier for SMS character limits.

Here is a list of common cell phone carriers in the U.S. and Canada with the email-to-SMS email addresses they use for sending text messages via email to a cell phone. Choose the carrier for the phone you want to receive event notifications.

Carrier	Email-to-SMS Email Address
AT&T®	*10digitphonenumber*@txt.att.net
Comcast®	*10digitphonenumber*@comcastpcs.textmsg.com
MCI®	*10digitphonenumber*@pagemci.com
Nextel®	*10digitphonenumber*@messaging.nextel.com
Qwest®	*10digitphonenumber*@qwestmp.com

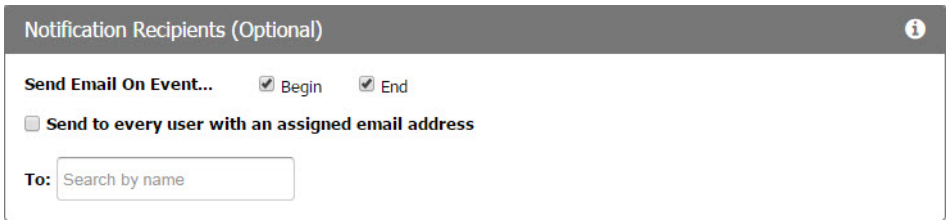
Carrier	Email-to-SMS Email Address
Sprint®	*10digitphonenumber*@messaging.sprintpcs.com
T-Mobile®	*10digitphonenumber*@tmomail.net
US Cellular®	*10digitphonenumber*@email.uscc.net
Verizon®	*10digitphonenumber*@vtext.com

For carriers not listed here, see the following websites:

- http://martinfitzpatrick.name/list-of-email-to-sms-gateways/
- http://www.emailtextmessages.com/

3. Add Notifications to Events

1. In Build mode, choose **Configure** > **Events**.
2. Click the name of the event you want to send a notification for.
3. Scroll down to **Notification Recipients** and configure the following options:

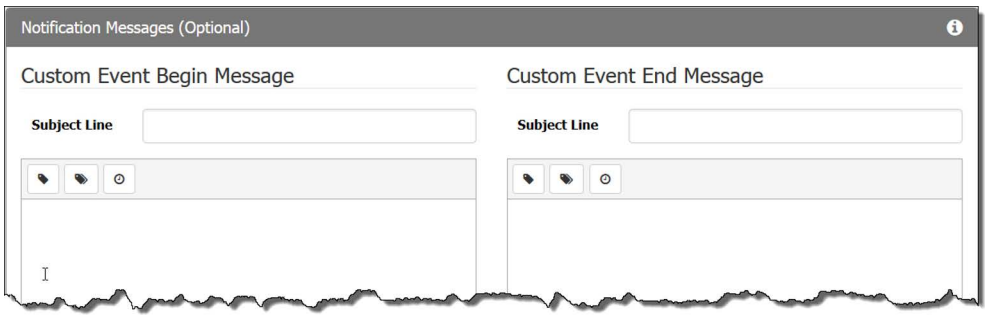


   a. For **Send Email On Event**, check the boxes to send the email when the event begins, when it ends, or both.
   b. Select the users to receive notifications using one of these options:
      – Check the **Send to every user with an assigned email address** option. The **To:** list is ignored.
      – Click in the **To:** text box and select the users who should be notified.

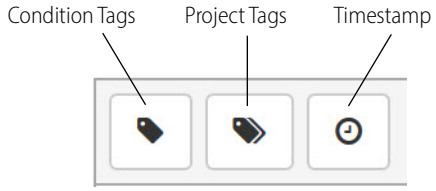
      All recipients must have an email address configured to receive event notifications. You can add users who don't have email addresses, but they won't receive notifications until addresses have been assigned. To assign and edit user email addresses, choose **Configure** > **Accounts** and edit the user (see page 145).

   TIP: If you have configured a group, you can add the group in the **To:** *field, and all the users in that group will receive the notification.*

4. Customize your message in the **Notification Messages** section. If you leave the subject line or message empty, a default subject line or message is used.



You can add Condition Tags, Project Tags, or a Timestamp to a message. When you add a Condition Tag or a Project Tag to a message, the `< Tag Name >` placeholder is replaced in the email by the tag's value at the time of the event beginning or end.



Click the icons above to add the following:

a. **Condition Tags**—The tags that you have referenced in the conditions for this event. When using condition tags, if you alter the conditions for this event, make sure that your tag references in these messages are updated to match.

b. **Project Tags**—All of the device tags in this *groov* View project.

c. **Timestamps**—All `< Timestamp >` placeholders are replaced in the email by the current local time of the event's beginning or ending.

   – On a *groov* EPIC processor, the timestamp is from the processor. To adjust the time and date, see Chapter 10 in the *groov EPIC User's Guide* (form 2267).

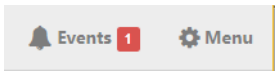
   – In *groov* Server for Windows, the timestamp uses the local time the PC is set to.

   – On a *groov* Box, make sure your time zone is correctly set in *groov* Admin. By default, the *groov* Box is set to UTC. If you change the time zone in *groov* Admin, you must restart the *groov* Box for the change to propagate through *groov* View. Once restarted, event timestamps use the configured time zone. For more information, see "Changing the Time Zone" in the *groov Box User's Guide for GROOV-AR1* (form 2104). (For the GROOV-AT1, see form 2077.)

5. Scroll back up to the top of the window and click **Update Event**.
6. Click **Close** to return to Build mode.

Once you save or update an event, it becomes active. If the event conditions become true, a notification is sent to *groov* View even while you are in Build mode. *groov* View continually scans for the event tags and monitors for event conditions even if you have *groov* View closed.

When an event occurs, the events icon in the upper-right corner of *groov* View changes, showing the number of events that have occurred. To view event status, click the icon. Also see "Viewing Events" on page 139.



EVENT CONDITION TYPES REFERENCE

Use the information in this section when creating events (page 136). If you want to use multiple conditions, also see "Using Multiple Conditions" on page 150.

Not Equal

The event is active when the tag value is not equal to the Comparison Value. The event is inactive when the tag value is equal to the Comparison Value.

Debounce Time. Debounce time filters out tag value noise. It specifies how long the tag's value must satisfy the condition before the event becomes active or inactive. If in that time the tag returns to a value that does not satisfy the condition, the event does not become active (or inactive).

Debounce time is an integer value in units of seconds.

Equal

The event is active when the tag value is equal to the Comparison Value. The event is inactive when the tag value is not equal to Comparison Value.

Debounce Time. Debounce time filters out tag value noise. It specifies how long the tag's value must satisfy the condition before the event becomes active or inactive. If in that time the tag returns to a value that does not satisfy the condition, the event does not become active (or inactive).

Debounce time is an integer value in units of seconds.

Above Limit

The event is active when the tag value is greater than (or equal to) the Limit Value. To become inactive, the tag value must drop to the Limit minus the hysteresis offset or below.

Hysteresis. A hysteresis offset value is used to determine when an active event may be considered inactive. It establishes an offset from the condition limit that the tag must reach before the event may transition from an active state to inactive.

For Above Limit conditions with hysteresis, the tag value must drop below the Limit Value minus the hysteresis offset. For example, if you want to know if a boiler's temperature exceeds a safe limit of 200 degrees, you could create an Above Limit condition that monitors the tag assigned to the boiler temperature sensor.

Setting the Limit Value to 200 and a Hysteresis to 20 indicates that if the boiler temperature exceeds 200 degrees, it should not be considered safe/stable until the temperature drops to 180 degrees or below rather than the maximum 200-degree limit.

Debounce Time. Debounce time filters out tag value noise. It specifies how long the tag's value must satisfy the condition before the event becomes active or inactive. If in that time the tag returns to a value that does not satisfy the condition, the event does not become active (or inactive).

Debounce time is an integer value in units of seconds.

Below Limit

The event is active when the tag value is less than (or equal to) the Limit Value. To become inactive, the tag value must rise up to the Limit plus the hysteresis offset or above.

Hysteresis. A hysteresis offset value is used to determine when an active event becomes inactive. It establishes an offset from the condition limit that the tag must reach before the event changes from an active state to inactive.

For Below Limit conditions with hysteresis, the tag value must rise above the Limit Value plus the hysteresis offset. For example, if you want to monitor a settling pond to determine when it is below capacity and is ready to receive more water, you could create a Below Limit condition that monitors the tag assigned to a water level sensor.

Setting the Limit Value to 4 (meters) and a Hysteresis of 2 indicates that if the pond drops below 4 meters in depth, it should not be considered to be at capacity until the level reaches 6 meters or greater rather than the minimum 4-meter limit.

Debounce Time. Debounce time filters out tag value noise. It specifies how long the tag's value must satisfy the condition before the event becomes active or inactive. If in that time the tag returns to a value that does not satisfy the condition, the event does not become active (or inactive).

Debounce time is an integer value in units of seconds.

Outside Range

The event is active when the tag value is less than (or equal to) the Lower Limit or greater than (or equal to) the Upper Limit. To become inactive, the tag value must rise up to or above the Lower Limit plus the Lower Hysteresis, or drop to or below the Upper Limit minus the Upper Hysteresis.

The hysteresis values are used to determine when an active event tag becomes inactive. They establish a value range that the tag must reach before the event changes from an active state to inactive. The Upper Hysteresis and Lower Hysteresis are independent of each other and either one may be left blank.

Also, for an Outside Range condition, hysteresis must be less than the difference between the Upper Limit and Lower Limit.

Debounce Time. Debounce time filters out tag value noise. It specifies how long the tag's value must satisfy the condition before the event becomes active or inactive. If in that time the tag returns to a value that does not satisfy the condition, the event does not become active (or inactive).

Debounce time is an integer value in units of seconds.

Inside Range

The event is active when the tag value is between the Lower and Upper Limits. To become inactive, the tag value must drop to or below the Lower Limit minus the Lower Hysteresis, or rise up to or above the Upper Limit plus the Upper Hysteresis.

The hysteresis values are used to determine when an active event tag becomes inactive. They establish a value range that the tag must reach before the event changes from an active state to inactive. The Upper Hysteresis and Lower Hysteresis are independent of each other and either one may be left blank.

USING MULTIPLE CONDITIONS

Using multiple conditions for a single event is a good way to reduce event duplication and to capture events that depend on the state of multiple tags. When using more than one condition for an event, the "event is active when" statement has the following effect:

Any: The event is active when condition 1 is active OR condition 2 is active OR condition 3 and so on. The event becomes inactive only when ALL of the conditions are inactive.

Example uses:

- You have multiple tags that all monitor the same type of condition.
- You want to be notified of a problem in your process that could be caused by any one of a number of sub-processes.

All: The event is active when condition 1 is active AND condition 2 is active AND condition 3 and so on. The event becomes inactive when ANY of the conditions is inactive.

