

SEL Grid Configurator Software

Instruction Manual

20250228

SEL SCHWEITZER ENGINEERING LABORATORIES

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S E C T I O N 1

Installation

Overview

To install the software, you must have at least the following.

Table 1.1 Minimum Requirements

Supported Operating Systems:	Microsoft Windows 11 (64-bit) Microsoft Windows 10 (64-bit) Microsoft Server 2016 (64-bit)
Processor Speed:	1.2 GHz (64-bit) or faster
RAM:	4 GB
Disk Space:	3 GB available
Monitor:	1280 x 800 or higher resolution monitor Note: For best viewing of the application windows and text, you may need to enter your Windows operating system settings and adjust the screen resolution settings to make text and other items larger or smaller.
Other Peripherals:	Mouse or other pointing device
Communications:	Serial or Ethernet connections to allow communication with SEL devices
Required Third-Party Software:	Microsoft .NET Framework 4.6.2

Two different installations of SEL Grid Configurator software are offered: a User Install and an Admin Install. Both install the same version of the software but support different use cases. SEL recommends using the User Install in most cases. Table 1.2 illustrates the differences and the different use cases for the two installation types.

Table 1.2 Differences Between Admin Install and User Install

User Install	Admin Install
Does NOT require administrative privileges to install on the computer.	Requires administrative privileges to install on the computer.
Accessible only to the user that installed the software.	Accessible by all users on the same computer.
Never requires an update to an existing installation of QuickSet.	May require an update to QuickSet and Device Manager for compatibility. If an update is necessary, the user is notified during SEL Grid Configurator installation. The user will then have the opportunity to cancel installation at that time.
Uses a separate database from QuickSet Device Manager. The User Install of SEL Grid Configurator cannot connect to an ACSELERATOR Database.	Uses the ACSELERATOR Database, the same database used by ACSELERATOR® QuickSet Device Manager, if installed. This provides a means to view and access supported devices from both SEL Grid Configurator and Device Manager.
Note: SEL Grid Configurator does not retain data when downgrading the User Install version.	

Examples of when to use the Admin Install:

- A single computer will be used to host SEL Grid Configurator, but many different users will be logging onto it and needing shared access to the devices in the database.
- The existing ACCELERATOR QuickSet Device Manager database devices that are compatible between both ACCELERATOR QuickSet Device Manager and SEL Grid Configurator are intended to be viewed and edited by both programs on an on-going basis.

QuickSet Compatibility With the Admin Version of SEL Grid Configurator

If you are using the Legacy Device Driver, or the Device Manager features of QuickSet, SEL recommends that you update to the latest available version of QuickSet in order for the SEL Grid Configurator, Legacy Drivers, and Device Manager to function properly. If the Legacy Drivers and Device Manager versions are not at the appropriate version in QuickSet, then during the SEL Grid Configurator installation you will be presented with a warning to update these components to the latest version before continuing with the SEL Grid Configurator installation.

Installation Instructions

IMPORTANT

You can find an instructional video on how to install SEL Grid Configurator at the following link: SEL Grid Configurator: How to Install.

Once you have decided on the best installation, perform the following:

- Step 1. Obtain the SEL Grid Configurator installation files from either the website (selinc.com/products/5037) or SEL Compass® software.
- Step 2. Run the installation file.
- Step 3. If you agree to the terms of the license agreement, select **I accept the license agreement**.
- Step 4. If you are running the User Install, select **Install** and go to *Step 6*. If you are running the Admin Install, select **Next** and continue to *Step 5*.

NOTE

The following option is only available in the Admin Install. Skip Step 5 if you are running the User Install.

- Step 5. Select the desired installation type.
 - a. Select **Typical** to use all default installation options, and then select **Install** to install the application.

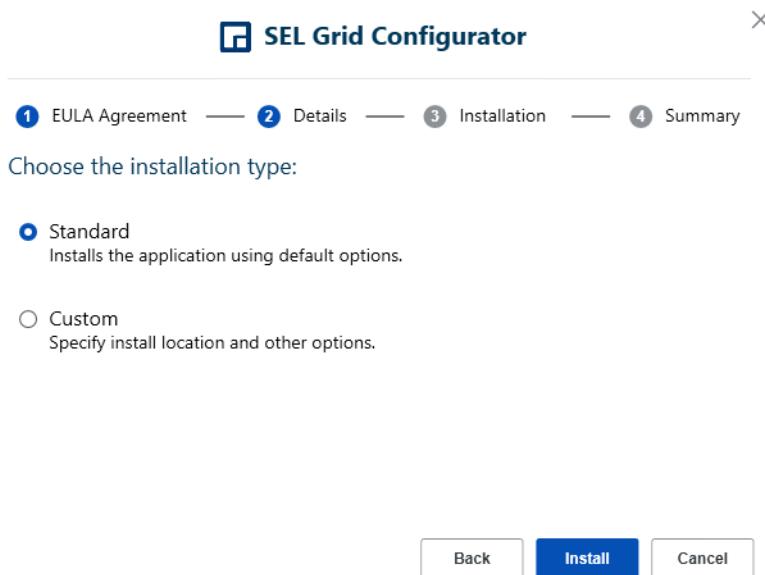


Figure 1.1 Select Typical to Accept All Default Installation Options or Select Custom to View or Modify Them

- b. Select **Custom** to choose where to install the application and the ACCELERATOR Database.
- c. Select **Next**.
- d. Enter the desired folder location or select **Browse** to select a folder and then select **Next**.

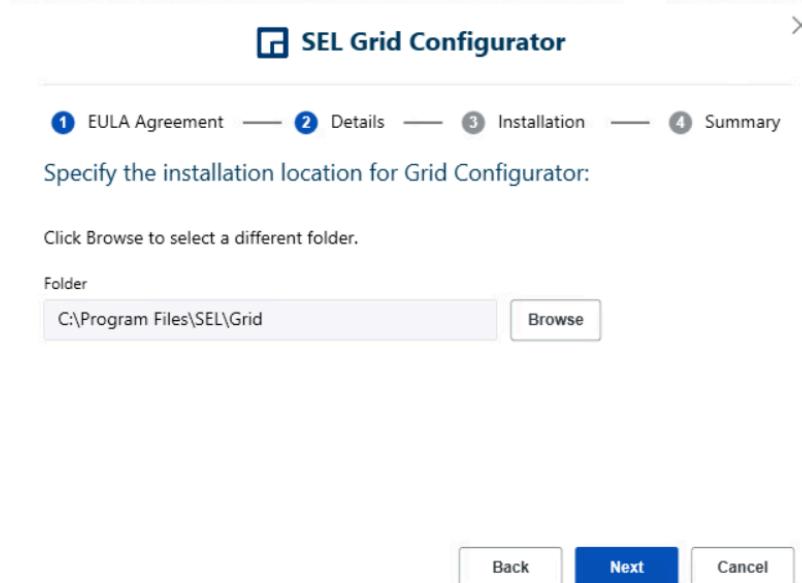
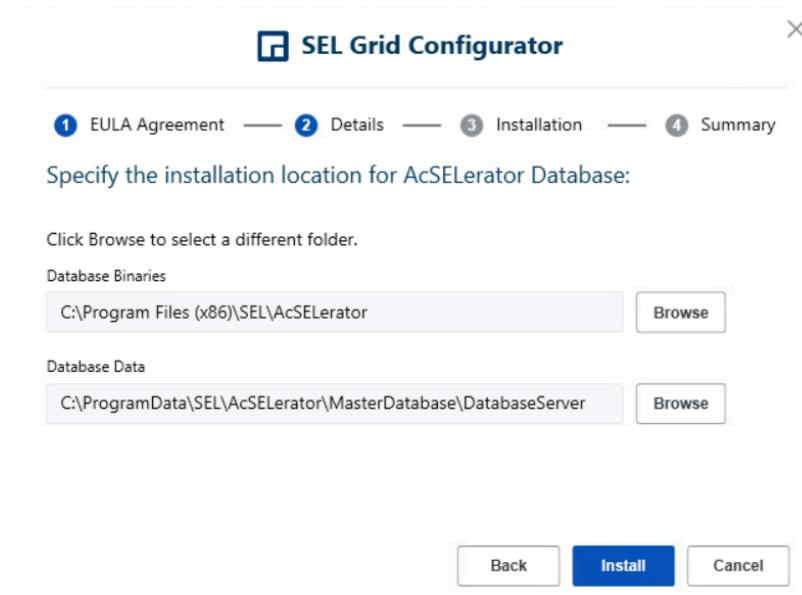


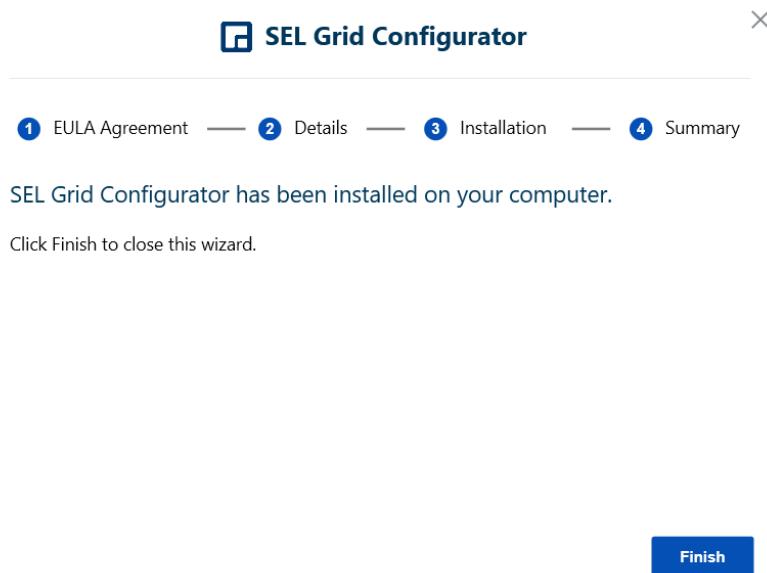
Figure 1.2 Select the Install Location for SEL Grid Configurator

- e. Enter the desired folder locations for the database binaries and data or select **Browse** to select a folder and then select **Install**.

Installation Instructions**Figure 1.3 Select the Install Location for the AcSELERATOR Database**

Step 6. After the installation process has been completed, select **Next**.

Step 7. Select **Finish** to close the installation wizard.

**Figure 1.4 SEL Grid Configurator Installation Completed Successfully**

Silent Installation

SEL Grid Configurator supports a command-line interface for silent, automated installations. The following parameters are supported:

- ▶ **/Silent**: Requires no end-user interaction and supports automated installs via scripting.
- ▶ **/AgreeEULA**: Represents an explicit approval of the License Agreement (EULA) to prevent showing the License Agreement form. This must be included with the /Silent option to perform a silent installation of SEL Grid Configurator.
- ▶ **/InstallPath**: Specifies the selected folder location when the default is not desired.
- ▶ **/DatabaseBinInstallPath**: Specifies the selected folder location for database binary files.
- ▶ **/DatabaseDataInstallPath**: Specifies the selected folder location for database data files.

Examples:

To perform a silent, default installation, execute the following:

```
SEL.Grid.UserInstaller-x.x.x.x.exe /Silent /AgreeEULA
```

To perform a silent installation while specifying the installation paths, execute the following:

```
SEL.Grid.AdminInstaller-x.x.x.x.exe /Silent /AgreeEULA /InstallPath="(Select file location)"  
/DatabaseBinInstallPath="(Select database binaries location)"  
/DatabaseDataInstallPath="(Select Database data location)"
```

Uninstalling SEL Grid Configurator

SEL Grid Configurator supports uninstallation by the following methods:

- ▶ Through Windows Apps & features (Admin Install only)
- ▶ Through Windows Start Menu via an **Uninstall SEL Grid Configurator** shortcut in the **SEL Applications** folder (User Install only)
- ▶ Through SEL Compass (Admin Install only)
- ▶ Silently using the SEL Grid Configurator uninstaller's command-line interface

SEL Grid Configurator Uninstaller

The SEL Grid Configurator uninstaller (uninstall.exe) is located in the Uninstall folder in the SEL Grid Configurator install folder. The following parameters are supported:

- ▶ **/Silent**: A silent uninstallation shall be performed.
- ▶ **/RemoveDatabaseData**: Database data will be removed as part of uninstallation (User Install only).

Example:

To perform a silent uninstall, execute the following:

```
uninstall.exe /Silent
```

Removing Database Data (User Install Only)

The database data contains device information, settings, and collected device reports. Because the SEL Grid Configurator database is also shared by QuickSet and Device Manager, removing the database could affect the functionality of those software products, if they are installed. By default, the database data will remain on the machine when uninstalling SEL Grid Configurator. An option to remove the database data is available with the User Uninstall but not the Admin Uninstall. If you intend to reinstall SEL Grid Configurator in the future, it is recommended to not remove these data. To remove the database data, select the check box in the User Uninstallation Wizard (see *Figure 1.5*).

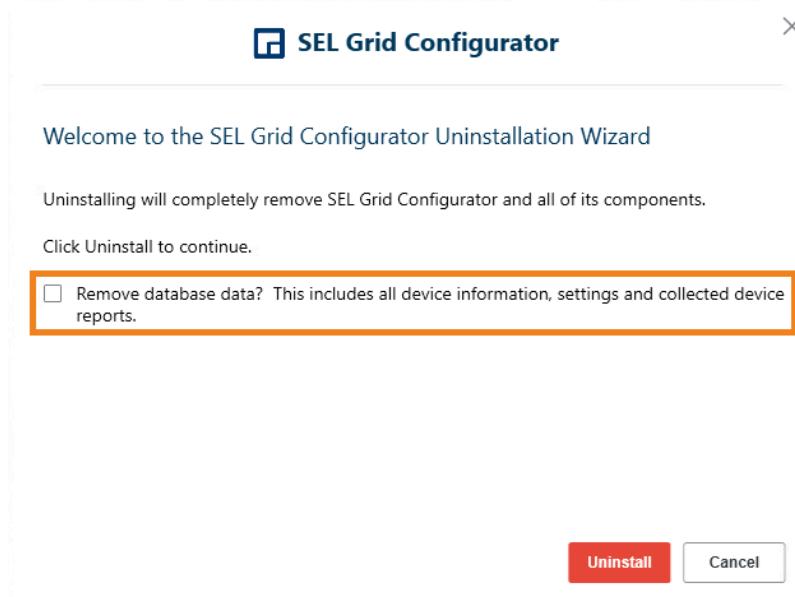


Figure 1.5 Option to Remove Database Data on Uninstallation (User Install Only)

In the case of the Admin Uninstall, the ACSELERATOR Database is not automatically removed. The ACSELERATOR Database requires manual removal via Windows Apps & features or SEL Compass.

SECTION 2

Getting Started

SEL Grid Configurator software is a tool for engineers and technicians to quickly and easily design, deploy, and manage device configurations for power system protection, control, metering, and monitoring. Through use of this software, you can perform the following:

- ▶ Configure settings for supported devices
- ▶ Organize and manage device settings
- ▶ Read and send settings for supported devices
- ▶ Read reports from supported devices

IMPORTANT

You can find an instructional video on getting to know the basics of SEL Grid Configurator at the following link: SEL Grid Configurator: Basics.

This section provides the basic process for creating and deploying settings for a new device. More detailed information on each part of the user interface is available in later sections of this manual. When you create a new device project, the software will prompt you for a part number. If you have none at the present time, start with the default part number; you may change it later.

- Step 1. Using a computer on which a supported operating system is installed, open SEL Grid Configurator by selecting the Windows start button (left side of the Taskbar in Windows 10), scroll down and select **SEL Applications**, and then select the SEL Grid Configurator icon. Alternatively, you can pin SEL Grid Configurator to the start panel, taskbar, or desktop on your computer.
- Step 2. Create a new device either by right-clicking in the System Explorer and selecting **New Project** or by selecting the New Project icon at the top of the System Explorer, as shown in *Figure 2.1*. Alternatively, you can select the + button in the Title Bar and select **New Project** to create a new project, as shown in *Figure 2.2*.

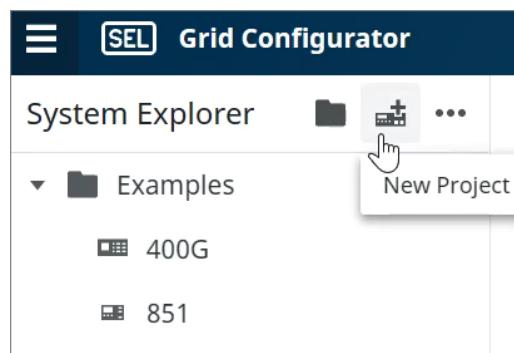


Figure 2.1 Add a New Device Project

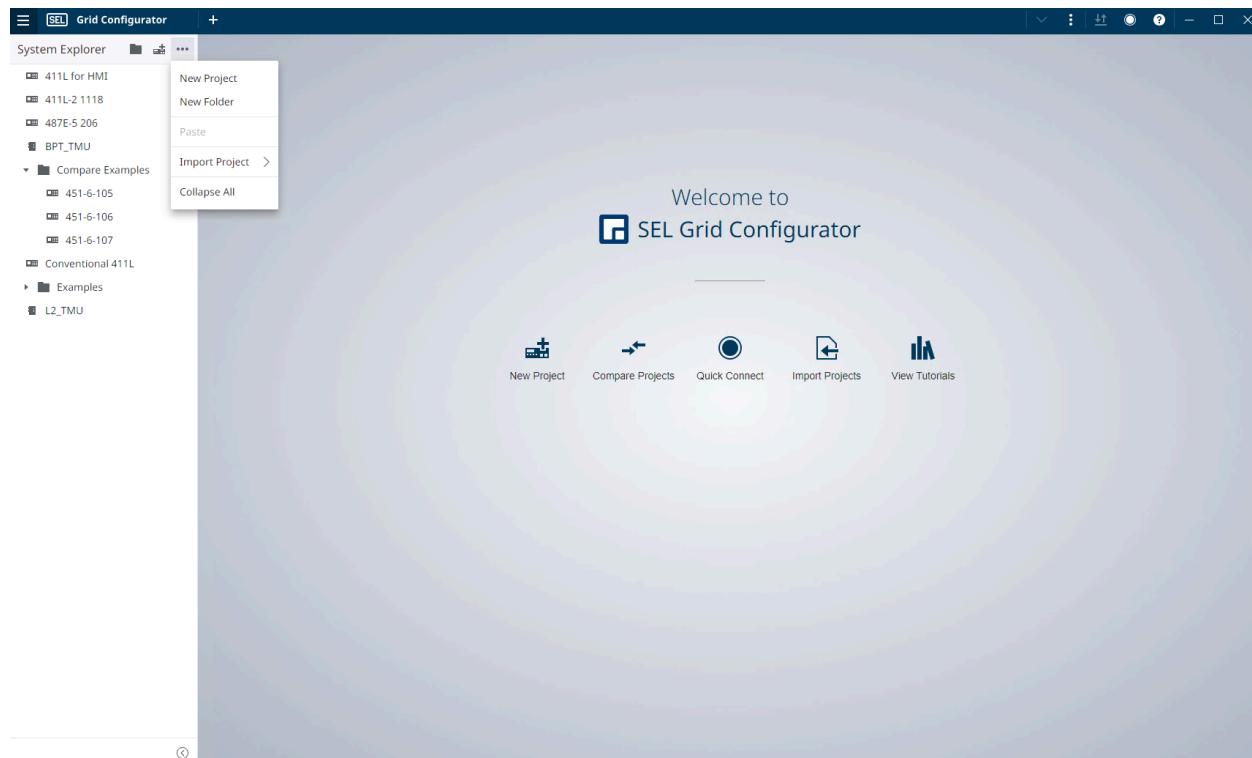


Figure 2.2 Add New Device Project Tab

- Step 3. Select the device model and settings version. Select **Next**.
- Step 4. Fill in a project name and part number. You can also add a Description and an ID for your device if you wish. Select **Create**. A device project includes all the information (such as settings, comments, communications parameters, etc.) that SEL Grid Configurator manages for a device. *Figure 2.3* shows how a new device project looks in the System Explorer.

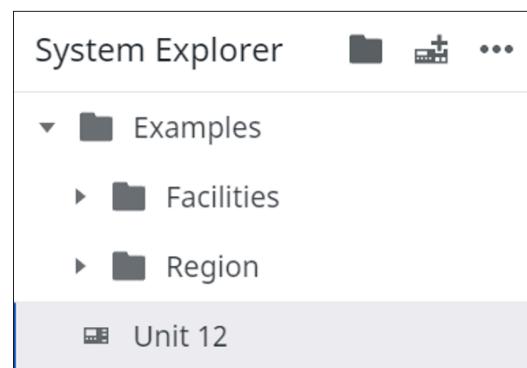


Figure 2.3 New Device in the System Explorer

- Step 5. Select **Protection > Protection Elements** under the Configuration perspective of the Device Explorer, as highlighted in green on the left side of *Figure 2.4*. Using the controls next to the Available Protection Elements, enable as many protection functions as necessary. Repeat for each settings group by using the group selector (highlighted in orange at the top of *Figure 2.4*) in the Device Commands menu. The features and groups that SEL Grid

Configurator shows in this view vary greatly depending upon the relay, meter, or distribution controller you are configuring. Refer to the device instruction manual for detailed information about the features available in your particular device.

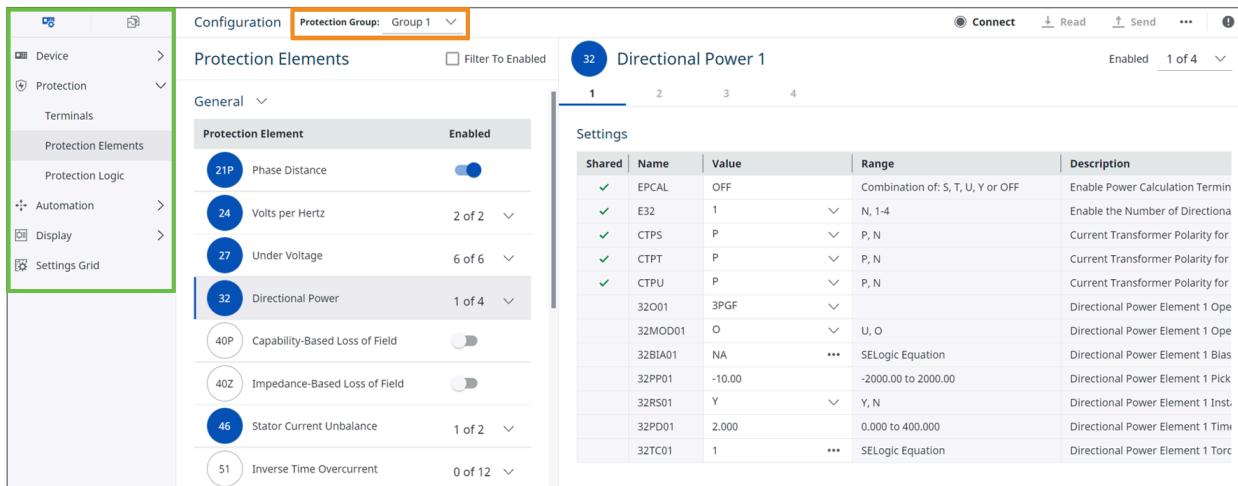
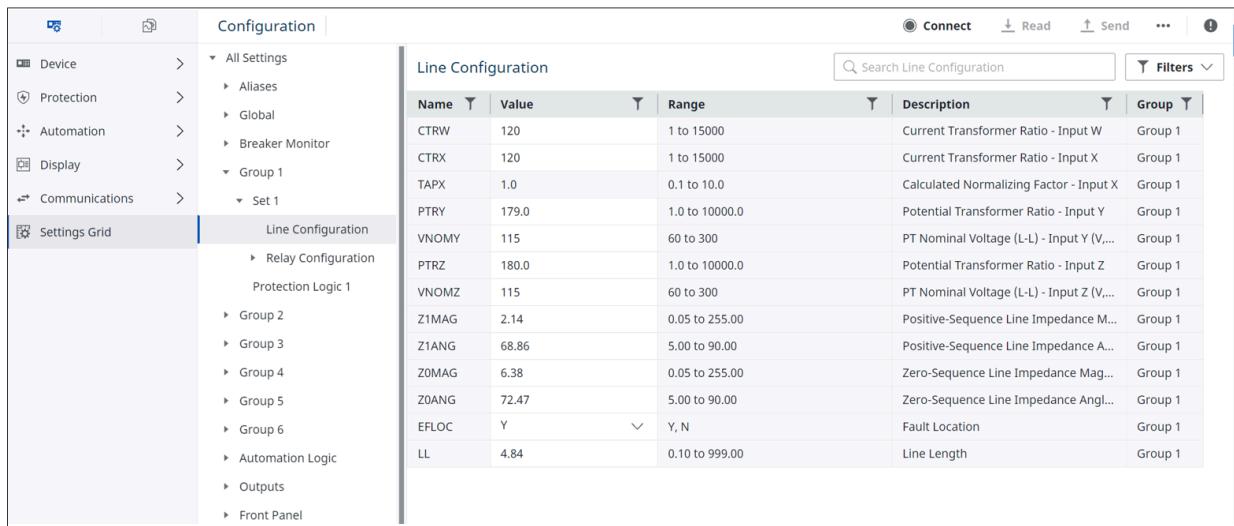


Figure 2.4 Protection Elements View

The views and editors available in the Device Explorer vary depending upon the device. The functionality of the device being configured determines the available settings groups. In the Settings Grid view, settings are organized hierarchically in a tree format. Settings categories have a small triangle to the left. When you select this triangle, the settings category expands to show additional available settings related to the overarching category, as shown in *Figure 2.5*. Select the triangle again to collapse that portion of the tree.

In any device settings view, such as Protection Elements or Settings Grid, an indicator displays next to any setting you have changed. The change indicator persists as long as you have the device project open.

**Figure 2.5 Settings Grid View**

Some settings will be disabled (grayed out) by default. SEL Grid Configurator displays settings as disabled according to such various factors as your part number selection, which protection elements you have enabled, etc. Refer to your device instruction manual to learn details about the specific settings for your device. SEL Grid Configurator makes settings available for editing once you change the options that caused them to be disabled.

- Step 6. In the Settings Grid view, expand the tree to see all settings and groups available in your device. Select an entry in the tree to view the settings editor for that element. Edit the setting value either by directly editing in the grid or by selecting the arrow button in the Value cell, if available. *Figure 2.6* shows an example of each editing workflow. For setting 46Q1P1, which requires a numerical entry, you can directly select and edit the necessary value in the Value cell. Setting 46QO1 requires a value from a list. Select the arrow button in the Value cell to open the selection helper, which displays the options available for that setting.

Name	Value	Range	Description	Group
46QO1	I2GP	▼	I2GP, I2GPEQ	Group 1
46Q1P1	8		2 to 100, OFF	Group 1
46Q1P2	1	?	2 to 100, OFF	Group 1

Figure 2.6 Editing Settings and Automatic Validation

If you enter a settings value into a field and that value is invalid or outside the acceptable range, as shown in *Figure 2.6*, SEL Grid Configurator displays an error icon in the Value cell for that setting. A message explaining the error displays if you hover over the Value cell. Correct these errors prior to deploying settings.

Select the alarm icon in the Device Commands menu, as shown in *Figure 2.7*, to see Errors & Warnings, a report of all settings errors in a device project. Select the notification message to immediately navigate to the invalid setting.

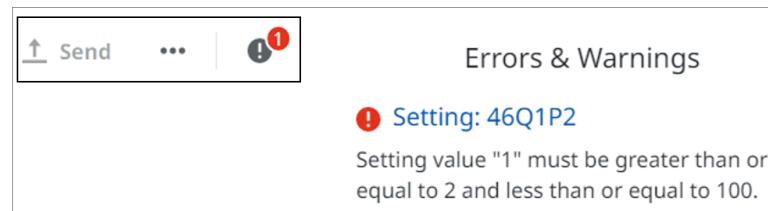


Figure 2.7 Viewing Project Notifications

- Step 7. For all remaining settings, navigate the tree or use the search bar to find the necessary settings and alter the appropriate values.
- Step 8. Select **Device > Connections** under the Configuration perspective of the Device Explorer, as shown in *Figure 2.8*. Then enter the connection parameters for your device, as shown in *Figure 2.9*. SEL Grid Configurator can communicate with devices via serial or network connections.

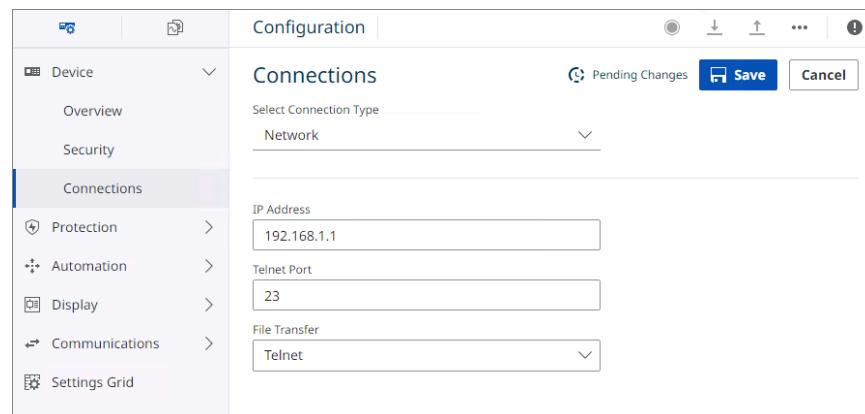


Figure 2.8 Connections View

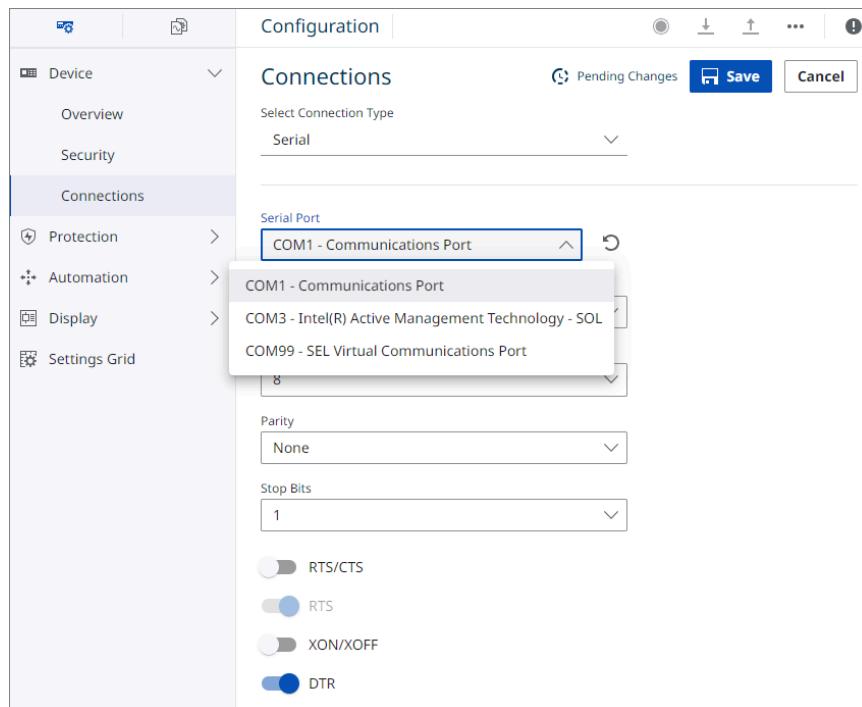


Figure 2.9 Configuring Communications Options

Step 9. Select **Device > Security** under the Configuration perspective of the Device Explorer, as shown in *Figure 2.10*. By default, SEL Grid Configurator has the default passwords for your device type. Enter custom passwords if you use them. Refer to the device instruction manual for detailed information about the access levels and password options for your device.

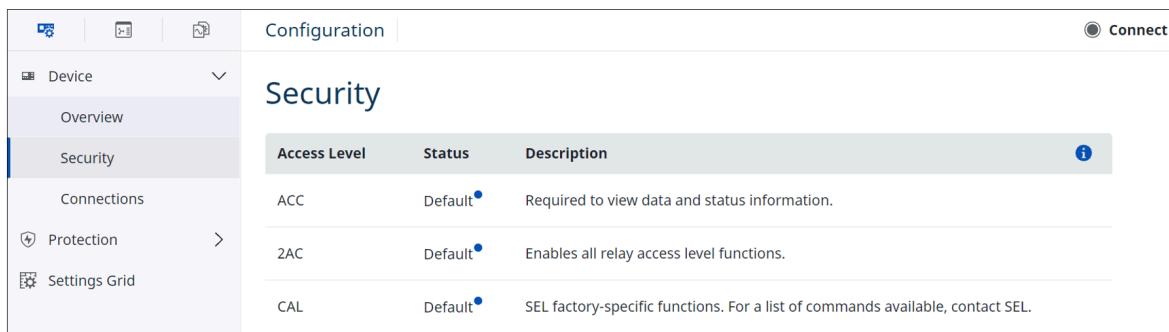


Figure 2.10 Configuring Security Options



Figure 2.11 Connecting to a Device

Step 10. Select **Connect** in the Device Commands menu, as shown in *Figure 2.11*. Once the connection is active, you will see a success message and a green dot displays in the device tab and next to the device name in the System Explorer. As long as SEL Grid Configurator has an active connection with the device shown in your workspace, device commands appear similar to *Figure 2.12*.



Figure 2.12 Device Commands Menu for Connected Devices

⚠️ IMPORTANT

You can find an instructional video on how to send and read settings at the following link: SEL Grid Configurator: Sending and Reading Settings.

Step 11. Select the **Send** button, as shown in *Figure 2.12*, to deploy settings to the device. A **Send Report** will open, as shown in *Figure 2.13*, which shows the progress of the operation.

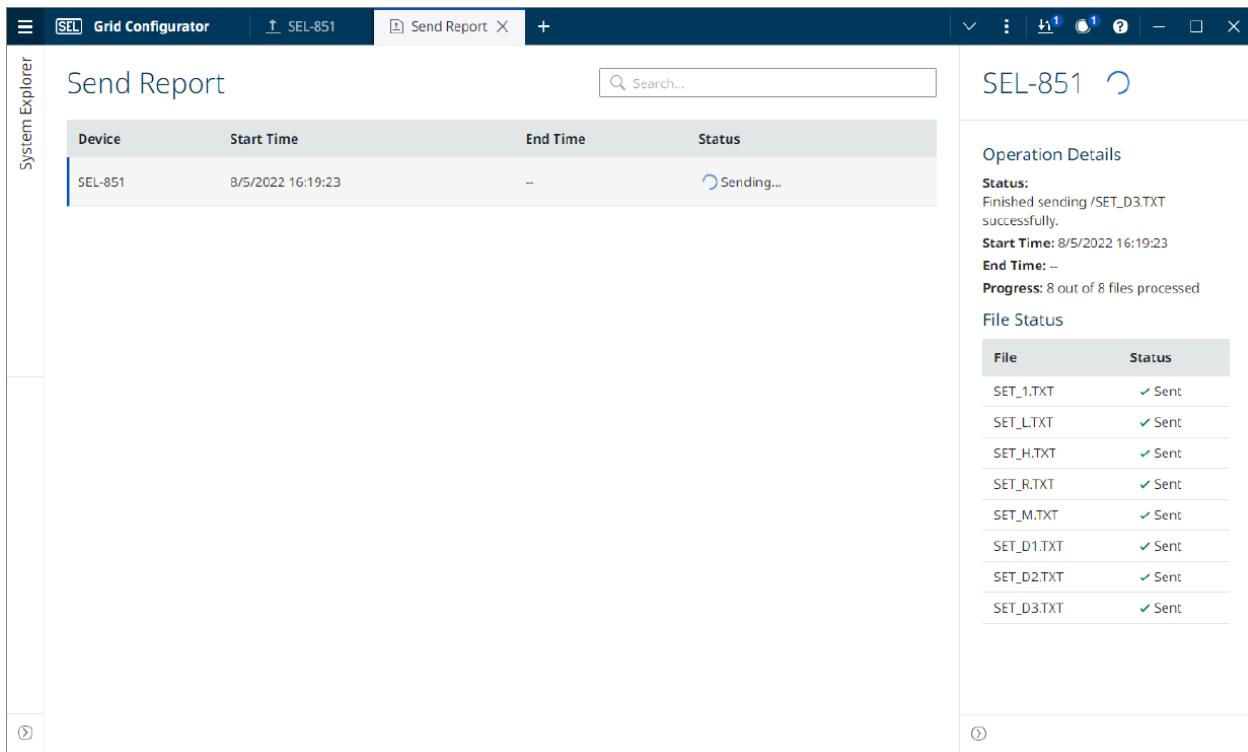


Figure 2.13 Send Report

Step 12. You can also access the Send Report by selecting the ellipsis button in the Title Bar and selecting **Send Report**, as shown in *Figure 2.14*.

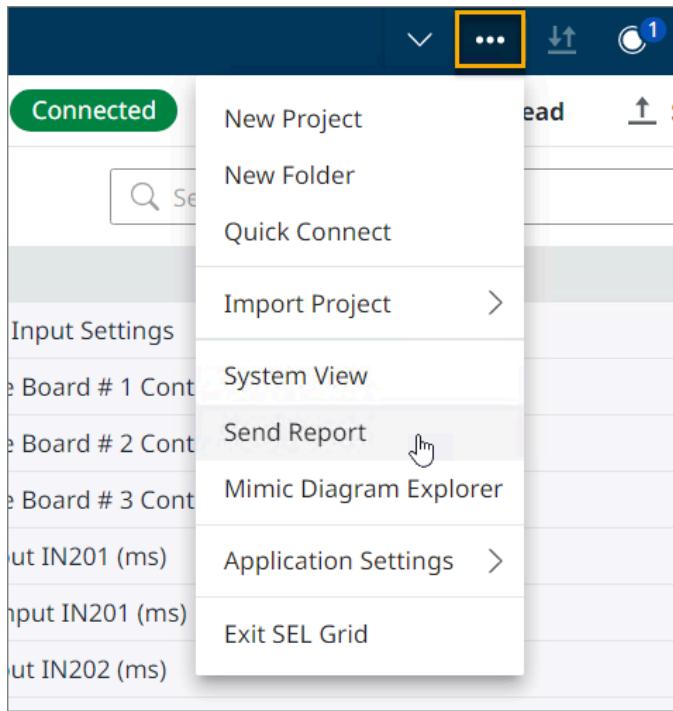


Figure 2.14 Opening the Send Report

Step 13. Select **Disconnect** from the Device Commands menu to terminate the connection to the device.

SECTION 3

SEL Grid Configurator Interface

Introduction

The user interface of SEL Grid Configurator is divided into a number of viewable areas that can generally be categorized as follows:

- ▶ **Navigators:** One or more navigators can be open and visible in the user interface at any time. These generally sit vertically (top to bottom) in the user interface and contain content in rows. In some cases, the content will be hierarchical and collapsible so you can focus only on what you need. A scroll bar appears if the content still extends beyond the viewable space. When the scroll bar appears, SEL Grid Configurator offers three navigational options:
 1. Press and drag with your mouse on the scroll bar.
 2. Hover the mouse over the sidebar and use the mouse scroll wheel.
 3. Touch the scroll bar and drag your finger in the direction you want the view to move.

 **IMPORTANT**

Opening multiple navigators on a smaller screen can make the workspace too confining. You can collapse or expand any navigator individually.

- ▶ **Title Bar:** The blue bar at the top of the user interface. It contains the application title and a number of icons for common actions that affect the entire application.
- ▶ **Workspace:** The previously mentioned sections of the user interface enable and support the core of the application, your workspace. The content (or view) in the workspace changes depending on the project type and workflow, but the workspace generally includes editable content and reports. Enter and edit content as necessary. Reports are read-only and provide information about your project. As with navigators, SEL Grid Configurator displays scroll bars if the content extends beyond the viewable space.

Accessing Contextual Information

The menu system in SEL Grid Configurator primarily displays via context menus. Select the ellipsis button,  , or in some cases, right-click, to display the context menu for the item with which you are working. Select  in the Title Bar to activate application help.

User Interface Sections

1. **Title Bar:** Includes the software title and application-level controls. Return to the Welcome Screen by selecting the SEL logo or the Grid Configurator text.
2. **System Explorer:** A navigator that includes a hierarchical view of all devices in your system. Open device projects from the System Explorer.
3. **Workspace:** The display of any open view or project. Commands and features differ according to the use case for any particular view.