Example uses:

- Multiple components along a process line turn off sequentially when not in use. It is normal to have some components off at any given time. If all of the components are off at the same time, however, that may indicate a problem.
- You have a system monitoring multiple boilers. If any one of those boilers becomes too hot, a separate, per-boiler event notification is sent to your on-site technicians. If several boilers all become too hot at the same time, a notification is sent to your on-call technicians and your engineers.

6: Viewing Your Operator Interface

The operator interface developed in Build mode can be securely accessed by an authorized user who is using *groov* View from any of the following:

- a *groov* EPIC's integral touchscreen
- a computer's web browser
- a smartphone, tablet, or other mobile device that has the *groov* View mobile app or a web browser

In this chapter:

OPENING VIEW

From the *groov* EPIC Touchscreen

1. Log into the EPIC's touchscreen.
2. Tap ***groov* View**.

From a Computer or Mobile Device's Web Browser

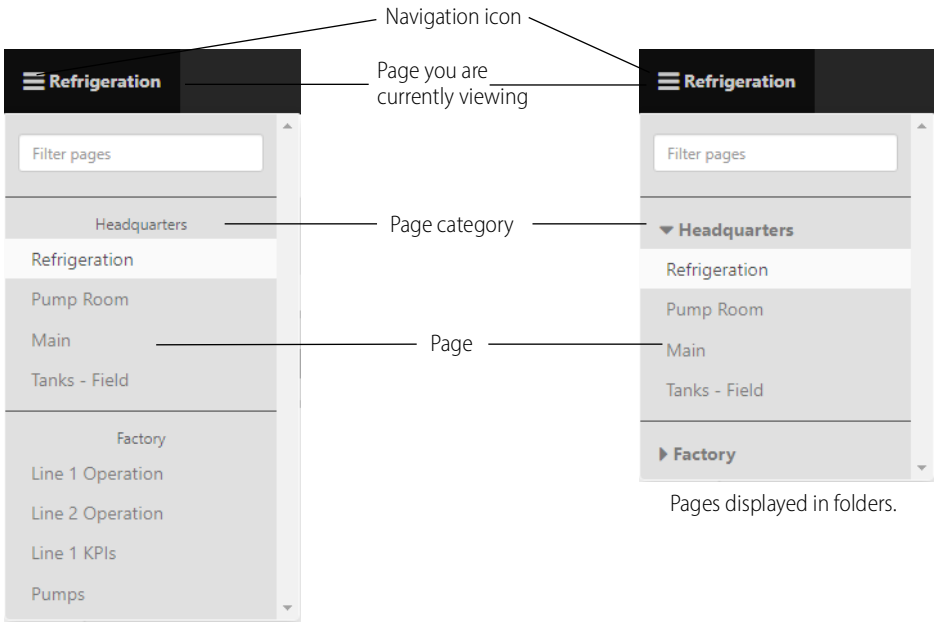
1. Open your web browser. (To use the *groov* View mobile app, see "Setting Up groov View Mobile Apps" on page 154.)
2. Type `https://` and the *groov* EPIC, *groov* Server, or *groov* Box's hostname as the URL. Make sure you type the **s**: `https://` when entering the URL.
   - On *groov* EPIC, use the EPIC's hostname (chosen when the EPIC was initialized).
   - If *groov* Server is installed on the same computer you're using, type `https://localhost`
     If *groov* Server is installed on a different computer, type `https://` and the computer's hostname. For example, if the computer's hostname is RStarr-w10, you type `https://RStarr-w10`
     You can use the IP address of the host PC instead of the hostname. However, if the PC is on a network with DNS and DHCP, the IP address is subject to change.

– On a *groov* Box, the default hostname is printed on the bottom of the Box. For example, if the hostname is opto-00-d2-dc, you type: `https://opto-00-d2-dc`
If you've assigned a static IP address to the Box, use the IP address instead of the hostname.

3. Log in with your username and password. For *groov* EPIC, select ***groov* View**.
groov View opens.

OPENING A PAGE

1. Click the navigation icon in the upper left of the screen to see the pages and page categories.



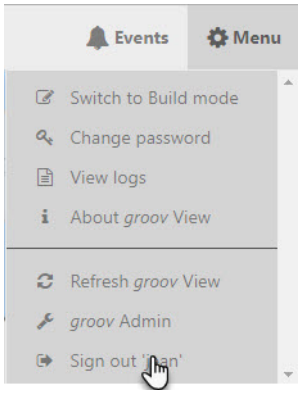
Pages displayed as a flat list.

Pages displayed in folders.

2. Select the page you want to open. If your pages are displayed in folders, first expand the folder, and then select the page you want to open.

LOGGING OUT

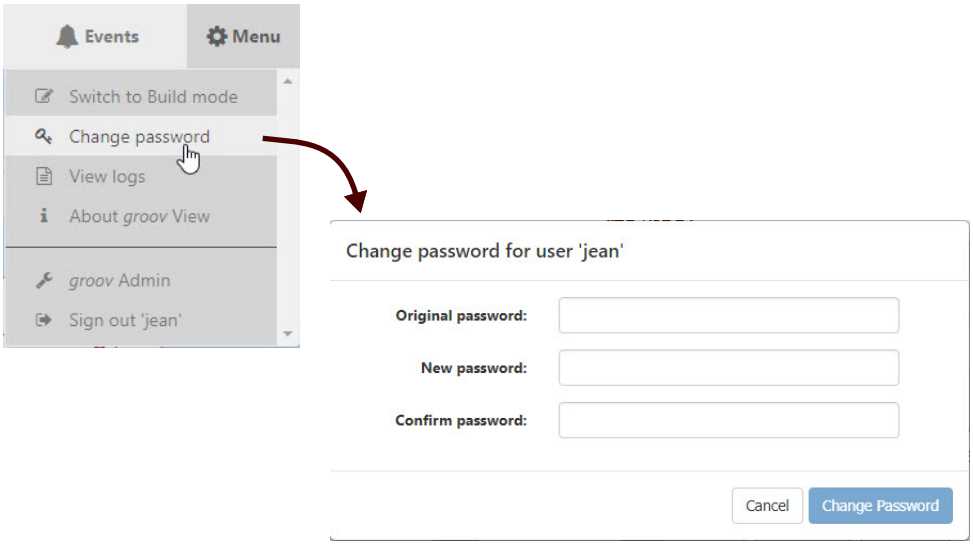
1. Click the gear (**Menu**) icon on the top right.



2. Click **Sign out '*username*'**.
   The login dialog box appears.

CHANGING YOUR PASSWORD

1. Click the gear (**Menu**) icon on the top right.
2. Choose **Change Password**.



3. Enter the current password in the **Original password** field.
4. Enter the new password in the **New password** field and again in the **Confirm password** field.
5. Click **Change Password**.

REFRESHING THE OPERATOR INTERFACE

The operator interface can be refreshed automatically or manually in *groov* View.

Automatic Refresh

In *groov* View version R3.5a and higher, any changes you make to your *groov* View operator interface (new and updated pages) are automatically pushed out to all users. Users do not need to refresh their screens.

Updated *groov* View Versions

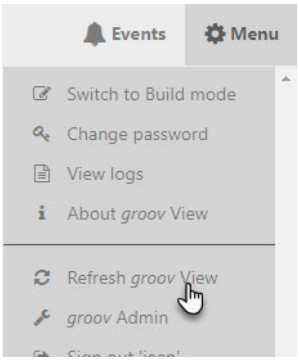
In *groov* View version R3.2a and higher, when your *groov* version is updated (for example, from R3.2a to R3.2b), clients are automatically updated as well.

Manual Refresh

If changes have been made and saved in Build mode, you can manually refresh View at any time and the new changes appear.

To manually refresh View:

1. Click the gear (**Menu**) icon on the top right.
2. Click **Refresh *groov* View**.



SETTING UP *groov* VIEW MOBILE APPS

Opto 22's free *groov* View apps for iOS and Android are the best way to view your operator interfaces on your iPhone, iPad, or Android smartphone or tablet. In the mobile app, you can see one or more *groov* installations in full-screen mode without the address bar, toolbars, and other things you see in a browser.

To connect to *groov* View the first time:

1. Download the app:
   - *groov* View for iOS
   - *groov* View for Android
2. Install the app on your iOS or Android device.
3. Tap the ***groov*** icon to start the app.

Continue with the instructions for iOS or Android:

- "Use the iOS Mobile App" (below)
- "Using the Android App" on page 159

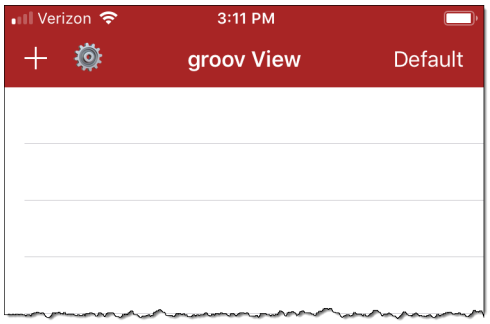
Use the iOS Mobile App

In this section:

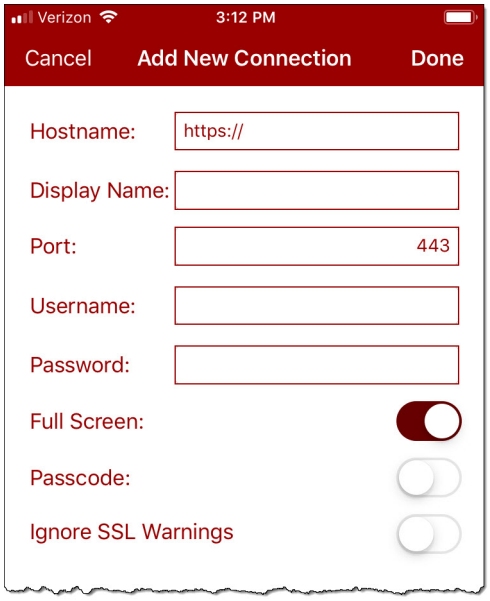
Adding a Connection to a *groov* Device or Server in the iOS App

Use these instructions in the *groov* View iOS mobile app to connect to a *groov* EPIC processor or *groov* Server for Windows. You need to perform this task to create the first connection and every time you want to connect to a new *groov* device or server.

1. Tap the *groov* View icon to open a list view for adding one or more connections.



2. Tap + to add a new connection.



3. Enter the following information (tap on the screen outside of the text boxes to hide the keyboard and reveal any hidden options):

   a. **Hostname**—Enter `https://` and the hostname or IP address of a *groov* EPIC processor or *groov* Server for Windows.