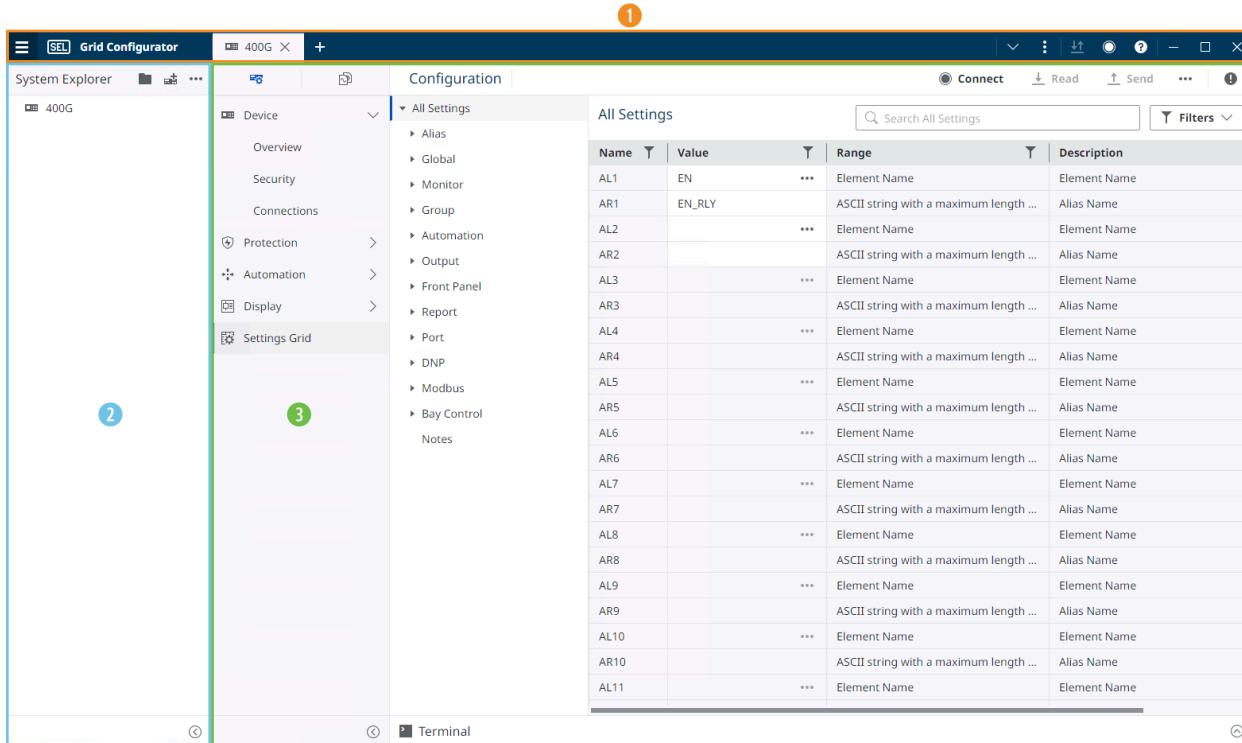


Figure 3.1 SEL Grid Configurator User Interface Overview

NOTE

Grid Configurator has a Welcome Screen that is shown in the Workspace section and contains links to commonly accessed features, as shown in Figure 3.2. Revisit this screen by selecting the SEL logo or the Grid Configurator text in the top left of the Title Bar or by closing all open device projects.

Light and Dark Theme

As shown in *Figure 3.2*, switch between the light theme, dark theme, or system theme by selecting the ellipses button on the Title Bar and selecting **Application Settings > Theme**. If you select the system theme, SEL Grid Configurator will match your Windows system theme setting.



Figure 3.2 Switching Between Themes

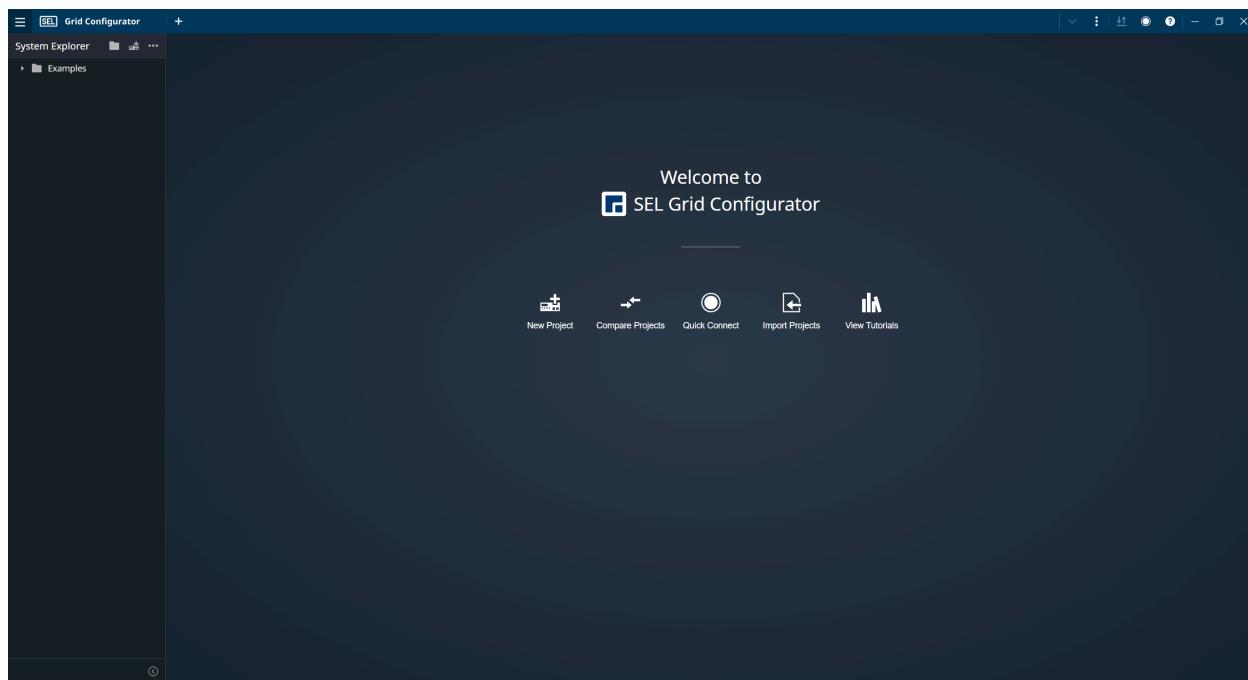


Figure 3.3 Dark Theme

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S E C T I O N 4

System Explorer

Overview

Use the System Explorer, which encompasses all device projects you have stored in the SEL Grid Configurator database, to create a folder hierarchy to categorize and organize device projects. The System Explorer, if visible, always resides along the left side of the user interface.

Figure 4.1 illustrates a System Explorer view structured according to the physical location of devices.

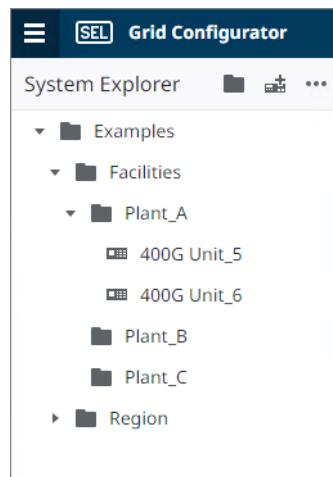


Figure 4.1 Structure of Folders and Device Projects in System Explorer

To expand your screen workspace, you may want to temporarily collapse the System Explorer. Select the encircled arrow at the bottom right of the System Explorer, as shown in *Figure 4.1*, to toggle between collapsing and expanding the System Explorer. Alternately, you can click the system navigation icon located in the upper left corner to toggle between collapsing and expanding the System Explorer.

Working With Folders

Determining your view in the System Explorer is simple and flexible. The System Explorer is similar to various file explorers for popular operating systems in that it uses folders and projects. As with folders on your computer, you can create a nested folder structure to represent your system according to your needs. You can then place each device project in whichever folder you choose. *Figure 4.2* shows an example of projects organized by facility and plant locations.

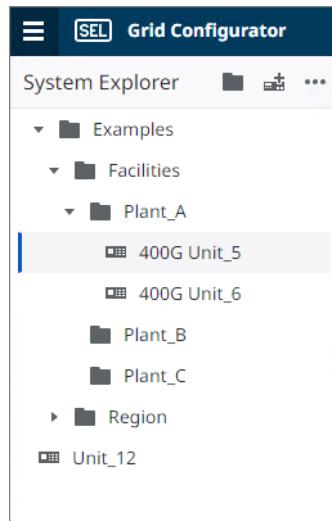


Figure 4.2 Customize Folder and Device Project Structure in System Explorer

Expand and collapse folders as necessary by selecting the triangle to the left of the folder icon.

For any folder or device project in the System Explorer, right-click the device name to see the context menu associated with that entry. To create a new folder as a child of an existing folder, right-click the parent folder and select **New Folder**. Provide a folder name in the provided dialog and select **Create**.

Creating a Root Folder

To create a root folder (with no parent folder), select the folder icon at the top of the System Explorer, as shown in *Figure 4.3*. Similarly, create a device project that does not reside in a folder by selecting the Add New Device button at the top of the System Explorer. Alternately, you can right-click on the empty space at the bottom of the System Explorer to add a new folder or device to the root.

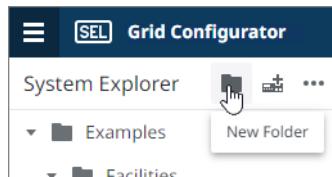


Figure 4.3 Creating a Root Folder

Renaming a Folder

You can rename any folder. Right-click the target folder and then select **Rename**, as shown in *Figure 4.4*. Provide the new name and select **Rename**.

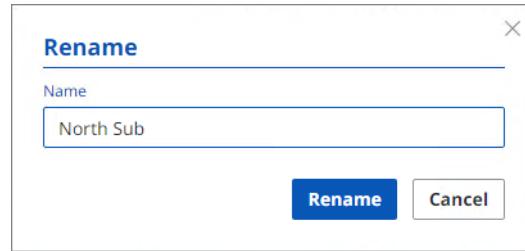


Figure 4.4 Renaming a Folder

Create a Device Project

To create a device project as a child of a folder, right-click the target folder and then select **New Project**, as shown in *Figure 4.5*. Refer to *Section 6: Create and Edit Device Projects* for more information.

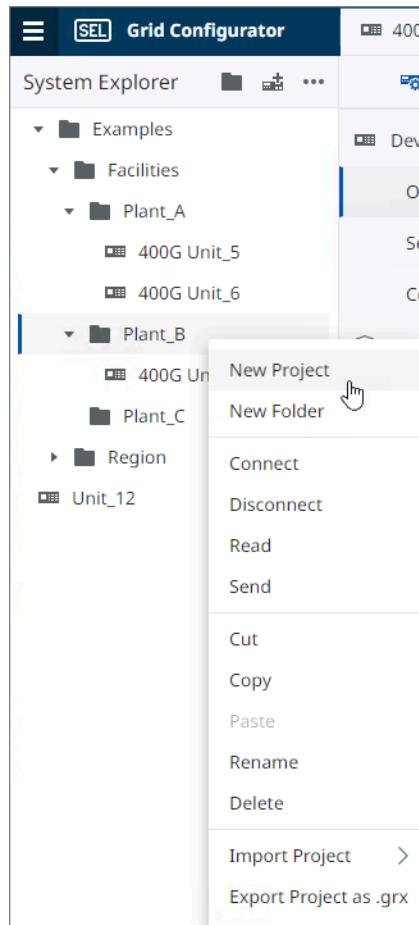


Figure 4.5 Create a New Device Project

Delete a Folder

In a folder context menu, the Delete option is for the folder itself and ALL child folders and device projects. Use this option carefully. If you select Delete, SEL Grid Configurator presents a confirmation dialog from which you can confirm or cancel the operation. If you confirm the deletion, the operation is permanent.

Export and Import Folders

SEL Grid Configurator provides a means to export and import individual device projects or entire folders. To share artifacts with another user, use the export and import features. SEL Grid Configurator exports artifacts as file type .grx. This is a binary format that is not human-readable. As shown in *Figure 4.6*, right-click the device or folder you want to export and select **Export Project as .grx**. You can also hold the <Ctrl> key down and select multiple devices or folders to export. In the window that appears, decide whether to provide a password for the export and then select a file name and file location in the provided Save As window. Share the resulting file with others via email, shared file system, etc.

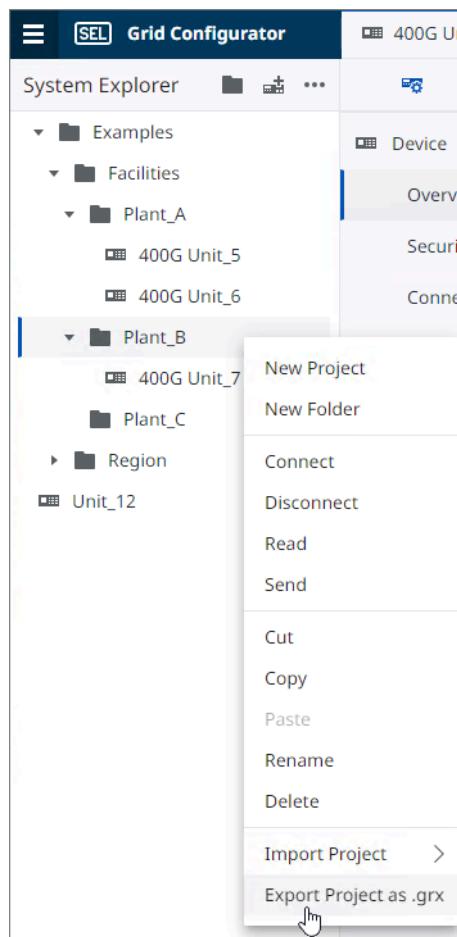


Figure 4.6 Export an Entire Folder

Export Settings

SEL Grid Configurator provides a means to export the device settings as a .zip file. The .zip file will contain the settings .txt files. As shown in *Figure 4.7*, right-click the device you want to export and select **Export Settings as .zip**. Note that this option is not available on a folder and you can only export the settings files from one device at a time.

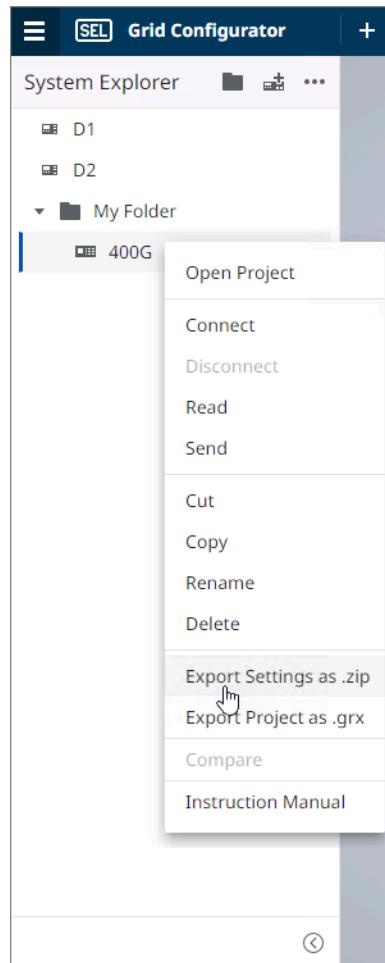


Figure 4.7 Export Settings

Importing Device Projects From QuickSet and SEL Grid Configurator

When you import device projects (for one or many devices) into SEL Grid Configurator, select whether you want to import an SEL settings database (.rdb) from QuickSet or a .grx file from SEL Grid Configurator, or a .zip file, as shown in *Figure 4.8*.

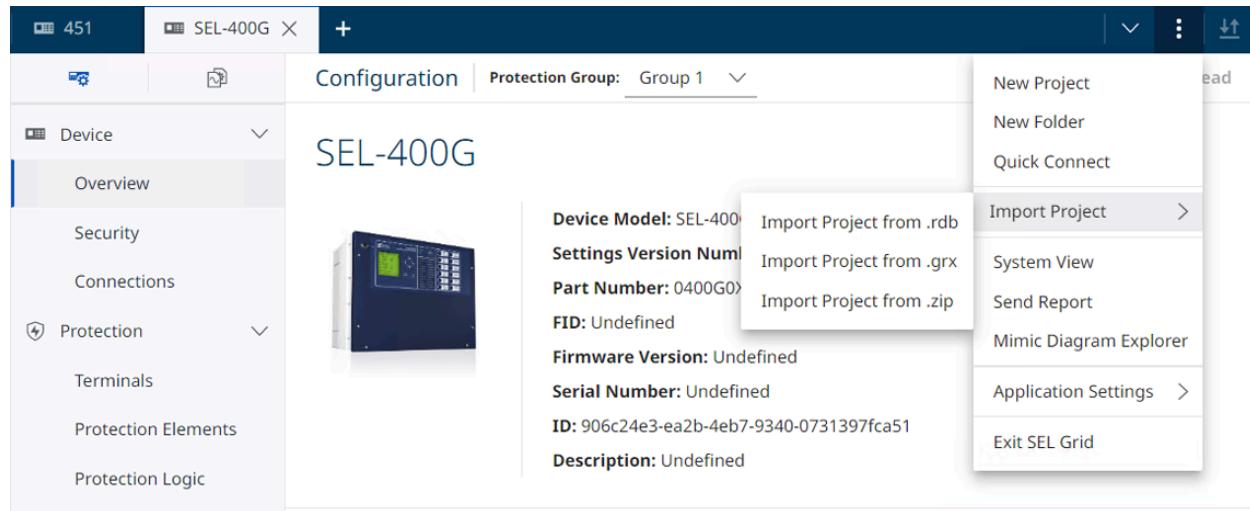


Figure 4.8 Import Device Projects

If you import a .grx file, SEL Grid Configurator will place all of the contents into a folder named **Import (<present system date>)**, as shown in *Figure 4.9*. You can subsequently move the device projects into your desired location in the System Explorer.



Figure 4.9 Import Folder for .grx Files

If you import a .zip file, SEL Grid Configurator creates a new device project from the SET.txt files that are included in the .zip file. SET.txt files are human-readable device settings generated by SEL software or uploaded from a device (examples include "SET_P1 .txt" and "SET_L1 .txt"). SEL Grid Configurator ignores any invalid contents in the .zip file and leaves any missing settings as factory default values. If the .zip file includes settings files from more than one device or device model, the import process ignores duplicate and superfluous contents.

NOTE

For more information on how to import .zip files into an existing device, see Import Into Grid on page 86.

Once the import is complete, you can select View More Details and scroll to find the unrecognized settings that were detected and ignored, as shown in *Figure 4.10*.

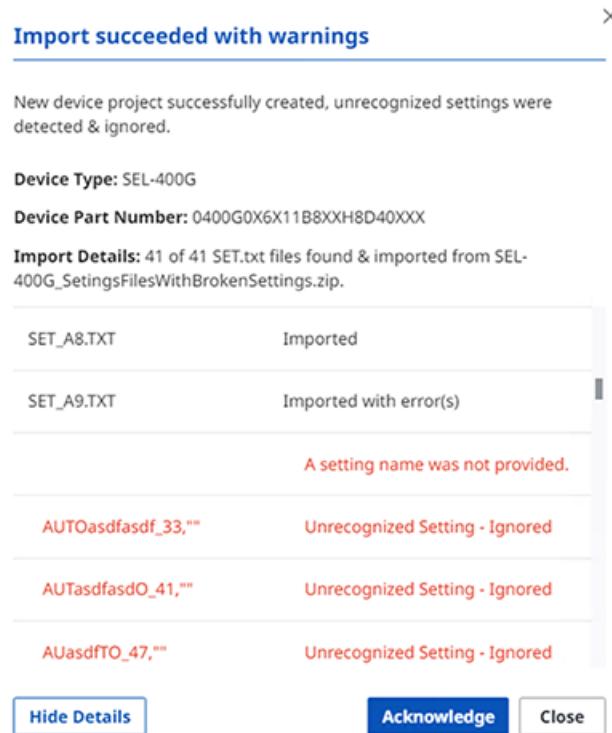


Figure 4.10 Import Succeeded With Warnings

If you select Close, SEL Grid Configurator will continue the import operation and make details available in the Active Operations panel, as shown in *Figure 4.11*.

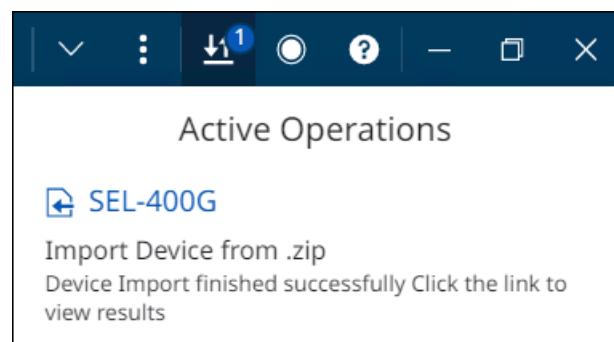


Figure 4.11 Import in Active Operations Window

Select the Active Operations icon and the link to your device import operation to re-open the import dialog. Select Acknowledge to complete the import process and remove the details from the Active Operations panel.

Importing .rdb Files

⚠️ IMPORTANT

You can find an instructional video on how to import RDB files at the following link: SEL Grid Configurator: RDB Importer.

Begin the import process by selecting **Add .rdb File** (as shown in *Figure 4.12*) and browse for one or more Settings Databases. Select the desired Settings Databases and select **Add Files**.

Valid Settings Databases will open in the importer, as shown in *Figure 4.12*. By default, SEL Grid Configurator will create a new folder in the System Explorer for each .rdb and a new device within that folder for each selected device.

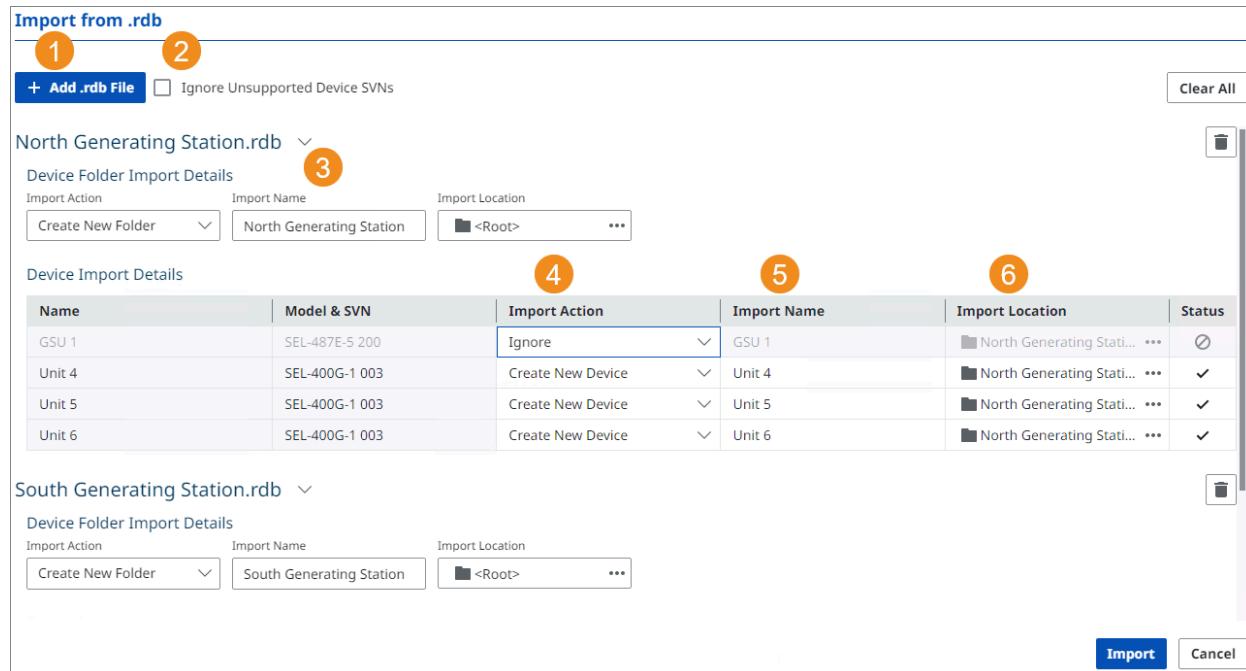


Figure 4.12 Import Options

Configuring Import Options

Figure 4.12 illustrates the available options for how SEL Grid Configurator can import .rdb files into the System Explorer. Multi-select and right-click options are also available.

Use the following controls to define the import options, as shown in *Figure 4.12*:

1. **Add .rdb File:** Select this button to identify the .rdb files that contain device settings you need to import.
2. **Ignore Unsupported Device SVNs:** Selected by default, this option disables options for all devices and settings versions unsupported by SEL Grid Configurator. Deselect to configure options for all device settings in the .rdb file.

3. **Configure .rdb Options:** SEL Grid Configurator lists each .rdb file selected in the **Add .rdb File** control in a separate table. Collapse and expand each section to focus the view.
 - **Import Action:** Select **Create New Folder** to place the imported device settings into a new folder in the System Explorer. Select **Do Not Create Folder** to select a location for each device setting in the .rdb file.
 - **Import Name:** Type in the desired folder name if you selected **Create New Folder** for the Import Option.
 - **Import Location:** Select the parent folder in the System Explorer where the software will place the new folder.
4. **Device Settings Import Action:** You can set an import action for each device setting in an .rdb file.
 - **Ignore:** SEL Grid Configurator will not import the device settings.
 - **Create New Device:** SEL Grid Configurator will create a new device in the System Explorer as a child of the import location folder.
 - **Modify Device:** SEL Grid Configurator will replace all existing settings in the target device already in the System Explorer.
5. **Import Name:** By default, this cell displays the setting name from the .rdb file. Type a replacement device project name, if desired.
6. **Import Location:** Select the ellipsis to view and select the target folder within the System Explorer. Highlighted green text in the folder view denotes the default location.

The **Status** field indicates whether all of the import options are valid (or if errors exist) and if the device settings will be ignored.

Importing the Device Settings

Select **Import** when ready to import the Settings Databases. A progress window will show the status of the import. Select **Close** to close the progress window. Selecting **Cancel** during the import operation will stop the import but will not affect those settings that were imported prior to the cancellation.

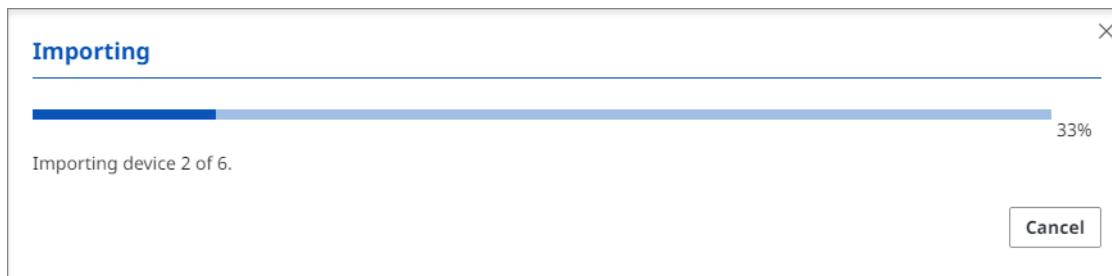


Figure 4.13 Progress Window

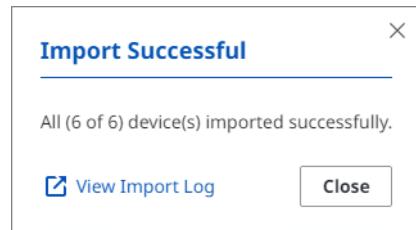


Figure 4.14 Import Log

SEL Grid Configurator generates a CSV file for each import operation to provide traceability for each import. When the import is completed, select **View Import Report**, as shown in *Figure 4.14*. Previous reports can be accessed from the following location: C:\Users\<user name>\AppData\Local\SEL\GRID\Import Reports\.

Reorganizing Device Projects and Folders in the System Explorer

SEL Grid Configurator supports a number of methods for quickly reorganizing device projects and folders in the System Explorer.

To copy a device project, right-click on the source project and select **Copy**, as shown in *Figure 4.15*. Then right-click the target folder and select **Paste**. You can rename the project at any time. Alternatively, to move a device project, right-click on the source project and select **Cut**. Then right-click on the target folder and select **Paste**. Alternately, you can drag and drop your project to any folder or root location in the System Explorer tree.

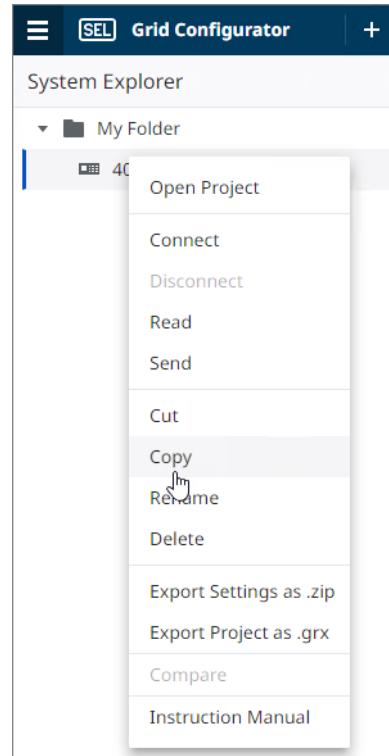


Figure 4.15 Copy a Device Project

SEL Grid Configurator provides Copy and Paste functions for folders as well. These operations impact all sub-folders and device projects within a folder.

SECTION 5

Device Comparison and Conversion

The comparison features in SEL Grid Configurator give you the ability to compare settings among multiple device projects in the System Explorer or between the device settings stored in your SEL Grid Configurator database and the settings stored on the physical device. Additionally, SEL Grid Configurator provides tools to convert existing device projects to a different firmware or hardware version.

Opening Device Comparison From the System Explorer

⚠️ IMPORTANT

You can find an instructional video on running device comparisons at the following link: SEL Grid Configurator: Device Comparison.

To compare settings between two or more device projects in the System Explorer, <Ctrl+Click> on the devices you want to compare (<Shift+Click> to select a range), then right-click on the highlighted device projects and select **Compare**, as shown in *Figure 5.1*.

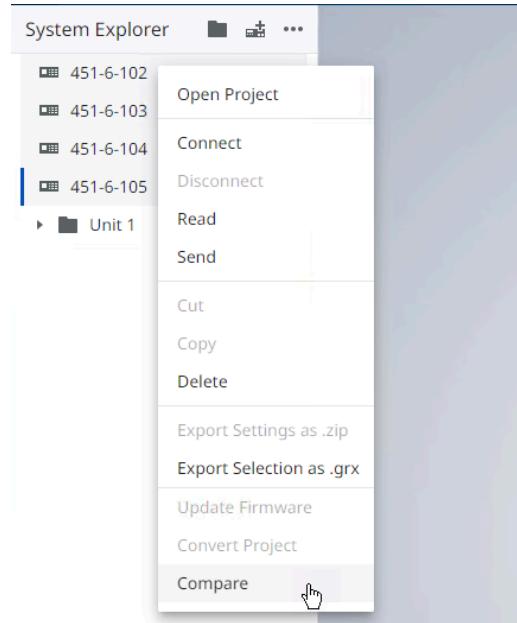


Figure 5.1 Select Device Projects for Comparison

Opening Device Comparison for a Connected Device

To compare settings on your computer to the settings stored in a device, first open the device project and select **Connect** from the Device Commands menu, as shown in *Figure 5.2*.



Figure 5.2 Create a Device Connection

Once the connection is established, select the ellipsis button from the Device Commands menu and select **Compare to Device**, as shown in *Figure 5.3*, to cause SEL Grid Configurator to begin reading settings from the device. The Comparison view appears blank until the read operation completes.

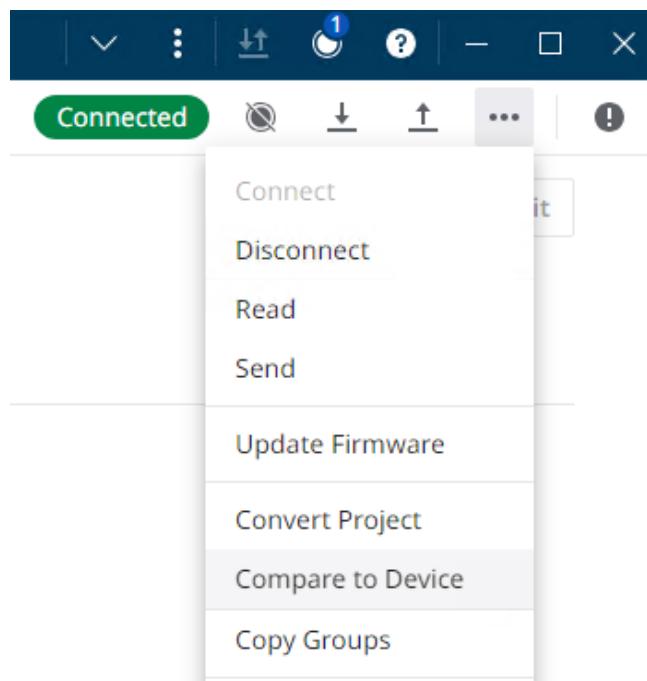


Figure 5.3 Compare to Connected Device

Layout and Usage of the Comparison View

The Comparison view, as shown in *Figure 5.4*, appears as an additional tab along with any device projects you may have open. If necessary, you can switch to other tabs without closing this view. The primary sections of the Comparison view are as follows:

1. **Filters and Reporting Commands:** Use the search bar to find any combination of settings names or values. You can use a search in combination with filters. Select the up and down arrows to navigate between rows that include differences in the Results Window. Use the **Add Project** button to change the contents of the comparison.
2. **Settings Tree:** Similar to the Settings Grid, this tree shows all settings and groups for the device. SEL Grid Configurator highlights any tree entries containing differences.

3. **Results Window:** This section displays the setting names and values for each device, with highlighted differences. A blue reference indicator (REF) appears in the column selected as the reference and a blue dot appears in the corresponding Differences Output row. Change the reference column by using the context menu in the chosen column.
4. **Differences Output:** For the selected setting in the Results Window, this section displays the setting values and highlights different and common values.

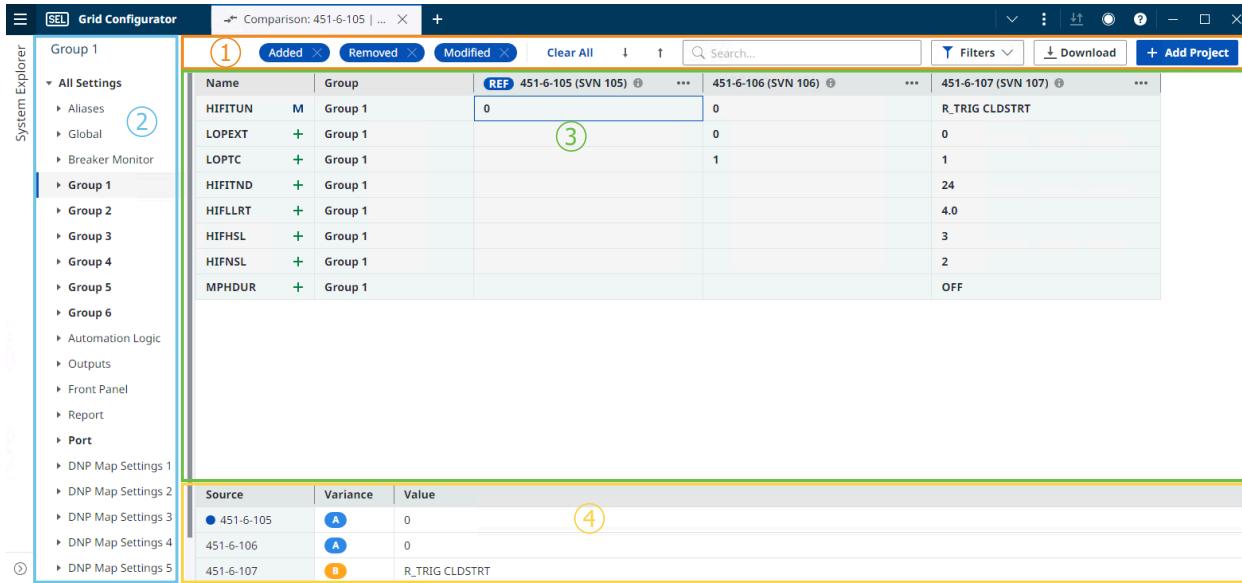


Figure 5.4 Comparison View

Compare Settings Groups

Using the comparison tool in SEL Grid Configurator, you can compare settings groups of the same type within a device. As shown in *Figure 5.5*, open the tool by selecting **Compare Groups** in the device project menu.

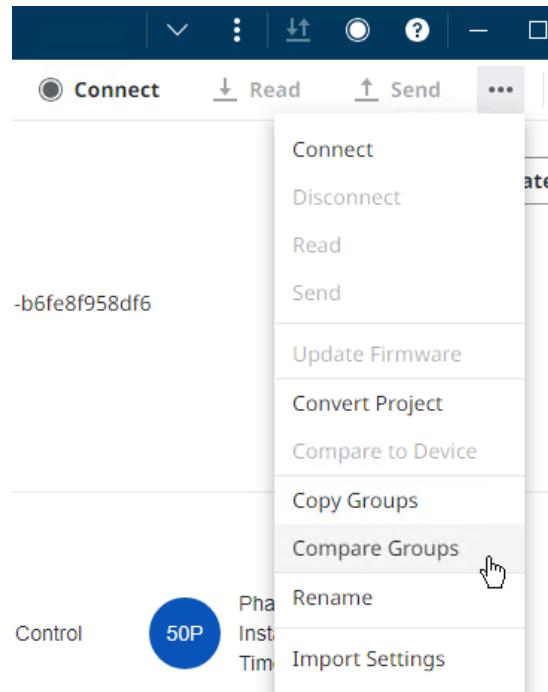


Figure 5.5 Select Compare Groups

In the Compare Groups dialog, shown in *Figure 5.6*, select a reference group and any additional groups of the same type, then select **Compare**.

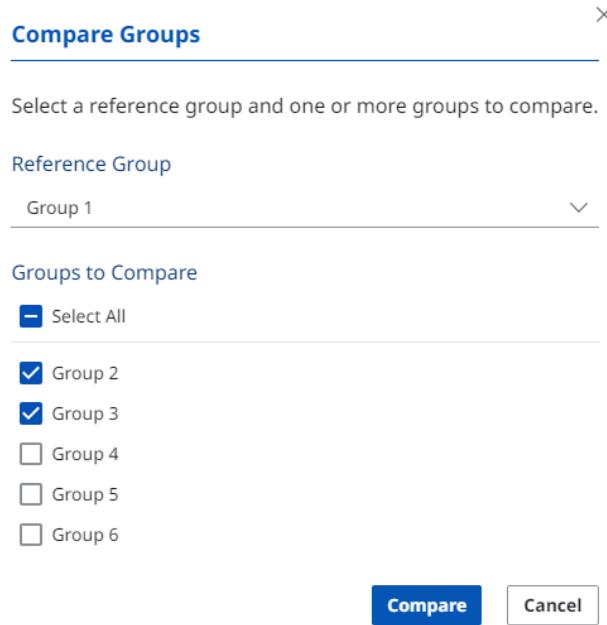


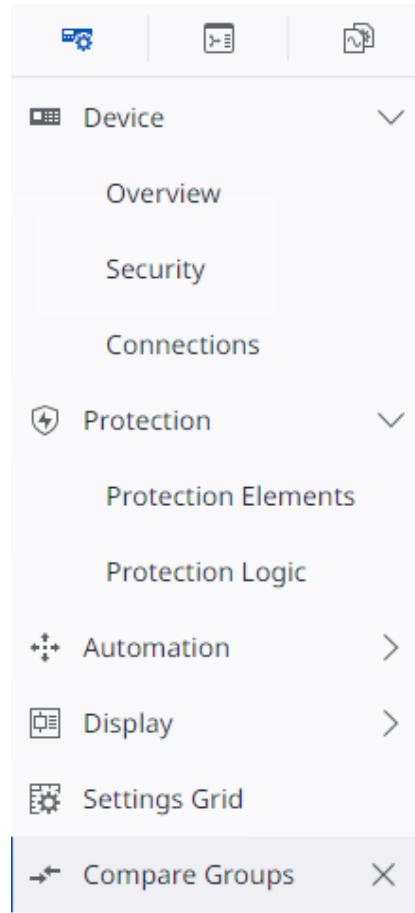
Figure 5.6 Select Comparison Groups

The resulting comparison view, as shown in *Figure 5.7*, functions in the same way as the comparison view in other use cases.

Name	REF	Group 1	Group 2	Group 3
DMTC	M	5	15	15
PDEMP	M	1.00	OFF	OFF
GDEMP	M	1.00	OFF	OFF
QDEMP	M	1.00	OFF	OFF

Figure 5.7 Group Compare View

Additionally, when you compare groups, SEL Grid Configurator creates a temporary entry in the project navigator, as illustrated in *Figure 5.8*. So long as the project is open, you can navigate away from this view and return as needed.

**Figure 5.8** Project Navigator With Compare Groups Entry

Report Options

Select the **Filters** button from among the filters and reporting commands and then select from among the available reporting choices the filters you want.

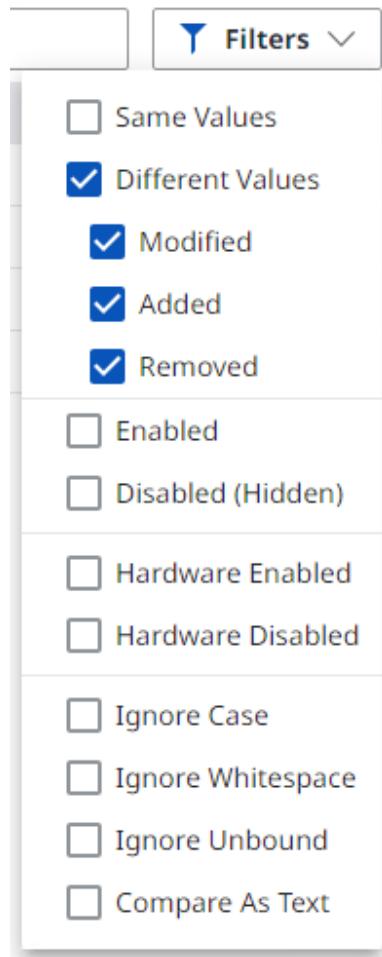


Figure 5.9 Filtering Options for Comparison

Same Values: This filter displays any results for settings that are the same for the devices under comparison.

Different Values: This filter displays any results for settings that are different for the devices under comparison.

Modified, Added, and Removed: If you are viewing a comparison report for two devices, a comparison report of two settings versions, an online device comparison, or a conversion preview, SEL Grid Configurator displays additional filter options as a subset of the Different Values filter. You can individually select an option to view only settings with modified values or settings that have been added or removed between the two devices.

Enabled: This filter displays any results for settings rendered available and editable due to either a part number or setting rule.

Disabled (Hidden): This filter displays results rendered inactive and unchangeable because of either a part number or setting rule.

Hardware Enabled: This filter displays results rendered available and editable because of the hardware options present in the device.

Hardware Disabled: This filter displays results rendered unavailable because of the hardware options present in the device.

Ignore Case: When this filter is enabled, SEL Grid Configurator treats values differing only in their use of uppercase and lowercase letters as if they are identical.

Example: "ABC" and "abc" compare identically when the Ignore Case option is enabled.

Ignore Whitespace: When this filter is enabled, SEL Grid Configurator ignores whitespace characters when performing a comparison of individual items between devices.

Example: "ABC" and "A B C" compare identically when the Ignore Whitespace option is enabled.

Ignore Unbound: This filter hides any unbound rows that have any missing values denoted by a gray-colored cell in the Results Window.

Compare as Text: When the Compare as Text filter is enabled, all items shall be compared as strings regardless of item data type.

Example: Numeric items "01.1" and "1.10" do not compare equally when you enable Compare as Text. They would be equal if this option is disabled.

Additionally, if you are viewing a comparison report for two devices, a comparison report of two settings versions, an online device comparison, or a conversion preview, the Results Window denotes altered settings with alteration symbols next to the setting name. Added settings have a "+", modified settings have an "M", and removed settings have a "-" as shown in *Figure 5.10*. Select **Convert** to process and complete the conversion.

E2AC	+
50FPS	M
EINTF	-

Figure 5.10 Conversion Preview Alteration Symbols

Downloading a Comparison Report

Select **Download** from the filters and reporting commands and then select the report configuration you want from among the resulting choices.

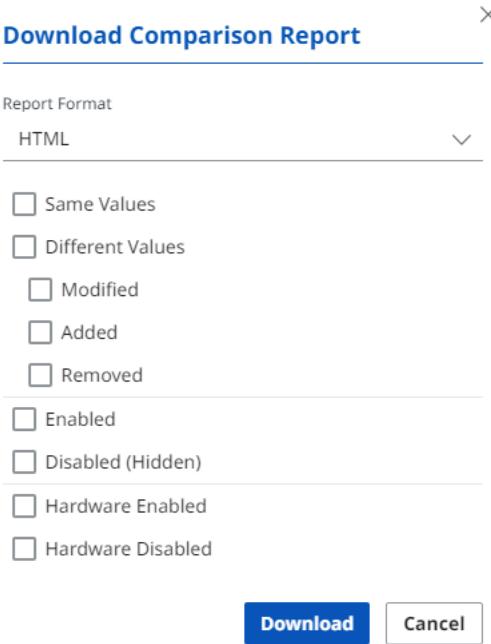


Figure 5.11 Comparison Report Options

Report Format: Choose whether you prefer the HTML or JSON output file format.

Same Values: This option displays only settings that are the same for the devices under comparison.

Different Values: This option displays only settings that are different for the devices under comparison.

Modified, Added, and Removed: If you are viewing a two-device comparison report, an online device comparison, or a conversion preview, SEL Grid Configurator displays additional filter options as a subset of the Different Values filter. You can individually select an option to only view settings with modified values or settings that have been added or removed between the two devices.

Enabled: This option displays any results for settings rendered available and editable due to either a part number or setting rule.

Disabled (Hidden): This option displays results rendered inactive and unchangeable because of either a part number or setting rule.

Hardware Enabled: This option displays results rendered available and editable because of the hardware options present in the device.

Hardware Disabled: This option displays results rendered unavailable because of the hardware options present in the device.

After you finish selecting the options you need, select **Download** for SEL Grid Configurator to build your report. In the Save As dialog that appears, select a file name and location for the report.

Updating Device Settings in the Comparison View

The Comparison view is useful not only for viewing settings differences but also as a powerful editing tool. You can select any individual cell and directly edit the value. More commonly, you may want to propagate a setting value from one device to all other devices in the comparison. To do this, right-click the setting row of interest, then select **Propagate**, as shown in *Figure 5.12*, select the source device that has the setting value you want to copy to the rest of the devices in the comparison.

NOTE

If you have the Exclude Identical Values option enabled, the setting row upon which you just operated disappears from view.

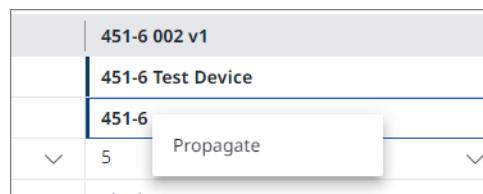


Figure 5.12 Applying a Setting Across Devices

Converting a Device Project to a Different Version

SEL Grid Configurator facilitates the process of converting device projects. You can modify the settings version number (e.g., after a firmware update) or specific device model information. To convert a settings project, select the ellipsis button from the Device Commands menu (or right-click the device in the System Explorer) and select **Convert Project**, as shown in *Figure 5.13*. SEL Grid Configurator will ask if you prefer to create a copy of your present project as a settings version prior to converting the project. Best practice is to first create a settings version, but you can skip this step if you choose. Refer to *Settings Versions* on page 114 for information about the Create Version dialog.

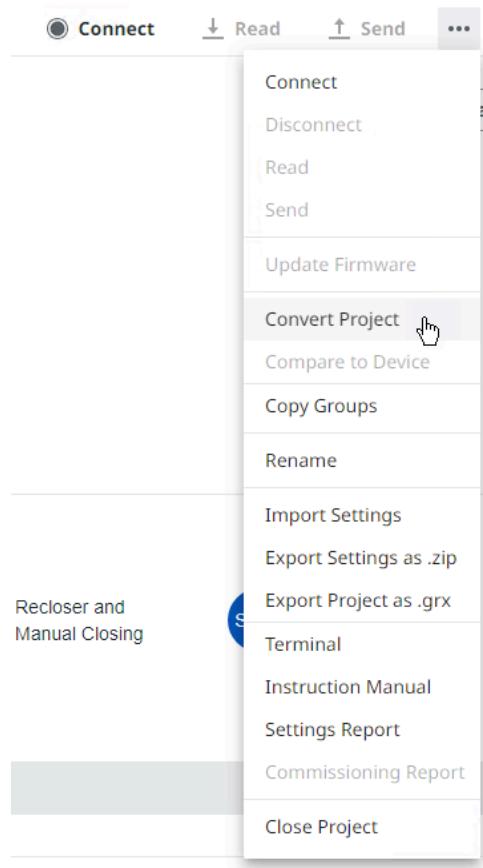


Figure 5.13 Convert a Project

After SEL Grid Configurator creates the settings version, you will see the project conversion dialog, as shown in *Figure 5.14*. The left side of the dialog illustrates the present device project information. The right side of the dialog presents options for the target model and settings version to which you want to convert. SEL Grid Configurator has two conversion methods:

Standard software conversion: Use this method to manually select from available models and settings version numbers. SEL Grid Configurator performs the conversion without any device communication.

Convert to match a connected device: Use this method to convert a project to match versions and settings with a connected device. You must have a communications connection with the target device to use this method. SEL Grid Configurator will overwrite all working copy settings using target device settings during this process.

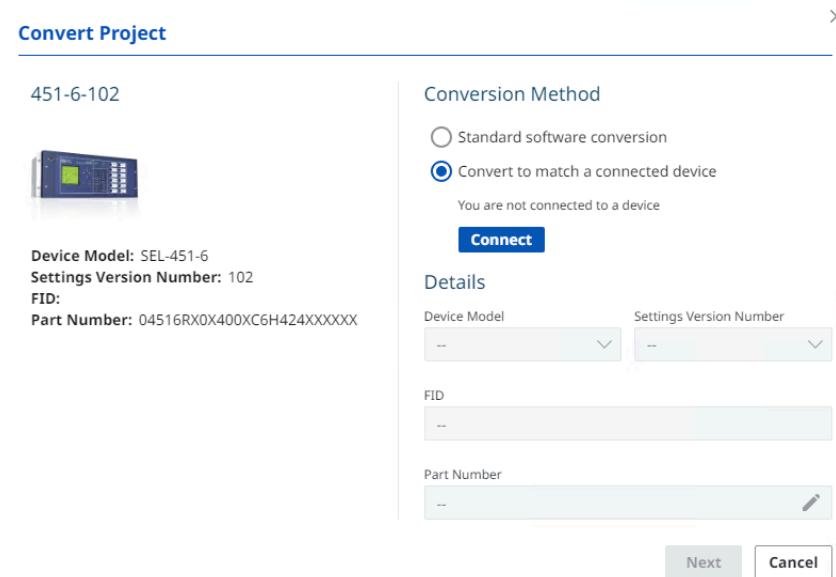


Figure 5.14 Convert Project Dialog

Standard Software Conversion

Select **Standard software conversion** to have SEL Grid Configurator perform an offline project conversion without device communication. As illustrated in *Figure 5.15*, you can choose to convert the project to a different Device Model, a different Settings Version Number, or both during the same conversion.

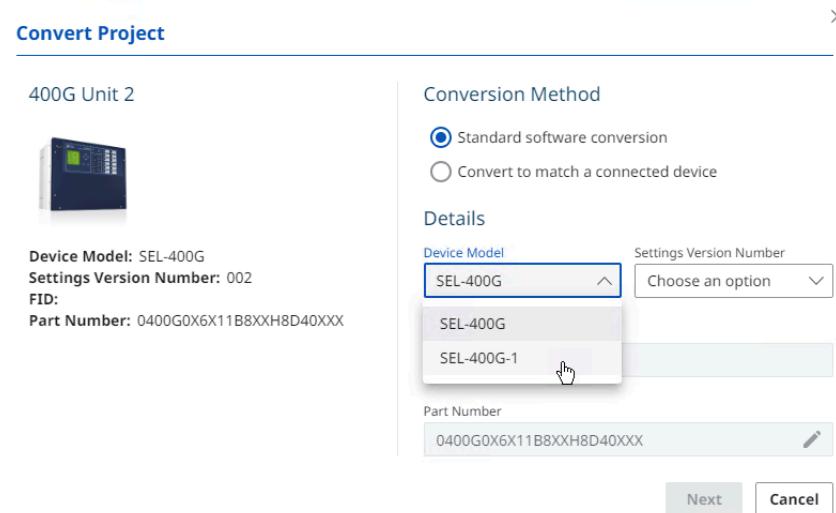


Figure 5.15 Conversion Details for a Standard Software Conversion

After choosing the desired target Device Model and Settings Version Number, you may see a red warning indicator around the part number field. If that appears, select the edit icon in the Part Number field and adjust any indicated part number fields. Select **Next** to begin processing the conversion. After processing the project conversion information, SEL Grid Configurator displays the Conversion Preview, as shown in *Figure 5.16*. Select **Convert** to process and complete the conversion process.

40 Device Comparison and Conversion
Converting a Device Project to a Different Version

Conversion Preview			
Preview settings that will be modified as a result of this conversion.			
All Settings	↓	↑	Search... Filters Download
All Settings			Added <input type="button" value="X"/> Removed <input type="button" value="X"/> Modified <input type="button" value="X"/> Clear All
Aliases			
Global			
Monitor			
Group 1			
Group 2			
Group 3			
Group 4			
Group 5			
Group 6			
Automation Logic			
Outputs			
Front Panel			
Report			
Port			
DNP Map Settings 1			
Name	REF Current Project Settings (SVN 201)	Converted Settings (Device Read - SVN 202)	
EACC	+ 1	1	...
E2AC	+ 1	1	...
50FPS	M 0.60	0.50	
50RPS	M 0.40	0.25	
Z2FS	M -0.10	-0.30	
Z2RS	M 0.10	0.30	
Z0FS	M -0.10	-0.30	
Z0RS	M 0.10	0.30	
ELINE	+ 1	1	
ELOP	+ Y1	Y1	
TSANG	+ 30.00	30.00	
TSZSR	+ Y	Y	
TTANG	+ 30.00	30.00	
TTZSR	+ Y	Y	
TUANG	+ 30.00	30.00	

Figure 5.16 Conversion Preview

The Conversion Preview is a settings comparison between your saved settings project and the potential changes after the conversion. All of the previously discussed settings comparison workflows are available in this dialog.

Convert to Match a Connected Device

If SEL Grid Configurator is not connected to a device when you select **Convert to match a connected device**, select the **Connect** button to enable the connection and begin the conversion process. If you connect to a device to which your project cannot be converted, SEL Grid Configurator will provide an error message explaining the restriction. The most common reason for this is that your saved project and the connected device represent different device model families.

Once SEL Grid Configurator is connected to a compatible device, the conversion details will automatically display the information from the target device, as shown in *Figure 5.17*. Select **Next** to begin reading all settings from the device.

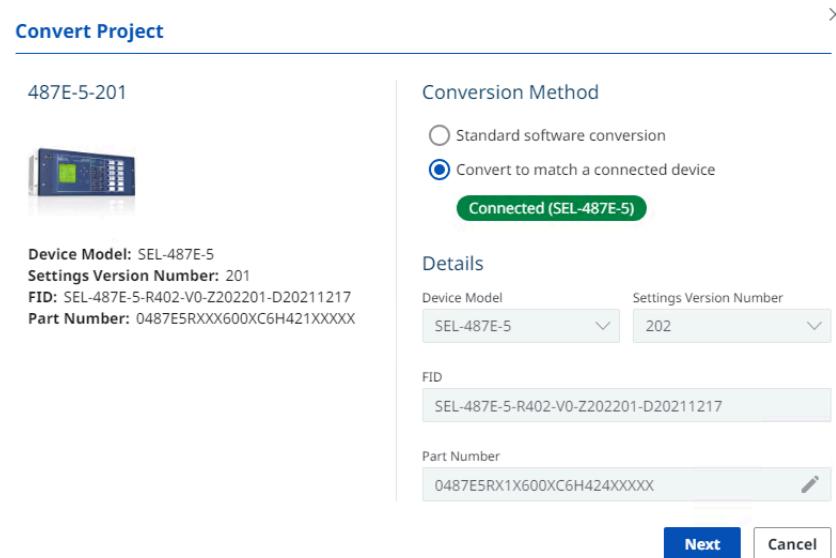


Figure 5.17 Conversion Details for a Connected Device Conversion

After SEL Grid Configurator finishes reading settings, you see the Conversion Preview dialog, as shown in *Figure 5.16*.

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SECTION 6

Create and Edit Device Projects

Device projects include all information related to a particular relay, meter, or distribution controller. This may include settings, passwords, communications parameters, etc. Creating and editing device projects is a key workflow in SEL Grid Configurator. To create a device project as a child of a folder, right-click on the target folder and then select **New Project**, as shown in *Figure 6.1*.

NOTE

SEL Grid Configurator supports the following keyboard shortcuts for open project tabs.

- <Ctrl+Tab>: Select the next open tab
- <Ctrl+Shift+Tab>: Select the previous open tab
- <Ctrl+W>: Close the active tab
- <Ctrl+Shift+T>: Re-open the last closed tab

Creating a New Device Project

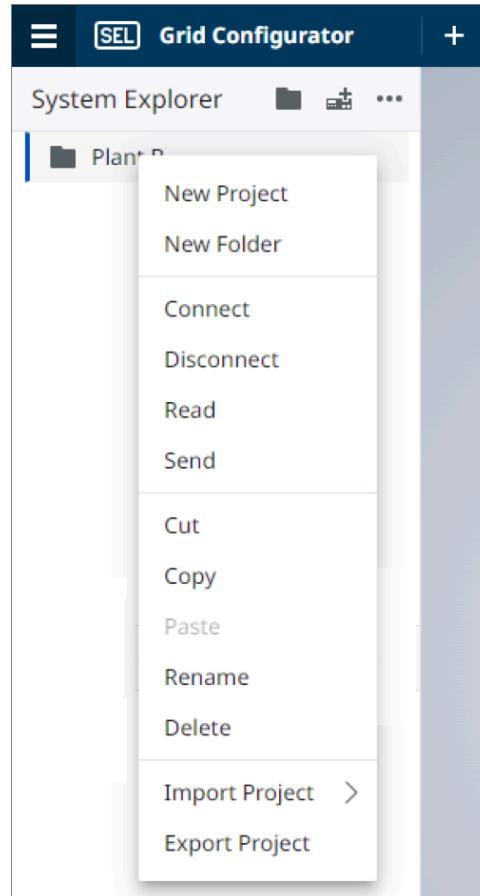


Figure 6.1 Creating a New Device Project

For some device types, SEL Grid Configurator supports multiple settings versions. Select from the list of supported settings versions the one that coincides with your device. If you can communicate with the device, one way to obtain the settings version is to issue the **ID** command (see *Terminal and Logging on page 117* for more information) from Access Level 1 to view the Firmware Identification (FID) string. From the response of the **ID** command, locate and record the Z-number from the FID string, as shown in *Figure 6.2*. The entire string following FID= in the figure represents the firmware ID.

FID=SEL-400G-Rxxx-V0-Z**001**001-Dyyyymmdd

Figure 6.2 SEL Grid Configurator Driver Information in the FID String

The first three digits of the Z-number (Z001xxx in *Figure 6.2*) denote the SEL Grid Configurator settings version number you use when creating or editing device projects. If you are ordering a new device and do not have a locked firmware version, select the latest settings version available. The part number form represents all applicable option fields available when ordering a device from SEL.

When the New Device Project dialog appears, as shown in *Figure 6.3*, identify and select the Device Family, Device Model, and Settings Version of the device you want to add to your system. Double-click on the Device Model or select the **Next** button at the bottom of the window to continue to the device information screen. From the New Device Project window, shown in *Figure 6.4*, you can enter a part number for the new device. It is necessary to provide a device project name and, optionally, a description and ID. SEL Grid Configurator automatically creates an ID if you do not provide one.

If you already know the part number, you can type or paste the value into the part number field, as shown in *Figure 6.4*. Otherwise, select the **Part Number Editor** button to the right of the field and use the drop-down tools for each option to select the options you ordered. Select **Save** when you finish. You can change the part number later if necessary.

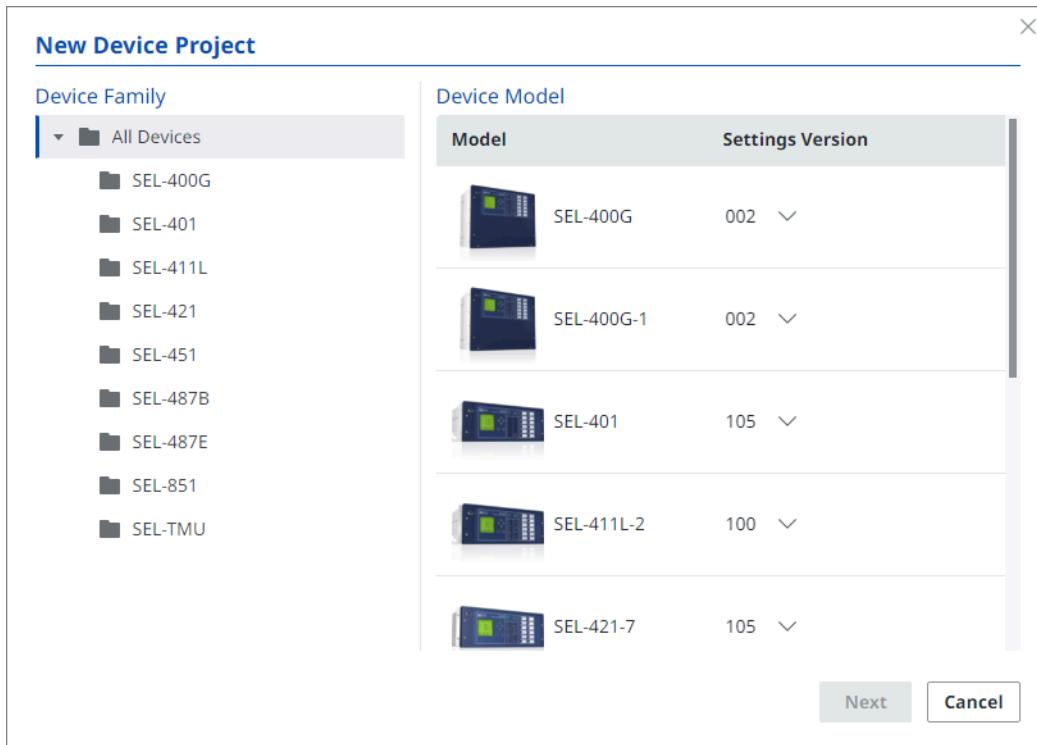


Figure 6.3 Select Device Type

The screenshot shows the 'New Device Project' configuration dialog. It includes fields for 'Device Project Name *' (Unit_4), 'Project Path' (/Examples/Facilities/Plant_B), 'Part Number *' (0400G0X6X11B8XXH8D40XXX) with a 'Part Number Editor' button, 'Description' (Give this device a description), and 'ID' (Give this device a unique identifier). On the left, there is a preview image of a SEL-400G device with the text 'SEL-400G' and 'SVN: 002'. At the bottom are 'Back', 'Create' (highlighted in blue), and 'Cancel' buttons.

Figure 6.4 Configure Device Part Number

Once you have created your device project, SEL Grid Configurator lists the new device project in the folder you designated. To open the project, double-click the project name. Right-click on the project to see the context menu for the device project.

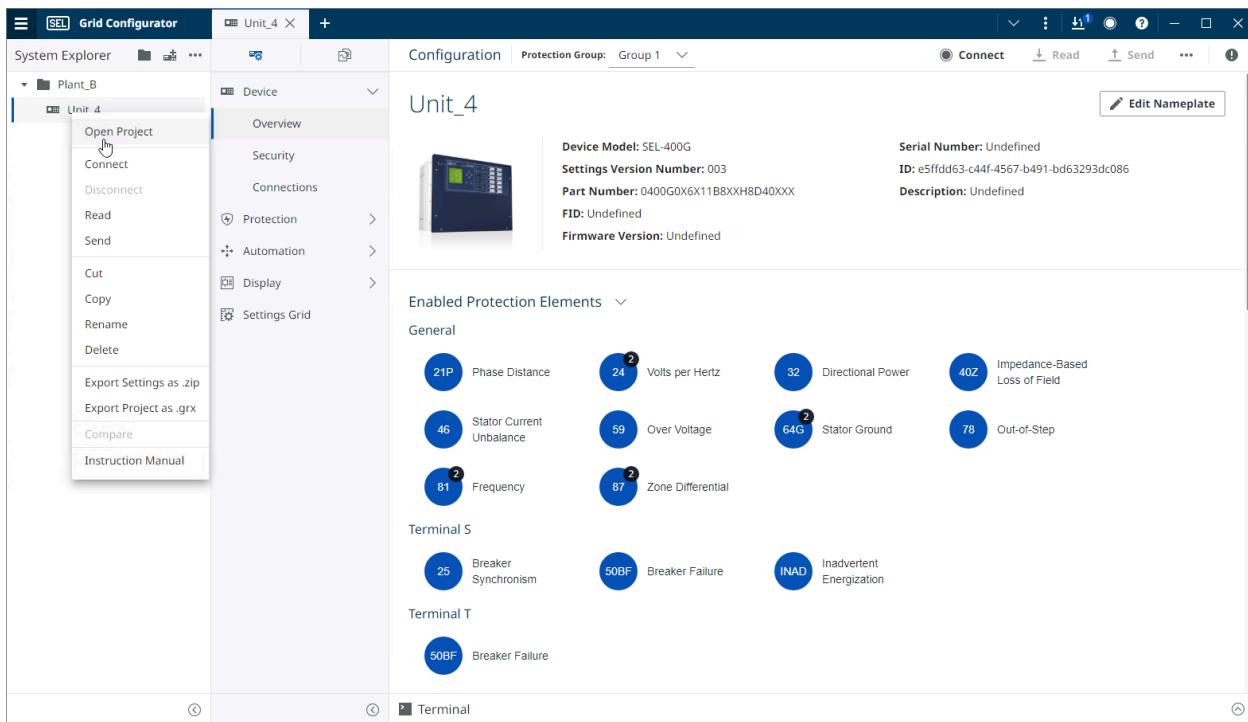


Figure 6.5 New Device Project in System Explorer

When you open a device project, SEL Grid Configurator displays a new project tab in the workspace and opens the DeviceExplorer between the System Explorer and the workspace. Close these tabs by selecting the X at the top right of the tab or by using Mouse Button 3 (middle click) anywhere on the tab's label. Additionally, SEL Grid Configurator automatically closes disconnected QuickConnect devices.

Device Explorer

The Device Explorer is a navigator specific to the device you have selected. It offers a variety of different views and editors that let you interact with that device. The Device Explorer is divided into two or more *perspectives*, which are indicated by the icons at the top of the screen. Each perspective represents a different type of device interaction.

From the left, the first perspective is the Configuration perspective (highlighted in orange in *Figure 6.6*), which includes views and editors that aid in configuration of the device.

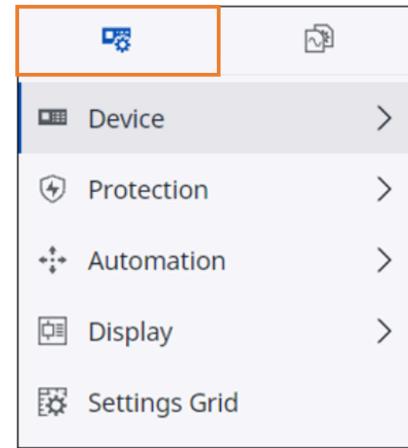


Figure 6.6 Configuration Perspective in Device Explorer

Some devices also support the Online HMI perspective (highlighted in orange in *Figure 6.7*), which provides live device information. See *Online HMI Perspective on page 107* for details about the information available in this perspective.

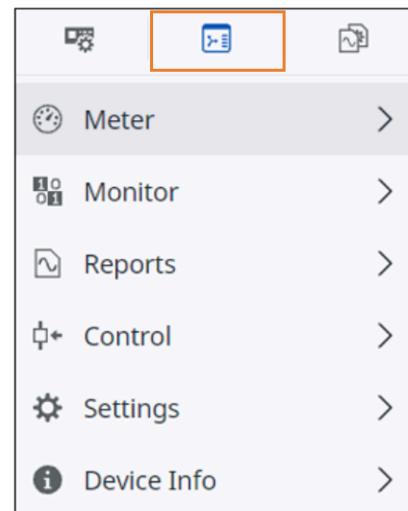


Figure 6.7 Online HMI Perspective in Device Explorer

The final perspective is the Resources perspective (highlighted in orange in *Figure 6.8*), which offers access to Event Reports. See *Resources Perspective on page 109* for more information about the Event Reports view.

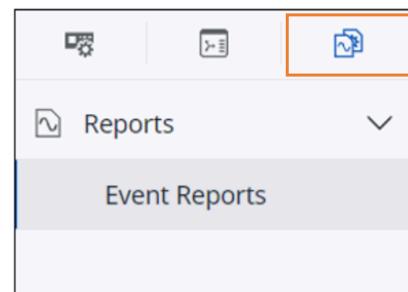
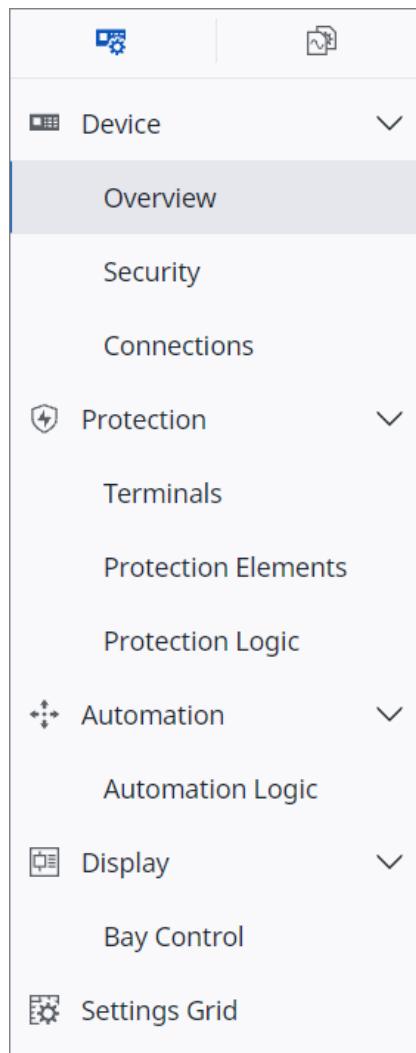


Figure 6.8 Resources Perspective in Device Explorer

**Figure 6.9 Example Device Explorer**

The views and editors available under each perspective vary according to the device you are viewing. Select a tab to see the associated views and editors. In *Figure 6.9*, note that the Protection tab includes views such as Terminals, Protection Elements, and Protection Logic, depending on the type of device. Toggle the arrow in the tab to view or hide the associated views. Use the encircled arrow icon at the bottom of the Device Explorer to collapse the titles and gain screen space. As shown in *Figure 6.10*, you can select views and view titles even while the Device Explorer is collapsed. Select the encircled arrow icon again to expand the Device Explorer.



Figure 6.10 Finding and Selecting Views From Collapsed Device Explorer

Configuration Perspective

The Configuration perspective in the Device Explorer contains a number of views to aid with configuration of the device. The available views in the Configuration perspective vary by device type.

Device

The Device tab in the Configuration perspective of the Device Explorer provides views that offer basic device information. Select **Device** to see the available views (see *Figure 6.11*).

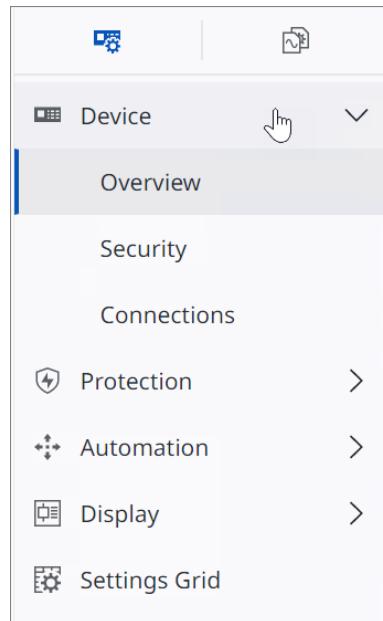


Figure 6.11 Device Tab

Device Overview

The Device Overview provides a general summary of the present device configuration stored in SEL Grid Configurator. Use the highlighted Settings Group selector to change which setting group you see in the summary (see *Figure 6.12*).

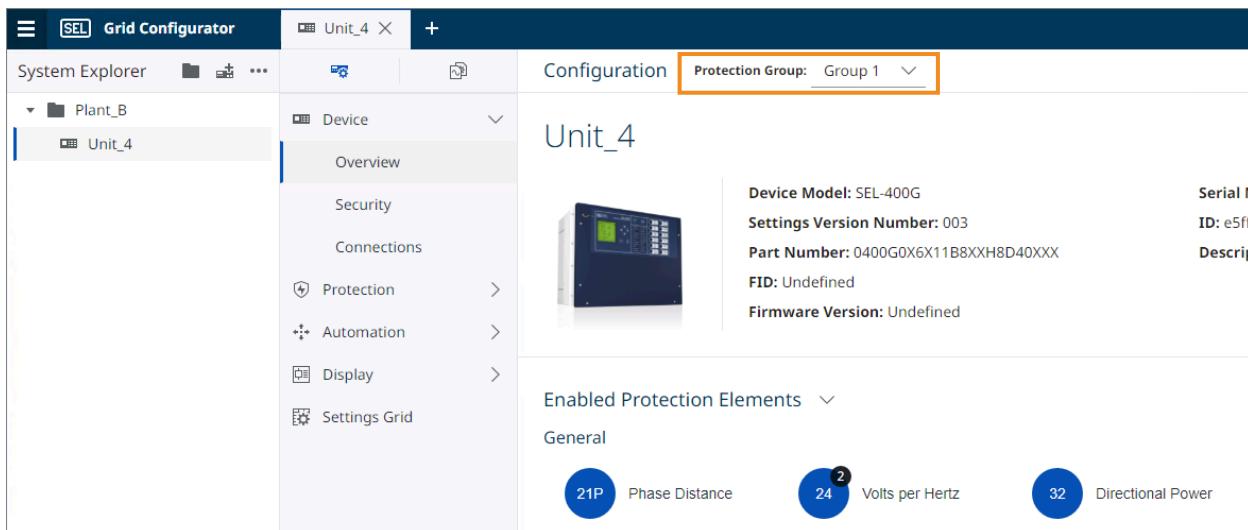


Figure 6.12 Device Overview



Figure 6.13 Device Details

The sections of the device details in the header of the Device Overview are as follows:

- **FID String:** The complete firmware ID string of the device.
- **Firmware Version:** The major release firmware version of the device.
- **Serial Number:** The serial number of the device.
- **ID:** A custom identification that can be used to track a particular device. SEL Grid Configurator provides a default value but does not automatically update this field. Maximum length of 64 characters; can start with either an alpha or numeric character.
- **Description:** A user-provided and optional description for the device. SEL Grid Configurator does not provide a default value and does not automatically update this field.

Select the Edit Nameplate button in the Device Overview workspace to open an Edit window. In the Edit window, you can make changes to the Part Number and other custom values (see *Figure 6.14*).

Edit Nameplate



Device Project Name *

Project Path

Part Number *

Part Number Editor

Description

ID

Serial Number

Firmware Version

FID

Save **Cancel**

SEL-400G
SVN: 001

Figure 6.14 Edit Nameplate

When SEL Grid Configurator connects to a device, it automatically attempts to compare the device serial number, firmware version, and FID string with the values displayed in the Device Overview. If those fields in the Device Overview are blank, SEL Grid Configurator attempts to automatically update them. If those fields have values that differ from those for the device, you will see a notification of the difference and have the option to update the Device Overview fields.

The first section shows the primary protection and control elements enabled for the device based on the general purpose of the device you are using. The next sections display device front-panel assignments. Additional sections may include contact output or remote I/O assignments. Hover over items in the Device Overview to see additional information.

Security View

Use the Security view to view and configure the security options for your SEL device.

Access Level	Status	Description	
ACC	Default •	Required to view data and status information.	
BAC	Default •	Enables Access Level 1 functions plus breaker control and data.	
PAC	Default •	Enables Access Level B functions plus protection settings.	
AAC	Default •	Enables Access Level B functions plus automation settings.	
OAC	Default •	Enables Access Level B functions plus output settings.	
2AC	Default •	Enables all relay access level functions.	
CAL	Default •	SEL factory-specific functions. For a list of commands available, contact SEL.	

Figure 6.15 Security View

As shown in *Figure 6.15*, the Security view displays access levels and password status for your device. Your device may have access levels that differ from those in the figure. SEL Grid Configurator initializes a new device project with the default passwords for that device type. You will see a notification icon in the table for any passwords that remain at their default values. To create a custom password, hover over the specific access level you want to change and select the pencil icon.

The listed passwords are used by SEL Grid Configurator for device operations supported by the application, such as sending settings or reading event reports. These passwords will not apply when you use the terminal in SEL Grid Configurator. If you want to elevate your terminal login above Level 1, you will be prompted for a password.

Connections View

IMPORTANT

You can find an instructional video on how to use the Connections view at the following link: SEL Grid Configurator: Communications.

Use the Connections view in the Device Explorer to view and configure the communications options for your SEL device. As shown in *Figure 6.16*, select either Network or Serial according to how you want to connect to the device.

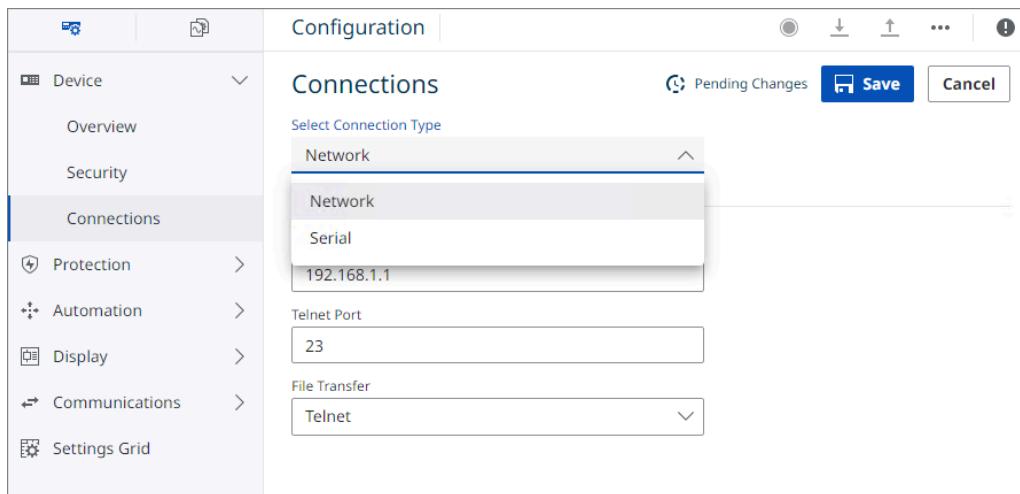


Figure 6.16 Connections View

Network Connections

SEL Grid Configurator provides the ability to communicate over a network to any supported SEL Ethernet-enabled device. The connection parameters, illustrated in *Figure 6.16*, are as follows:

- ▶ **IP Address:** The IP address of the device to which you are connecting. An IP address contains a binary number that uniquely identifies devices on a TCP/IP network.
- ▶ **Telnet Port:** Refers to the port in use for the Terminal during Telnet communications.
- ▶ **File Transfer:** Provides selection of either FTP or Telnet for transferring files to and from the device to which you are connecting. If Telnet is selected, the YMODEM file transfer protocol will be used. Only certain SEL devices provide FTP support, and of these, some devices rely solely on FTP for file transfer. Consult the instruction manual for your device to determine which file transfer protocol is supported.
- ▶ **FTP User Name:** If FTP is selected as the File Transfer protocol, the FTP User Name can also be indicated. The default FTP User Name for SEL-400 series devices is **2AC**. For SEL-800 series devices, the default FTP User Name is **FTPUSER**.

Serial Connections

Select **Serial** as the connection type for using either an EIA-232 or USB port to communicate to your device. SEL Grid Configurator uses ASCII data transmission to communicate to the connected device and provides for binary transfer in the form of Ymodem and SEL Fast Meter. *Figure 6.17* displays the parameters associated with serial connections.