      NOTE: If you are within the company network and have a valid hostname that is registered with the domain server, you still might have to enter the fully qualified domain name. For example, if the hostname is `petrovsgroov` *and the domain name is* `somecompany.com`*, you would enter* `petrovsgroov.somecompany.com`.

   b. **Display Name**—Enter a name for the connection (it appears in the connection list).

   c. **Port**—Enter the port number (usually 443).

   d. **Username** and **Password**—Enter the username and password for this connection.

   e. **Full Screen**—Enable this option to hide navigation to the *groov* View list. (With this option enabled, swipe right to return to the *groov* View list.)

   f. **Passcode**—Enable this option to add another security layer by requiring a passcode each time this connection is viewed on this device. The next time you connect to this *groov* device or server, you are prompted to enter this new passcode.

   g. **Ignore SSL Warnings**—Enable this option to have the device ignore browser security warnings.

h. **Handheld Layout** (iPad only)—Enable this option to force the display to use the *groov* View Handheld layout rather than the Desktop layout.

4. Tap **Done**.

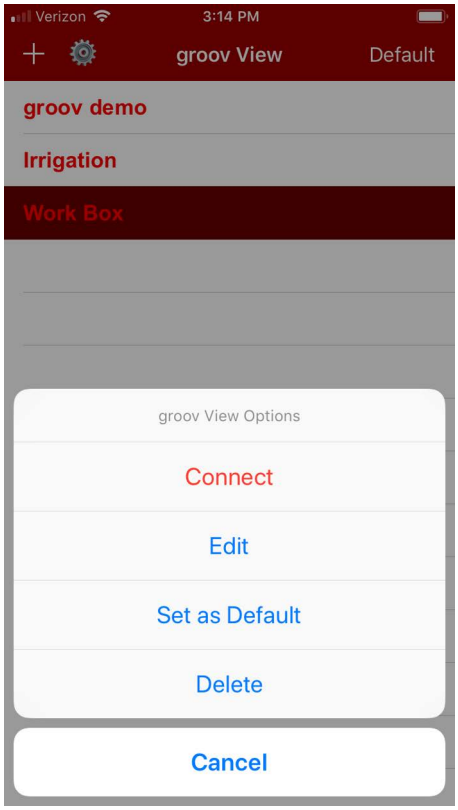
Connecting, Editing, and Setting a *groov* View Connection as the Default in the iOS App

Follow these steps in the *groov* View iOS app to connect to a *groov* device or server, edit the connection settings, or set a default connection.

1. Start the *groov* View app to open a list of connections.

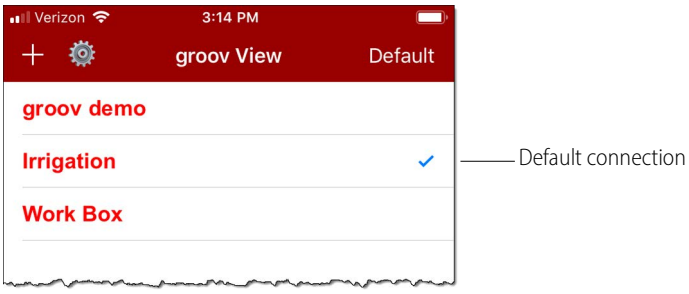
   If you haven't connected a *groov* device or server, see "Adding a Connection to a groov Device or Server in the iOS App". If you have set and enabled a default connection, *groov* View automatically attempts to connect to the default *groov* View connection. To return to the list view, swipe right.

2. Tap a connection in the list to view the **Options** menu:



- **Connect**—Connects to the selected connection.
- **Edit**—Opens the selected connection so you can edit connection settings. The screen is filled with the data from the selected connection, and the title is the **Display Name** (if configured) or the hostname of the connection. For information about the options, see "Adding a Connection to a groov Device or Server in the iOS App".
- **Set as Default**—Sets the selected *groov* View connection as the default so that when you start the *groov* View app it bypasses the connection list and opens the default connection automatically. For this to work, also tap the **Settings** icon at the top of the screen and turn on **Enable Default**

Connection (see "Configuring iOS Mobile App Settings"). The default connection is indicated with a check mark. Only one connection can be the default.

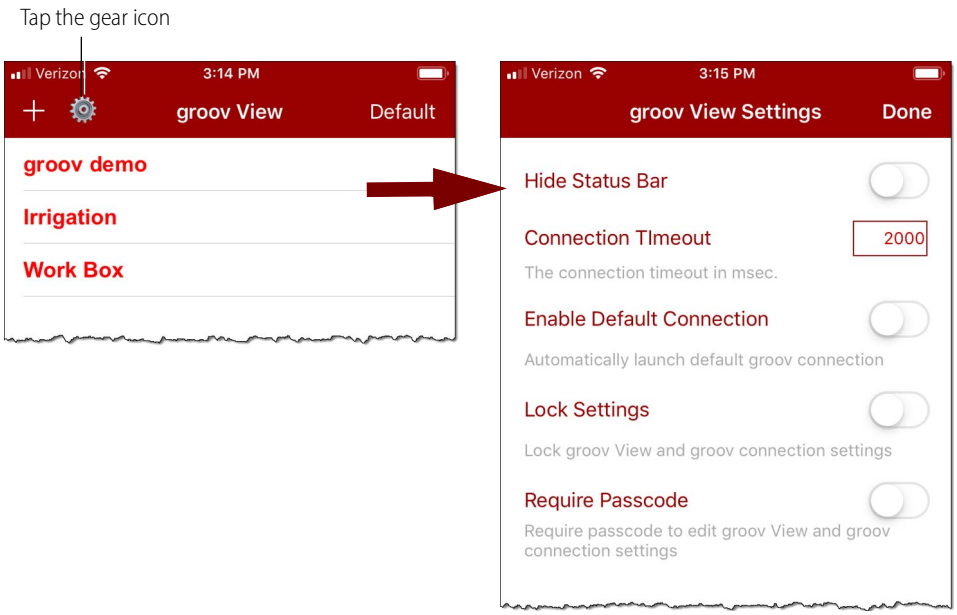


- **Delete**—Deletes the selected connection from the list.
- **Cancel**—Closes the **Options** menu.

Configuring iOS Mobile App Settings

To configure the iOS *groov* View app settings:

1. Tap the gear (**Settings**) icon.



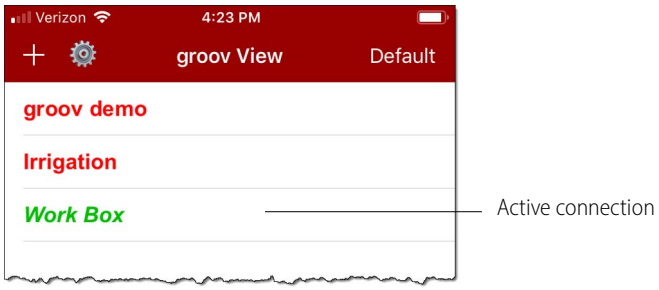
2. Configure the following settings:
   a. **Hide Status Bar**—Hides the status bar that normally appears at the top of the screen.
   b. **Connection Timeout**—Sets how long the app spends trying to connect to the *groov* device or server. The timer starts as soon as the **Connect** menu option is selected.
   c. **Enable Default Connection**—Bypasses the connection list when starting the *groov* View app and goes directly to the default connection. To enable this, you also need to assign a default connection in the ***groov* View Options** menu. See "Connecting, Editing, and Setting a groov View Connection as the Default in the iOS App".
   d. **Lock Settings**—Locks the settings so that no connections can be added, modified, or deleted, and the settings themselves can't be changed. When using this option, you also need to require a passcode. Otherwise, anyone can unlock the settings.

e. **Require Passcode**—Requires a user of this mobile device to enter a passcode to change the settings or to add, modify, and delete connections. You are prompted to enter a new passcode when you enable this option.

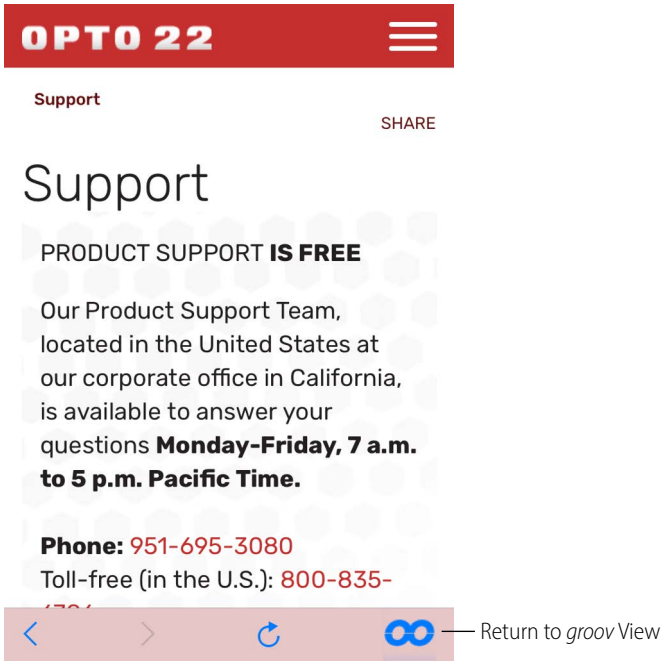
3. Tap **Done** to return to the connection list.

Navigating Through the *groov* View iOS App

- **To return to the connection list** without closing the current *groov* View connection, swipe right. This works in normal view or with **Full Screen** enabled (see "Adding a Connection to a groov Device or Server in the iOS App"). The active connection is shown in green.



- **To return to the current connection**, do one of the following:
  - Swipe left from the connection list.
  - Tap the active connection and tap **Resume** from the menu.
- **To disconnect from the current connection**, tap the connection in the list, and tap **Disconnect**.
- **When you navigate to an external webpage** that opens when you tap a URL link in a *groov* View HMI, use the navigation bar at the bottom of the page to return to *groov* View and tap the *groov* View icon.



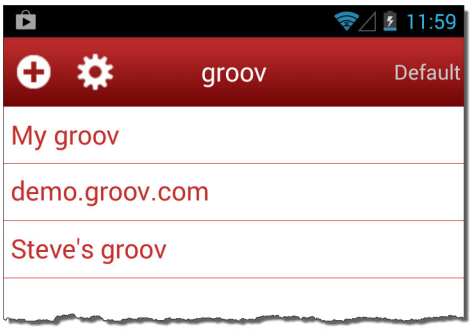
Using the Android App

In this section:

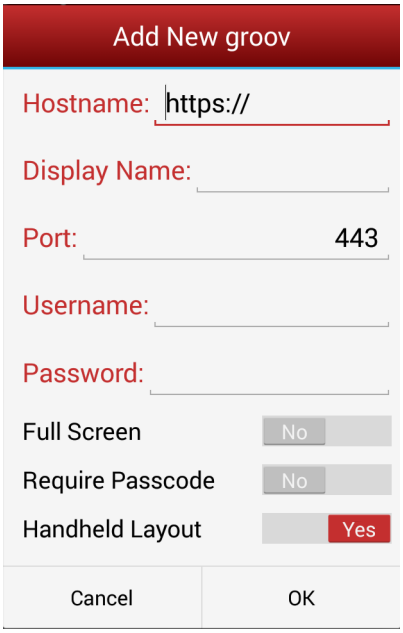
Adding a Connection to a *groov* Device or Server in the Android App

Use these instructions in the *groov* View Android mobile app to connect to a *groov* EPIC processor or *groov* Server for Windows. You need to perform this task to create the first connection and every time you want to connect to a new *groov* device or server.

1. Tap the *groov* View icon to open a list view for adding one or more connections.



2. Tap  to add a new connection.



3. Enter the following information:
   a. **Hostname**—Enter `https://` and the hostname or IP address of a *groov* EPIC processor or *groov* Server for Windows.

NOTE: If you are within the company network and have a valid hostname that is registered with the domain server, you still might have to enter the fully qualified domain name. For example, if the hostname is `petrovsgroov` *and the domain name is* `somecompany.com`*, you would enter* `petrovsgroov.somecompany.com`.

b. **Display Name**—Enter a name for the connection (it appears in the connection list).

c. **Port**—Enter the port number (usually 443).

d. **Username** and **Password**—Enter the username and password for this connection.

e. **Full Screen**—Enable this option to hide navigation to the *groov* View list. (With this option enabled, swipe right to return to the *groov* View list.)

f. **Require Passcode**—Enable this option to add another security layer by requiring a passcode each time this connection is viewed on this device. The next time you connect to this *groov* device or server, you are prompted to enter this new passcode.

g. **Handheld Layout**—Enable this option to force the display to use the *groov* View Handheld layout rather than the Desktop layout.

4. Tap **OK**.

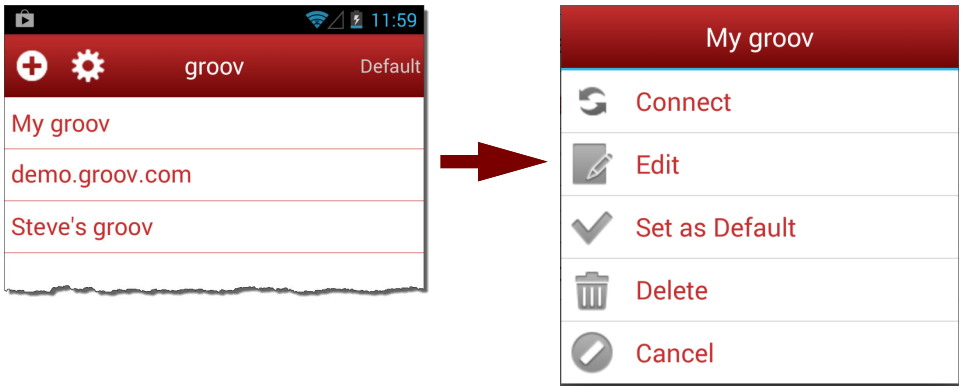
Connecting, Editing, and Setting a *groov* View Connection as the Default in the Android App

Follow these steps in the *groov* View Android app to connect to a *groov* device or server, edit the connection settings, or set a default connection.

1. Start the *groov* View app to open a list of connections.

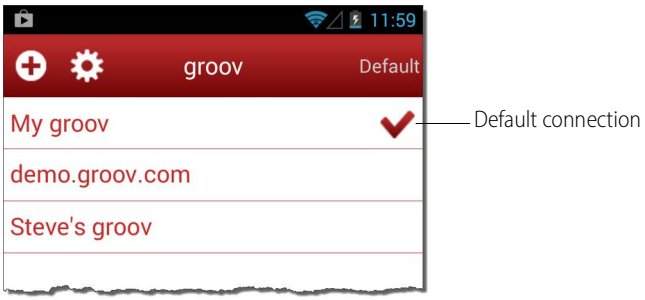
   If you haven't connected a *groov* device or server, see "Adding a Connection to a groov Device or Server in the iOS App". If you have set and enabled a default connection, *groov* View automatically attempts to connect to the default *groov* View connection. To return to the list view, tap the back button or swipe right.

2. Tap a connection in the list to view the **Options** menu:



- **Connect**—Connects to the selected connection.
- **Edit**—Opens the selected connection so you can edit connection settings. The screen is filled with the data from the selected connection, and the title is the **Display Name** (if configured) or the hostname of the connection. For information about the options, see "Adding a Connection to a groov Device or Server in the iOS App".
- **Set as Default**—Sets the selected *groov* View connection as the default so that when you start the *groov* View app it bypasses the connection list and opens the default connection automatically. For this to work, also tap the **Settings** icon at the top of the screen and turn on **Enable Default**

Connection (see "Configuring iOS Mobile App Settings"). The default connection is indicated with a check mark. Only one connection can be the default.

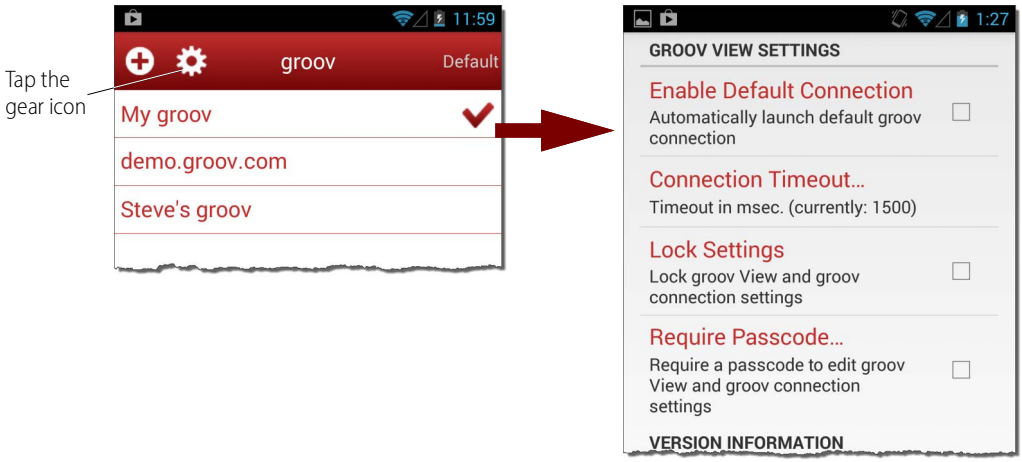


- **Delete**—Deletes the selected connection from the list.
- **Cancel**—Closes the **Options** menu.

Configuring Android Mobile App Settings

To configure the Android *groov* View app settings:

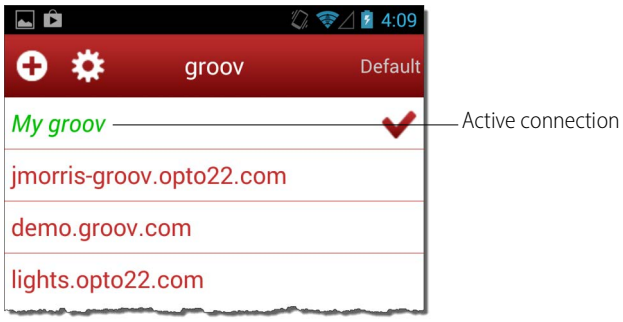
1. Tap the gear (**Settings**) icon.



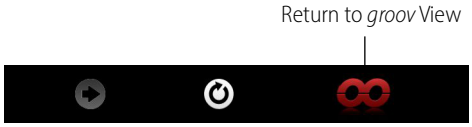
2. Configure the following settings:
   a. **Enable Default Connection**—Bypasses the connection list when starting the *groov* View app and goes directly to the default connection. To enable this, you also need to assign a default connection in the *groov* View **Options** menu. See "Connecting, Editing, and Setting a groov View Connection as the Default in the iOS App".
   b. **Connection Timeout**—Sets how long the app spends trying to connect to the *groov* device or server. The timer starts as soon as the **Connect** menu option is selected.
   c. **Lock Settings**—Locks the settings so that no connections can be added, modified, or deleted, and the settings themselves can't be changed. When using this option, you also need to require a passcode. Otherwise, anyone can unlock the settings.
   d. **Require Passcode**—Requires a user of this mobile device to enter a passcode to change the settings or to add, modify, and delete connections. You are prompted to enter a new passcode when you enable this option.
3. To return to the list view, tap the back button or swipe right.

Navigating Through the *groov* View Android App

- **To return to the connection list** without closing the current *groov* View connection, swipe right. This works in normal view or with **Full Screen** enabled (see "Adding a Connection to a groov Device or Server in the iOS App"). The active connection is shown in green.



- **To return to the current connection**, do one of the following:
  - Swipe left from the connection list.
  - Tap the active connection and tap **Resume** from the menu.
- **To disconnect from the current connection**, tap the connection in the list, and tap **Disconnect**.
- **When you navigate to an external webpage** that opens when you tap a URL link in a *groov* View HMI, use the navigation bar at the bottom of the page to return to *groov* View and tap the *groov* View icon.



USING *groov* VIEW OVER THE INTERNET

If you're using a PC or mobile device to communicate with *groov* View over the internet rather than from inside your local area network, we recommend you use a VPN for security. Talk with your IT Department to get a VPN set up. For more information about using a VPN, see the *Guide to Networking groov Products* (form 2161).

7: Troubleshooting and Additional Help

This chapter provides troubleshooting information and answers questions you may have about *groov* View.

In this chapter:

TROUBLESHOOTING

In addition to the questions and answers in this chapter, see "Viewing Log Messages" on page 96. Admins for *groov* may also find it useful to create an Admin-only page to show system information such as uptime, number of user sessions, CPU usage, and so on. See "Add System Tags" on page 54.

Q: In *groov* View on my laptop/HDTV/phone/tablet, all I see is a blank page.

A: There are two possibilities:

- Your web browser may not fully support the modern standards *groov* is based on. Try downloading the latest version of your browser, or try a different browser. We generally recommend Firefox or Chrome, but your device might work better with Apple® Safari® or Microsoft Edge®.
- You may be logged in as a user who doesn't have access to any pages. Go to Build mode and check your users and groups to make sure the user has access. See "Managing User Access" on page 81 for help.

Q: In *groov* View on my mobile device, I can't get the pages to load.

A: If pages won't load, first, make sure you have at least the minimum OS for your device:

- **Android:** 4.0.1 (Ice Cream Sandwich)
- **iOS:** 5.0

If you're still having problems, here are some things to try:

- Try adding your own company domain to the hostname of the *groov* EPIC controller, *groov* Box, or *groov* Server for Windows. Sometimes the DNS (domain name server) won't resolve the hostname unless you add your domain. For example, instead of `https://opto-02-81-c2` try `https://opto-02-81-c2.opto22.com` (Your domain will be different. Note the period between the hostname and domain.)
- Try adding the port number to the hostname. Port 443 is the default; port 8443 is the secondary, so try them in that order. For example, instead of `https://opto-02-81-c2` try `https://opto-02-81-c2:443` (Note the colon between the hostname and port.)

Q: In *groov* View, why are some gadgets grayed out with a yellow triangle?