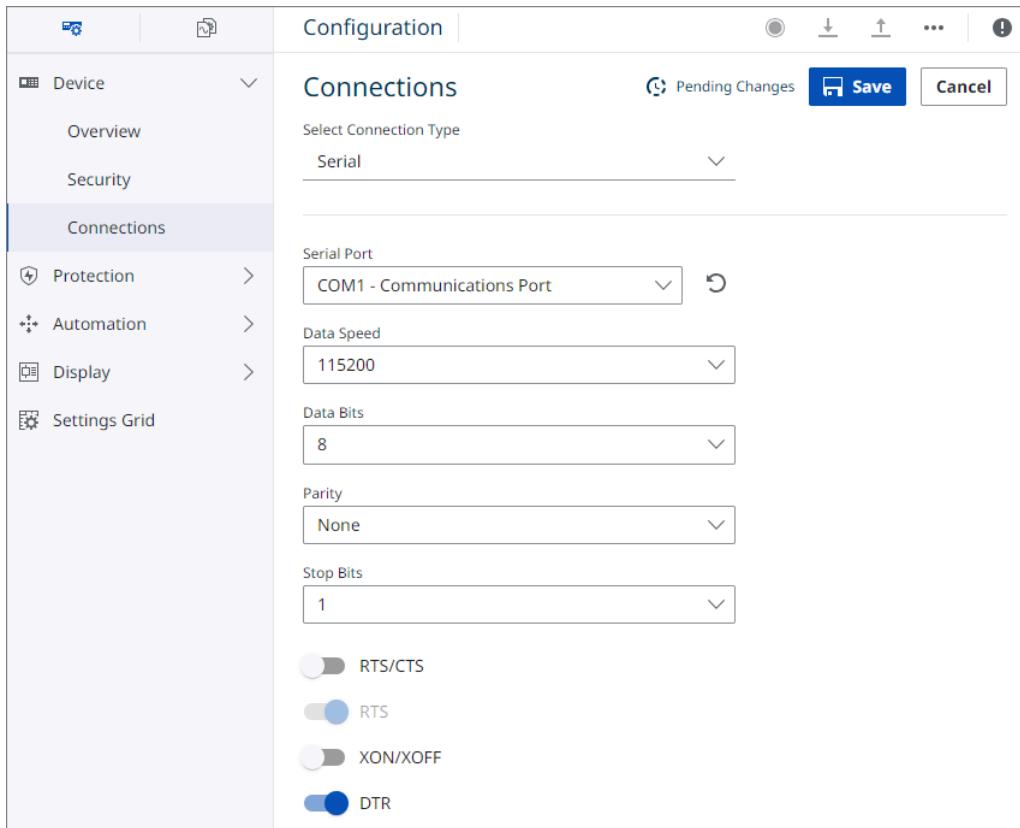


Figure 6.17 Serial Connection Parameters

Serial Port: The serial COM port used to communicate between SEL Grid Configurator and the supported device. Select the drop-down list, as shown in *Figure 6.17*, to find the desired port. Select the **Reload available serial ports** icon next to the drop-down list to refresh the list of available serial ports.

Data Speed: The rate of data transfer used by the port. The data speed is the number of bits transferred per second. When connecting to a device, SEL Grid Configurator first uses the provided data speed. If the connection is unsuccessful, SEL Grid Configurator automatically attempts to connect to the device using other available data speeds. The successful connection may occur at a data speed other than what you entered.

Data Bits: The number of data bits a transmission contains.

Parity: The parity-checking mode for the port.

Stop Bits: The number of stop bits for the port. Stop bits signal the end of a packet of information.

RTS/CTS: The hardware flow control options for the port. RTS stands for Request to Send and CTS stands for Clear to Send.

XON/XOFF: The software flow control options for the port.

RTS: The state of the RTS signal.

DTR: The present state of the Data Terminal Ready (DTR) signal.

Saving Changes in Connections View

When changes are made to parameters in the Connections view, they must be saved in order to be applied. This can be done by selecting **Save** at the top of the screen (see *Figure 6.18*). Alternatively, select **Cancel** to discard changes.

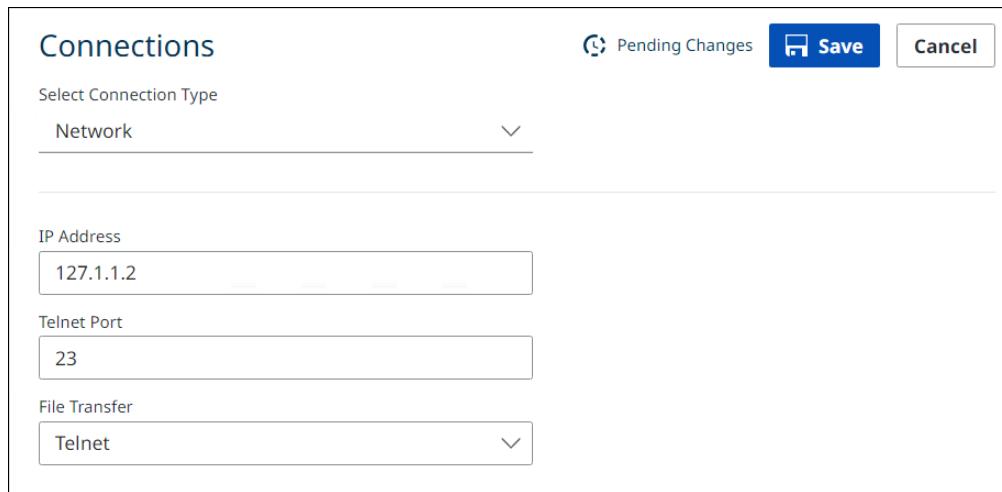


Figure 6.18 Save and Cancel Buttons in Connections View

Connecting to Multiple Devices

Perform common device operations on multiple devices simultaneously by first selecting all of the desired devices. As shown in *Figure 6.19*, press <Shift+Click> to select multiple devices in a list. Press <Ctrl+Click> to select individual devices in any order.

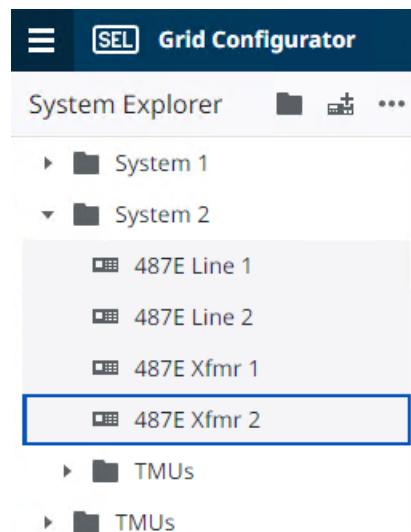


Figure 6.19 Select a List of Devices

Once selected, right-click on any of the devices to see a list of available bulk operations. As shown in *Figure 6.20*, select **Read** or **Send** to connect to the selected devices and perform the desired operation.

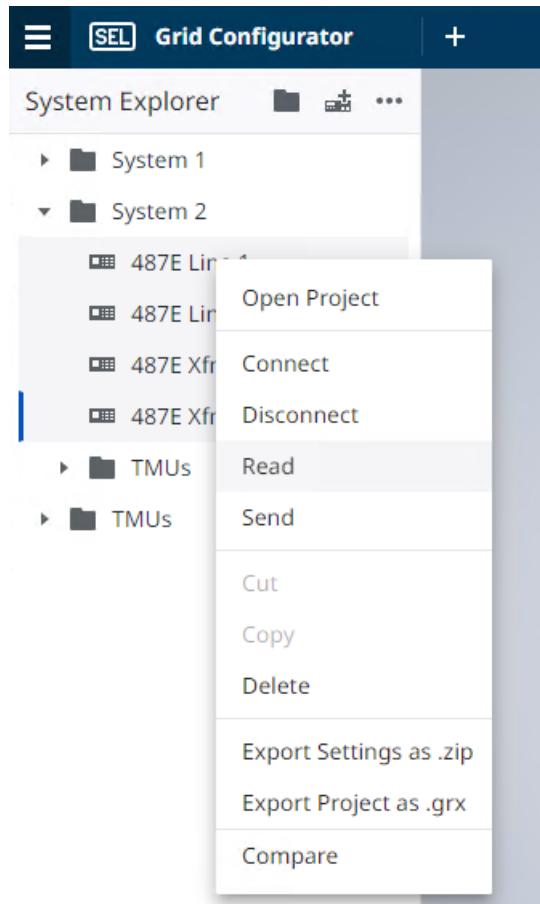


Figure 6.20 Bulk Operation Context Menu

NOTE

SEL Grid Configurator limits FTP file transfer connections to a maximum of five devices.

SEL Grid Configurator performs all of the operations in the context menu for the selected devices. You can use it to quickly open multiple device projects or compare settings between devices.



Figure 6.21 Title Bar Menus

As shown in *Figure 6.21*, use the Connections and File Transfer icons in the Title Bar to monitor the status of bulk operations.

Protection

The Protection tab in the Configuration perspective provides views related to protection functions and protection logic. Select **Protection** to see the available views (see *Figure 6.22*).

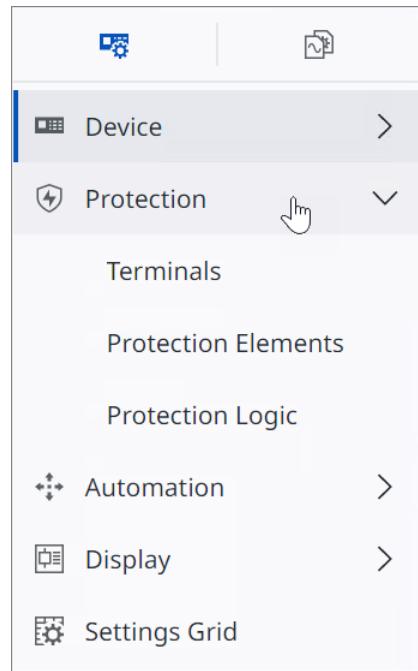


Figure 6.22 Protection Tab

Protection Elements View

⚠️ IMPORTANT

You can find an instructional video on how to use the Protection Elements view at the following link: SEL Grid Configurator: Protection Elements.

SEL relays include a wide variety of protection functions tailored to the primary application of the device. Refer to the instruction manual for your device to find details about the available protection elements. The Protection tab in the Configuration perspective of the Device Explorer includes views that provide a single place to enable and configure settings for all protection functions.

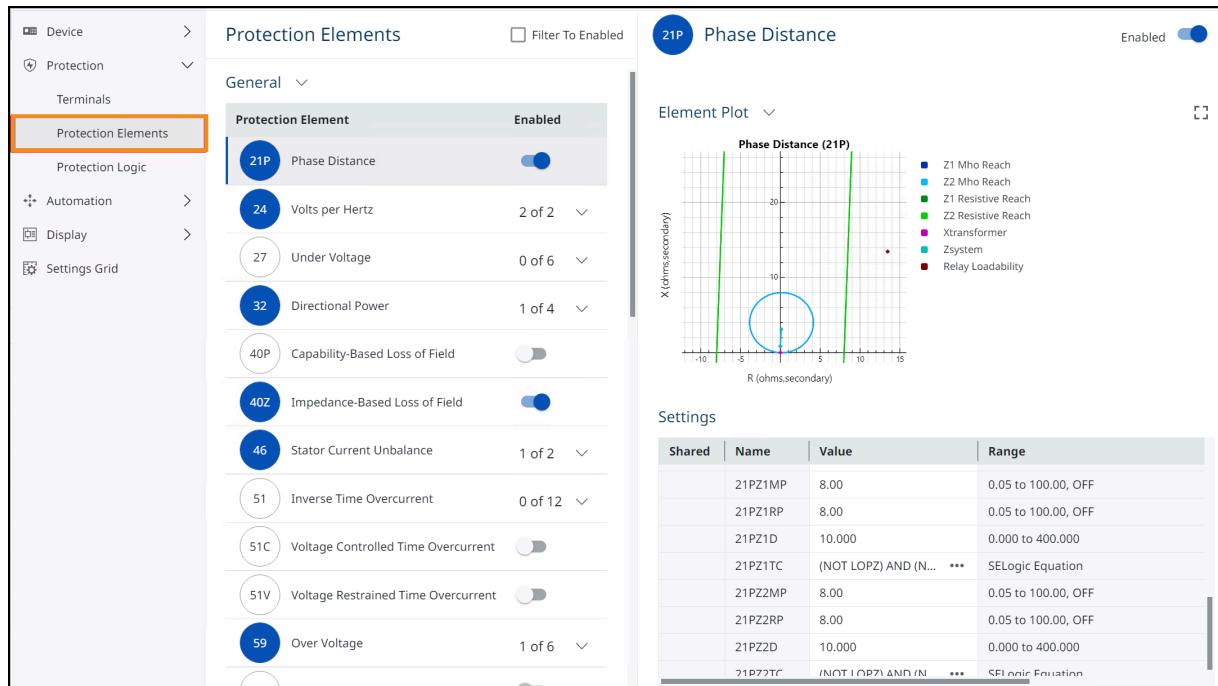


Figure 6.23 Protection Elements View

As shown in *Figure 6.23*, the Protection Elements view includes a navigator and a workspace where protection elements can be customized.

NOTE

SEL Grid Configurator only presents a plot for protection functions that support settings plots. In these cases, the plot automatically displays.

Working With the Protection Elements Navigator

The Protection Elements navigator provides a summary of the protection functions in your device, including which elements are enabled and the quantity of each in use. Check the **Filter to Enable** box to hide all disabled protection elements. As illustrated in *Figure 6.24*, each element is listed by ANSI number or other designator, a brief description, the quantity or type of that element type presently in use, and the total available for your relay. SEL Grid Configurator displays disabled elements in a white color and enabled elements in a bold dark blue. Use the numerical control next to each element to change the quantity of enabled elements or toggle the slider to enable or disable elements for which there is only a single instance. Note that as you change the configuration of Protection Elements, the Protection Elements workspace updates to match your latest configuration. For relays that support protection elements associated with terminals, the available protection elements list includes collapsible entries for each terminal.

Protection Elements		<input type="checkbox"/> Filter To Enabled
General ▾		
Protection Element	Enabled	
21P Phase Distance	<input checked="" type="checkbox"/>	
24 Volts per Hertz	2 of 2 ▾	
27 Under Voltage	0 of 6 ▾	
32 Directional Power	1 of 4 ▾	
40P Capability-Based Loss of Field	<input checked="" type="checkbox"/>	
40Z Impedance-Based Loss of Field	<input checked="" type="checkbox"/>	
46 Stator Current Unbalance	0 of 2 ▾	
51 Inverse Time Overcurrent	0 of 12 ▾	
51C Voltage Controlled Time Overcurrent	<input checked="" type="checkbox"/>	

Figure 6.24 Available Protection Elements

If your device includes multiple protection groups, you can change the protection group that you see by using the drop-down menu in the Device Commands menu, as shown in *Figure 6.25*. Refer to your device instruction manual for more information about settings groups and logic for your device.

**Figure 6.25 Settings Groups**

As shown in *Figure 6.26*, SEL Grid Configurator may prevent you from enabling certain protection functions because of other related and required settings values. If this occurs, the workspace displays all settings and related functions required to enable the protection function in question. In some cases, the workspace displays a description of other product information, such as part number options, that prohibit certain protection functions.

The screenshot shows a list of protection elements on the left and a descriptive message on the right.

21XP	Quadrilateral Phase Distance Zone	3 of 5 ▾
25	Breaker Synchronism Check BK1	<input type="checkbox"/>
25	Breaker Synchronism Check BK2	<input type="checkbox"/>
27	Under Voltage	0 of 6 ▾
32	Directional Control	

Element Disabled

Enable second breaker to enable this element. See NUMBK setting.

Edit Setting(s)

Figure 6.26 Notification of Pertinent Settings and Other Product Information

When you select **Edit Setting(s)**, if available, SEL Grid Configurator displays a list of pertinent settings, similar to *Figure 6.27*. Edit all needed settings in the dialog and select **Save** to close the dialog.



Figure 6.27 Edit Setting(s) Dialog

Enabled Protection Elements Workspace

When the **Filter to Enabled** box is checked, the Enabled Protection Elements Navigator displays a list of all enabled elements for each protection group. If you have enabled more than one instance of a particular element type, your screen displays entries in the list for each instance. Select a tab in the workspace to view the desired protection element instance, as shown in *Figure 6.28*.

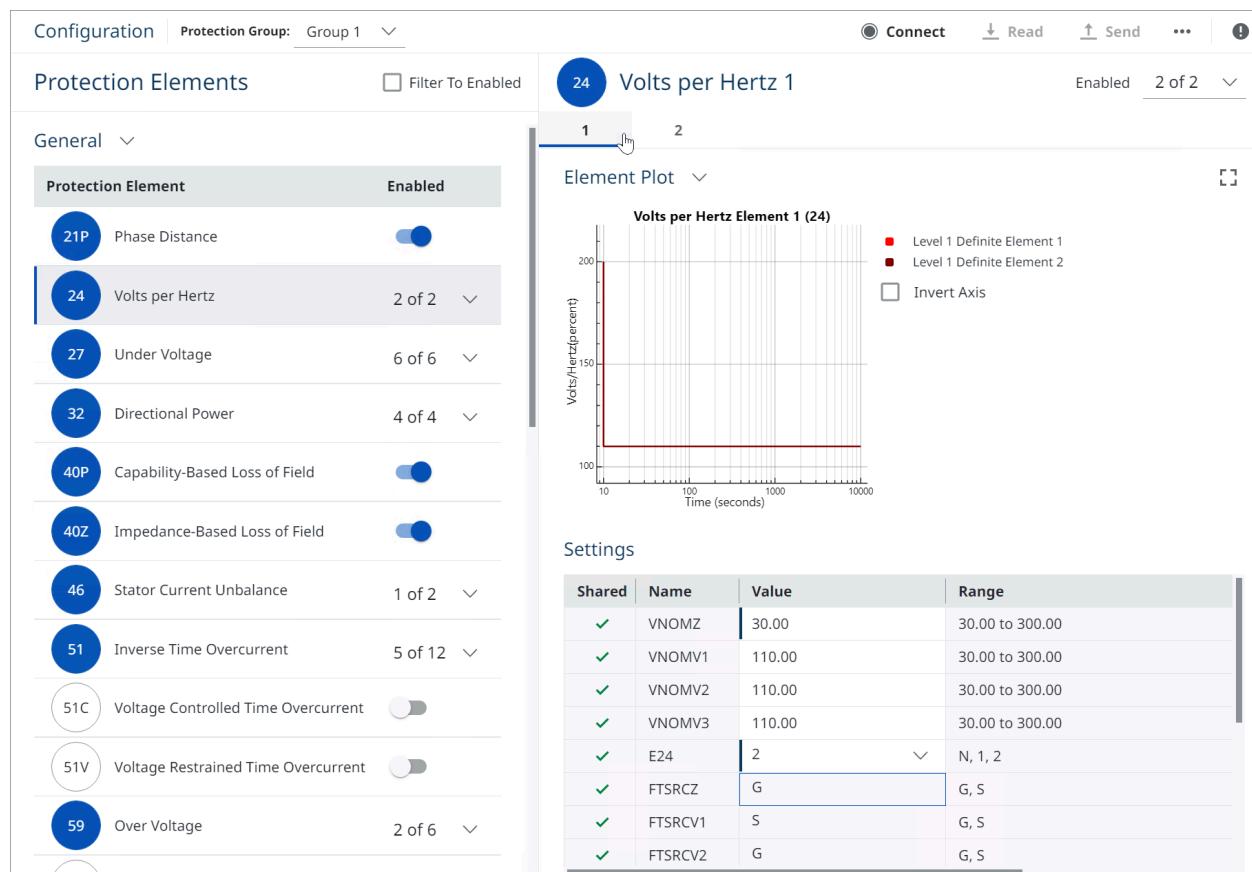


Figure 6.28 Enabled Protection Elements

As shown in *Figure 6.28*, select each protection element to view and edit the settings associated with that element. For settings that use numerical or string entries, you can select the Value cell for each setting and directly edit the value. For settings that accept a value from a list or require SELOGIC® equations, the Value cell includes an ellipsis button. Select the ellipsis button to open the helper dialog for each setting.

Some settings display a green check in the Shared column, as shown in *Figure 6.28*. This icon indicates association of this setting with multiple protection and control functions. If you change this setting value in any protection view, it updates in all views associated with those multiple functions.

You will also see for some protection elements a plot representing the present values of settings, as shown in *Figure 6.29*. The associated plot updates to reflect each setting change you make. Select any item in the legend to toggle the visibility of that parameter in the plot. If visible, select the  icon in the corner of the plot to see an enlarged view.

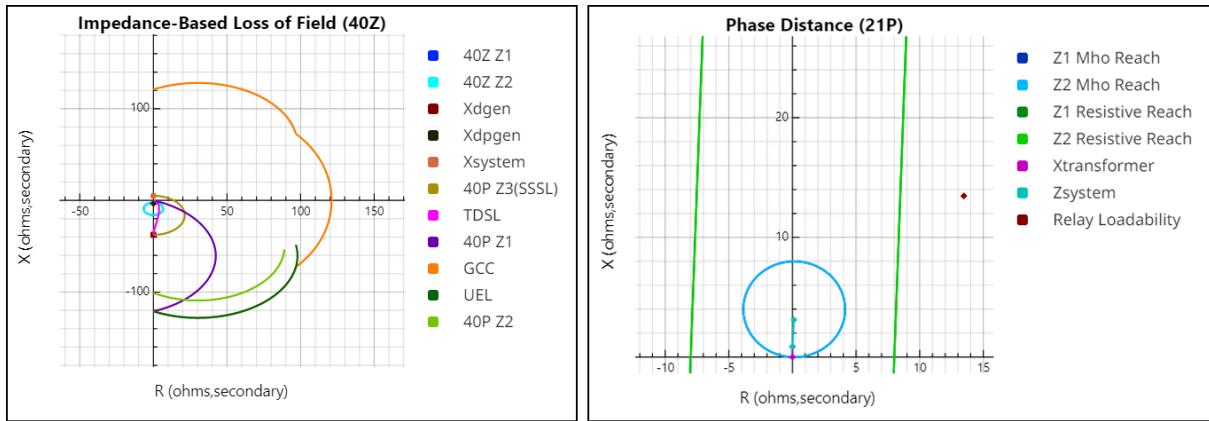


Figure 6.29 Protection Element Plots

Protection Logic View

IMPORTANT

You can find an instructional video on how to use the Protection Logic View at the following link: SEL Grid Configurator: Protection Logic Editor.

SEL Grid Configurator provides the Freeform Logic Editor (*Figure 6.30*) for assistance in creating Automation and Protection Logic for supported devices. Access the Freeform Logic Editor by opening a device project that supports Freeform Logic and then selecting the **Protection Logic** tab. The Freeform Logic Editor includes autocomplete helpers that guide the user in creating logic. The Freeform Logic Editor functions as other text editors where you can copy, paste, and insert lines of logic directly into the editor. Logic equations that display in the Freeform Logic Editor display also in the corresponding Logic settings within the device Settings tab. When you select a line of logic in the Workspace pane, it populates the equation in the Edit pane section to the right of the workspace. The Freeform Logic Editor colorizes the text to indicate the type of logic it represents.

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Configuration Perspective

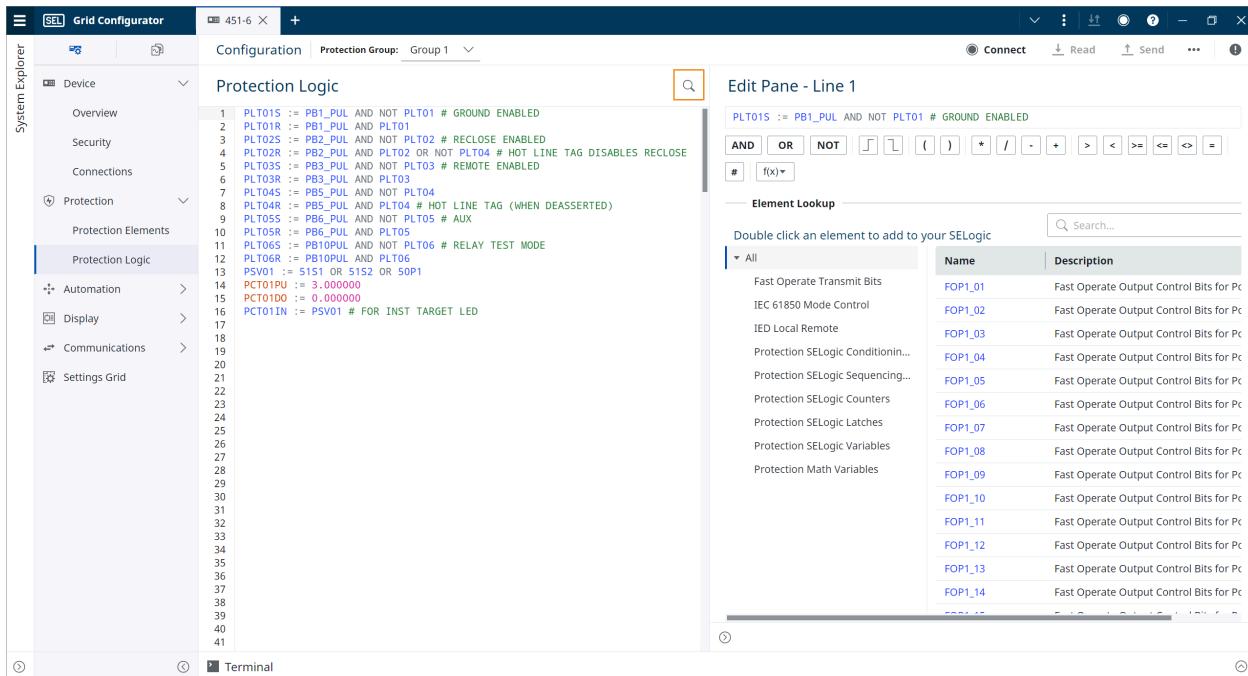


Figure 6.30 Freeform Protection Logic Editor

The Freeform Logic Editor automatically color codes the logic in your equation. The colors are as follows:

- **Analog Values:** Orange
- **Boolean Values:** Blue
- **Operators:** Gray
- **Numbers:** Pink
- **Comments:** Green. Some devices support inline SELOGIC comments.
Refer to your device instruction manual.

You can search your Protection Logic by selecting the magnifying glass near the top of the screen (highlighted in orange in *Figure 6.30*) and entering your search string in the Find field. You can also use your keyboard (via <Ctrl+F>) to perform a search. Any matches in your SELOGIC will be highlighted, as shown in *Figure 6.31*. You can replace SELOGIC by entering a replacement string in the Replace field and using the arrow buttons to scroll through the different matches. Alternatively, you can select **Replace All** to replace all matches.

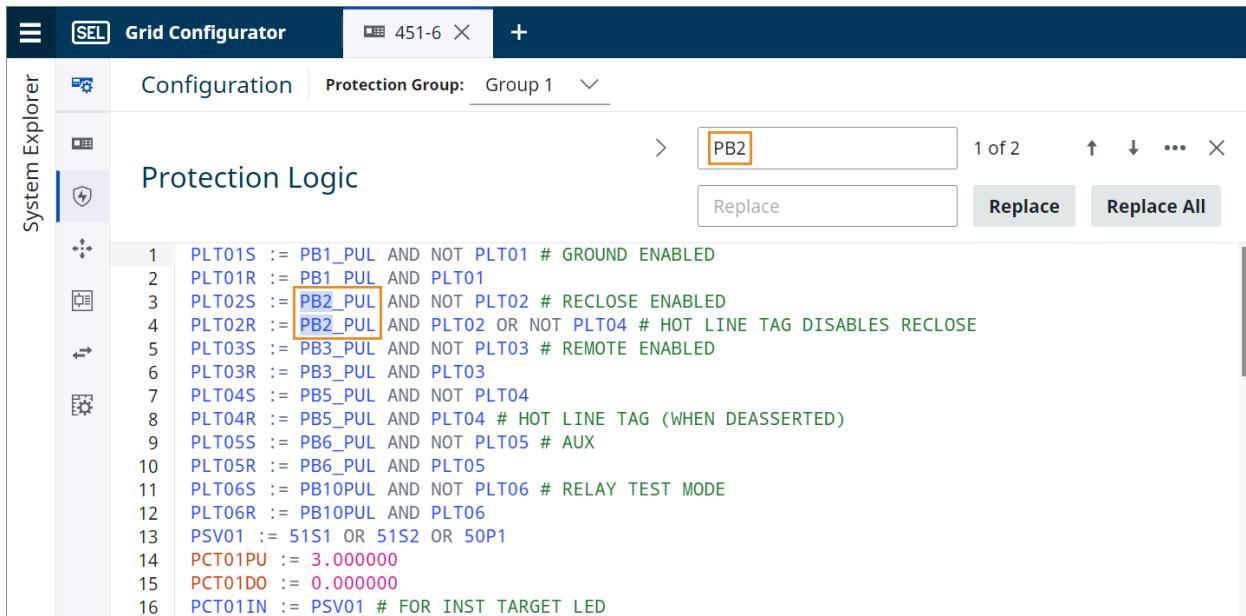


Figure 6.31 Search and Replace in the Freeform Protection Logic Editor

SEL Logic Editor Within the Freeform Logic Window

Within the Freeform Logic Editor is an Edit Pane that can be located on the right side of the Logic window. Whatever you type in the SEL Logic Editor also appears in the Freeform Logic window. Selecting a line in the Freeform Logic window also causes that same line to display in the SEL Logic Editor window. When you select multiple lines in the Freeform Logic window, it disables the Edit pane. You can also collapse and expand the SEL Logic Editor window by selecting the arrow at the bottom of the window between the two sections. For more information on using the SEL Logic Editor window, refer to the SEL Logic Editor section in the SEL Grid Configurator Instruction Manual.

Terminals View

Depending on the device you are configuring, you may see the Terminals view listed under Protection in the Device Explorer, as shown in *Figure 6.32*. The Terminals view is available to devices, such as the SEL-400G, for which the instrument transformer and terminal connections significantly affect the device configuration and available protection and control functions. Refer to your device instruction manual for additional information related to the configuration of these options.

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Configuration Perspective

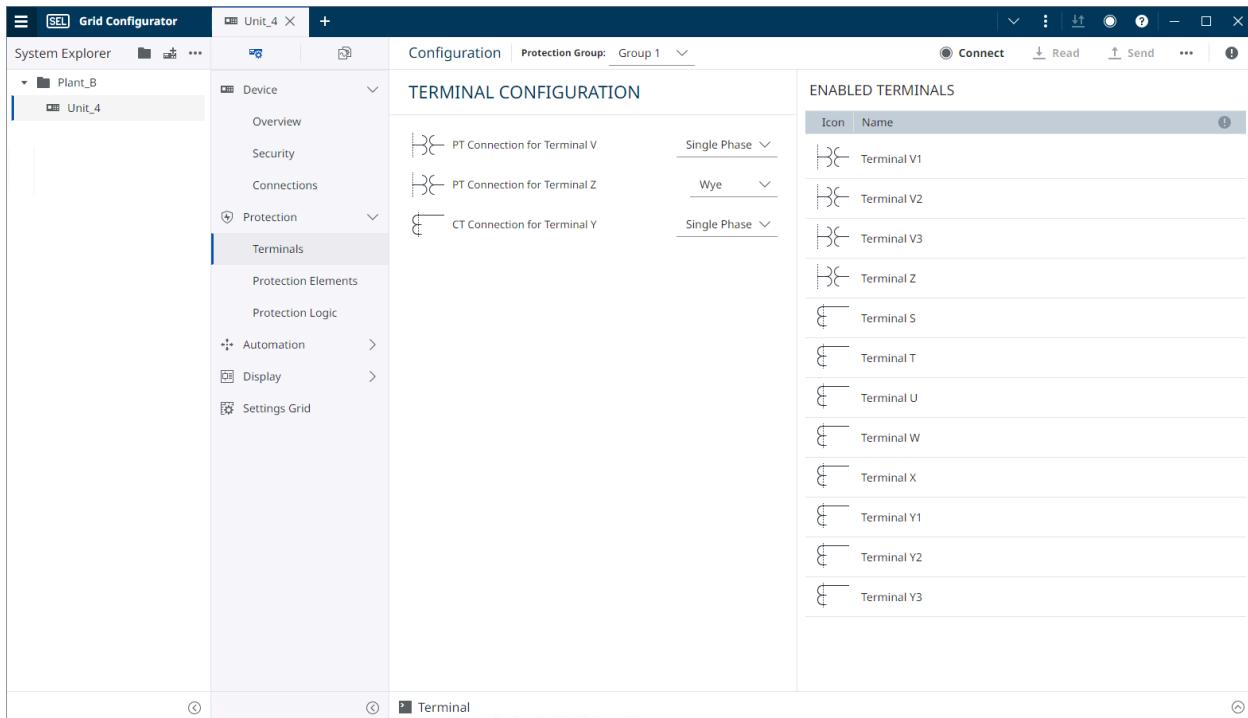


Figure 6.32 Terminals View

Working With the Terminal Configuration Navigator

As shown in *Figure 6.33*, each available terminal connection is shown in the Terminal Configuration navigator with a drop-down menu listing the available options. The Enabled Terminals workspace reflects the result of your configuration choices.

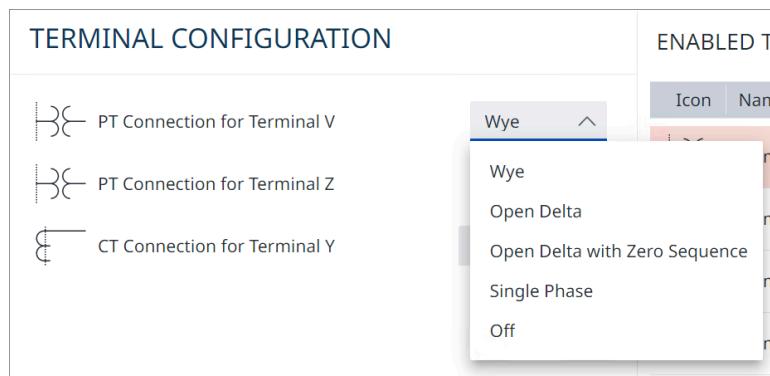


Figure 6.33 Terminal Configuration Navigator

Working With the Enabled Terminals Workspace

Based on your terminal configuration choices, the Enabled Terminals workspace, as shown in *Figure 6.34*, displays each terminal requiring configuration. Select each terminal you want to display and edit the associated settings, as shown in *Figure 6.34*. If you alter the terminal configuration into an unsupported state, error notifications for each affected terminal display, as shown in *Figure 6.35*. Select each terminal to identify the settings you

must change to remove an error. For example, Terminal V is selected in *Figure 6.35*. Once you select the intended terminal, the displayed settings grid identifies settings errors in the corner of the settings value. Refer to your device instruction manual for detailed information about your device settings.

ENABLED TERMINALS				
Icon	Name			
TC	Terminal V1			
TC	Terminal V2			
TC	Terminal V3			
TC	Terminal Z			
ET	Terminal S			
ET	Terminal T			
ET	Terminal U			
ET	Terminal W			
ET	Terminal X			
ET	Terminal Y1			
ET	Terminal Y2			

TERMINAL X SETTINGS				
Shared	Name	Value	Range	Description
	CTRX	4000.0	1.0 to 50000.0, OFF	Curre
✓	EGNCT	X	Combination of: W, X	Enabl
	FTSRCX	G	G, S	Frequ

Figure 6.34 Enabled Terminals

Grid Configurator											
System Explorer		Test Device 1	Send Report	+							
Test Device 1		Send Report		Search...							
		<table border="1"><thead><tr><th>Device</th><th>Start Time</th><th>End Time</th><th>Status</th></tr></thead><tbody><tr><td>Test Device 1</td><td>10/21/2022 12:56:51 PM</td><td>10/21/2022 12:56:57 PM</td><td>✓ Success</td></tr></tbody></table>		Device	Start Time	End Time	Status	Test Device 1	10/21/2022 12:56:51 PM	10/21/2022 12:56:57 PM	✓ Success
Device	Start Time	End Time	Status								
Test Device 1	10/21/2022 12:56:51 PM	10/21/2022 12:56:57 PM	✓ Success								
		Test Device 1									
		Operation Details									
		Status: Successfully sent SETTINGS\SET_S1.TXT to device. #001 Transfer Complete									
		Start Time: 10/21/2022 12:56:51 PM									
		End Time: 10/21/2022 12:56:57 PM									
		Progress: 1 out of 1 file processed									
		File Status									
		<table border="1"><thead><tr><th>File</th><th>Status</th></tr></thead><tbody><tr><td>SETTINGS\SET_S1.TXT</td><td>✓ Sent</td></tr></tbody></table>		File	Status	SETTINGS\SET_S1.TXT	✓ Sent				
File	Status										
SETTINGS\SET_S1.TXT	✓ Sent										

Figure 6.35 Evaluating Configuration Errors

Automation View

SEL Grid Configurator provides the Freeform Logic Editor (*Figure 6.36*) for assistance in creating Automation Logic for supported devices. Access the Freeform Logic Editor by opening a device project that supports Freeform Logic and then selecting **Automation > Automation Logic**.

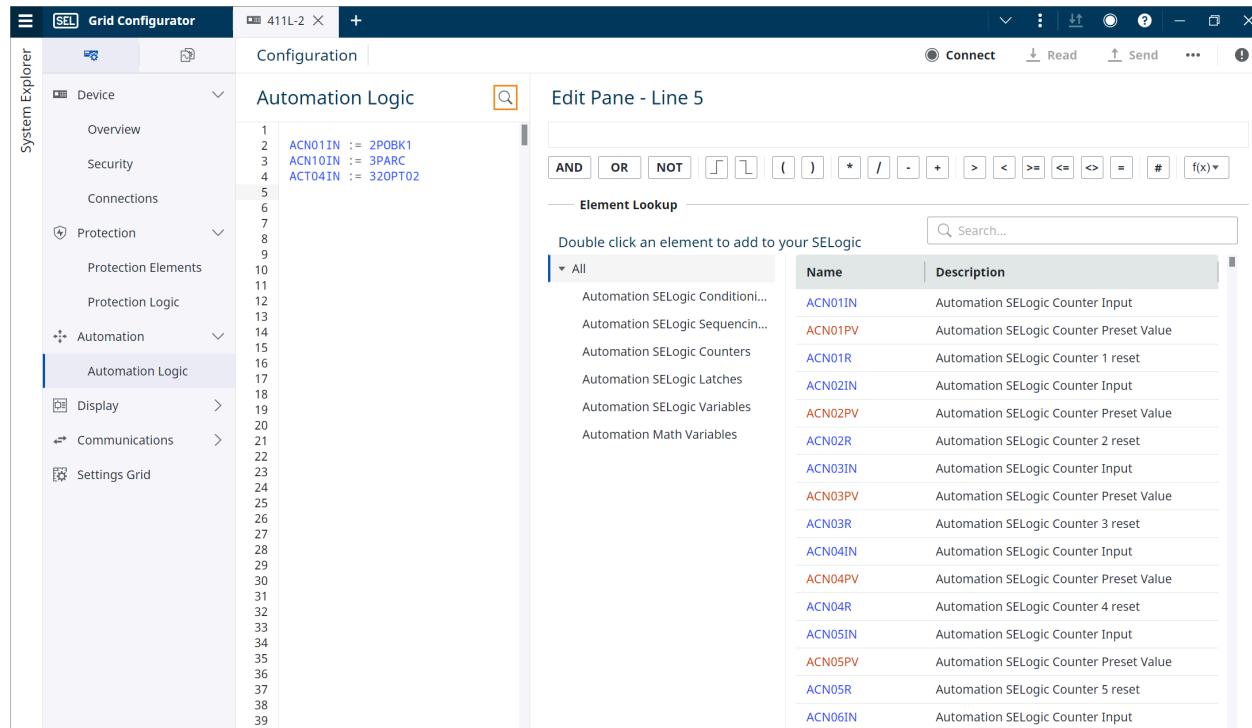


Figure 6.36 Freeform Automation Logic Editor

You can search your Automation Logic by selecting the magnifying glass near the top of the screen (highlighted in orange in *Figure 6.36*). You can also use your keyboard (via <Ctrl+F>) to search Automation Logic.

Display View

Bay Control

IMPORTANT

You can find an instructional video on how to use the Bay Control view at the following link: SEL Grid Configurator: Configuring Mimic Diagrams With Bay Control.

For devices that support bay control functions and front-panel mimic diagrams, SEL Grid Configurator provides the Bay Control view as a simple interface for selecting and configuring the diagrams. As shown in *Figure 6.37*, select **Display > Bay Control** to navigate to the Bay Control view. The Bay Control view includes two panes. The first is an interactive preview pane showing the presently selected mimic diagram. The second is a settings grid editor representing the device settings related to mimic diagram and bay control functions.

NOTE

The bay control settings can also be found in the Settings Grid view.