A: If a gadget is grayed out with a yellow triangle, one of these communication problems is occurring:

- *groov* View isn't communicating with the *groov* EPIC, Server, or Box.
- *groov* View isn't communicating with the device the tag comes from (for example, a PLC or PAC, OPC UA server, etc.).
- If you're using the Ignition Edge free trial, the trial may have expired. See the *groov EPIC User's Guide* (form 2267) or the *groov Box User's Guide for GROOV-AR1* (form 2104) for steps to restart it or to license Ignition Edge.
- The device the tag comes from (for example, an OPC UA server or PLC) is not communicating with your control system or equipment.

Click the yellow triangle to display an information dialog box.

- If the information box says that a tag is not available on a SNAP PAC controller, make sure the strategy running on that controller matches the `idb.txt` file you have associated with that IP address.
- If the information box reports **Bad_ShelvingTimeOutOfRange**, your Ignition Edge trial has probably expired, and the internal OPC UA server cannot be reached.

Once you have fixed communications, *groov* View automatically restores the gadget to working order.

NOTE: groov View polls the device (for example, a PAC/PLC or OPC UA server) for data once per second. This frequency cannot currently be changed.

Q: In *groov* View, why are some gadgets grayed out with a manila tag?

A: If a gadget is grayed out with a *no-tag* symbol, the gadget does not have a properly configured tag associated with it.

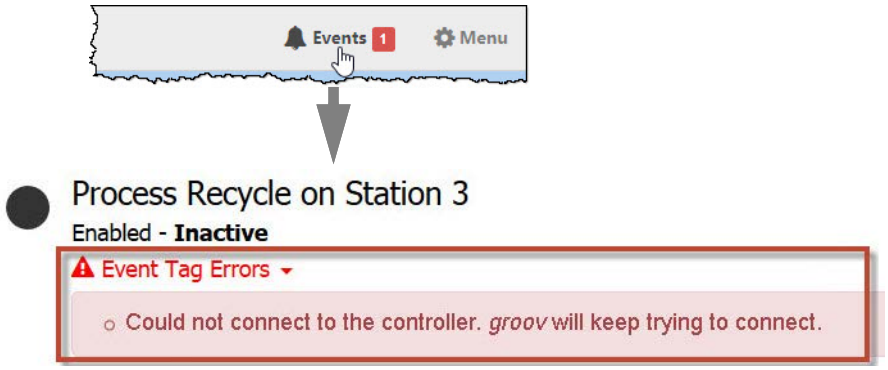
Once you have configured a tag for the gadget, *groov* View automatically restores the gadget to working order.

Q: Why am I not receiving event notifications for properly configured events?

A: You may have lost connection with the device that has the tags (Modbus/TCP device, EPIC, PAC or PLC, OPC UA server, etc.). If so, *groov* View cannot check the tags it's supposed to be watching, so you won't receive event notifications for those tags.

If you are sending notifications via email, make sure you have updated security for your email account. See the *Configuring Email Applications for Opto 22 Products Technical Note* (form 2384).

Click the **Events** (bell) icon to open the Events Viewer. If you see the **Could not connect**... error, you'll need to track down what happened to your lost connection. See also "Viewing Events" on page 139.



Q: In Build mode, where are the dialog box buttons?

A: If you can't see dialog box buttons, your browser's font size may be set too high. Reduce the browser's font size so that you can see them.

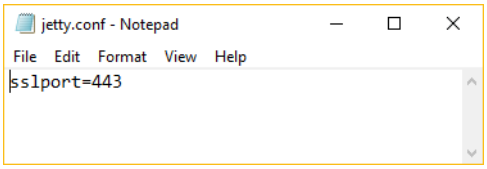
Q: I have *groov* Server and I'm not able to open *groov* View.

A: There might be a conflict with another service running on your computer. In this case, you might need to change one or both of the ports *groov* Server uses to run.

Before changing port numbers, consult with your IT manager as needed.

To change a port number:

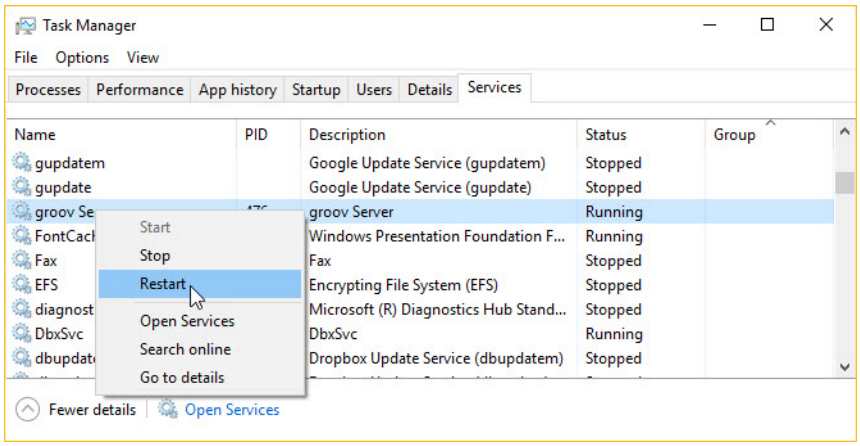
1. Open the `jetty.conf` file installed on the *groov* Server computer (located in `Opto22\groov\jetty`).



2. Change the port number as necessary.
3. Save and close the file.
4. Restart *groov* Server and try again.

To restart *groov* Server:

5. Open the Windows Task Manager and click the **Services** tab.
6. Right-click ***groov* Server** and choose **Restart** from the pop-up menu.

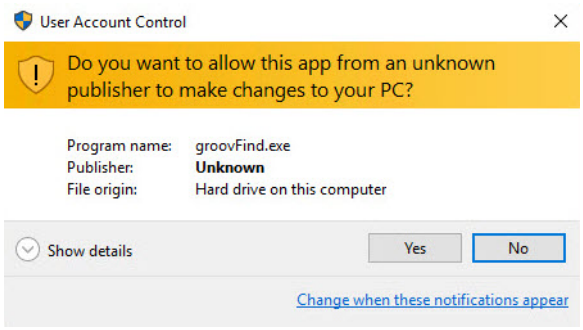


Q: I cannot locate my *groov* EPIC, *groov* RIO, or *groov* Box on the network.

A: If your browser can't connect to your *groov* RIO module, *groov* EPIC processor, or *groov* Box using its hostname, you can use *groov* Find to locate *groov* devices on your network. You must use *groov* Find if your network does not provide DHCP and DNS services.

For Windows

1. Download *groov* Find from our website (go to www.opto22.com and search for `groov Find`).
2. Save the file to your computer.
3. Open *groov* Find.
4. If you have User Account Control (UAC) turned on, click **Yes** when asked if you want *groov* Find to be allowed to make changes to your computer.

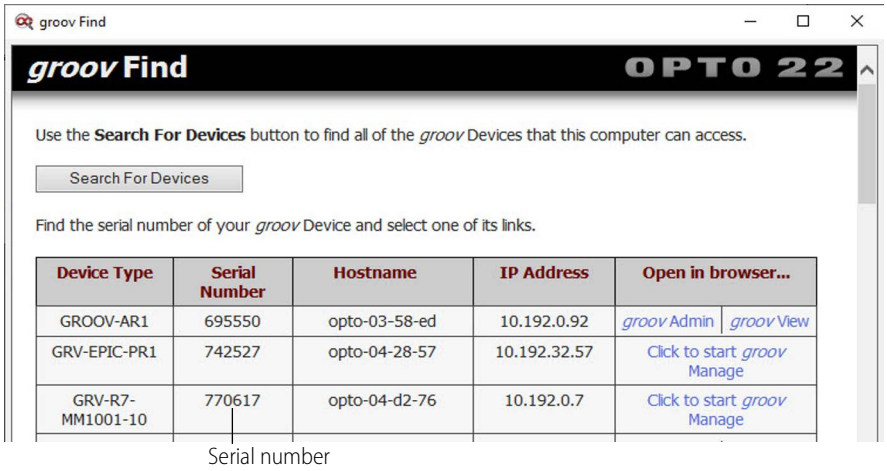


NOTE 1: *If you are using a Windows account that does not have Administrator privileges (such as Guest), you need to enter the Administrator username and password to use groov Find. If you do not have this information, contact your IT department.*

NOTE 2: *Clicking* **Yes** *permits groov Find to have temporary administrative privileges to create an additional temporary IP address for each network interface on the computer. This enables groov Find to locate a groov device on a network that does not have DNS and DHCP. If the network does not have DNS and DHCP, you need to assign a static IP address to the groov device to maintain communication. (See the device's user's guide.) If the network does have DNS and DHCP, the temporary IP address is not used and is removed when you exit groov Find.*

5. Click **Yes**.
   groov Find opens and automatically searches for *groov* devices on the network.

6. Locate the serial number on the *groov* device label.
   - On a *groov* EPIC, open the LCD display and the label is on the back of the display.
   - On a *groov* RIO, the label is on the side of the unit. The serial number is indicated by **SN**.
   - On a *groov* Box, the label is on the bottom of the unit.
7. Locate the matching serial number in *groov* Find.



   If you do not see the serial number right away, wait 60 seconds and click **Search For Devices**.
8. Note the *groov* device's IP address. Enter this IP address instead of the hostname as the URL in your browser: `https://<ip address>`

   Or you can click the link for *groov* Manage, *groov* Admin, or *groov* View depending on your device and the software you want to open.

For Macs

1. Go to the App Store and search for `Opto 22`.
2. On the *groov* Find app, click **Get**. If requested, enter your Apple Store ID and password.
3. Click **Open**.

   Within a minute, *groov* Find begins locating *groov* RIOs, *groov* EPICs, and *groov* Boxes on your network and displays them in a list.
4. Locate the serial number on the *groov* device label.
   - On a *groov* EPIC, open the LCD display and the label is on the back of the display.
   - On a *groov* RIO, the label is on the side of the unit. The serial number is indicated by **SN**.
   - On a *groov* Box, the label is on the bottom of the unit.
5. Locate the matching serial number in *groov* Find and note the *groov* device's IP address. Enter this IP address instead of the hostname as the URL in your browser: `https://<ip address>`

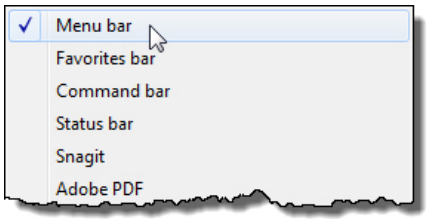
Q: I'm having trouble using Internet Explorer 10 with *groov* View.

NOTE: If you have a groov View version higher than 4.4, you cannot build HMIs with Microsoft Edge versions prior to 79 or with any version of Internet Explorer. However, you can still view your HMIs with these older browser versions.

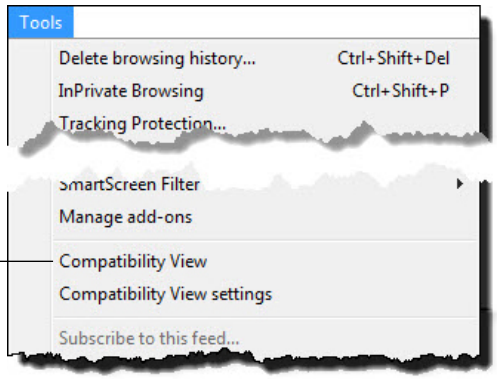
A: If available to you, try the Microsoft Edge, IE11, Chrome, or Firefox browsers instead. If you have to use Internet Explorer 10, make sure the browser is not reverting back to version 9 mode; *groov* View is not compatible with Internet Explorer 9. To do this:

1. Open Internet Explorer 10.

2. If the menu bar is not already showing, right-click anywhere in the top border of the browser and select the **Menu bar** option.

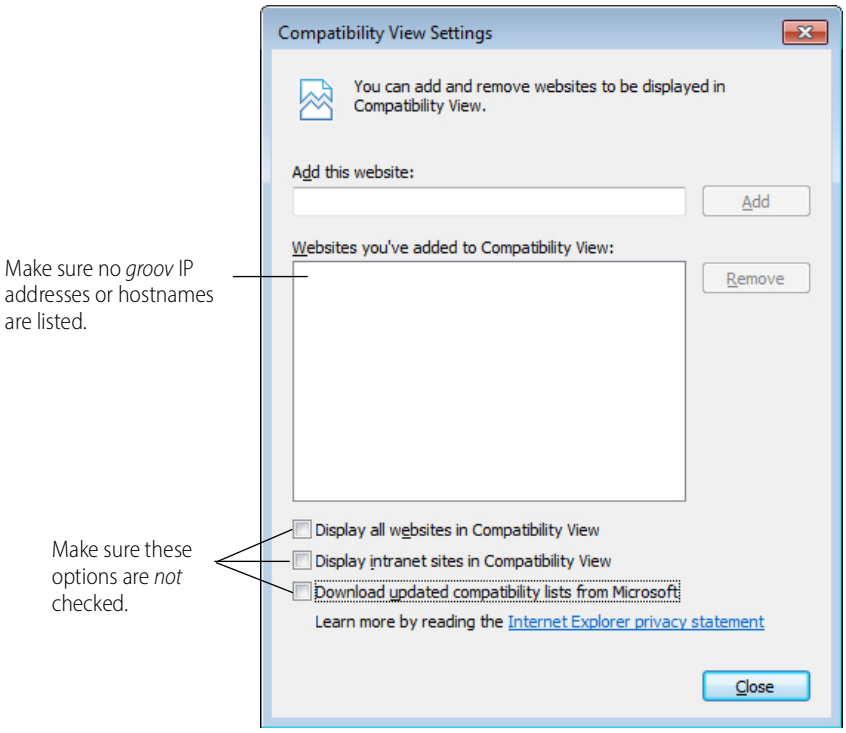


3. Open the **Tools** menu, and make sure that **Compatibility View** is ***not*** selected.



Make sure this option is *not* selected.

4. Select **Tools** > **Compatibility View** settings.
5. In the Compatibility View Settings dialog box, make sure that no *groov* IP addresses or hostnames are listed under **Websites you've added to Compatibility View**.
6. Make sure the compatibility options at the bottom of the dialog box are ***not*** checked.



7. Click **Close**.

Q: My cell phone disconnects from *groov* View after about 30 seconds (*groov* Box).

A: The settings on your phone can cause a connection to the soft access point on the GROOV-AR1 to disconnect.

If you are a Sprint customer, try turning off the Connections Optimizer.

1. On your phone, go to **Settings** > **More...** > **Mobile Networks** > **Connections Optimizer**.
2. Uncheck the box for Connections Optimizer.

If you are *not* a Sprint customer, check your WiFi options.

1. On your phone, go to **Settings** > **WiFi** > **Advanced**.
2. Make sure the **Avoid poor Internet connection** and **Internet Unavailable** options are *not* checked.

Q: I can't read (or write to) my Modbus/TCP device *or* the data I get from my Modbus/TCP device doesn't make sense.

A: Although based on a standard protocol, Modbus/TCP devices may be set up differently from one another. Some use zero-based addressing and some use one-based addressing. Some devices don't support all Modbus functions. Modbus/TCP devices also vary in the way they present float data. Additionally, device documentation sometimes doesn't specify how the device is set up.

If you're having trouble reading or writing to your device, or if the data is clearly wrong, start by reading the explanations in "Add a Modbus/TCP Device" on page 35. Consult your device's documentation for help, and change the settings for your Modbus device in **Configure** > **Devices and Tags**. You may need to try different combinations of settings to see what works.

If data from the Modbus device doesn't make any sense (looks like garbage or is completely abnormal), change the **Use base one addressing** setting or change the combination of **Value Orders**.

One of the best ways to figure out how to connect with any Modbus/TCP device and get the data presented in the right format is to use a Modbus/TCP test utility like ModScan32 from www.Win-Tech.com. Our Product Support Group recommends this utility.

You can also use the utility Wireshark (www.wireshark.org) to see the Modbus/TCP traffic between your devices, so you know exactly what message was sent and what the specific reply was.

If you need help, be sure to contact Opto 22 Product Support (see page 7). Product support is free.

Q: I want to check when my license expires or renew my license, but I don't see the Licensing item in the Configure menu.

A: If *groov* View is running on a *groov* EPIC processor, your license does not expire.

For *groov* Server or a *groov* Box, you must be logged into Build mode as an Admin security level user to see licensing information or update your license. If you're logged in as an Editor, you won't see **Licensing** in the **Configure** menu.

NOTE: If you're using a groov Box, it's easy to confuse groov Admin, the software that administers the Box, with the Admin user security level in groov View. For licensing, use the Admin username and password for groov View.

Q: Is there a forum for *groov* View?

A: Yes! There's a *groov* OptoForum. Find it at www.opto22.com: click **Community** > **Opto Forums** and choose ***groov*** from the **categories** drop-down list. This is the place to ask and answer questions. Experienced engineers and integrators all over the world contribute to OptoForums, so it's a great way to get help at any time.

WORKING WITH *groov* VIEW

Q: How safe is *groov* View in terms of information security?

A: *groov* products use the same security as your bank: the latest 256-bit encryption plus authentication with usernames and passwords. For communications over the internet, we recommend a virtual private network (VPN).

Q: Can I VPN into my *groov* EPIC?

A: Yes. The *groov* EPIC processor includes an OpenVPN client. See the *groov EPIC User's Guide* (form 2267) for information about setting it up.

Q: Can I VPN directly into my *groov* Box?

A: The *groov* Box is not a VPN server. Find out if your company network has a VPN server. Most companies do and use it to let employees safely access the network from home or a remote site. Most smartphones have a VPN client built into them. For more information, see the *Guide to Networking groov Products* (form 2161).

Q: How often does the *groov* View operator interface update its data?

A: Your interface in *groov* View polls tags once per second by default. You can change this rate for each device as needed. See "Working with a Device" on page 29 and follow the steps for your type of device.

Q: Can I change more than one tag with a single gadget or stack gadgets to do two things at once?

A: Sorry, not for control. Currently, *groov* View supports only one tag per gadget. If you stack gadgets, the one on top wins: it's the only one that will be functional.

But from a monitoring standpoint, if indicators on the gadget at the back are still visible with another gadget in front, stacking gadgets can work. See Chapter 4: Gadget Reference for details on each gadget, including transparency (opacity) options and using images or colors to indicate values within a range.

Q: Can gadgets be restricted to particular operators?

A: Operator permissions are based on a page, so everything on one page must be OK for everyone in a user group to see and change. If some operators should be able to see a gauge and some should not, for example, just create two pages—one that includes the gauge and one that doesn't. Then assign user rights to the pages appropriately. See "Manage User Groups" on page 86.

However, a page can be different for operators using it on a desktop or tablet versus those using it on a handheld device. You can stash individual gadgets so they don't appear in one view while making them still visible in the other. See "Use the Page Stash" on page 26.

Q: Can you choose who can edit which pages?

A: Currently, anyone designated as an Editor can edit all pages in one *groov* View installation (*groov* EPIC, *groov* Server, or *groov* Box). A second *groov* product would give you the option to assign different Editors to different pages.

OPTO 22 SYSTEMS

Q: I'm talking to Opto 22 equipment and can't find my strategy .idb.txt file.

A: Your *groov* EPIC or SNAP PAC controller is running the control program (strategy) you built in PAC Control. When you saved that strategy, the `.idb.txt` file was automatically created on your PC in the same directory as your other strategy files. If you're now using a different PC, you need to get the `.idb.txt` file from the other computer.

If your computer hides common file type extensions (some do), you'll see two files with the same name (the name of your strategy). Just select the file that does *not* have the PAC Control icon next to it.

NOTE: If you're using groov View with an OptoEMU Sensor, you can get the OptoEMU Sensor.idb.txt file from www.opto22.com.

Q: What's the minimum PAC firmware requirement for *groov* View?

A: The SNAP PAC controller your *groov* EPIC, *groov* Box, or *groov* Server connects to must be running R9.2 or higher firmware. If you're using *groov* View with an OptoEMU Sensor, you need update file R3.0a or higher.

Q: If a PAC controller is connected to B3000 serial brains, can I get those tags in *groov* View?

A: Yes. If the tag is in the controller, it can be displayed in *groov* View.

Q: Can I use *groov* View to access I/O points on my SNAP PAC brain?

A: Yes, as of version R3.5a, *groov* View can access memory map tags on a SNAP PAC I/O unit. See "Add an Opto 22 I/O Unit" on page 31.

If you need to access legacy I/O units, it's possible to do so using KEPServerEX (see next question).

Q: Can I use *groov* View with my FactoryFloor system? I have an Ethernet card.

A: Yes, but not directly. *groov* View works with all *groov* EPIC processors, SNAP PACs running 9.2 firmware or higher (SNAP PAC S-series controllers, SNAP PAC R-series controllers, and the SoftPAC software-based controller), and with OptoEMU Sensor energy monitoring units running update file R3.0a or newer.

groov View does not work with Opto 22 FactoryFloor, SNAP Ultimate I/O, SNAP-LCSX, other legacy controllers, or pre-9.2 SNAP PACs.

However, it's still possible to use *groov* View with these legacy systems by installing KEPServerEX with the OPC Connectivity Suite. Connect to your FactoryFloor OPC Server (which is an OPC-DA server). *groov* View (which is an OPC UA client) can then connect to KEPServerEX, and you can import your tags.

Q: Can I use tables in *groov* View?

A: You can select individual elements (indexes) of a table. *groov* View supports all of these data types: integer, float, and string variables and tables, and analog and digital I/O.

Q: How do I use timers/PIDs/Scratch Pad in *groov* View?