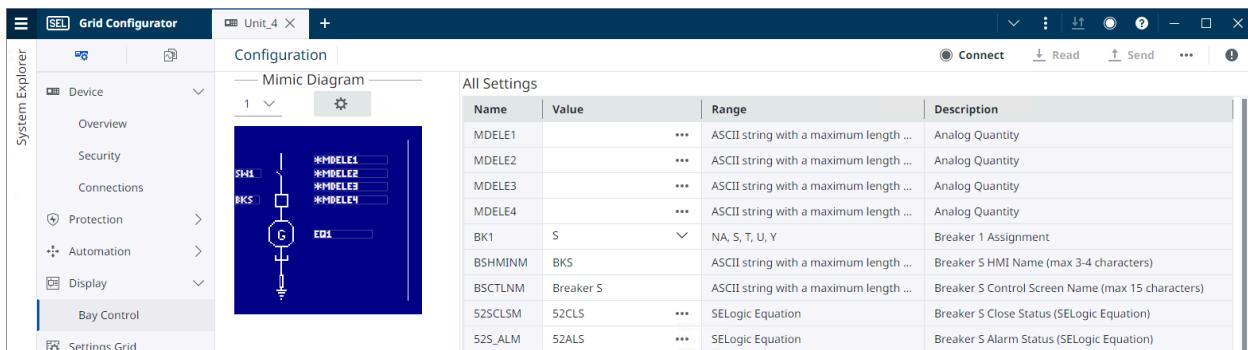


Figure 6.37 Bay Control View

Browsing Mimic Diagrams From the System Explorer

If you want to browse all available mimic diagrams for all devices, select the ellipsis button in the upper right side of the SEL Grid Configurator Title Bar and then select **Mimic Diagram Explorer**, as shown in *Figure 6.38*.

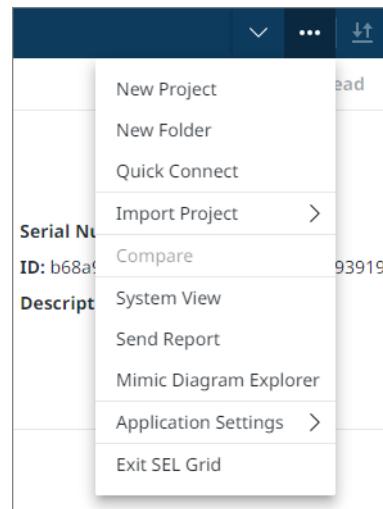


Figure 6.38 Finding Mimic Diagrams in System Explorer

As shown in *Figure 6.39*, you can filter the view according to device type, settings version number, number of breakers, and number of disconnects to find the diagrams appropriate for your application.

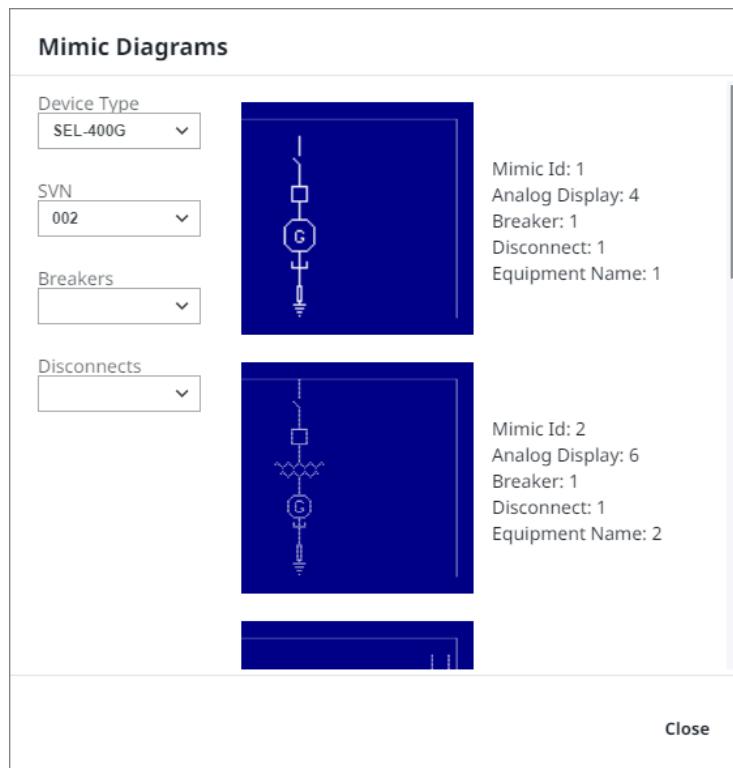
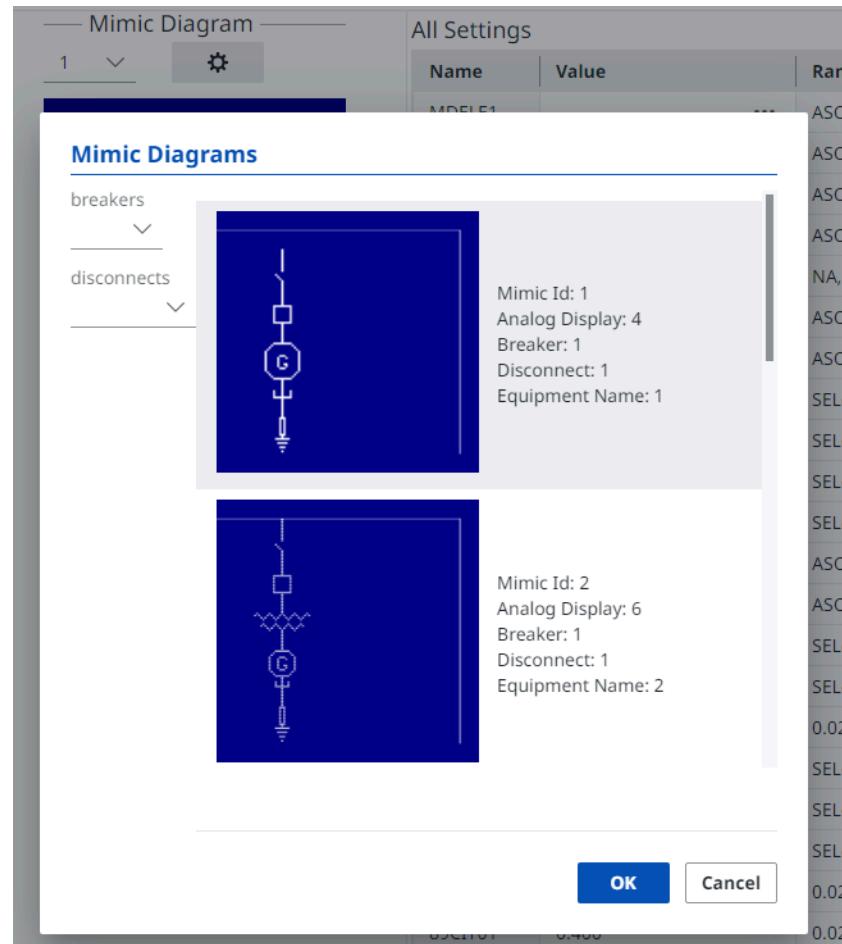


Figure 6.39 Finding Mimic Diagrams for all Supported Devices

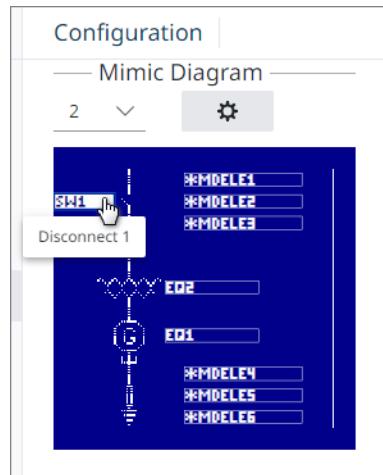
Selecting a Diagram for a Device Project

After you open a device project, select the gear icon next to the mimic diagram title (as shown in *Figure 6.40*) in the Bay Control view to open the selection dialog for your device. You can filter the options based on the number of breakers and number of disconnects available in each diagram. Select the diagram you need and then select **OK**. You can also select the diagram by double-clicking it. If you need to change the selected mimic diagram after you have started changing settings, all your setting changes will be preserved for the new diagram.

**Figure 6.40** Selecting a Mimic Diagram

Editing Diagram Settings

When you first navigate to the Bay Control view, the Settings Grid pane shows all settings related to the mimic diagram and displays a heading of All Settings at the top of the pane, as shown in *Figure 6.40*. To filter the Settings Grid to a specific element of the diagram, first select an editable element in the preview pane. *Figure 6.41* illustrates how the mouse cursor changes when you hover over an editable element. Additionally, you will see a pop-up notification with the name of the element.

Display View**Figure 6.41 Selecting an Editable Field in a Preview Pane**

Name	Value	Range	Description
D01HMIN	SW1	ASCII string with a maximum length ...	Disconnect 1 HMI Name (max 3-4 cha...
D01CTLN	BB 1	ASCII string with a maximum length ...	Disconnect 1 Control Screen Name (...
89AM01	1	***	SELogic Equation
89BM01	0	***	SELogic Equation
89ALP01	6.000	0.020 to 2000.000	Disconnect 1 Alarm Pickup (seconds)
89CCN01	89CC01	***	SELogic Equation
89OCN01	89OC01	***	SELogic Equation
89CTL01	1	***	SELogic Equation
89CST01	5.600	0.020 to 2000.000, OFF	Disconnect 1 Close Seal-in Time (seco...
89CIT01	0.400	0.020 to 2000.000, OFF	Disconnect 1 Close Immobility Time (...
89CRS01	89CL01 OR 89CSI01	***	SELogic Equation

Figure 6.42 Filtered Settings Grid

Select the element you want from the preview diagram to filter the Settings Grid to show only the settings associated with that element, as shown in *Figure 6.42*. When you update label settings, such as D01HMIN in *Figure 6.43*, the newly updated label appears in the preview. If your label will not fit on the screen, an error appears in the Settings Grid and in the preview.

Name	Value	Range	
D01HMIN	B1S1	ASCII string with a maxim	
D01CTLN	BB 1	ASCII string with a maxim	
89AM01	1	***	SELogic Equation
89BM01	0	***	SELogic Equation
89ALP01	6.000	0.020 to 2000.000	0.020 to 2000.000

Figure 6.43 Changed Diagram Settings Reflected on Screen

Configuring Analog Display Points

In addition to the one-line depiction, most mimic diagrams include a number of optional analog display points. If analog display points are not required, leave the setting(s) blank; the relay displays only the defined display points. As a configuration example, select the analog display label *MDELE2 in the preview, as shown in *Figure 6.44*, then select the ellipsis button in the Value cell in the Settings Grid to display the form shown in *Figure 6.45*.

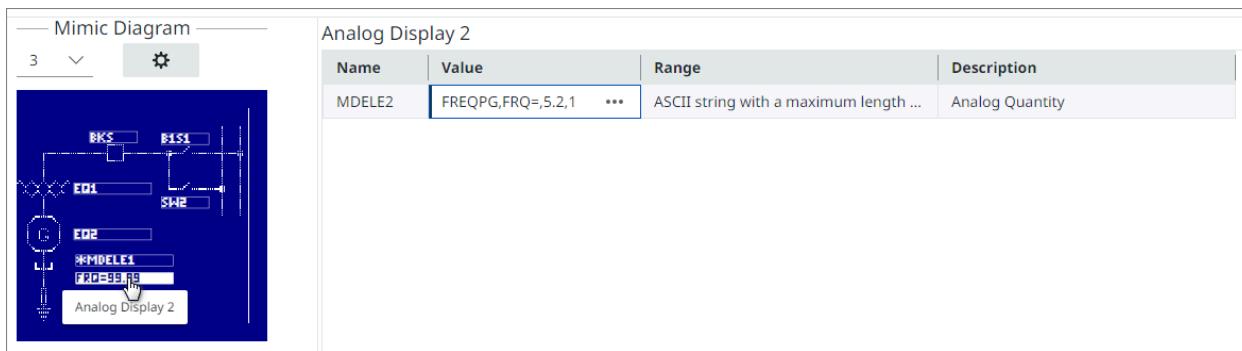


Figure 6.44 Selecting an Analog Display Point

Use the dialog to select the value you want for the Display Point and select **Close**.

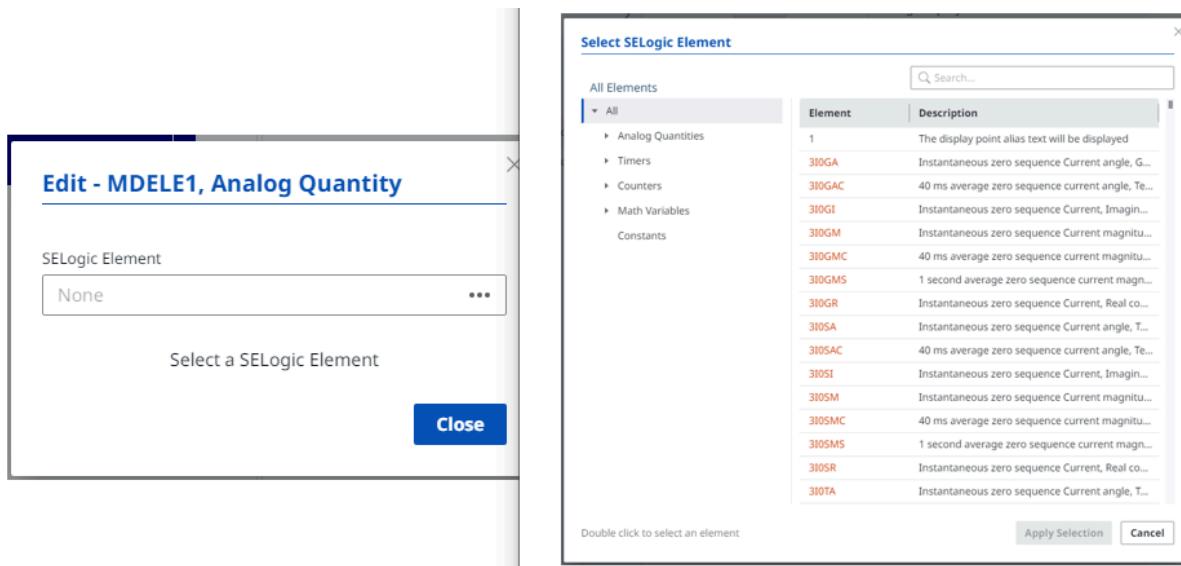


Figure 6.45 Select Display Point for Diagram

SEL Grid Configurator next displays the Edit dialog shown in *Figure 6.46*. Use the SELogic Element cell to change the selected Display Point. The expression builder provided in the dialog helps build the analog quantity setting string. The example shows a selection of the generator source frequency, FREQPG, for the display. Enter a Pre-Text, for example FRQ=, as shown in *Figure 6.46*. Set the numerical display format to 5 for the overall displayed length of the number and 2 for digits after the decimal. You can scale the numerical value of FREQPG to display a scaled value of the analog quantity. For example, a scaling value of 0.5 displays only half the value of FREQPG, while a scaling value of 2 displays twice the value of FREQPG. Enter text, such as the units of the analog quantity,

in the Post-Text field. The table beneath the expression builder shows examples of how the resulting display point appears on the screen. Select **Close** when complete, and the preview pane highlights the Display Point you just configured. Repeat this process for each display point you need.

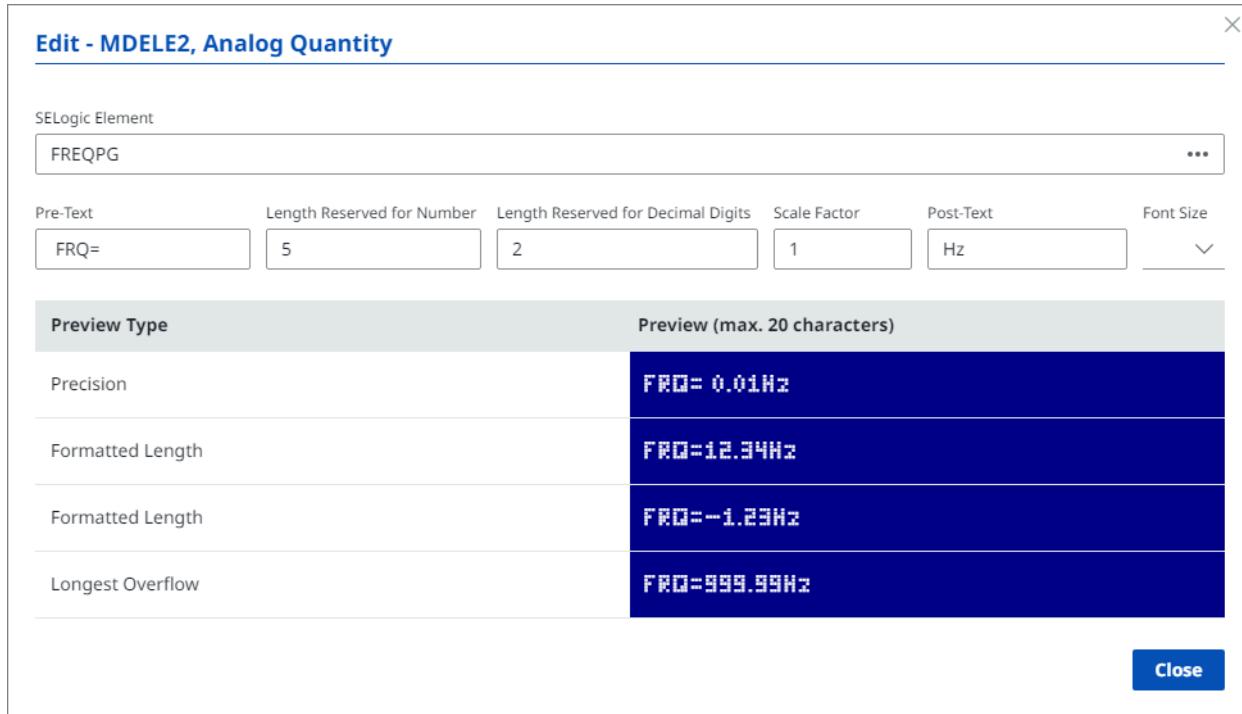


Figure 6.46 Configure Details of the Analog Display Point

Settings Grid View

⚠️ IMPORTANT

You can find an instructional video on how to use the Settings Grid view at the following link: SEL Grid Configurator: Settings Grid.

The Settings Grid view provides an editing interface for all device settings with integrated tools for navigation, sorting, and filtering that help you quickly locate the settings you need. The Settings Grid view has three primary sections, as shown in *Figure 6.47*: the search and filter bar, the settings tree, and the editor workspace.

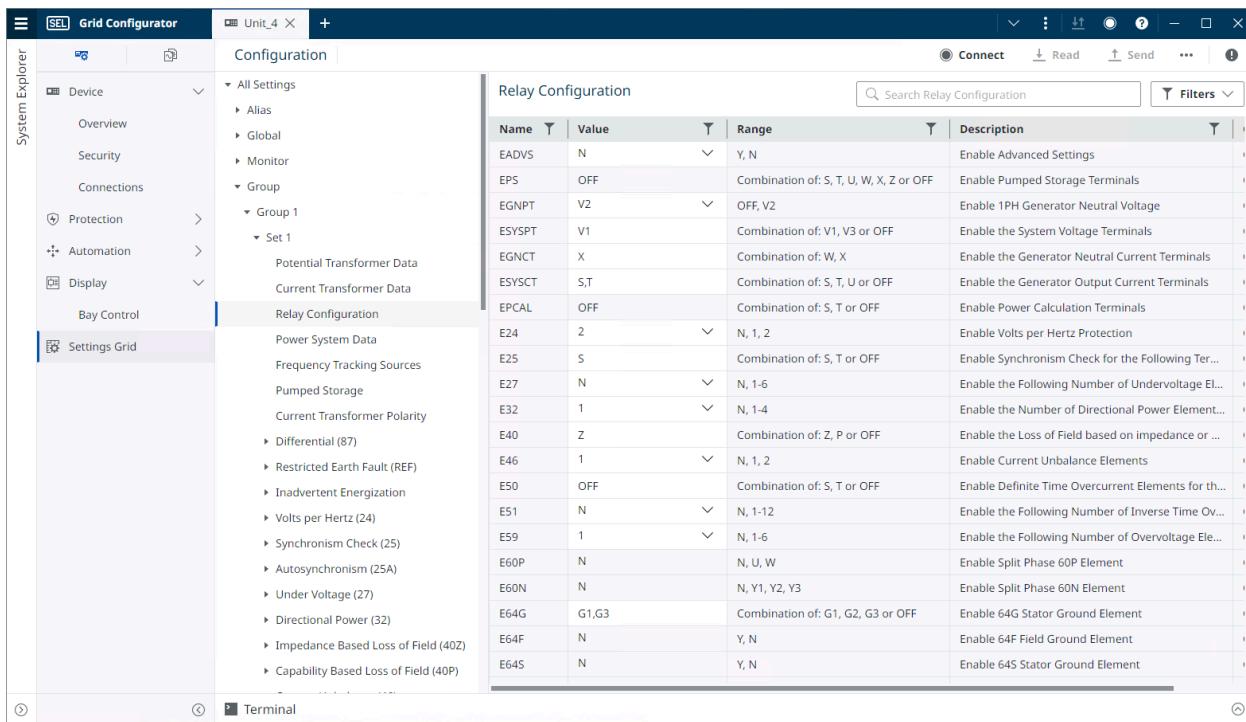


Figure 6.47 Opening the Settings Grid View

Using the Settings Tree

The settings tree is organized hierarchically. Settings categories may have a small triangle to the left. When you select this triangle, the settings category expands to show further available settings categories that relate to the overarching category, as shown in *Figure 6.47*. Select the triangle again to collapse that portion of the tree. When you select a category or individual entry in the tree, as shown in *Figure 6.48*, the editor workspace filters the settings to show only those associated with the selected entry. Additionally, you will see a tile above the Settings Grid showing that you have selected that section to view. Select the boundary between the settings tree and the editor workspace to adjust the width of the settings tree pane.

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Settings Grid View

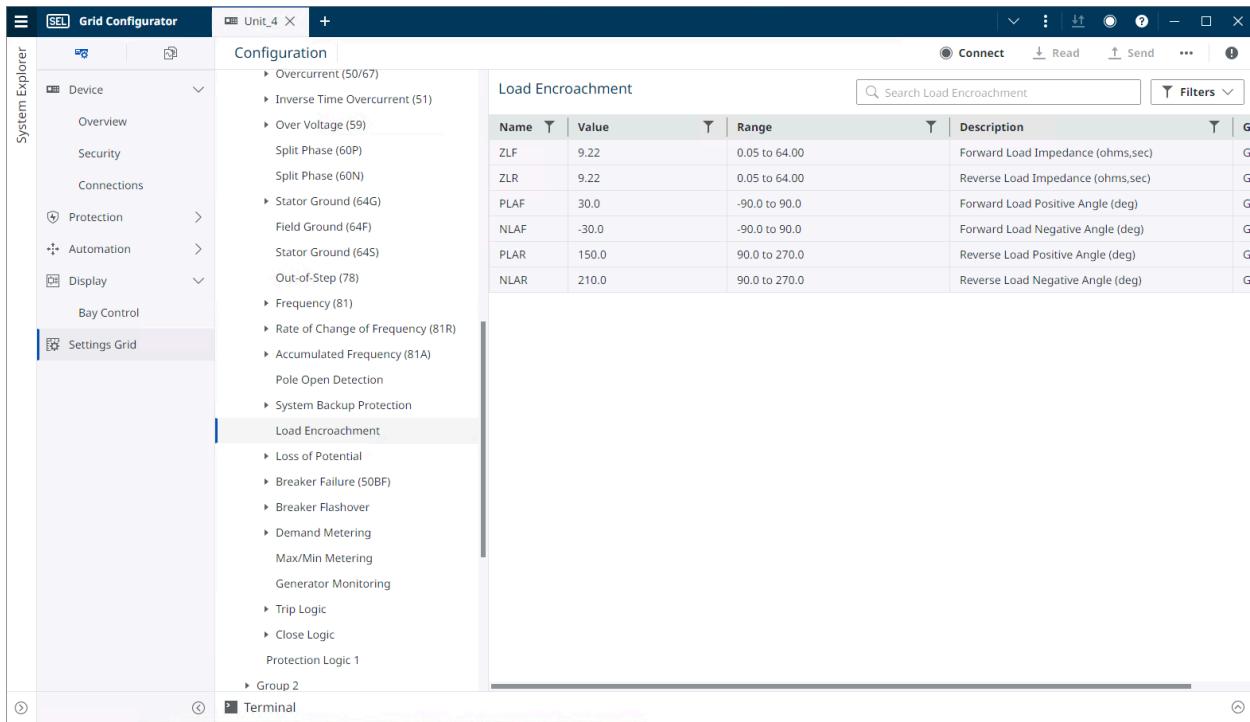


Figure 6.48 View Specific Settings Category

Using the Filter and Search Bar

Use the filter and search capabilities in the Settings Grid view to simplify your workspace and quickly find the settings you need. Filtering on specific fields can be done by selecting the filter icon to the right of the field name, as shown in *Figure 6.49*. When you use a filter, input a search term, or select a category in the tree, you will see the category shown in *Figure 6.50* to the left of the search bar. Select the X in any tile to remove that option from your view preferences or select **Clear All** to remove all filter settings.

Name	Value	Range	Description	Group
AL1	Contains (~) Element Name	Element Name	Element Name	Alias
AR1	SCII string with a maximum length ...	Alias Name	Alias Name	Alias
AL2	Element Name	Element Name	Element Name	Alias

Figure 6.49 Filter on Fields

All Settings	Enabled	Name ~ RS	Clear All	Search All Settings	Filters
--------------	---------	-----------	-----------	---------------------	---------

Figure 6.50 Search and Filter Tiles

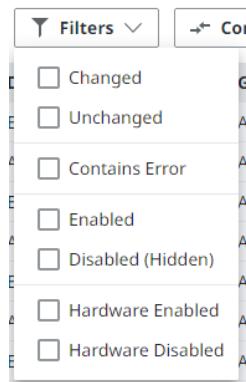


Figure 6.51 Filter Options in Settings Grid View

As shown in *Figure 6.51*, select the **Filters** button to see the available options in the Settings Grid view. Select all that apply:

- **Changed:** This option includes all settings that changed during the present editing session.
- **Unchanged:** This option includes all settings that are unchanged during the present editing session.
- **Contains Error:** This option includes all settings that are in an error state.
- **Enabled:** This option includes results rendered active and changeable because of either a part number or setting rule.
- **Disabled (Hidden):** This option includes results rendered inactive and unchangeable because of either a part number or setting rule.
- **Hardware Enabled:** This option includes results rendered available based on the hardware options present in the device.
- **Hardware Disabled:** This option includes results rendered unavailable based on the hardware options present in the device.

The search bar helps you quickly find individual settings or categories of settings according to your search parameters. Press <Ctrl+F> to place the cursor focus in the search bar. The search function is *not* case-sensitive. Results of a search affect the settings tree and the editor workspace, as shown in *Figure 6.52*.

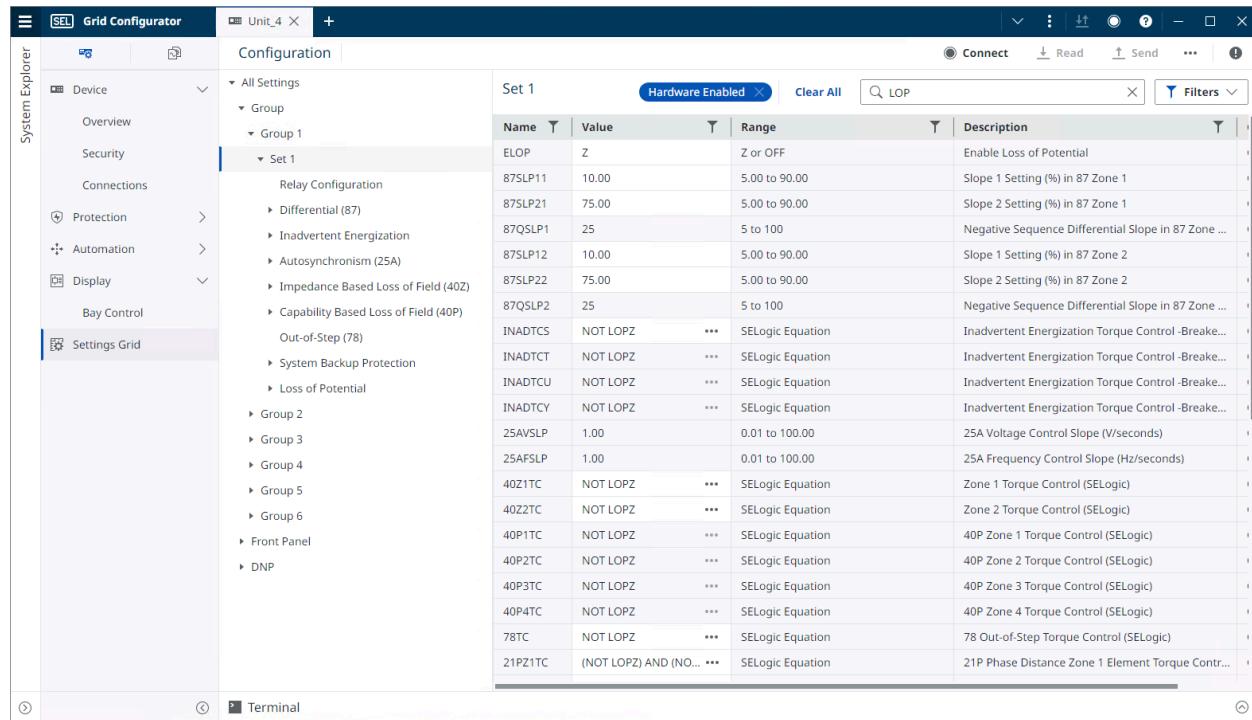


Figure 6.52 Search Results

To perform a search, enter the term in the search bar. SEL Grid Configurator will search all the fields and categories to find matches for your search parameters. Both the settings tree and the editor workspace display the results of your search. The resulting editor workspace displays all positive results for your search. If you subsequently select a category in the settings tree, the editor workspace shows only settings within that category that match your search. You can use the search in conjunction with filter options, such as Exclude Hidden Settings, to further refine your results.

The search bar supports the following syntax:

- **Single Term:** Any alphanumeric string without spaces is a single term. SEL Grid Configurator searches for that term in all settings categories, names, values, and descriptions. The search is case insensitive. Search results include cases where the search term is part of a word.
- **Multiple Term:** Enter multiple search terms separated by spaces. SEL Grid Configurator displays results that match any of your search terms.
- **Phrase:** Surround one or more words in quotation marks to create a search phrase. SEL Grid Configurator returns only cases that match the entire phrase. The search is case insensitive.

Remove the filter by closing the corresponding tiles or by clicking the X in the search bar to remove all search terms.

Editing Numerical and Textual Settings

You can directly edit numerical and textual settings in the editor workspace. *Figure 6.53* is an example of a numerical setting. Select anywhere in the Value cell to see a cursor and then type the value you want. Press **Enter** or select outside the present cell to commit the new value.

Name	Value	Range	Description	Group
21PZ1MP	3.00	0.05 to 100.00, OFF	21P Phase Distance Zone 1 Element R...	Group 1

Figure 6.53 Numerical Setting**NOTE**

Settings such as those shown in Figure 6.53 accept both a numerical value and OFF. Directly enter OFF or an allowed number in the Value cell.

As shown in *Figure 6.54*, the left column of the editor indicates any settings with altered values. Settings change indicators will clear after you close SEL Grid Configurator. The Value cell in the editor displays an indicator if the setting value is invalid or outside the allowed range. Hover over the Value cell to see a message explaining the error.

Name	Value	Range	Description	Group
21PZ1MP	.01	0.05 to 100.00, OFF	21P Phase Distance Zone 1 Element R...	Group 1
21PZ1MP	8.00	Setting value ".01" must be greater than or equal to 0.05 and less than or equal to 100.00.	21P Phase Distance Zone 1 Element R...	Group 2
21PZ1MP	8.00	OFF	21P Phase Distance Zone 1 Element R...	Group 3
21PZ1MP	8.00	0.05 to 100.00, OFF	21P Phase Distance Zone 1 Element R...	Group 4

Figure 6.54 Settings Notifications

As shown in *Figure 6.55*, right-click in the Value column and select **Reset To Default** to return the setting to its default value.

All Settings		Current Transformer Data				
		Name	Value	Range	Description	Group
	All Settings	CTCONY	1PH	1PH, Y	Current Transformer Connection for T...	Group 1
	Group 1	CTRS	4000.0	1.0 to 50000.0, OFF	Current Transformer Ratio for Termin...	Group 1
	Set 1	CTR1	400.0		Current Transformer Ratio for Termin...	Group 1
	Potential Transformer Data	CTR2	12000.0		Current Transformer Ratio for Termin...	Group 1
	Current Transformer Data	CTR3	4000.0		Current Transformer Ratio for Termin...	Group 1
	Relay Configuration	CTR4	4000.0		Current Transformer Ratio for Termin...	Group 1
	Power System Data	CTR5	4000.0		Current Transformer Ratio for Termin...	Group 1
	Frequency Tracking Sources	CTR6	4000.0		Current Transformer Ratio for Termin...	Group 1
		CTRY	OFF	1.0 to 50000.0, OFF	Current Transformer Ratio for Termin...	Group 1
		CTRY1	100.0	1.0 to 50000.0, OFF	Current Transformer Ratio for Termin...	Group 1
		CTRY2	100.0	1.0 to 50000.0, OFF	Current Transformer Ratio for Termin...	Group 1
		CTRY3	100.0	1.0 to 50000.0, OFF	Current Transformer Ratio for Termin...	Group 1

Figure 6.55 Return a Setting to Its Default Value

You can see all settings errors in the device project by selecting the Errors & Warnings icon in the Device Commands menu. Select this icon to see Errors & Warnings, as shown in *Figure 6.56*. Select the notification message to immediately navigate to the invalid setting.

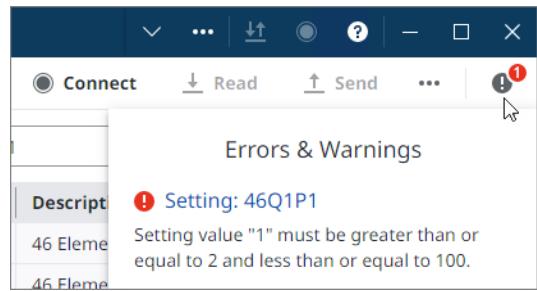


Figure 6.56 Viewing Project Notifications

You can directly select and edit settings, such as those in *Figure 6.57*, that accept alphanumeric strings.

Name	Value	Range	Description	Group
SID	Station A	ASCII string with a maximum length of 40.	Station Identifier	Global
RID	Relay 1	ASCII string with a maximum length of 40.	Relay Identifier	Global

Figure 6.57 Alphanumeric Settings

Editing Settings in a List

You can select many settings from a specified list of values. For these types of settings, as shown in *Figure 6.58*, select the Open button in the Value cell to access the selection list.

Name	Value	Range	Description	Group
PTCONV	1PH	OFF, Y, D, D1, 1PH	Potential Transformer Connection for Terminal V	Group 1
PTCONZ	Y	Open ↗ D1	Potential Transformer Connection for Terminal Z	Group 1

Figure 6.58 List-Based Settings

Name	Value	Range	Description	Group
PTCONV	1PH	OFF, Y, D, D1, 1PH	Potential Transformer Connection for Terminal V	Group 1
PTCONZ	Y	Y, D, D1	Potential Transformer Connection for Terminal Z	Group 1
PTRZ	D	1.0 to 10000.0	Potential Transformer Ratio for Terminal Z	Group 1
VNOMZ	D1	30.00 to 300.00	Potential Transformer Nominal Line-to-Line Voltage for Termi...	Group 1
PTRV1	1PH	1.0 to 10000.0, OFF	Potential Transformer Ratio for Terminal V1	Group 1
VNOMV1	OFF	30.00 to 300.00	Potential Transformer Nominal Voltage for Terminal V1 (V,sec)	Group 1
PTRV2	ZUU:U	1.0 to 10000.0, OFF	Potential Transformer Ratio for Terminal V2	Group 1

Figure 6.59 Drop-Down for List-Based Settings

As shown in *Figure 6.59*, select the desired setting value from the list.

Editing SELOGIC Settings

Edit logic settings through the SELOGIC editor. To display the SELOGIC editor, as shown in *Figure 6.60*, select the ellipsis button in the Value cell for a logic setting.

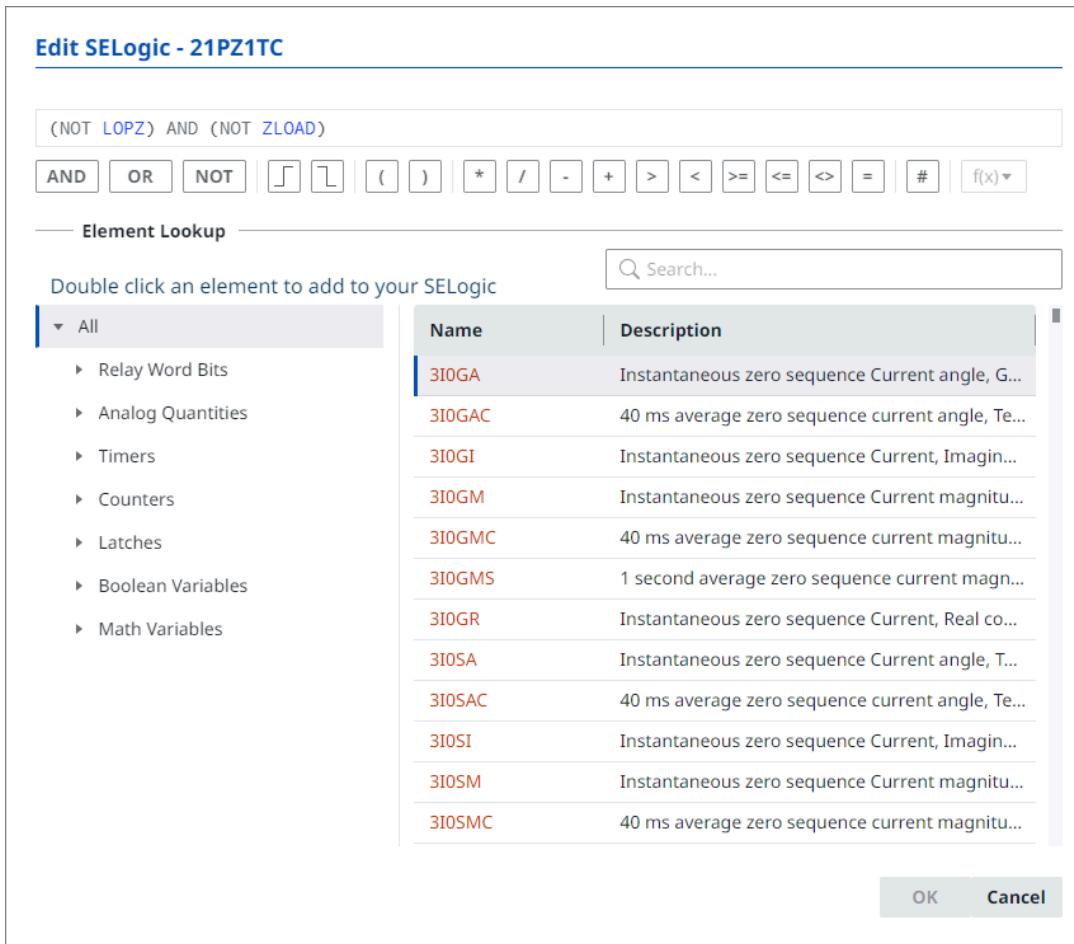


Figure 6.60 SELogic Editor

SELOGIC commands, operators, and relay variables differ greatly between device families and device models. Refer to the instruction manual for your device to learn about the logic support. In SEL Grid Configurator, you can either select and start typing directly in the editor or use the Variable Lookup to find available device variables.

In the Variable Lookup, you can use the search bar or the hierarchical tree to find the relay variable you need. Devices on which you are working may vary and support logic settings only or also support freeform logic equations. If you are configuring a logic setting, as shown in *Figure 6.60*, the hierarchical tree shows only referenceable device variables. On the other hand, if you write a freeform equation, the hierarchical tree displays assignable device variables (such as Protection Math Variables) when you place the insertion cursor to the left of the equal sign. When you place the insertion cursor to the right of the equal sign, the hierarchical tree displays referenceable device variables. Select the cell in the Elements list for the item you need and select **Insert** or double-click to place the item in your SELOGIC equation at the location of the insertion cursor. The search function in the Variable Lookup works similarly to the overall settings search. Refer to the filter and search section of this manual for more information.

You can also directly type logic equations in the SELogic editor. Based on your device type, the editor provides autocomplete suggestions for device variables. *Figure 6.61* illustrates the autocomplete function for analog values. A series of buttons representing the available operators for your logic equation displays beneath the SELogic editor. Select the desired operator button to place it at the location of the insertion cursor. You can also type the operator directly in the editor. Select the **f(x)** button in the list of operators to see a drop-down of available math functions. If no math functions exist for the equation you are writing, the **f(x)** button will be grayed out.