A: *groov* View supports integer, float, timer, and string variables and tables, and analog and digital I/O. To use elements in a PID loop, memory-map Scratch Pad elements, or other data you need in a *groov* View interface, just periodically move the data you want into a variable.

A: IP Cameras

The Video gadget works with IP cameras that can serve a single image in response to an HTTP request without the need for an ActiveX® control. Make sure that the IP camera or server is configured to provide a single frame at a time. IP cameras serve content in a variety of ways, but single-frame display is a very common configuration option.

We have successfully used the following IP cameras in our projects:

- Foscam® Fi8910w
- Foscam® Fi9802w
- Vivotek® FD8361
- Vivotek® IP8352

If you are using an IP camera make or model other than the ones listed here, you can try using one of the example URLs described in the following sections.

In this appendix:

SERVING A SINGLE IMAGE IN RESPONSE TO AN HTTP REQUEST

groov View does not support streaming. Instead, it uses a web browser to retrieve a sequence of images from an IP camera. Therefore, when you set up a Video gadget, you cannot simply paste the IP camera's IP address (like you can in your browser). Nor can you use the link that leads to the IP camera video stream. Instead, you need to construct a link that retrieves a single image from your IP camera. Your link may look something like this: `http://123.123.123.123/snapshot.cgi`

Every IP camera is different, so you have to look in your IP camera's documentation to find out what your specific IP camera uses. It might be called either a *snapshot* or *single shot*.

TIP: To find URL information for your IP camera on the internet, try searching for your IP camera model number and the word `snapshot`.

SETTING UP THE IP CAMERA'S USERNAME AND PASSWORD

If your IP camera requires a password, you will need to include the username and password in the URL that the browser passes to the IP camera.

NOTE: Not all IP cameras use the same format, so you refer to your IP camera's documentation for the exact syntax.

1. Construct the URL to include the username and password.

   For example:

```
http://123.123.123.123/snapshot.cgi?user=yourusername&pwd=yourpassword
```

   Make sure to use your IP camera's IP address and link information, and use the appropriate username and password to replace *yourusername* and *yourpassword*. If you do not provide the username and password in the URL, *groov* View displays an empty box instead of the image and prompt you for the username and password.

   NOTE: The link is not secure because you are passing the username and password in plain text, so it is easy to sniff.

2. Open the URL in a new browser tab.

   You should see a static picture.

3. Click **Refresh** or **Reload** in the browser.

   If the static picture updates to a new picture, this means you have an IP camera and a URL that will work with *groov* View.

4. Copy and paste the URL into the video gadget, and then save the project.

   In *groov* View the image is refreshed at the rate you set in **Configure** > **Project** in Build mode.

   NOTE: It is the browser, not groov View, that polls the IP camera. This means the browser (not groov View) needs to have network access, permissions, and so on to access the IP camera.

If you use this procedure and cannot get the web browser to display a static image from the IP camera, it is not an issue with *groov* View. Check the IP camera itself and its configuration, the browser and its settings, the network and subnet, and network permissions. For more information, see "Viewing an IP Camera Outside the Network" on page 175.

FOSCAM IP CAMERAS

Foscam Fi8910w

Sample URL:

```
http://123.123.123.123/snapshot.cgi?user=UUUU&pwd=PPPP
```

Change the IP address to match your internal or external IP address. Change `UUUU` to the username for the IP camera, and change `PPPP` to the password for the IP camera.

Foscam Fi9802w

Sample URL:

```
http://123.123.123.123/cgi-bin/CGIProxy.fcgi?cmd=snapPicture2&usr=UUUU&pwd=PPPP
```

1. Change the IP address to match your internal or external IP address.
2. Change UUUU to the username for the IP camera, and change PPPP to the password for the IP camera.

3. If you are using a different port than port 80, you need to add that to the URL.
   For example, some Foscam IP cameras use port 88, so 88 is added to the URL as follows:

```
http://123.123.123.123:88/cgi-bin/CGIProxy.fcgi?cmd=snapPicture2&usr=UUUU&pwd=PPPP
```

VIVOTEK IP CAMERAS

IP cameras tested:

- Vivotek FD8361
- Vivotek IP8352

For details about how to construct a URL for a Vivotek IP camera and configure security, see the documentation that came with the IP camera.

Example URL:

Here is an example of a URL to use with a Vivotek IP camera that is compatible with *groov* View.

```
http://opto22.groov.com:8082/cgi-bin/viewer/video.jpg?channel=1&resolution=640x480&quality=3
```

This IP camera is on port 8082, and it has been configured with a user (*viewer*) that has no username or password. Your IP camera may be configured differently.

VIEWING AN IP CAMERA OUTSIDE THE NETWORK

If you wish to view your IP camera image from outside your network, you have two options:

- **Option 1:** Make sure your IP camera can be accessed from outside the local area network it is configured on. Discuss access with your IT department so they can set up a VPN or allow a port forward on your router to the IP camera.
- **Option 2:** Use the **Proxy** option for the video gadget. In this case, *groov* View polls the IP camera over your local area network and presents the updated video frames to the client at the rate (in seconds) set on the video gadget.

***CAUTION**: Be aware that anyone with access to Build mode can view the username and password to the IP camera in clear text. This should be accounted for when setting up access to Build mode and access to the IP camera.*

CHANGING THE VIDEO GADGET REFRESH PERIOD

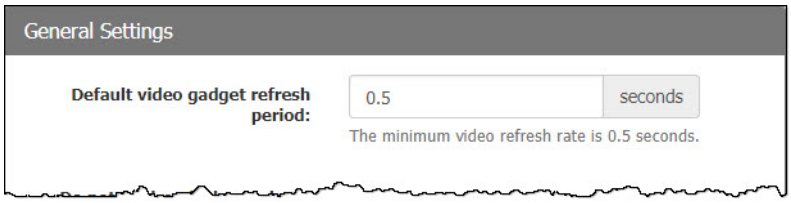
The video gadget refresh period sets how often in seconds *groov* View refreshes the image from an IP camera. You can set the default update period for all instances of the video gadget, or you can set the refresh period for an individual instance.

If you have a fast internet connection and are not concerned about data use, then you can use the fastest setting (0.5 seconds) for a smoother video. However, if you have a slower connection, the video might not be able to keep up, and you should set a slower rate by entering a higher value. Also, if you have a data use cap, you should probably set a slower rate.

Satellite or cell modem networks may require refresh rates of 5 seconds or slower. For example, the default 0.5 seconds may be too fast for some ADSL (Asymmetric Digital Subscriber Line) connections.

To set the default update period for all video gadgets:

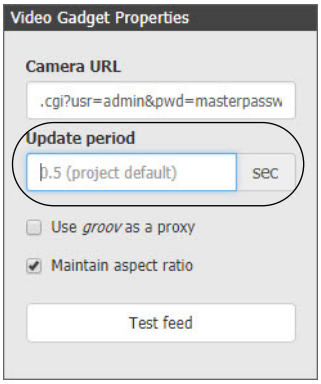
1. In Build mode, choose **Configure** > **Project**.
2. In the **General Settings** section, enter a value in the **Default video gadget refresh period** field.



3. Click **Save Settings** at the top of the page.
4. Click **Close**.

To set the update period for an individual video gadget:

1. In Build mode, click the Video gadget to display the **Video Gadget Properties**.
2. Enter a value in the **Update period** field.



B: OPC UA Data Types Supported

The following table shows the official Browse Name for OPC UA data types and the corresponding names used in *groov* View. The official OPC UA data type names are defined in the UA Specification (Part 5, Section 12). For information about the data types supported by a specific OPC UA server, see that company's documentation.

OPC UA Type	*groov* View
Boolean	Boolean
String	String
SByte	Signed Byte
Int16	16-bit Signed Integer
Int32	32-bit Signed Integer
Int64	64-bit Signed Integer
Byte	Unsigned Byte
UInt16	16-bit Unsigned Integer
UInt32	32-bit Unsigned Integer
UInt64	64-bit Unsigned Integer
Float	Single Float
Double	Double Float

C: Data Simulator Tags

The tags provided with *groov* View's built-in Data Simulator allow you to experiment with adding tags to gadgets, configuring the tags, and running your project in *groov* View. This appendix lists the Data Simulator tags and briefly describes what they do. The first section describes the Basic Tags. For Advanced Tags, see page 182.

BASIC TAGS

Variables

Unlike many other tags in the Data Simulator, you can read and write these basic variable tags. There are five each of Boolean, float32, integer32, and string data types.

Variable Name	Data Type
bool Variable A	boolean
bool Variable B	boolean
bool Variable C	boolean
bool Variable D	boolean
bool Variable E	boolean
float32 Variable A	32-bit float
float32 Variable B	32-bit float
float32 Variable C	32-bit float
float32 Variable D	32-bit float
float32 Variable E	32-bit float
int32 Variable A	32-bit integer
int32 Variable B	32-bit integer
int32 Variable C	32-bit integer
int32 Variable D	32-bit integer
int32 Variable E	32-bit integer

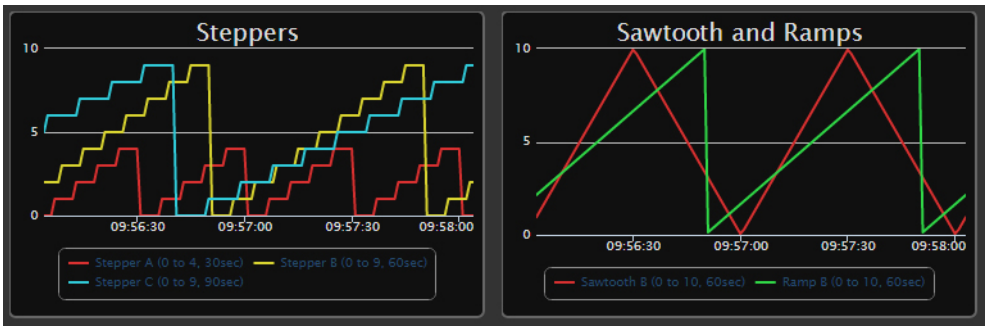
Variable Name	Data Type
string Variable A	string
string Variable B	string
string Variable C	string
string Variable D	string
string Variable E	string

General

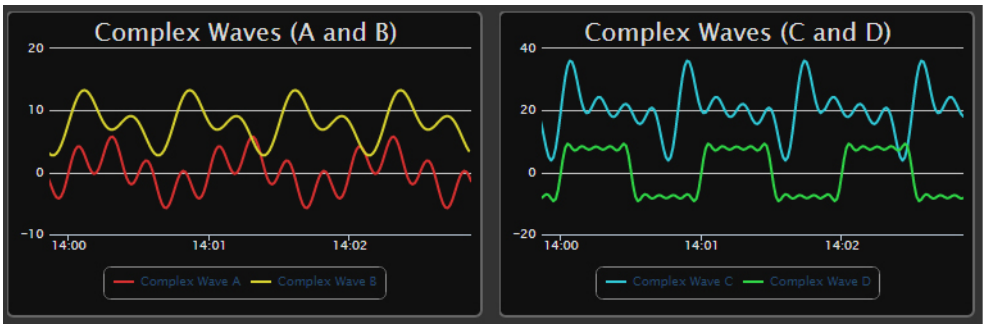
The complex and jagged waves have various ranges so that they don't overlap too much when placed on the same Trend.

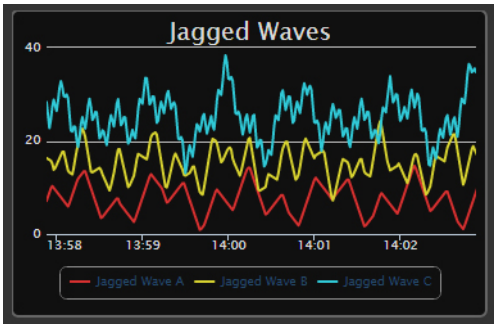
Variable Name	Data Type	Description
Complex Wave A	32-bit float	A complex but smooth wave, composed of various sine waves, with values ranging from -6 to 6.
Complex Wave B	32-bit float	A complex but smooth wave, composed of various sine waves, with values ranging from 2 to 14.
Complex Wave C	32-bit float	A complex but smooth wave, composed of various sine waves, with values ranging from 0 to 40.
Complex Wave D	32-bit float	A complex but smooth wave, composed of various sine waves, with values ranging from -10 to 10.
Jagged Wave A	32-bit float	A jagged wave, composed of various sawtooth patterns, with values ranging from 0 to 15.
Jagged Wave B	32-bit float	A jagged wave, composed of various sawtooth patterns, with values ranging from 5 to 25.
Jagged Wave C	32-bit float	A jagged wave, composed of various sawtooth patterns, with values ranging from 10 to 40.
Ramp A (0 to 10, 30 sec)	32-bit float	A ramp pattern, from 0 to 10, with a 30 second period.
Ramp B (0 to 10, 60 sec)	32-bit float	A ramp pattern, from 0 to 10, with a 60 second period.
Sawtooth A (0 to 10, 30 sec)	32-bit float	A sawtooth pattern, from 0 to 10, with a 30 second period.
Sawtooth B (0 to 10, 60 sec)	32-bit float	A sawtooth pattern, from 0 to 10, with a 60 second period.
Stepper A (0 to 4, 30 sec)	32-bit integer	Steps from values 0 to 4 over a period of 30 seconds.
Stepper B (0 to 9, 60 sec)	32-bit integer	Steps from values 0 to 9 over a period of 60 seconds.
Stepper C (0 to 9, 90 sec)	32-bit integer	Steps from values 0 to 9 over a period of 90 seconds.

Sample Stepper, Sawtooth, and Ramp Waves



Sample Complex and Jagged Waves





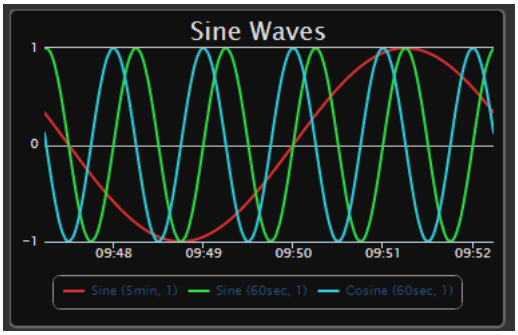
Square Waves

Variable Name	Data Type	Description
Square Wave A (1 sec true/false)	boolean	A square wave with a period of 2 seconds: TRUE for 1 second then FALSE for 1 second
Square Wave B (2 sec true/false)	boolean	A square wave with a period of 4 seconds: TRUE for 2 seconds then FALSE for 2 seconds
Square Wave C (5 sec true/false)	boolean	A square wave with a period of 10 seconds: TRUE for 5 seconds then FALSE for 5 seconds
Square Wave D (10 sec true/false)	boolean	A square wave with a period of 20 seconds: TRUE for 10 seconds then FALSE for 10 seconds
Square Wave E (Random period)	boolean	A square wave with random TRUE/FALSE periods. Each TRUE and FALSE state will be within 2 and 4 seconds.
Square Wave F (Random period)	boolean	A square wave with random TRUE/FALSE periods. Each TRUE and FALSE state will be within 4 and 8 seconds.
Square Wave G (Random period)	boolean	A square wave with random TRUE/FALSE periods. Each TRUE and FALSE state will be within 6 and 12 seconds

Sine Waves

Wave Name	Data Type	Description
Cosine (30 sec)	32-bit float	Cosine wave with a 30 second period and amplitude of 1
Cosine (60 sec)	32-bit float	Cosine wave with a 60 second period and amplitude of 1
Sine (15 min)	32-bit float	Sine wave with a 15 minute period and amplitude of 1
Sine (30 min)	32-bit float	Sine wave with a 30 minute period and amplitude of 1
Sine (30 sec)	32-bit float	Sine wave with a 30 second period and amplitude of 1
Sine (5 min)	32-bit float	Sine wave with a 5 minute period and amplitude of 1
Sine (60 sec)	32-bit float	Sine wave with a 60 second period and amplitude of 1

Sample Sine Waves



ADVANCED TAGS

Variables (Extra)

These variables have data types that are used less often. Unlike many other tags in the Data Simulator, you can read and write these variable tags. There are three of each type.

Variable Name	Data Type
float64 Variable A	64-bit float
float64 Variable B	64-bit float
float64 Variable C	64-bit float
int16 Variable A	16-bit integer
int16 Variable B	16-bit integer
int16 Variable C	16-bit integer
int64 Variable A	64-bit integer
int64 Variable B	64-bit integer
int64 Variable C	64-bit integer

Variable Name	Data Type
int8 Variable A	8-bit integer
int8 Variable B	8-bit integer
int8 Variable C	8-bit integer
uint16 Variable A	16-bit unsigned integer
uint16 Variable B	16-bit unsigned integer
uint16 Variable C	16-bit unsigned integer
uint32 Variable A	32-bit unsigned integer
uint32 Variable B	32-bit unsigned integer
uint32 Variable C	32-bit unsigned integer
uint64 Variable A	64-bit unsigned integer
uint64 Variable B	64-bit unsigned integer
uint64 Variable C	64-bit unsigned integer
uint8 Variable A	8-bit unsigned integer
uint8 Variable B	8-bit unsigned integer
uint8 Variable C	8-bit unsigned integer

Arrays

The arrays have the most common data types. Like the variables, you can read and write to the elements in the array tags.

Array Name	Data Type
bool Array [100]	boolean table
float32 Array [100]	32- bit float table
int32 Array [100]	32-bit integer table
string Array [100]	string table

User Controllable

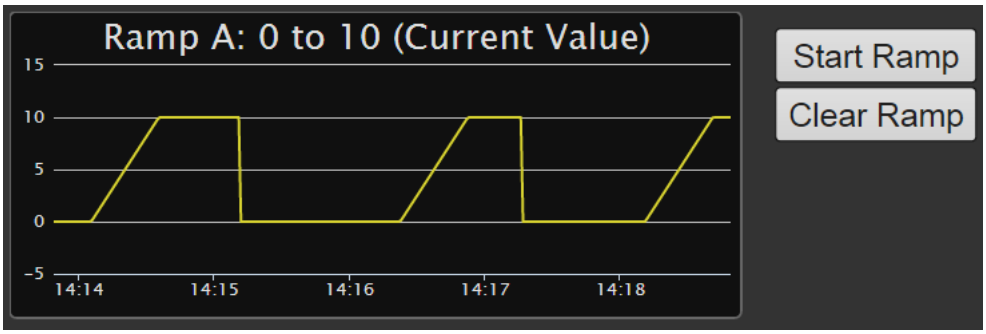
There are two user-controllable waves (or patterns) that provide you something to interact with in the *groov* View interface.

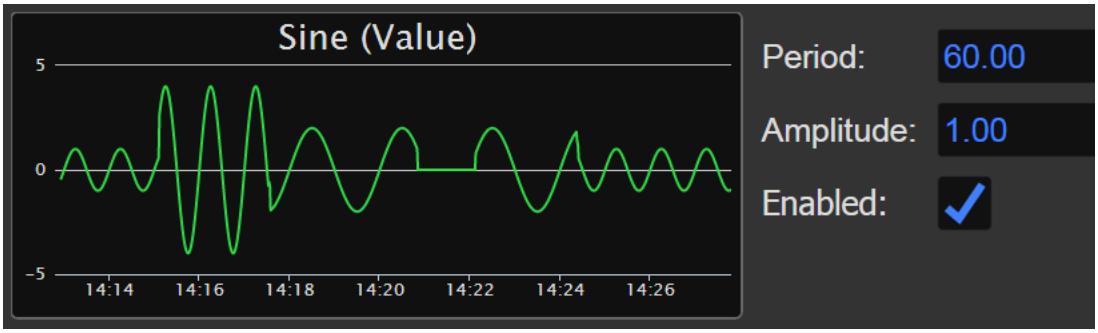
Ramp A: 0 to 10 is a ramping float32 value that you can start and then clear back to 0.

Sine is a sine wave that you can control for period and amplitude. You can also disable the sine wave, during which time it has a value of 0.

Wave Name	Data Type	Notes
Ramp A: 0 to 10 (Clear Flag)	boolean	A boolean flag to clear the ramp
Ramp A: 0 to 10 (Current Value)	32-bit float	The current value of the ramp
Ramp A: 0 to 10 (Start Flag)	boolean	A boolean flag for starting the ramp
Sine (Amplitude, 1 to 1000)	32-bit float	The amplitude of the sine wave (0 to 1000)
Sine (Enabled Flag)	boolean	The enable flag for the sine way (Setting this tag to False will disable the sine wave and set its current value to 0.)
Sine (Period, 1 to 1000 sec)	32-bit float	The period of the sine wave (1 to 1000 seconds)
Sine (Value)	32-bit float	The current value of the sine wave

Sample Ramp and Sine Waves





Static Values

These tags have static values, which means that they never change.

Static Value Name	Data Type	Notes
bool Always False	boolean	Always boolean “false“
bool Always True	boolean	Always boolean “true“
float32 Always +INF	32-bit float	Always float32 “+INF”
float32 Always -INF	32-bit float	Always float32 “-INF”
float32 Always 0.0	32-bit float	Always float32 “0.0“
float32 Always 1.0	32-bit float	Always float32 “1.0“
float32 Always NaN	32-bit float	Always float32 “NaN”
float64 Always +INF	64-bit float	Always float64 “+INF”
float64 Always -INF	64-bit float	Always float64 “-INF”
float64 Always NaN	64-bit float	Always float64 “NaN”
int32 Always 0	32-bit integer	Always an int32 “0“
int32 Always 1	32-bit integer	Always an int32 “1“
string Always ABC	string	Always a string of “ABC“
string Always Opto 22	string	Always a string of “Opto 22“

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