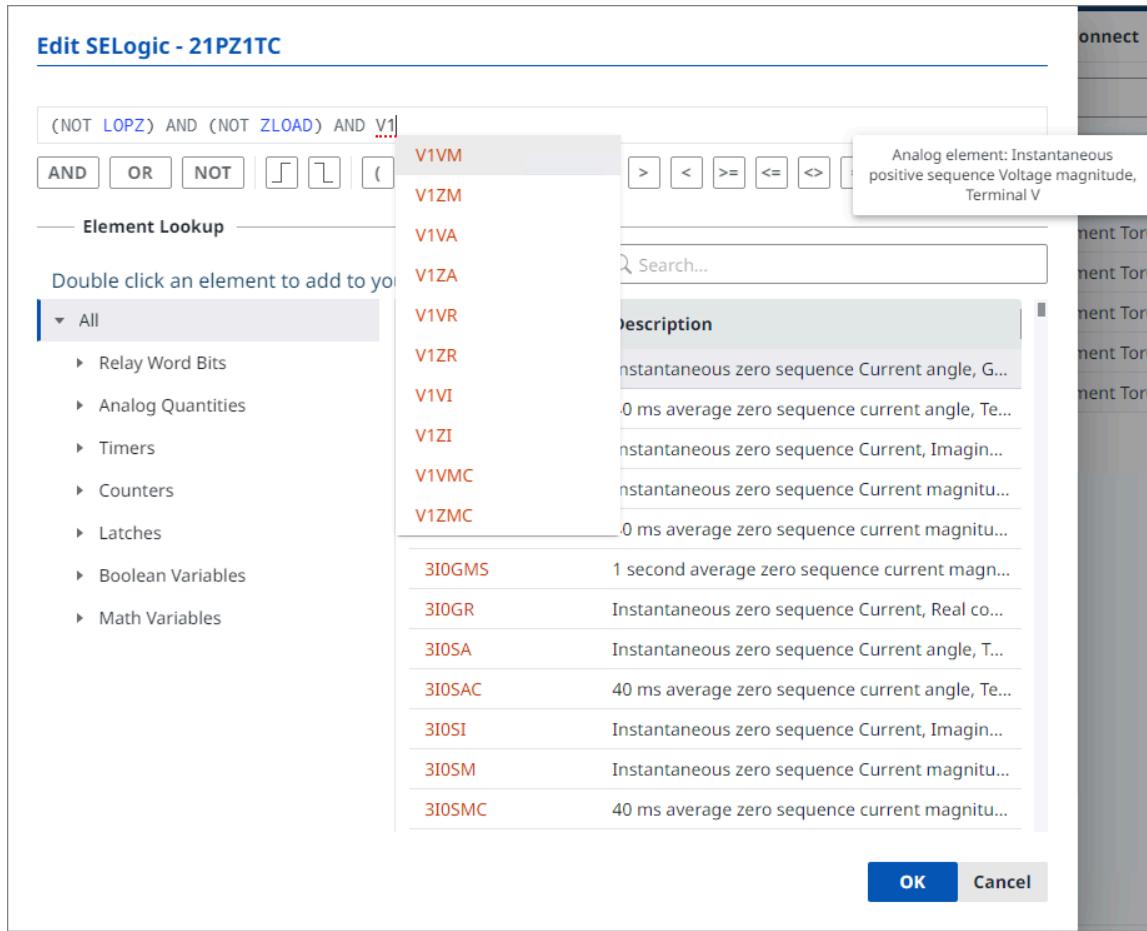


Figure 6.61 Autocomplete in the SELogic Editor

The SELogic editor automatically color codes the logic in your equation. The colors are as follows:

- **Analog Values:** Orange
- **Boolean Values:** Blue
- **Operators:** Gray
- **Numbers:** Pink
- **Comments:** Green. Some devices support inline SELogic comments. Refer to your device instruction manual for more information.

When you start typing a variable name, SEL Grid Configurator displays a list of all variables that match what you type. If you know the full variable name, you can continue typing the entire name. Alternatively, you can use the list of autocomplete entries to select the variable you need a list of either by selecting the desired variable name or by using the up and down arrow keys to highlight the desired variable and pressing **Enter**.

NOTE

If you have created aliases for any relay elements, the autocomplete list displays the element name and the alias name in parentheses.

At any time, you can hover over a variable to see a pop-up with the definition of the variable, as shown in *Figure 6.62*.



Figure 6.62 Variable Definition Pop-Up

If your equation includes any syntax errors, you will see red dots underline the error and a pop-up display to indicate the error location and nature of the error. Once you complete the equation, select **OK**.

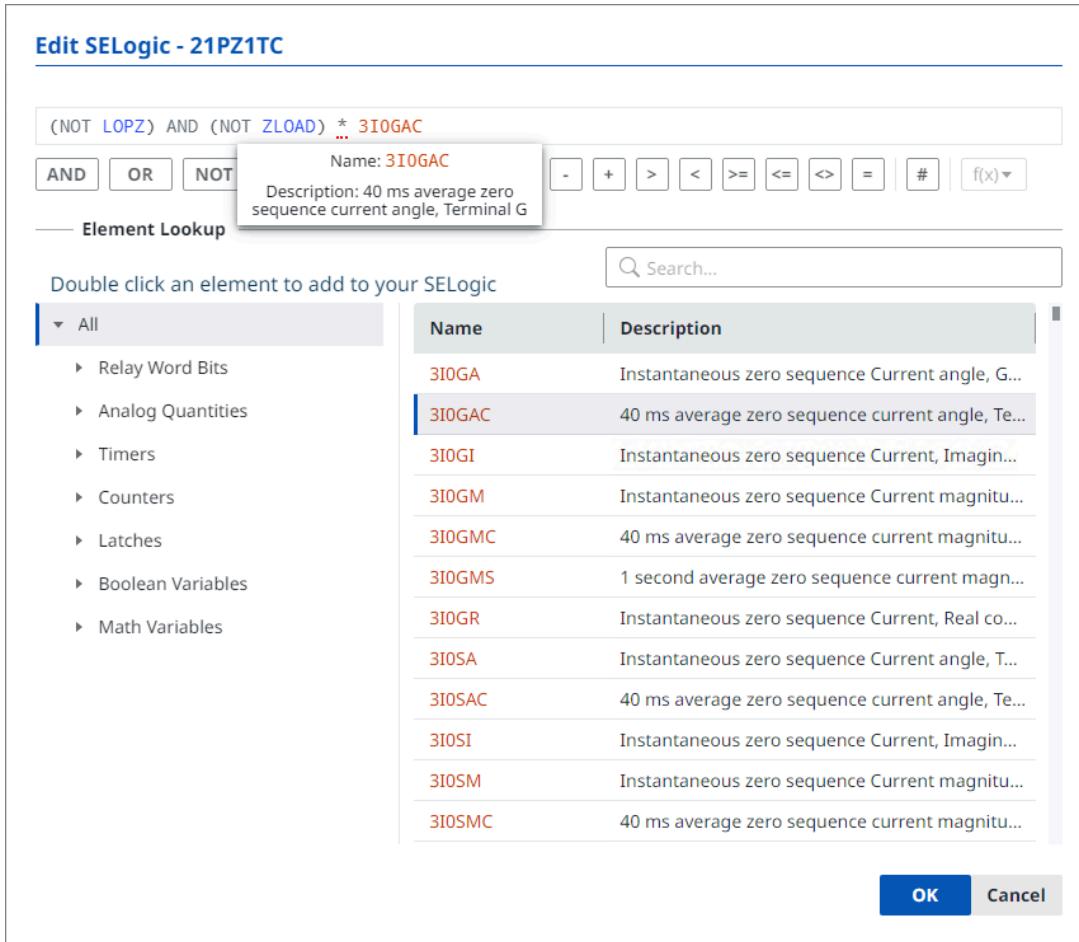


Figure 6.63 Syntax Error Indication in SELogic Editor

Batch Import and Paste of Settings

In cases where you are calculating settings in a spreadsheet or other software tool, SEL Grid Configurator provides a means to import one or many settings all in one step. You must format the settings to be imported into a tabular structure. Data coming from a spreadsheet will automatically be in the correct format. In general, the data format for the import is as follows:

- One setting per row
- Carriage return/line feed between rows

Tab-delimited values in each row shall be Name, Value, and Protection Group. Optionally, if you only copy names and values, the result pastes across all settings groups.

As an example, *Figure 6.64* shows a small table with settings calculation results in a spreadsheet. Copy the results table to your Windows clipboard.

PTRZ	2000	Group 1
VNOMZ	11	Group 1
PTRV1	2000	Group 1
PTRV2	2000	Group 1
PTRV3	2000	Group 1
VNOMV1	110	Group 1
VNOMV2	110	Group 1
VNOMV3	110	Group 1
21PZ1D	10	Group 1
21PZ2D	10	Group 1

Figure 6.64 Table of Settings Ready to Import

In the Settings Grid view, select **Import Settings**, as shown in *Figure 6.65*. Paste the settings results into the resulting dialog, as shown in *Figure 6.66*. Finally, select **Submit**.

Name	Value	Range	Description
AL1	EN	...	Element Name
AR1	EN_RLY	ASCII string with a maximum length ...	Alias Name
AL2		...	Element Name
AR2		ASCII string with a maximum length ...	Alias Name
AL3		...	Element Name
AR3		ASCII string with a maximum length ...	Alias Name
AL4		...	Element Name
AR4		ASCII string with a maximum length ...	Alias Name
AL5		...	Element Name
AR5		ASCII string with a maximum length ...	Alias Name
AL6		...	Element Name
AR6		ASCII string with a maximum length ...	Alias Name
AL7		...	Element Name
AR7		ASCII string with a maximum length ...	Alias Name
AL8		...	Element Name
AR8		ASCII string with a maximum length ...	Alias Name
AL9		...	Element Name
AR9		ASCII string with a maximum length ...	Alias Name
AL10		...	Element Name
AR10		ASCII string with a maximum length ...	Alias Name
AL11		...	Element Name

Figure 6.65 Import Settings

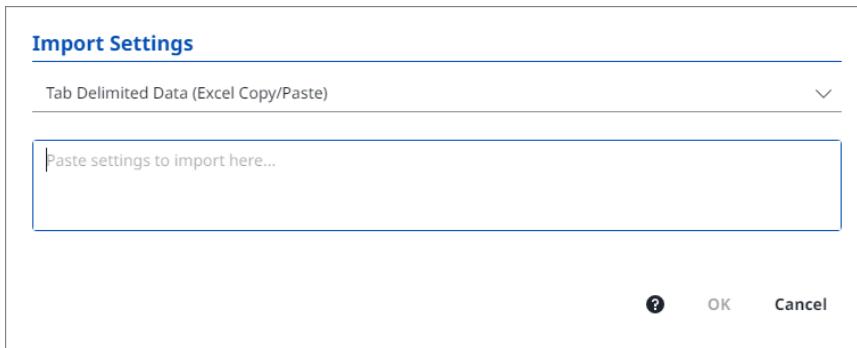


Figure 6.66 Paste Settings Into SEL Grid Configurator

SEL Grid Configurator matches the settings names and values of what you paste, regardless of the sequence of settings. It is unnecessary to match the order of settings in the device. If the paste is successful, you will see a message listing the number of settings successfully written. SEL Grid Configurator completes all matching settings. If there are any errors, you will see a detailed error message similar to that shown in *Figure 6.67*.

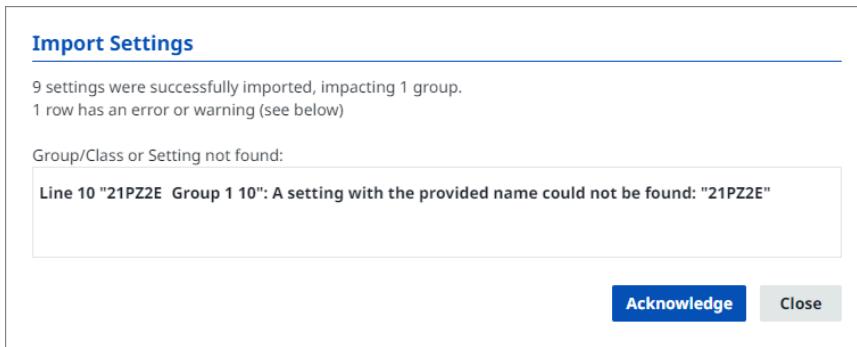


Figure 6.67 Error Message for Settings Paste

The bulk import process works for SELLOGIC equations as well. As an example for SEL-400 series devices, *Figure 6.68* displays how to arrange the setting name, group name, and setting values for SELLOGIC equations. The process for importing these values into SEL Grid Configurator is identical to other settings types. This feature is convenient if you develop custom SELLOGIC schemes for use in many devices.

PROTSEL2 | Protection 1 | PSV07 := VAZFM >= V1VM

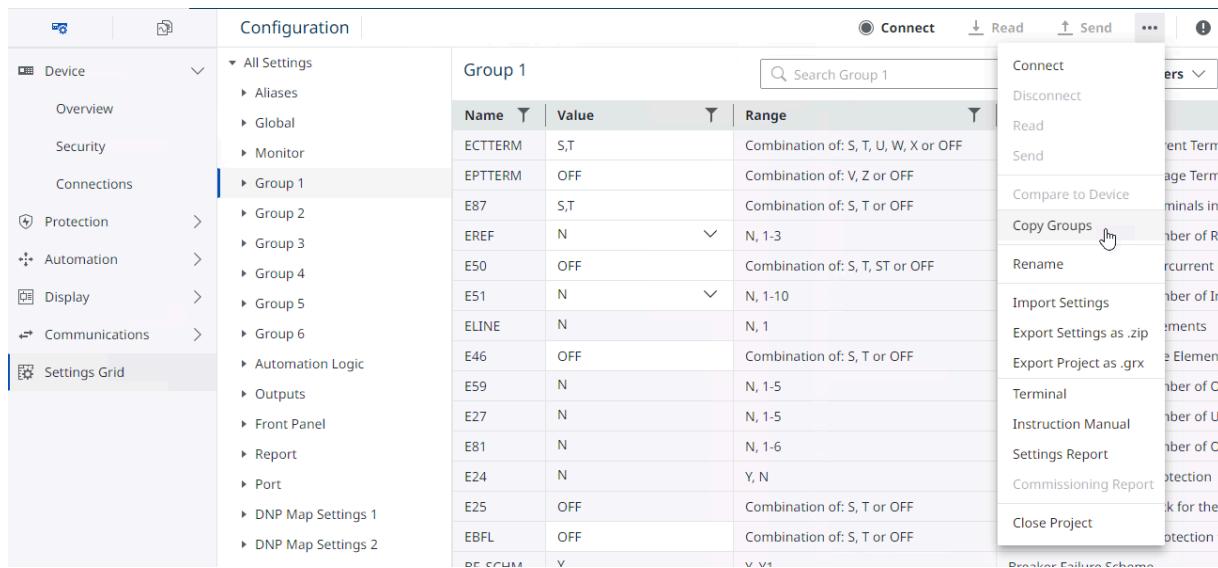
Figure 6.68 Importing SELogic Equations Into SEL Grid Configurator

Copy Settings

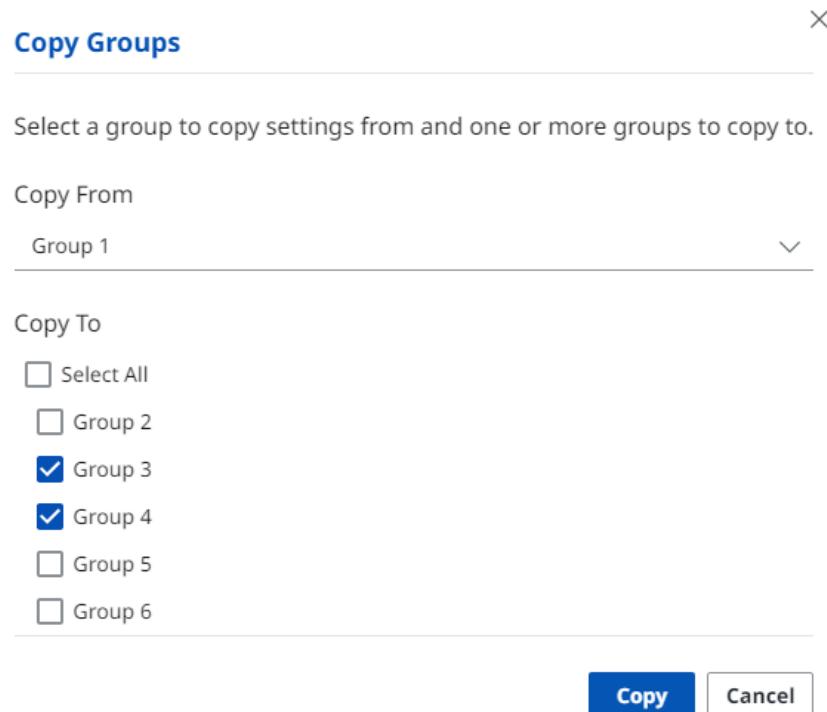
To copy settings between protection groups, logic groups, or SCADA maps, select the project menu and then select **Copy Groups** as shown in *Figure 6.69*.

NOTE

The Copy Groups command in the project menu is available in all project views.

**Figure 6.69 Copy Groups From Project Menu**

In the Copy Groups window, as shown in *Figure 6.70*, you can choose to copy among groups of the same type. Choose a group from the **Copy From** combo box to select the source group from which you want to copy. Then select one or more boxes in the **Copy To** list to identify the target groups to which you want to copy. Select **Copy** to perform the operation.

**Figure 6.70 Copy Groups Dialog**

Import Settings Files From QuickSet to SEL Grid Configurator

SEL Grid Configurator can take settings files you created in and exported from QuickSet and import them into a device project within the System Explorer of SEL Grid Configurator. Perform the following steps to export the settings files from QuickSet and import those settings files into SEL Grid Configurator.

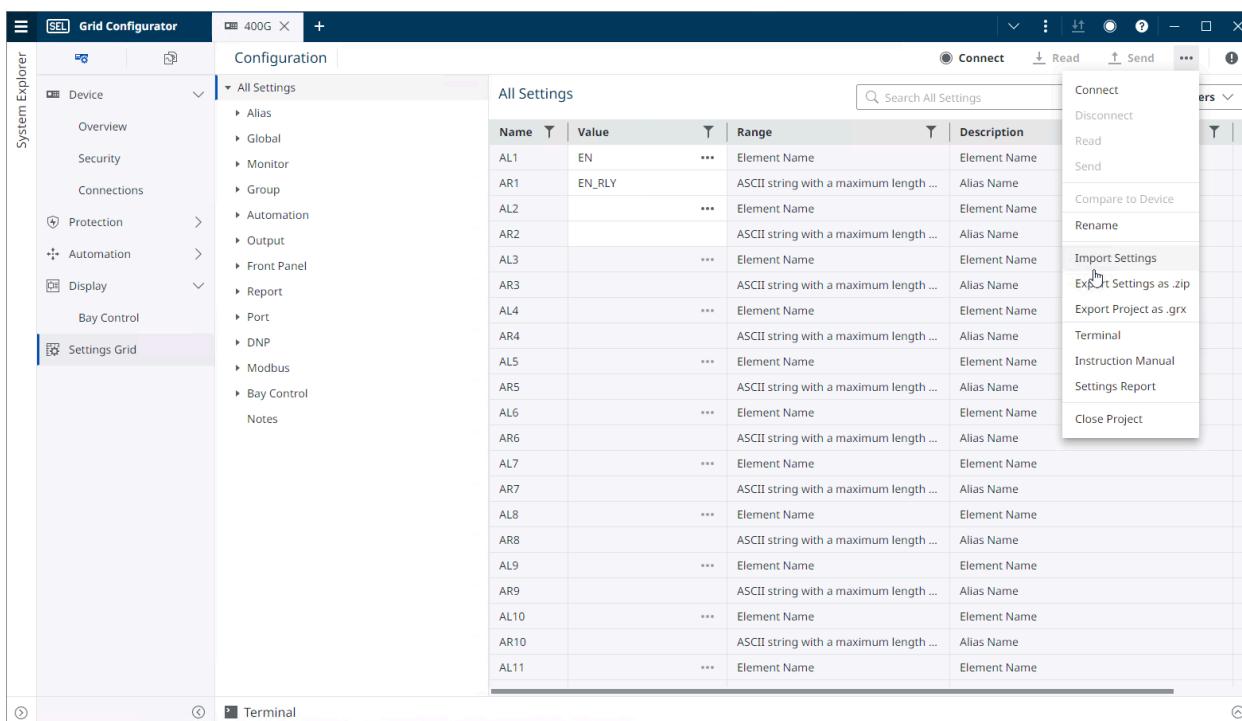
Export From QuickSet

- Step 1. Open QuickSet and then open the settings editor that includes the settings that you want to import into SEL Grid Configurator.
- Step 2. Navigate to **Tools > Settings > Export**.
- Step 3. In the Export Select window, either select all or select specific groups you want to export. Select the export options and select **OK**.
- Step 4. Choose the location and the folder for the destination of the settings files and then select **OK**.

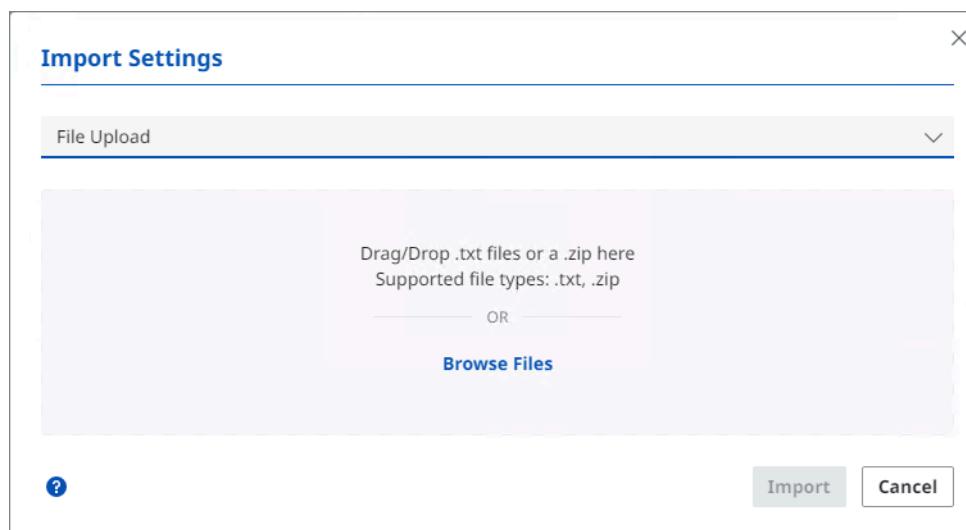
Once you have exported the settings files from QuickSet, you can import those files into an existing device project within the SEL Grid Configurator System Explorer.

Import Into Grid

- Step 1. Open SEL Grid Configurator and then open the device project within the System Explorer into which you want to import the settings. If you do not have a device project, you can create a new one within the System Explorer.
- Step 2. When the device project is open, select the Settings Grid section and then select **Import Settings** near the top of the device window, as shown in *Figure 6.71*.

**Figure 6.71 Settings Import**

Step 3. Choose the **File Upload** method from the drop-down selection in the Import Settings window, as shown in *Figure 6.72*.

**Figure 6.72 Import Window**

Step 4. There are multiple ways to select the settings files to import. One is to drag and drop the files within the Import Settings window. Another is to select the **Drag/Drop Settings Files Here** section of the window or the **Browse Files** button and then browse to the settings you want to import. You can use the Import Settings window to import multiple settings in .txt format at the same time or import a single .zip folder containing the settings.

Step 5. After you have selected the settings files, select **OK** to import the settings files.

Step 6. After you have imported settings, an acknowledgement message appears indicating that you have imported the settings correctly. Select **Acknowledge** to complete the import process.

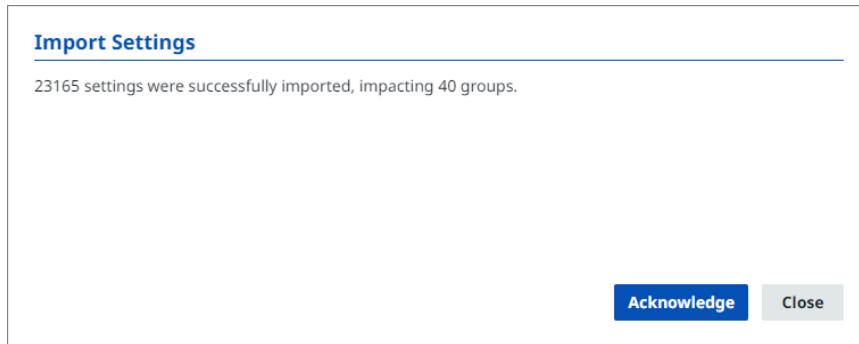


Figure 6.73 Import Acknowledge

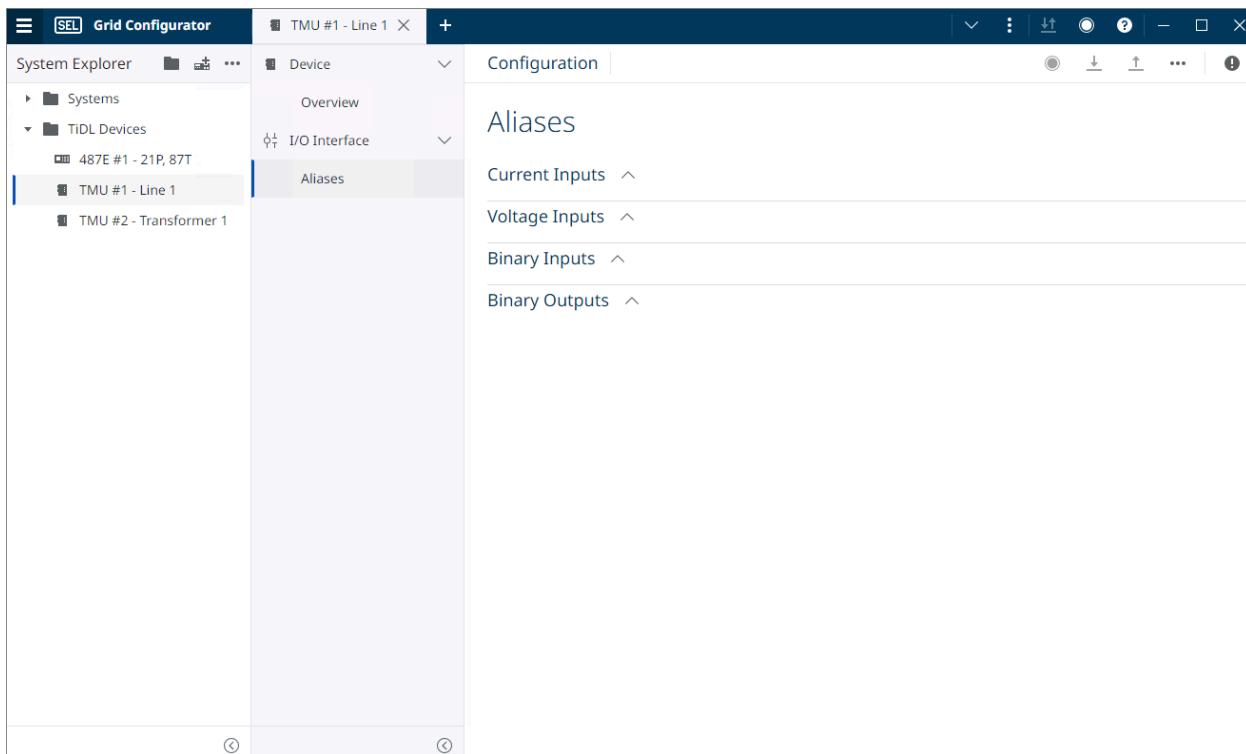
TMU Overview

What Is a TMU?

⚠️ IMPORTANT

You can find instructional videos on how to set up a TiDL system at the following link: SEL Grid Configurator: Setting Up a TiDL System.

The SEL TiDL Merging Unit (SEL-TMU) is a remote data acquisition device designed for use in an SEL Time-Domain Link (TiDL) system. Within the SEL TiDL system, the SEL-TMU provides multiple, point-to-point connections with SEL TiDL relays to share data among those relays. The standard 4 CT/4 PT SEL-TMU supported data streams are Current Inputs, Voltage Inputs, Binary Inputs, and Binary Output control signals. The standard 8 CT SEL-TMU supports the same data streams *except* for Voltage Inputs. The I/O Interface view only applies to the SEL-TMU devices. The main parts of this view are Current Inputs, Voltage Inputs (4 CT/4 PT SEL-TMUs only), Binary Inputs, and Binary Outputs, as shown in *Figure 6.74*. These sections enable you to supply descriptive alias names (naming signals after primary equipment, for example) for the SEL-TMU channels within each data stream.

**Figure 6.74** I/O Interface

I/O Interface Alias Names

This section allows the creation of descriptive alias names for 4 CT and 8 CT connections, as shown in *Figure 6.75* (4 CT) and *Figure 6.76* (8 CT). You can enter alias names by selecting the cell in the Alias column corresponding to input/output item row. Alias names can be as long as 40 characters in length and cannot have any special characters. (Although these examples only show Current Input aliases, the same limits apply to alias names for Voltage Inputs, Binary Inputs, and Binary Outputs.)

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TMU Overview

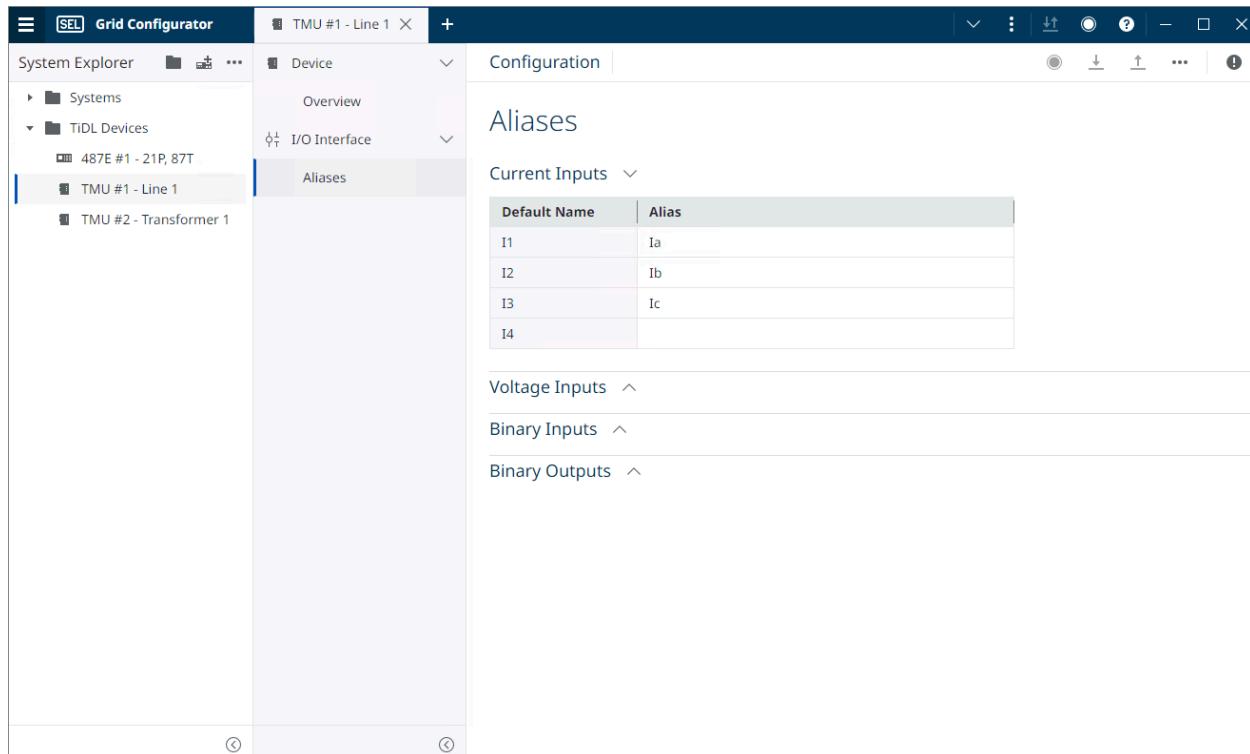


Figure 6.75 4 CT Current Input Aliases

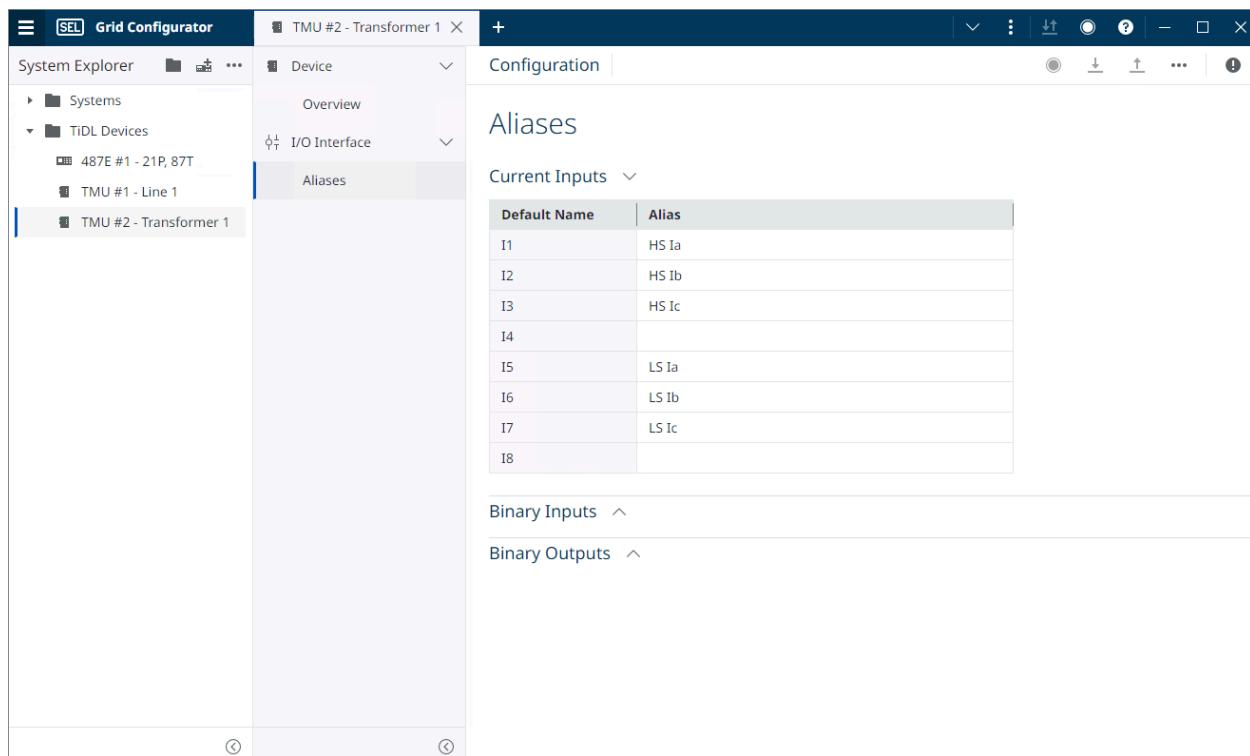


Figure 6.76 8 CT Current Input Aliases

Communications

TiDL Relay Channel Mapping

The Communications tab is where the TiDL I/O Map view can be found. This view only applies to the SEL-400 series relay models that support TiDL TMU connections and is not visible for devices that do not support TiDL. Use this view to map the TiDL relay ports to the TMU ports.

These mappings enable you to map for Current Inputs, Voltage Inputs, Binary Inputs, and Binary Outputs. The main parts of this view, as shown in *Figure 6.77*, are Port Mapping and I/O Mapping.

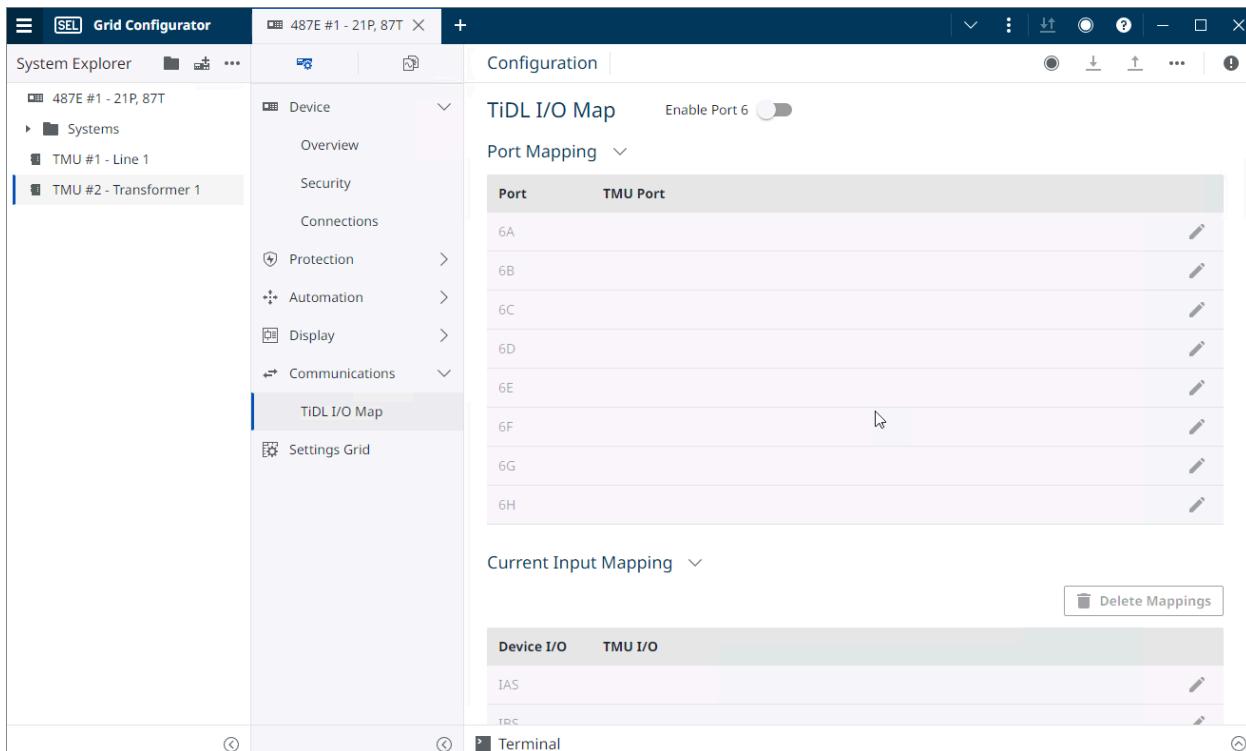


Figure 6.77 TiDL I/O Map View

Enable Port 6

Toggling the **Enable Port 6** slider to the on position, as shown in *Figure 6.78*, sets the Port 6 EPORT setting to on, which enables the TiDL I/O Map view for editing.

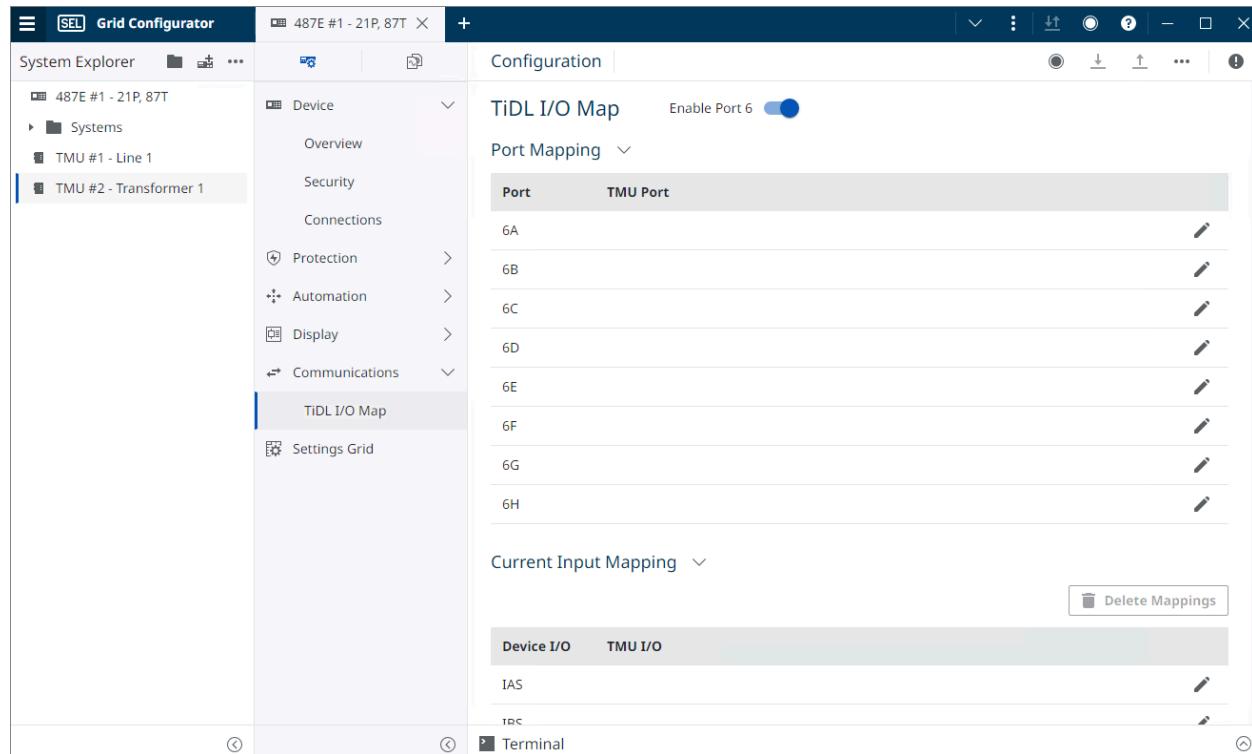


Figure 6.78 Enable Port 6

Port Mapping

Use the Port Mapping section of the TiDL I/O Map view to configure the port connections between a TiDL relay and an SEL-TMU. This mapping represents the physical connection between the relay and SEL-TMU ports. To map the ports, as shown in *Figure 6.79*, select the Edit button in the TMU Device cell to access the Map TMU to Device dialog, as shown in *Figure 6.80*.

Port	TMU Port	
6A	TMU #1 - Line 1.Port 1 (/TiDL Devices)	
6B		
6C		

Figure 6.79 Port Mapping

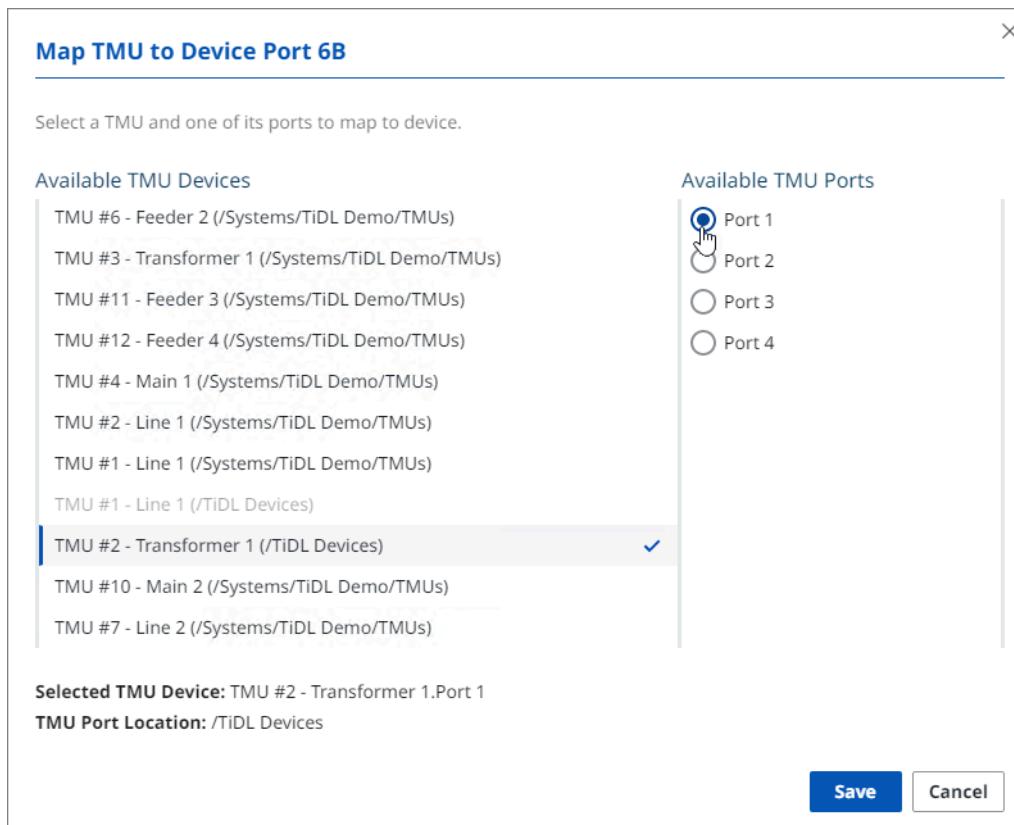


Figure 6.80 Add TMU to Device

The Map TMU to Device dialog allows you to select the SEL-TMU and the SEL-TMU port to map to the TiDL device. Note that you can map an SEL-TMU to a device only once. To map the device port, select the SEL-TMU from the Available TMU Devices column and then select which SEL-TMU port to map from the Available TMU Ports column. Completing the selection in *Figure 6.80* results in an updated mapping, as shown in *Figure 6.81*.

Port Mapping	
Port	TMU Port
6A	TMU #1 - Line 1.Port 1 (/TiDL Devices)
6B	TMU #2 - Transformer 1.Port 1 (/TiDL Devices)
6C	

Figure 6.81 Mapped SEL-TMU Device

I/O Mapping

Use the I/O Mapping section to map the analog input signals (currents and voltages) and digital inputs and outputs. The Device I/O column represents the Relay Word bits and analog quantities in the relay, and the TMU I/O column represents the input or output signal on the SEL-TMU that is mapped into the

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Communications

relay. To map I/O, as shown in *Figure 6.82*, select the Edit button to access the TMU I/O Selection dialog, as shown in *Figure 6.83*. SEL-TMU devices support the configuration of descriptive alias names to the channels of each data stream. Refer to *TMU Overview on page 88* for further details.



Figure 6.82 I/O Mapping

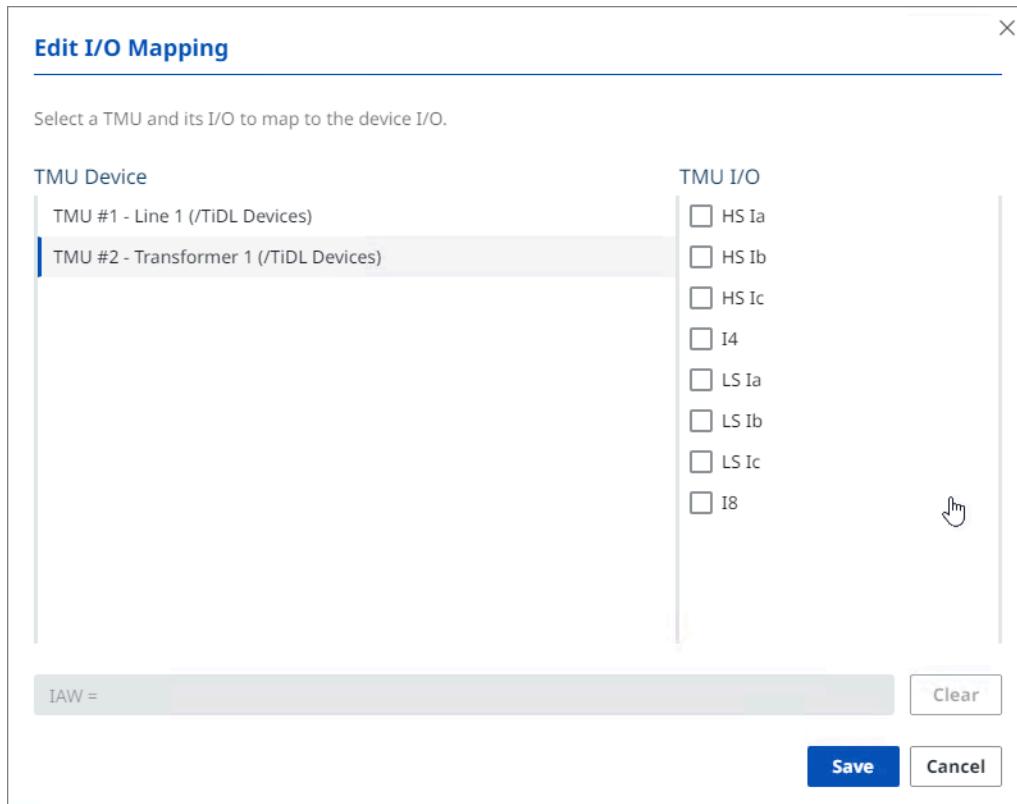


Figure 6.83 TMU I/O Selection

Choose the SEL-TMU and the signal to map and select **Save** when you have completed the mapping, as shown in *Figure 6.84*. Follow the same process to map the I/O for the Voltage and Binary data channels.

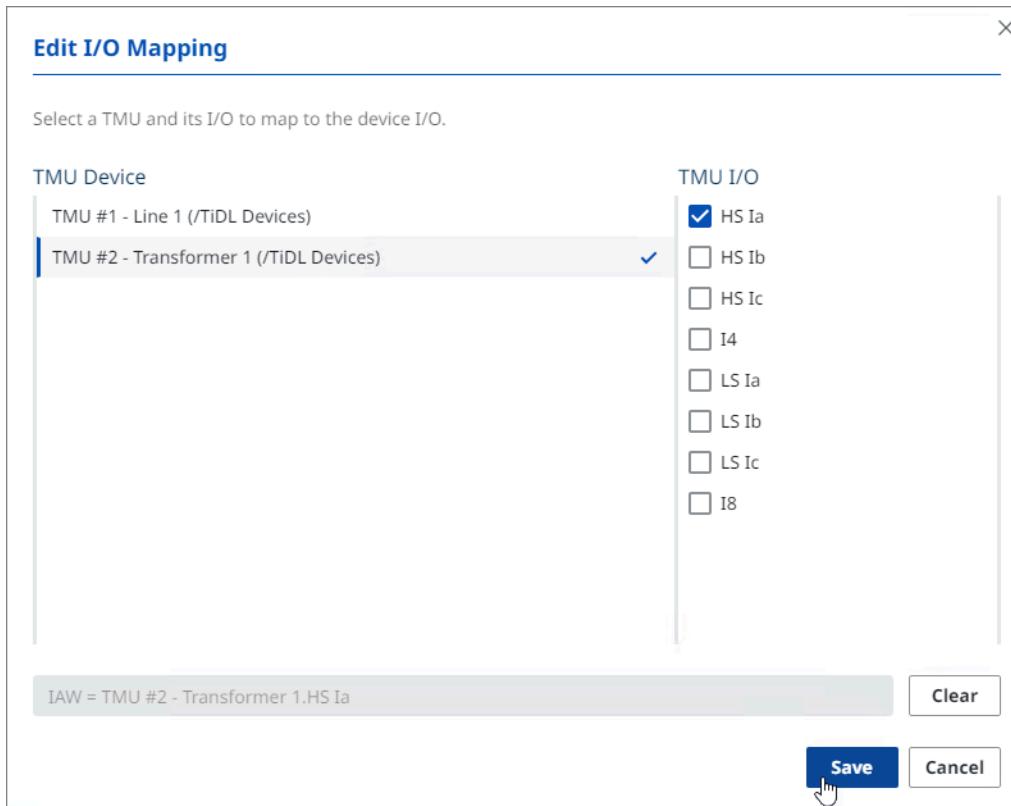


Figure 6.84 Mapped I/O Signal

The TiDL relay connected to an SEL-TMU can accept inputs from multiple CTs. This allows the collection of separate current metering and breaker monitor information for each CT. You can sum the values of as many as three of the current inputs by selecting the Edit button, as shown in *Figure 6.85*.

Current Input Mapping		▼
Device I/O	TMU I/O	Delete Mappings
IAW	TMU #2 - Transformer 1.HS Ia	
IBW		

Figure 6.85 Multiple SEL-TMU I/O Signals

To add another current input channel to your selected I/O Mapping row, select the TMU device and then select the I/O channel you want to add, as shown in *Figure 6.86*. To remove the I/O for the selected channel, uncheck the TMU I/O port or select the Clear button.

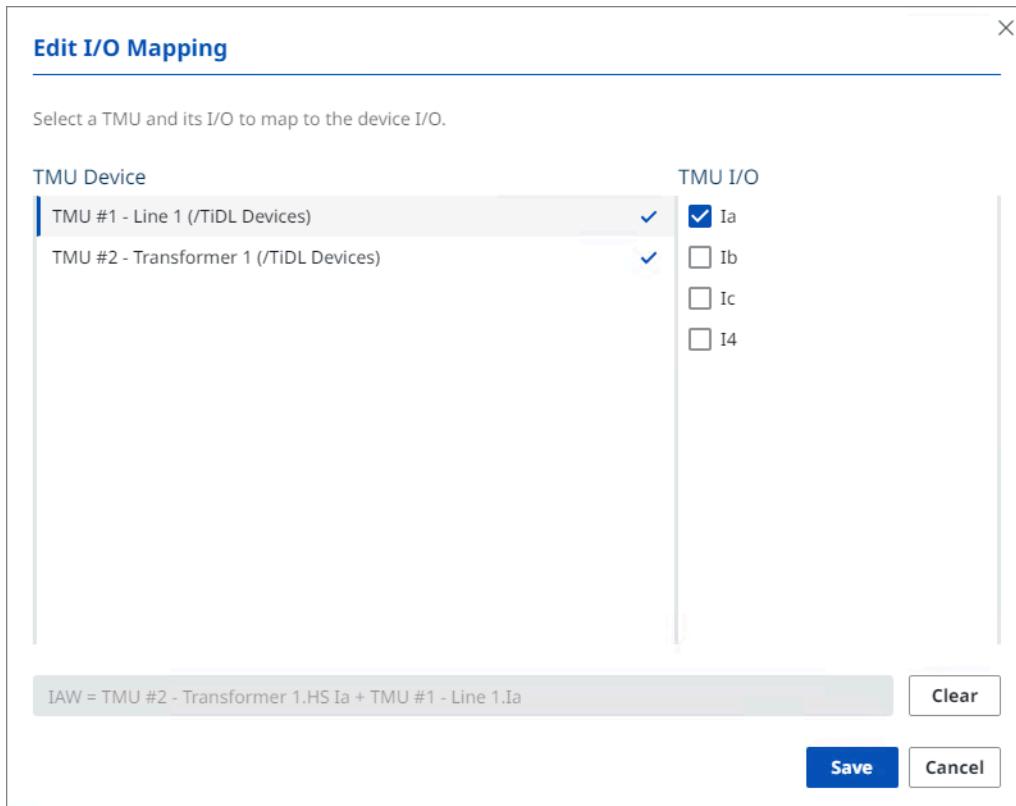
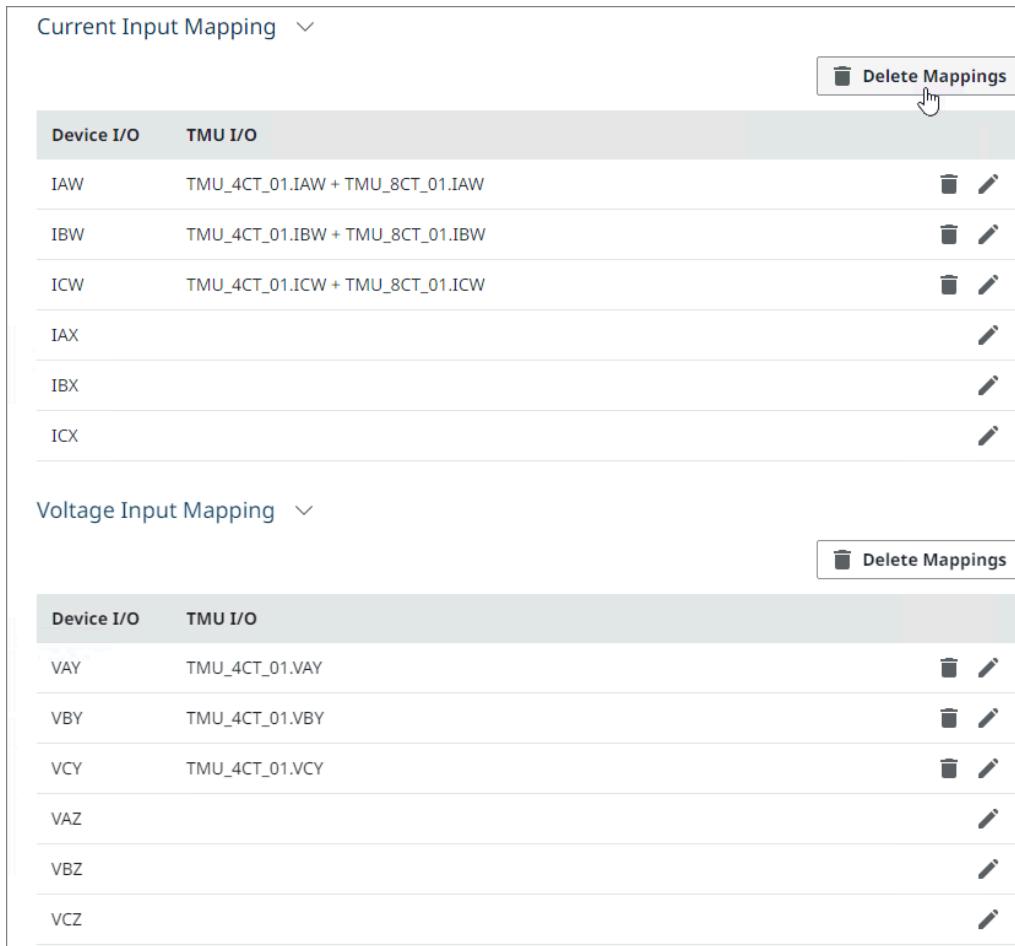


Figure 6.86 Current Input Summation

When selected, the **Delete Mappings** button provides a prompt to confirm deletion of all the IO Mapping for a specific section, as shown in *Figure 6.87*. Individual mappings can be cleared by selecting the Delete icon located on the right side of each input stream, as seen in *Figure 6.88*.



The screenshot displays two tables for managing input mappings in a device project. Both tables have a header row with 'Device I/O' and 'TMU I/O' columns, and a 'Delete Mappings' button at the top right.

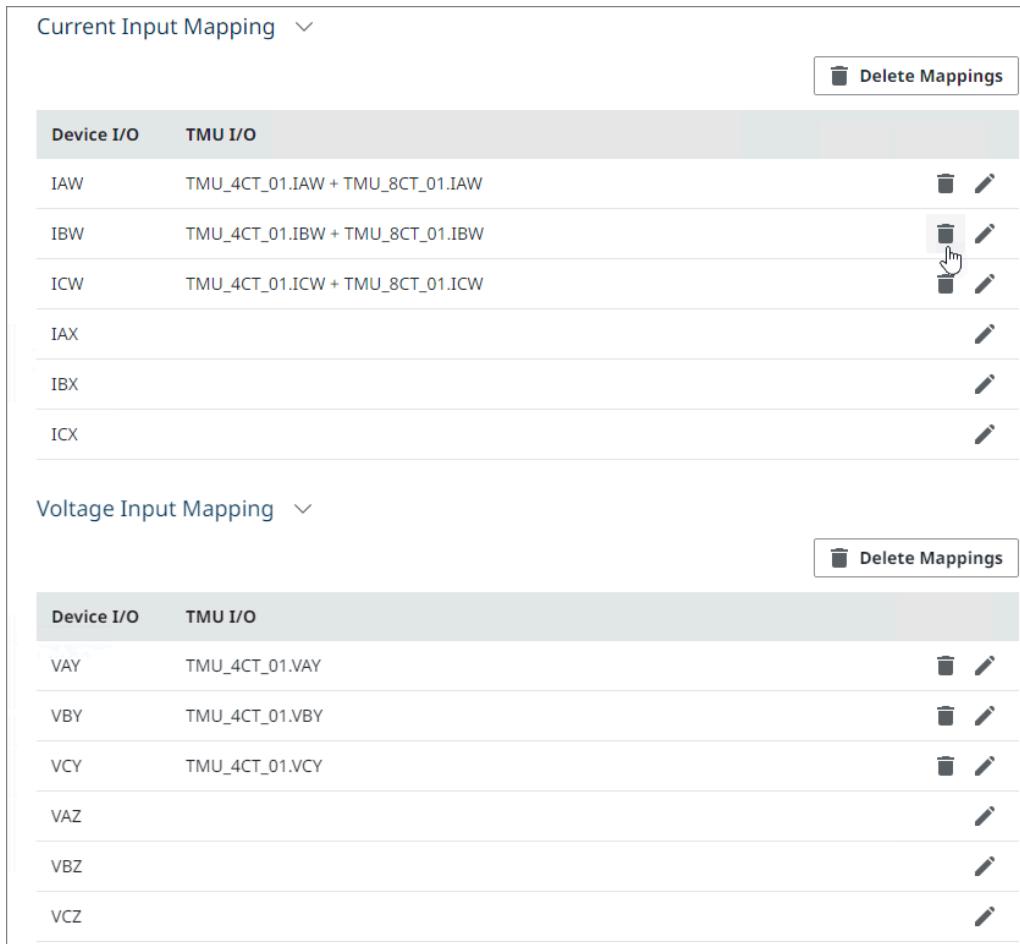
Current Input Mapping

Device I/O	TMU I/O	
IAW	TMU_4CT_01.IAW + TMU_8CT_01.IAW	
IBW	TMU_4CT_01.IBW + TMU_8CT_01.IBW	
ICW	TMU_4CT_01.ICW + TMU_8CT_01.ICW	
IAX		
IBX		
ICX		

Voltage Input Mapping

Device I/O	TMU I/O	
VAY	TMU_4CT_01.VAY	
VBY	TMU_4CT_01.VBY	
VCY	TMU_4CT_01.VCY	
VAZ		
VBZ		
VCZ		

Figure 6.87 Delete Mappings



The screenshot shows two tables for managing I/O mappings in SEL Grid Configurator. The top table is titled 'Current Input Mapping' and lists device I/O (IAW, IBW, ICW, IAX, IBX, ICX) and their corresponding TMU I/O (TMU_4CT_01.IAW + TMU_8CT_01.IAW, TMU_4CT_01.IBW + TMU_8CT_01.IBW, TMU_4CT_01.ICW + TMU_8CT_01.ICW). The bottom table is titled 'Voltage Input Mapping' and lists device I/O (VAY, VBY, VCY, VAZ, VBZ, VCZ) and their corresponding TMU I/O (TMU_4CT_01.VAY, TMU_4CT_01.VBY, TMU_4CT_01.VCY). Both tables include a 'Delete Mappings' button at the top right and edit icons (pencil) next to each row.

Current Input Mapping		▼
Device I/O	TMU I/O	
IAW	TMU_4CT_01.IAW + TMU_8CT_01.IAW	
IBW	TMU_4CT_01.IBW + TMU_8CT_01.IBW	
ICW	TMU_4CT_01.ICW + TMU_8CT_01.ICW	
IAX		
IBX		
ICX		

Voltage Input Mapping		▼
Device I/O	TMU I/O	
VAY	TMU_4CT_01.VAY	
VBY	TMU_4CT_01.VBY	
VCY	TMU_4CT_01.VCY	
VAZ		
VBZ		
VCZ		

Figure 6.88 Delete Individual I/O Mapping

Firmware Update in SEL Grid Configurator Overview

SEL Grid Configurator provides the ability to both upgrade and downgrade firmware on a connected device that meets the following requirements:

- ▶ Device has firmware update over Ethernet enabled
- ▶ SEL Grid Configurator is connected via FTP
- ▶ SEL Grid Configurator has 2AC access permission over FTP and Telnet

Acquire Firmware Files

Contact SEL Customer Service, the local SEL Application Engineer, or the regional SEL Sales and Customer Service representative to acquire firmware files for all SEL devices.

Prepare the Device

If the device is in service, follow your company practices for removing the device from service. Typically, these practices include disabling input and output control functions.

Firmware Update

⚠️ IMPORTANT

You can find an instructional video on how to update firmware at the following link: SEL Grid Configurator: Firmware Loader.

To initiate a firmware update, connect to the device, navigate to the device menu, and select **Update Firmware**, as seen in *Figure 6.89*. If **Update Firmware** is disabled, ensure that the device's Connection Type is set to **Network** and the File Transfer protocol is set to **FTP**.

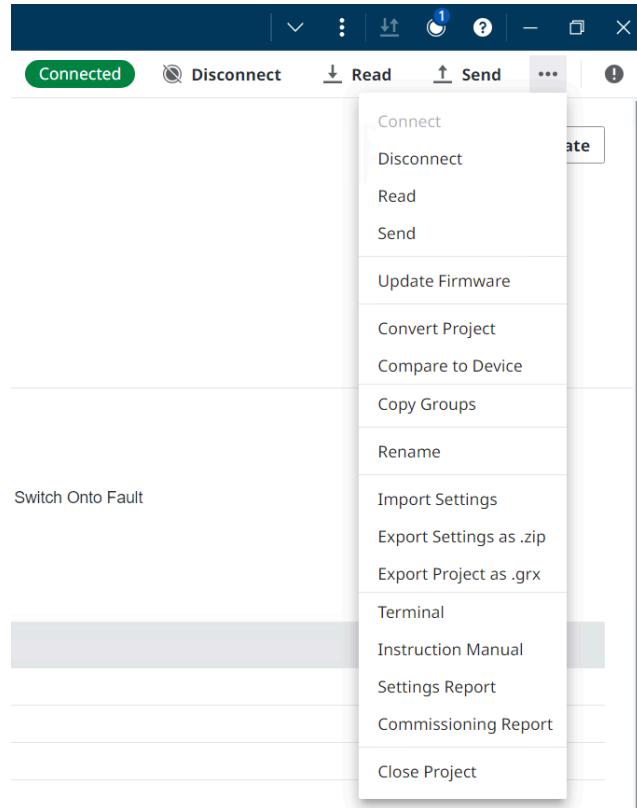


Figure 6.89 Initiating the Firmware Update

NOTE

SEL Grid Configurator must remain connected to the device throughout the firmware update setup process to complete validation checks. If the connection times out, the Update Firmware dialog will show a prompt to reconnect without losing any configured options.

Before starting the update process, SEL Grid Configurator displays a Best Practice dialog encouraging the user to create a version history entry, then checks to ensure the device settings allow firmware updates. If the device is not configured correctly, you will see a dialog similar to *Figure 6.90*, which instructs you on what settings need to be changed on the device to enable firmware update.

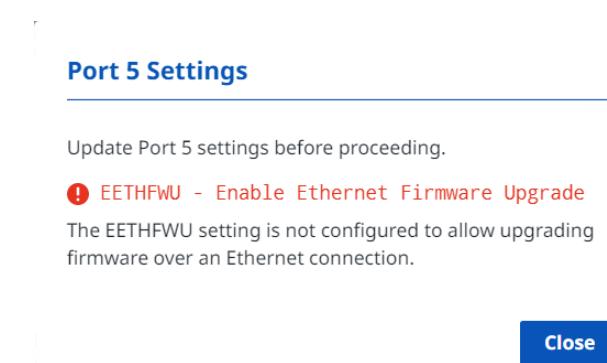


Figure 6.90 Failed Prerequisites Check

Figure 6.91 illustrates the two sections of the Update Firmware dialog. The left section provides the interface to configure and execute the update. The right section displays information about the update as it proceeds. SEL Grid Configurator preserves this information as part of the Firmware History log. The **Export** button provides the ability to save this information as a text file to your computer.

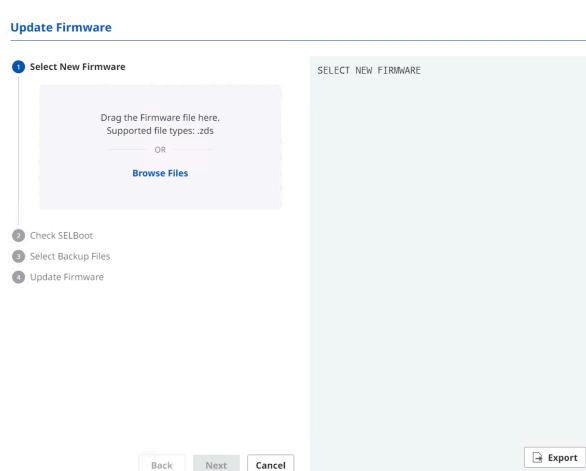


Figure 6.91 Firmware Update Dialog

The update configuration process consists of four steps that you must complete in sequential order. Use the **Back** and **Next** buttons to transition between steps.

Step 1. **Select Firmware.** Select the firmware file to send to the device. As long as the firmware is compatible with the device's hardware and SELBOOT version, it can be a newer firmware version or an older firmware version.

SEL Grid Configurator verifies that the firmware file is compatible with the connected device and displays compatibility status in the information section. SEL Grid Configurator always displays a warning during a firmware downgrade to help ensure that a downgrade does not happen from inadvertently selecting an incorrect firmware file.

- Step 2. **Check SELBOOT.** Confirm that the current SELBOOT satisfies the minimum version requirement to load the new firmware by referencing the manual, the *SEL Firmware Tools* page, or by contacting SEL Technical Support at +1.509.338.3838.
- Step 3. **Select backup files.** SEL recommends that you backup important device artifacts prior to Firmware Update. By default, as part of the update process, SEL Grid Configurator backs up information from the device and stores it as part of the Firmware History.

The **Start** button presented at the end of this step launches a final confirmation, as seen in *Figure 6.92*.

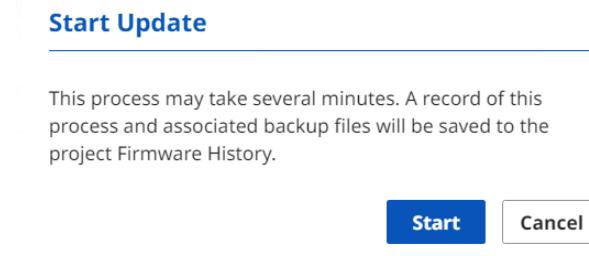


Figure 6.92 Start Firmware Update Dialog

Selecting **Start** in the Start Update dialog begins the firmware update process.

- Step 4. **Update Firmware.** During this step, SEL Grid Configurator executes the update process. Status information about the update proceeding is displayed throughout the process. After the update, new options are available, as seen in *Figure 6.93: Convert Project, Close, and Firmware History*. **Convert Project** will update the device project to match the device. **Close** will close the dialog without any further changes. **Firmware History**, located as a link in the Update Complete description, navigates SEL Grid Configurator to the Firmware History workspace.

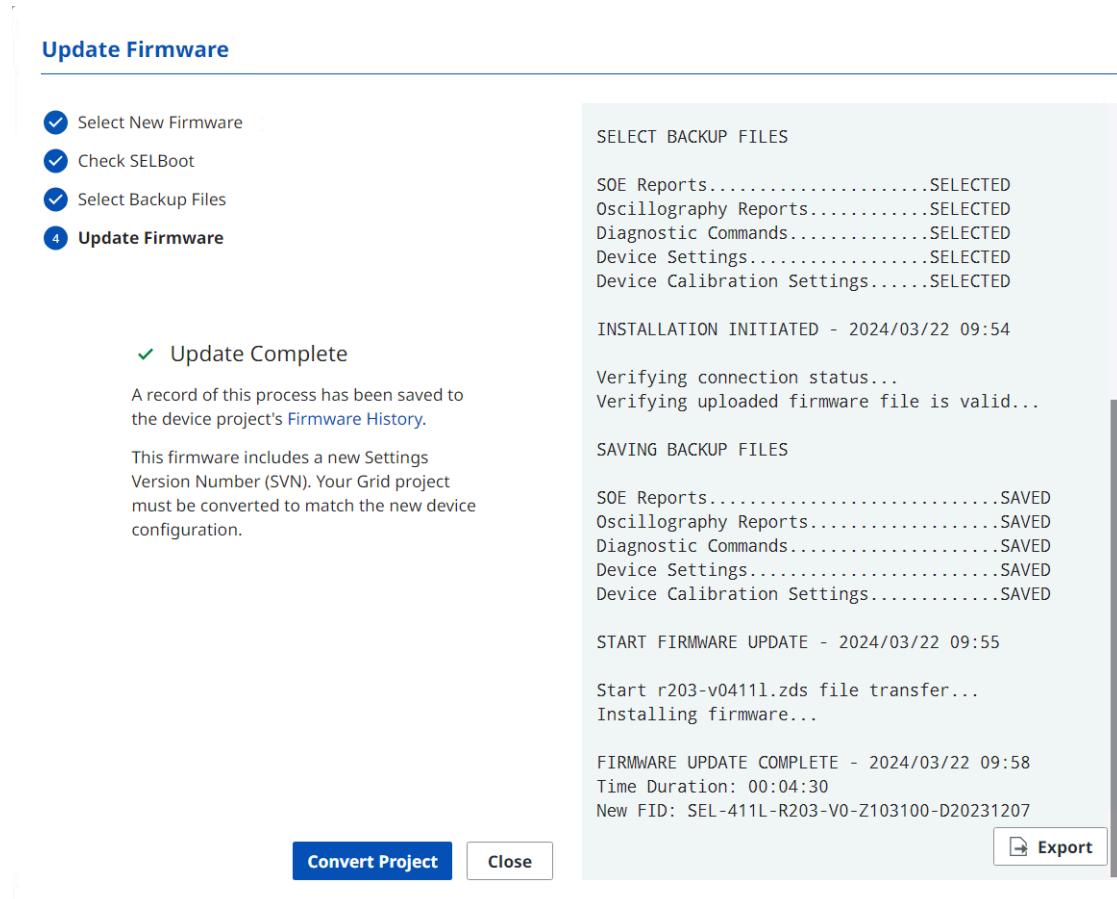


Figure 6.93 Completed Firmware Update

Settings Read and Send

Reading Device Settings

After you set up the connection information to a device (refer to *Connections View on page 52*) and initiate a connection, the Device Commands menu appears, as shown in *Figure 6.94*.



Figure 6.94 Device Commands Menu for a Connected Device

To read settings, select **Read** from the Device Commands menu. If the model or SVN of the connected device does not match your device project, the read operation does not proceed and SEL Grid Configurator displays details. If the model and SVN match, but the part number does not match your device project, SEL Grid Configurator alerts you to the differences and provides options to proceed or cancel.

When performing a read to a connected device, SEL Grid Configurator provides the option of selecting all files or only desired single files. The Read Settings dialog displays after you select **Read** from the Device Commands menu. Select **All** to read all files or deselect **All** and choose the individual files you want to read from the connected device (see *Figure 6.96*).

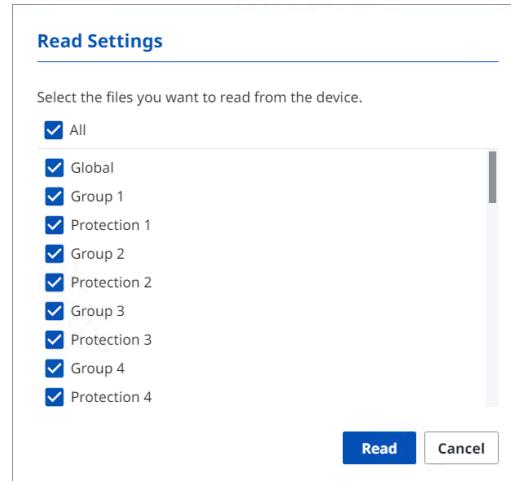


Figure 6.95 Read Settings Options

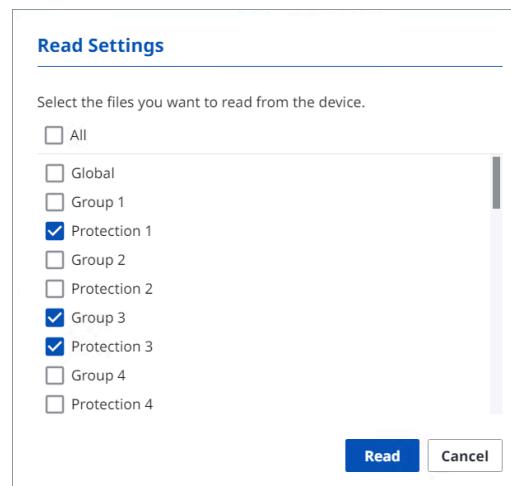


Figure 6.96 File Selection in Read Settings Window

Select **Read** to begin the read of the connected device.

While SEL Grid Configurator is reading the settings from the device, you can select the Device Operations button in the Title Bar, as shown in *Figure 6.97*, to monitor progress of the read process. You can also initiate a settings read from multiple connected devices at the same time. After the read is complete, SEL Grid Configurator displays a message to confirm the completion of the process.

NOTE

SEL Grid Configurator will overwrite all device settings in your database when you read settings from the device.

NOTE

All terminal operations are disabled while SEL Grid Configurator sends or reads settings.



Figure 6.97 Device Operations Button in Title Bar

Sending Device Settings

As with reading settings, you can initiate a connection to your device and select **Send** in the Device Commands menu, as shown in *Figure 6.94*, to send settings to the device. As shown in *Figure 6.98*, select the settings files you want to send to the device. Select **All** if you want to send all settings to the device. If the model or SVN of the connected device does not match your device project, the send operation does not proceed and SEL Grid Configurator displays details. If the model and SVN match, but the part number does not match your device project, SEL Grid Configurator alerts you to the differences and provides options to proceed or cancel.

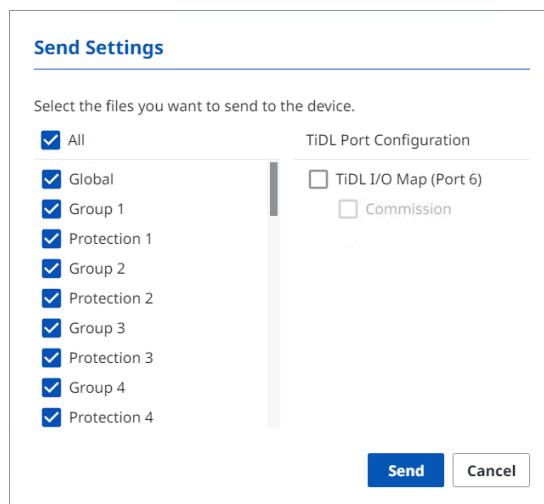
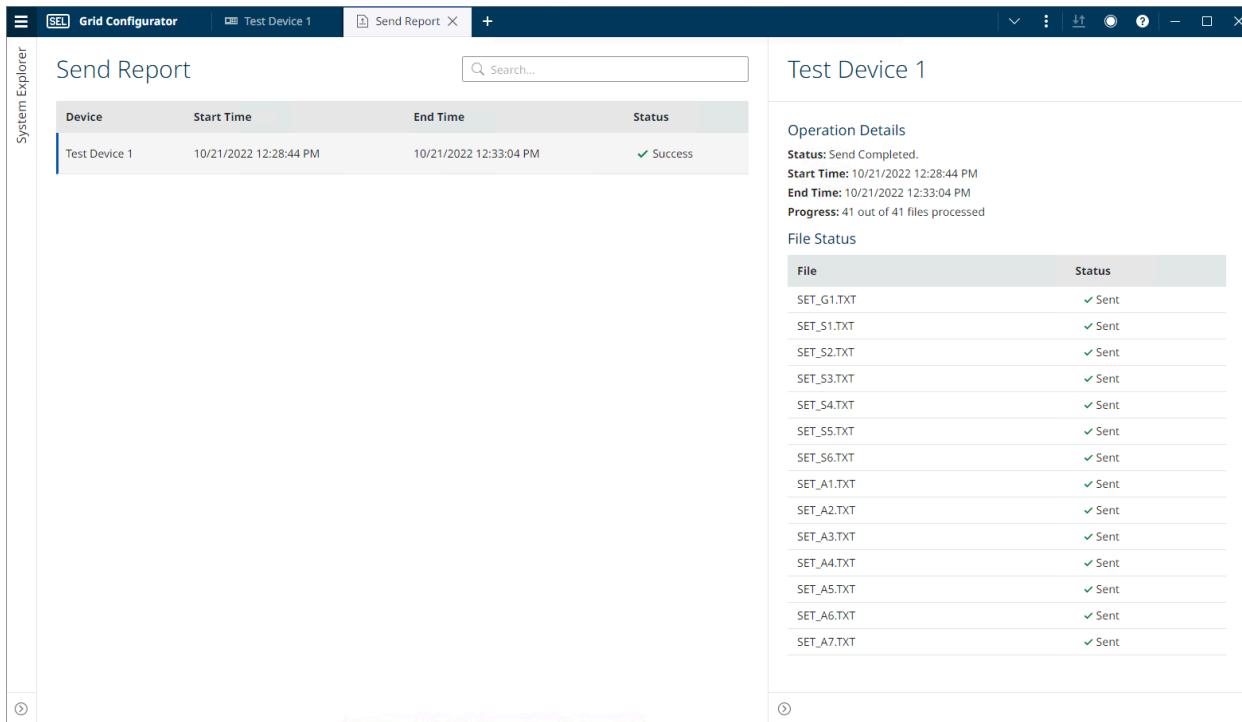


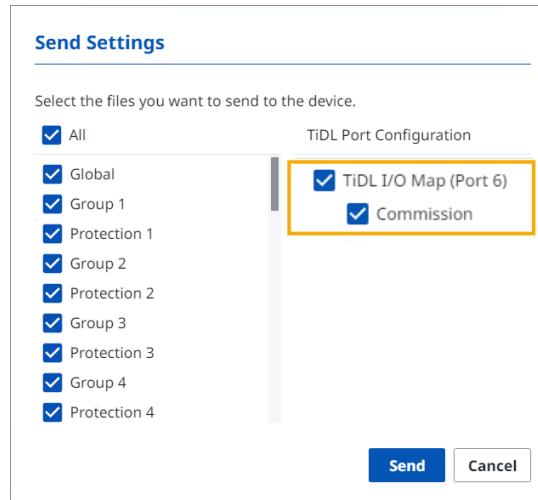
Figure 6.98 Send Settings Options

While settings are being sent, a Send Report tab is displayed showing the status of the operation, as shown in *Figure 6.99*. Alternatively, you can view the Send Report by selecting the + button in the tab bar and then select **Send Report**, as shown in *Figure 2.2*. SEL Grid Configurator maintains a record of all settings reports for logging and auditing purposes. Click on a row in the Send Report Grid to view that report's detail information.

**Figure 6.99** Send Report Tab

Commissioning Reports

In addition to the Settings Report, SEL Grid Configurator provides a Commissioning Report for systems using SEL TiDL technology. To learn more about commissioning and TiDL devices, refer to the *SEL-400 Series Relays Instruction Manual*. After sending and commissioning TiDL Map settings (*Figure 6.100*), you can choose to view a Commissioning Report (*Figure 6.101*), which displays information about the device setup as it relates to TiDL and TMU mapping.

**Figure 6.100** TiDL Send

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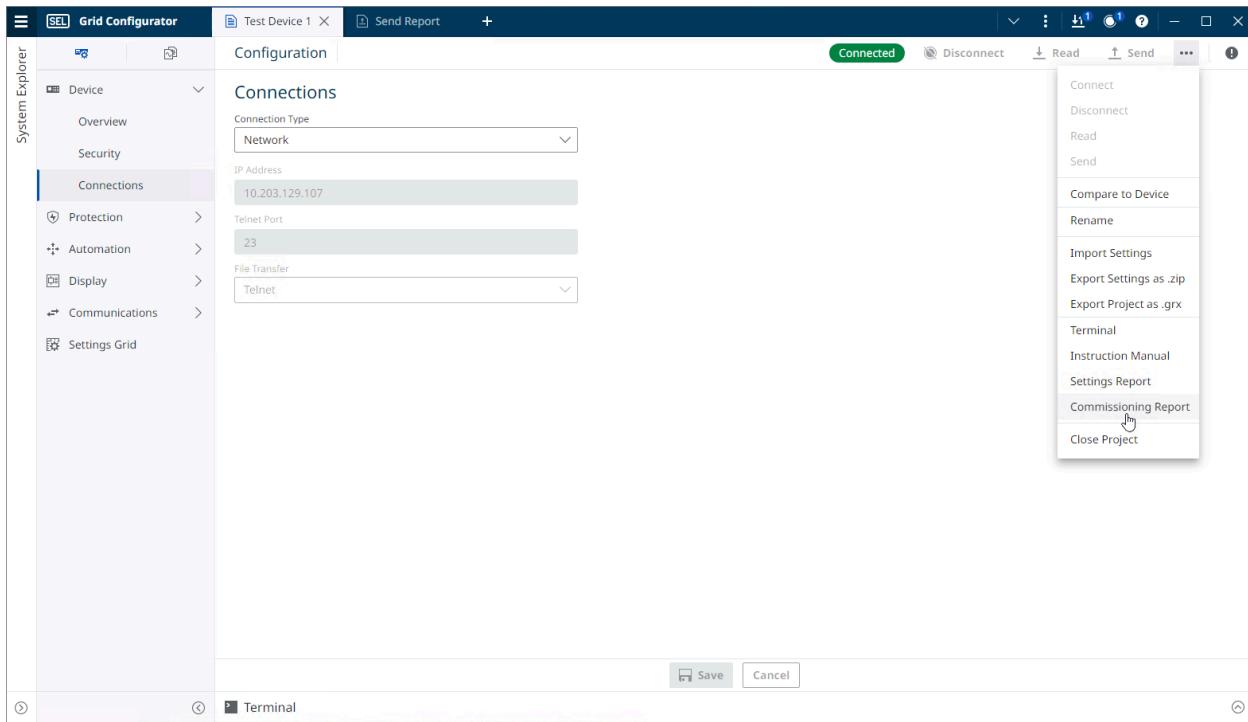


Figure 6.101 Send–Commissioning Report

The Commissioning Report (*Figure 6.102*) contains information regarding the TiDL Map device information and the SEL-TMU configurations.

The 'Commissioning Report' dialog box is displayed. It has a header 'Commissioning Report' and a table of contents. The first section is 'TiDL Commissioning Report' with a timestamp 'Report Generated on 1/21/2022 12:24:55 PM'. The next section is 'Device Information' with rows for 'Device Name' (test3), 'Station Name' (Device1), 'FID' (FID=SEL-451-6-R402-V0-Z102102-D20210521), and 'Serial Number' (10203129107). The final section is 'TiDL Commissioning Report' with a row for 'System Topology' (TiDL Operational). At the bottom are buttons for 'HTML' (dropdown), 'Export' (button with a file icon), and 'Close' (button).

TiDL Commissioning Report	
Report Generated on	1/21/2022 12:24:55 PM

Device Information	
Device Name	test3
Station Name	Device1
FID	FID=SEL-451-6-R402-V0-Z102102-D20210521
Serial Number	10203129107

TiDL Commissioning Report	
System Topology	TiDL Operational

Figure 6.102 Commissioning Report

Along with viewing the report, you can export the report in HTML format, which is the default and most easily read format. You can also save the report in CSV or JSON formats for archiving and reviewing (as shown in *Figure 6.103*).

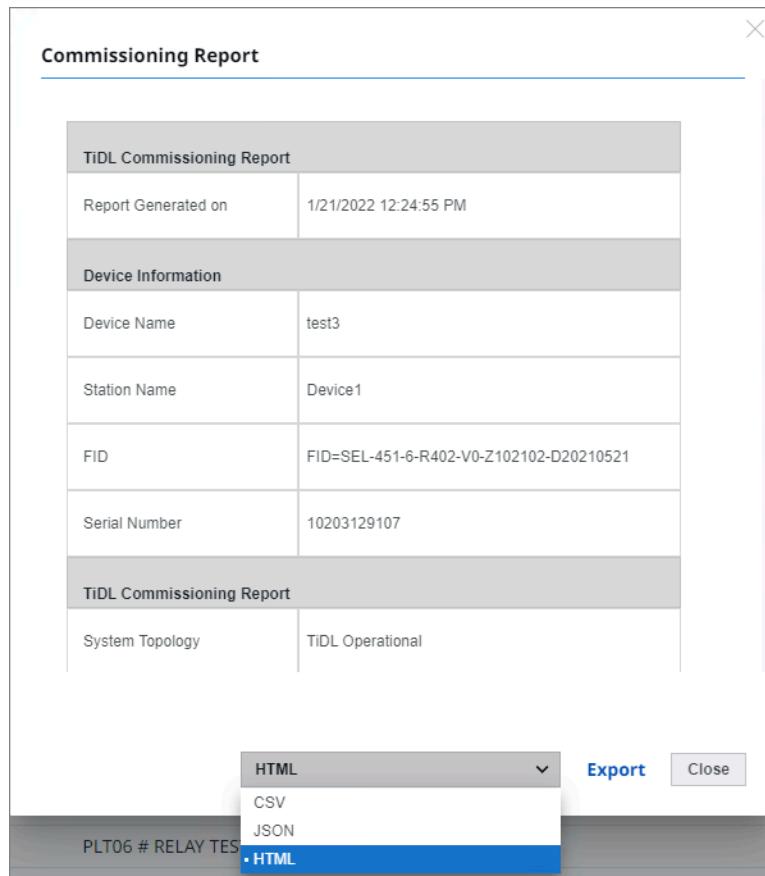


Figure 6.103 Commissioning Report Export

Online HMI Perspective

Overview

IMPORTANT

You can find an instructional video on how to use the online HMI at the following link: SEL Grid Configurator: Online HMI.

Use the SEL Grid Configurator online HMI to monitor and analyze device performance quickly and easily. The HMI provides a graphical representation of analog and digital data specific to each SEL device and provides user control functionality. For more detailed information on available HMI screens or SER data, refer to the instruction manual for the device from which you are displaying the HMI information.

SEL Grid Configurator must be connected to the device to display HMI information. For more information on connecting to the device, refer to *Section 2: Getting Started*. To access the HMI, select the Online HMI perspective button (as shown in *Figure 6.104*) in the Device Explorer. If SEL Grid Configurator is not connected to the device, it displays a banner at the top of the workspace highlighting the option to connect to the device.

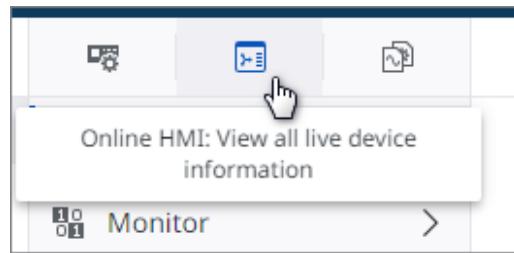


Figure 6.104 Online HMI Perspective in Device Explorer

The Online HMI perspective provides a tree-view list with a unique set of monitoring options depending on the device type. Select a report or control entry from the list to display the contents within the workspace. *Figure 6.105* shows an example list of HMI views and a dashboard.

Name	Magnitude	Angle	Ref
IA	0.009 A	-171.19°	<input type="radio"/>
IB	0.016 A	-38.89°	<input type="radio"/>
IC	0.023 A	91.78°	<input type="radio"/>
VA	0.0000 kV	0.00°	<input checked="" type="radio"/>
VB	0.0000 kV	159.46°	<input type="radio"/>
VC	0.0000 kV	-108.31°	<input type="radio"/>

Name	Value	Controls
521CLSM	0	Open Breaker Close Breaker
522CLSM	0	Open Breaker Close Breaker
OUT201	0	1 sec ▲ Pulse
OUT202	0	1 sec ▲ Pulse
OUT203	0	1 sec ▼ Pulse
OUT204	0	1 sec ▼ Pulse
RB01	0	Pulse Set Clear
RB02	0	Pulse Set Clear

Name	Type
OUT201	Digital
OUT202	Digital
OUT203	Digital
OUT204	Digital
OUT205	Digital
OUT206	Digital
OUT207	Digital
IN201	Digital
IN202	Digital

Name	Value
Date	10/15/2024 12:48:41.921 to 11/13/2024 09:06:16.462
Present Status	Re-sync
Last error	Available
Total errors	1
Relay disabled	0
Data error	0
Re-sync	1

Figure 6.105 Example Online HMI Dashboard

HMI Dashboards

Select the **Dashboard** tab in the Online HMI Perspective navigator to view and edit custom device dashboards. Each dashboard may include as many as four cards. You can populate each card with any available HMI screen. Select **New Dashboard** to create and name a new dashboard. Use the **Add View** and **Remove View** buttons in each card to modify the contents of a dashboard. Drag and drop any card to change the location of the card in the dashboard. You can import and export dashboards by selecting **Import HMI Configuration** and **Export HMI Configuration** from the project menu if you want to store or share dashboards. While connected to the device with live updates enabled, all four screens in the dashboard continually update with device data. Delete unwanted dashboards by selecting **Delete Dashboard** from the dashboard's right-click context menu in the Online HMI Perspective navigator.

Live Updates

The SEL Grid Configurator HMI workspace provides real-time updates by maintaining continual communication with a device. There may be times, however, when you need to pause the updates to analyze a snapshot of the data. The **Live Updates** feature (*Figure 6.106*) allows the communications channel to be switched on or off. When Live Updates is switched off, the continual updates are paused to provide a snapshot of the data.

To turn Live Updates on or off, toggle the **Live Updates** switch.

- When blue, Grid will display live updates.
- When gray, Grid will not update live data.

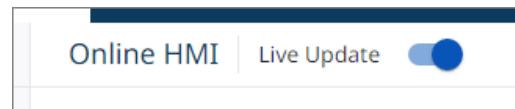


Figure 6.106 Live Updates Switch

Control Options

Some HMI screens include controls with which you can update live data within the device and force certain behaviors. Use the HMI controls to perform actions such as the following: reset metering values, clear event records, trip and close reclosers/breakers, pulse output contacts, set and clear remote bits, etc.

Additional Tree-View Functions

Refer to the instruction manual for your device for additional details on device-specific HMI tree-view functions.

Resources Perspective

Event Reports

The Resources perspective in the Device Explorer includes the Event Reports view, which allows you to access event reports in your device, download those into SEL Grid Configurator, and export them to a location of your choice.

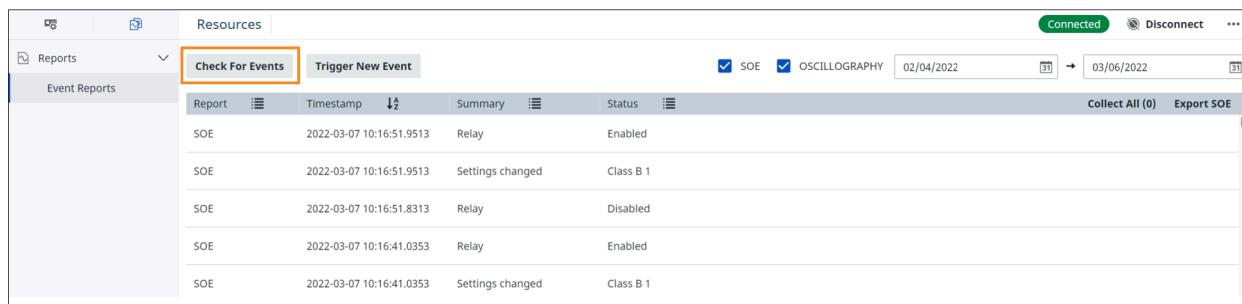


Figure 6.107 Collecting Event Reports

To discover new reports, select **Check For Events** in the Reports view, as shown in *Figure 6.107*. SEL Grid Configurator will download new SOE messages and summary information for new event reports. If you have previously collected events from a device, the Reports view will display the SOE and event summaries you collected. SEL Grid Configurator will download all new SOE records and event summaries from the device, regardless of the date range shown in the Reports view. Use the date range to filter the Reports view for items you already collected. While SEL Grid Configurator is collecting the events from the device, you can select the Device Operations button in the Title Bar, as shown in *Figure 6.108*, to watch the progress of the collection process.

NOTE

All terminal operations are disabled while SEL Grid Configurator is collecting events.

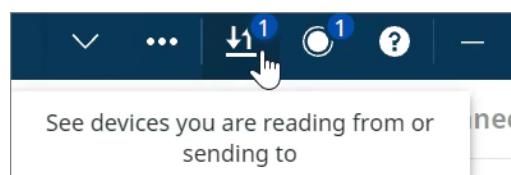


Figure 6.108 Device Operations Button in Title Bar

Filtering the Reports View

From the Reports screen, you can view SOE data and/or download your Oscillography event files.

You can filter the Reports view by setting the report type(s) and/or a valid date range, as shown in *Figure 6.109*. The report type filters and date range will narrow the Reports view to show matching items you have already collected. When you select **Check For Events**, SEL Grid Configurator downloads all new SOE records and event summaries, regardless of your filtering selections.

Resources						Connected	Disconnect	...				
Reports		Event Reports				Check For Events Trigger New Event						
						<input checked="" type="checkbox"/> SOE	<input checked="" type="checkbox"/> OSCILLOGRAPHY	02/04/2022	→	03/06/2022	<input type="button" value="Collect All (0)"/>	<input type="button" value="Export SOE"/>
Report	Timestamp	Summary	Status									
SOE	2022-03-07 10:16:51.9513	Relay	Enabled									
SOE	2022-03-07 10:16:51.9513	Settings changed	Class B 1									
SOE	2022-03-07 10:16:51.8313	Relay	Disabled									
SOE	2022-03-07 10:16:41.0353	Relay	Enabled									
SOE	2022-03-07 10:16:41.0353	Settings changed	Class B 1									

Figure 6.109 Report File Type Filter

Sorting the Reports View

Select the sorting icon to the right of a specific column header to sort report data in ascending or descending order. The list sort icon symbol changes to a down arrow for ascending and an up arrow for descending. *Figure 6.110* shows the Timestamp column sorted in ascending order. Note that you can only sort by one column at any given time.



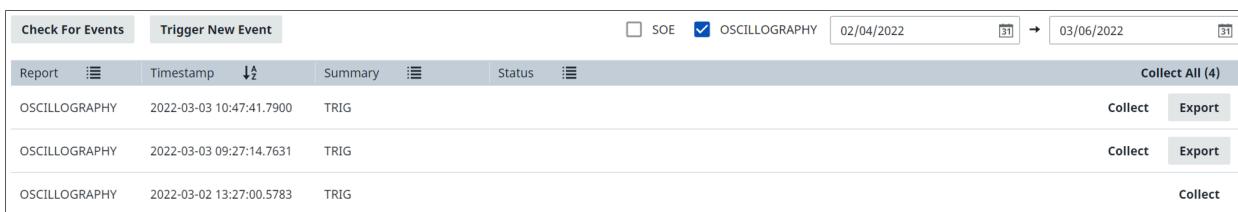
Check For Events		Trigger New Event							
Report	Timestamp	Summary	Status						
SOE	2022-03-07 10:16:51.9513	Relay	Enabled						
SOE	2022-03-07 10:16:51.9513	Settings changed	Class B 1						
SOE	2022-03-07 10:16:51.8313	Relay	Disabled						

Figure 6.110 Column Sorting

Collecting and Exporting Oscillography Events

SEL Grid Configurator provides a means for downloading new oscillography events either all at once or one at a time. As shown in *Figure 6.111*, select **Collect** next to each event you want to download individually. Select **Collect All** to download all the events. Many devices retain a larger history of event summaries than full event records (such as raw or filtered event reports) in memory. Therefore, you will see event summaries in the Reports view for which you cannot download complete event reports.

Once collected, select the **Export** button on the right of the event record to export oscillography event files. Each download will include all event report types, such as the raw and filtered report, associated with an event. When prompted, you can supply a location and file name to which you can save. When you provide a custom file name, only the evzip file name updates. The individual event files within the evzip file retain the original names. Note that you will need to open the SYNCHROWAVE® Event Software and select the saved evzip file you want to view.

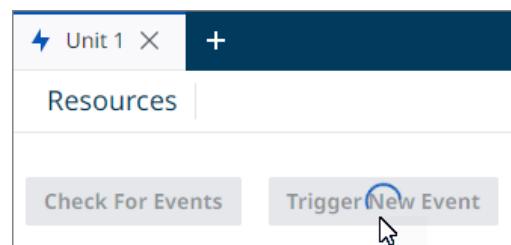


Check For Events		Trigger New Event							
Report	Timestamp	Summary	Status						
OSCILLOGRAPHY	2022-03-03 10:47:41.7900	TRIG						Collect	Export
OSCILLOGRAPHY	2022-03-03 09:27:14.7631	TRIG						Collect	Export
OSCILLOGRAPHY	2022-03-02 13:27:00.5783	TRIG						Collect	

Figure 6.111 Collect and Export Oscillography Events

Triggering a New Event

Select **Trigger New Event** to send a trigger command to the connected device and update the event history list. The button is inactive if you are not connected to the device or if the device is busy. If the device is in use, scrolling over the **Trigger New Event** button displays a message indicating that the device is busy.

**Figure 6.112 Trigger New Event Button**

Once the device completes the triggered event and updates the history, the Reports view displays a pop-up message indicating successful completion, as shown in *Figure 6.113*.

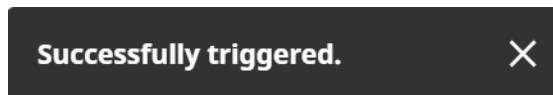


Figure 6.113 Successfully Triggered Event

You can also trigger a new event through the terminal by executing a **TRI** or Trigger command. (Note that when triggering an event through the terminal, you will not receive the same pop-up notification shown in *Figure 6.113* and the Reports view will not be automatically updated. You need to select **Check For Events** to show the event triggered through the terminal.)

Firmware History

SEL Grid Configurator keeps a history of firmware files it sends to devices. This log provides a method to track previous device firmware versions along with dates of updates.

NOTE

SEL Grid Configurator stores firmware history information locally, not on the device. Share firmware history information with other SEL Grid Configurator databases by exporting the device project as a .grx file.

The workspace table separates each firmware entry into four sections, as shown in *Figure 6.114*:

- ▶ **Firmware Installed (FID):** Device firmware version resulting from the firmware update
- ▶ **SELBOOT Installed (BFID):** Device SELBOOT version, if it was changed, resulting from the firmware update
- ▶ **Status:** The status of the firmware update
 - **Successful:** The firmware update operation completed successfully
 - **Failed:** The firmware update operation could not complete or was cancelled
- ▶ **Timestamp:** The date and time that the update process concluded

Firmware Installed (FID)	SELBoot Installed (BFID)	Status	Timestamp
SEL-421-R409-V0-Z107003-D20230317	No Change	Successful	2023-07-28 15:30:06

Figure 6.114 Firmware History Workspace Table

Select an entry in the Firmware History table to see detailed information on the right side of the Firmware History workspace regarding the process, as shown in *Figure 6.115*. This information is divided into three sections:

1 **Firmware Installed (FID):** SEL-421-R409-V0-Z107003-D20230317
SELBoot Installed (BFID): No Change
Status: Successful
Timestamp: 2023-07-28 15:30:06
Firmware Version: R409-V0
Settings Version Number: 107
Grid Configurator Version: 4.5.0.20

2 **Backup Files**

Name	Action
SOE Reports	View
Oscillography Reports	View
Diagnostic Commands	Download
Device Settings	Download
Device Calibration Settings	Download

3 **Firmware Upgrade Process Report**

```
Diagnostic Commands.....SAVED
Device Settings.....SAVED
Device Calibration Settings.....SAVED

START FIRMWARE UPGRADE - 2023/07/28 03:31

Start r409-v0421.zds file transfer...
Installing firmware...

Finished Installing Firmware - Upgrade Complete
UPGRADING DEVICE PROJECT

Reading settings from device...

FIRMWARE UPGRADE COMPLETE - 2023/07/28 03:35
Time Duration: 00:05:11
New FID: SEL-421-R409-V0-Z107003-D20230317
```

[Export](#)

Figure 6.115 Details Portion of the Firmware History Workspace Labeled With Section Identifiers

1. **Firmware Installed (FID):** Version information about the various components of the upgrade process
2. **Backup Files:** Artifacts that were backed up as part of the upgrade process
3. **Firmware Upgrade Process Report:** Detailed Firmware Upgrade Process Report

Settings Versions

⚠️ IMPORTANT

You can find an instructional video on settings versions at the following link:
SEL Grid Configurator: Settings Versions Tool.

Within the Resources perspective, the Settings Versions view provides an interface to create and manage settings versions for any device in SEL Grid Configurator. By default, SEL Grid Configurator creates a working copy of settings for each device at the time you create the device project. You can optionally create additional settings versions. *Figure 6.116* illustrates the initial state of the workspace with a Working Copy and no settings versions in the Version History.

NOTE

All views in the Configuration Perspective utilize the Working Copy. You cannot directly edit settings versions in the Configuration Perspective.

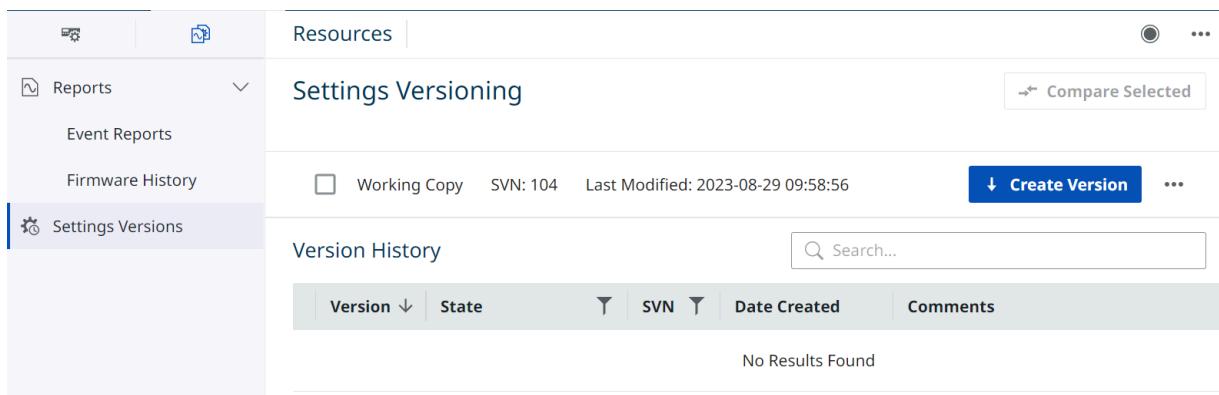


Figure 6.116 Initial Settings Versions Workspace

To create a new settings version, select **Create Version** and provide the needed version information presented in *Figure 6.117*. SEL Grid Configurator provides suggested version numbers based on semantic versioning syntax. Select a radio button to assign a new major version, minor version, or custom version (custom values must be numerical with a maximum of six digits and may include a period to define major.minor versions). Provide comments to document any additional context for the version in the Version History.

NOTE

To learn more about semantic versioning, visit semver.org.

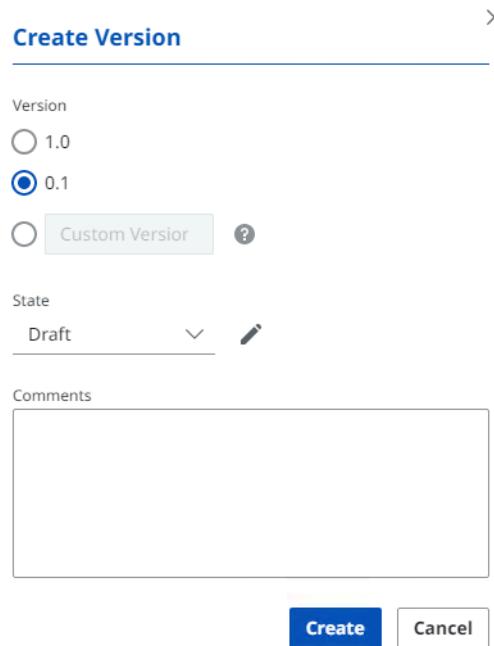


Figure 6.117 Create Version Dialog

Use the drop down, as shown in *Figure 6.118*, to select an appropriate state to associate with the version. Select the edit icon next to the state value to manage the list of available states.

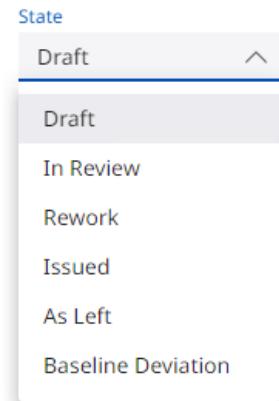


Figure 6.118 Settings Version States

Figure 6.119 illustrates the options SEL Grid Configurator provides for customizing the list of version states. Select **New State** to create a new entry in the list. When you select a row in the table, such as **Issued** in the figure, click on the up and down arrows to alter the sequence of states. Edit the Name field to alter the selections displayed in the State drop down menu. You can only delete states that display a trash icon. SEL Grid Configurator includes four mandatory states that you can rename.

**116 Create and Edit Device Projects
Resources Perspective**

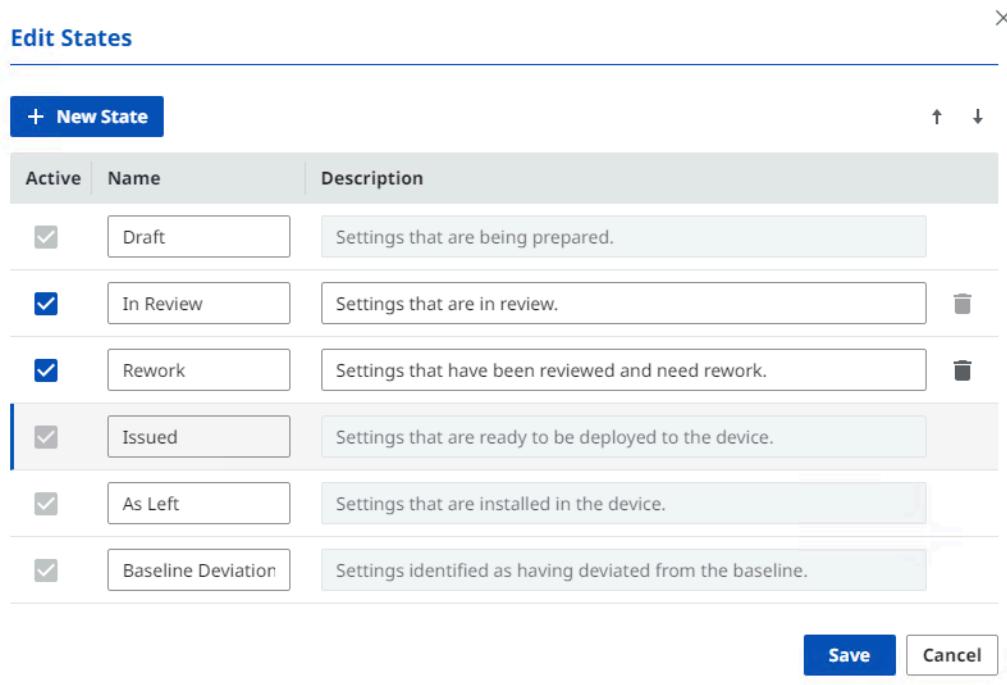


Figure 6.119 Edit States Dialog

Using the Version History, as shown in *Figure 6.120*, check two or more check boxes next to settings versions and Working Copy (if desired). Then select **Compare Selected** to open a comparison view for the selected versions. Refer to *Section 5: Device Comparison and Conversion* for details about the Comparison View.

Use the ellipse button for any version to set it as the Working Copy, export the version as a .zip package, or edit the version details.

NOTE

If you move a version to the Working Copy, SEL Grid Configurator overwrites all settings values in the Working Copy with the values stored in the historical version.

The screenshot shows the 'Version History' section of the software. At the top left is a button labeled 'Working Copy' with a checkbox, 'SVN: 107', and 'Last Modified: 2024-11-12 09:46:04'. At the top right are 'Create Version' and '...' buttons. Below the header is a search bar with the placeholder 'Search...'. The main area is a table with columns: Version, State, Device Model, SVN, Date Created, and Comments. There are four rows of data:

Version	State	Device Model	SVN	Date Created	Comments
<input checked="" type="checkbox"/> 2.0	Issued	SEL-451-6	107	2024-11-12 09:46:04	Approved and issued with SVN conversion
<input checked="" type="checkbox"/> 1.0	In Review	SEL-451-6	106	2024-11-12 09:43:29	Review Version
<input type="checkbox"/> 0.2	In Review	SEL-451-6	106	2024-11-12 09:42:39	SVN Conversion
<input type="checkbox"/> 0.1	Draft	SEL-451-6	105	2024-11-12 09:41:05	First Draft Version

Figure 6.120 Version History

Terminal and Logging

Using the ASCII Terminal in SEL Grid Configurator

SEL Grid Configurator includes an ASCII terminal with which you can issue commands, such as reading metering data, pulsing outputs, viewing device status, etc., to the device. SEL Grid Configurator can connect to multiple devices at one time with a separate terminal for each device.

Running the ASCII Terminal

IMPORTANT

You can find an instructional video on how to use the terminal at the following link: SEL Grid Configurator: Terminal.

Once SEL Grid Configurator is connected to the supported device, select **Terminal** in the bar on the bottom of the active device workspace. The Terminal window expands to occupy the bottom portion of the screen, as shown in *Figure 6.121*. To minimize the Terminal window, select the Terminal bar again.

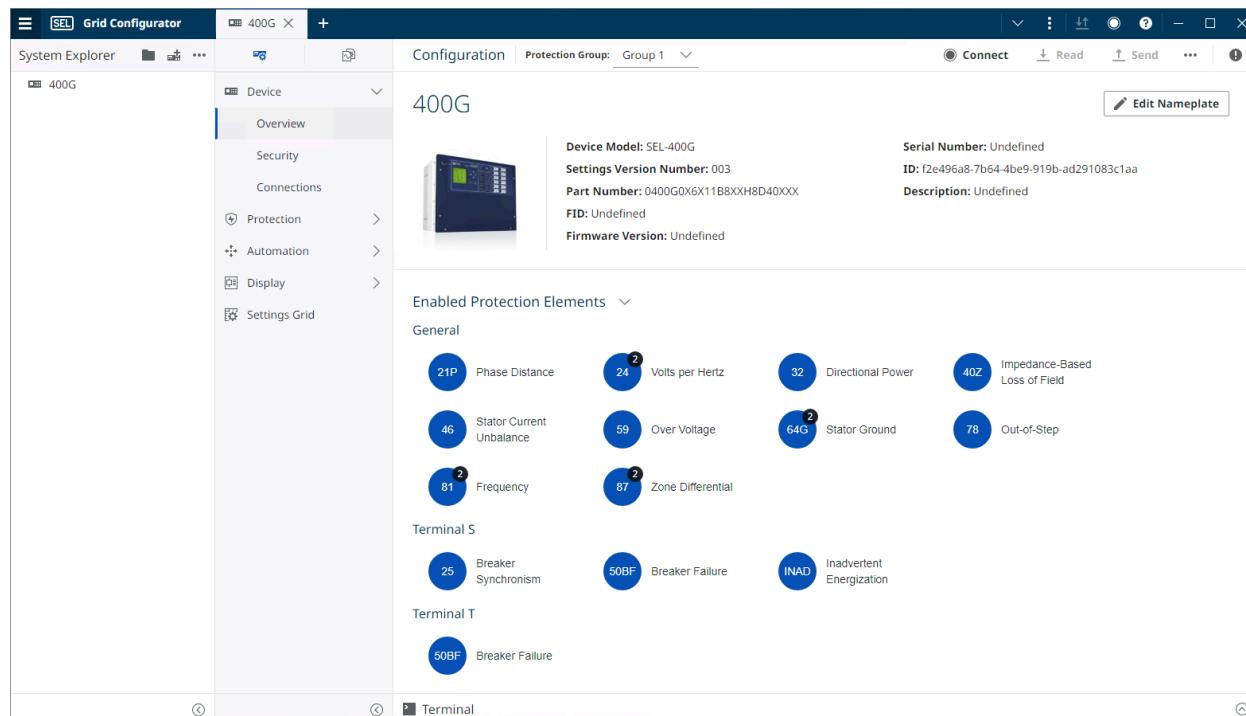


Figure 6.121 Accessing the SEL Grid Configurator Terminal

For a list of valid commands, issue a **Help** command to the device via the terminal or see the device instruction manual.

Examples of valid commands:

- **ID**: Return a list of relay identification codes.
- **MET** or **METER**: View metering data and internal relay operating variables.
- **STA** or **STATUS**: Display or clear/reset relay status information.

In the event of an error, SEL Grid Configurator issues a response notifying you if a device is not connected, a command is invalid, or a command has insufficient parameters.

Select **Cancel** to cancel a command after it has been executed, as shown in *Figure 6.122*. The **Cancel** button is visible only when the terminal is executing a command; otherwise, it remains hidden.



Figure 6.122 Canceling a Command

Hiding and Showing Command Text in the Terminal Window

The Hide/Show command button (/), located to the right of the Command to Execute text area, can be toggled to show or hide commands as they are being typed, as shown in *Figure 6.123*.



Figure 6.123 Hide Command

The command text will show as masked when you type an access level password, as shown in *Figure 6.124*. The state of the command text area will return to unmasked after you enter the password. The masked state can be set at any time, regardless of the commands you are typing.



Figure 6.124 Show Command

Scrollable Command Text History

Use the up/down arrow keys on your keyboard to scroll through previously entered commands. Entered passwords will not be in the scrollable command history. The command history is exclusive to the terminal window of each device and does not carry over to other device terminal windows. You can edit previously entered commands and re-run them if necessary. SEL Grid Configurator will not preserve the command history when exiting the application.

Terminal Window History, Export, and Clear Options

The Terminal window text area retains the last 1,000 lines of text for display, as shown in *Figure 6.125*.

```

Terminal
sho
Group 4

Relay Configuration

ECTTERM := "S,T,U,W,X"
EPTTERM := "V,Z"    E87   := "S,T"    EREF   := N      E50    := OFF
E51     := N       E46   := OFF     E59    := N      E27    := N
E81     := N       E24   := N      E25    := OFF    EBFL   := OFF
EPCAL   := OFF     EDEM   := N

Current Transformer Data

CTRS   := 100     CTCNS  := Y      CTRT   := 100    CTCONT := Y
CTRU   := 100     CTCNU  := Y      CTRW   := 100    CTCONW := Y

```

→ Command to Execute

Figure 6.125 Terminal Window Available Text Lines

Select the available text lines by using standard keyboard and mouse operations. You can then copy and paste the selected text into any text editor you choose, as shown in *Figure 6.126*.

```

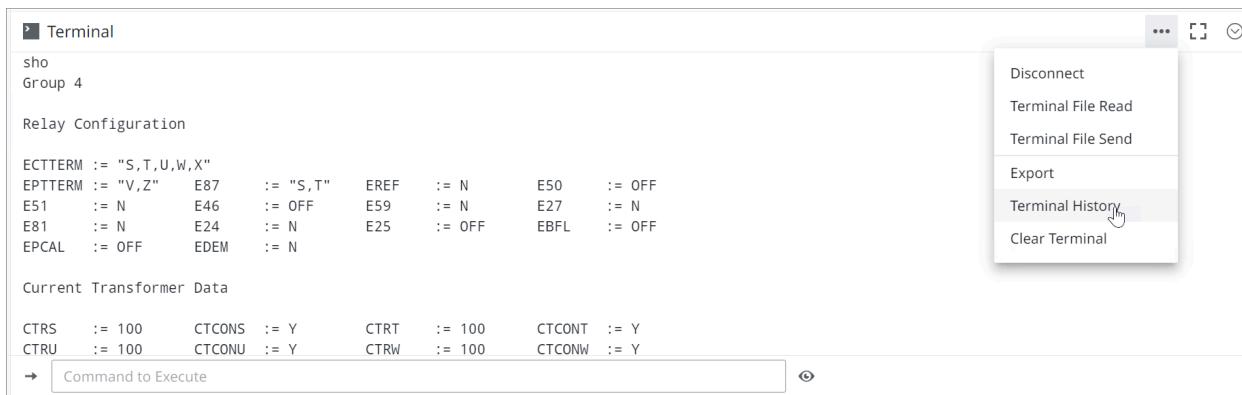
*new 1 - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
new 1
1 End of most recent 1000 lines.
2
3          Phase Voltages           Phase-Phase Voltages
4          VA      VB      VC      VAB      VBC      VCA
5 V MAG (kV) 0.000  0.000  0.000  0.000  0.000  0.000
6 V ANG (DEG) 0.00  0.00  0.00  0.00  0.00  0.00
7
8          Sequence Currents (A)   Sequence Voltages (kV)
9          I1      3I2      3I0      V1      3V2      3V0
10 MAG 0.004  0.021  0.010  0.000  0.000  0.000
11 ANG (DEG) 82.72  -103.12  -170.70  0.00  0.00  0.00
12
13          A      B      C      3P
14 P (MW) 0.00  0.00  0.00  0.00
15 Q (MVAR) 0.00  0.00  0.00  0.00
16 S (MVA) 0.00  0.00  0.00  0.00
17 POWER FACTOR 0.00  0.00  0.00  0.00
18          LEAD    LEAD    LEAD    LEAD
19 FREQ (Hz) 60.00
20
21
22 Relay 1                               Date: 10/29/2020 Time: 12:44:29.916
23 Station A                               Serial Number: 10203129109
24
25          Phase Currents
26          IA      IB      IC
27 I MAG (A) 0.020  0.009  0.001
28 I ANG (DEG) 63.71  169.15  -22.61
29
30          Phase Voltages           Phase-Phase Voltages
31          VA      VB      VC      VAB      VBC      VCA
32 V MAG (kV) 0.000  0.000  0.000  0.000  0.000  0.000
33 V ANG (DEG) 0.00  0.00  0.00  0.00  0.00  0.00
34
35          Sequence Currents (A)   Sequence Voltages (kV)

```

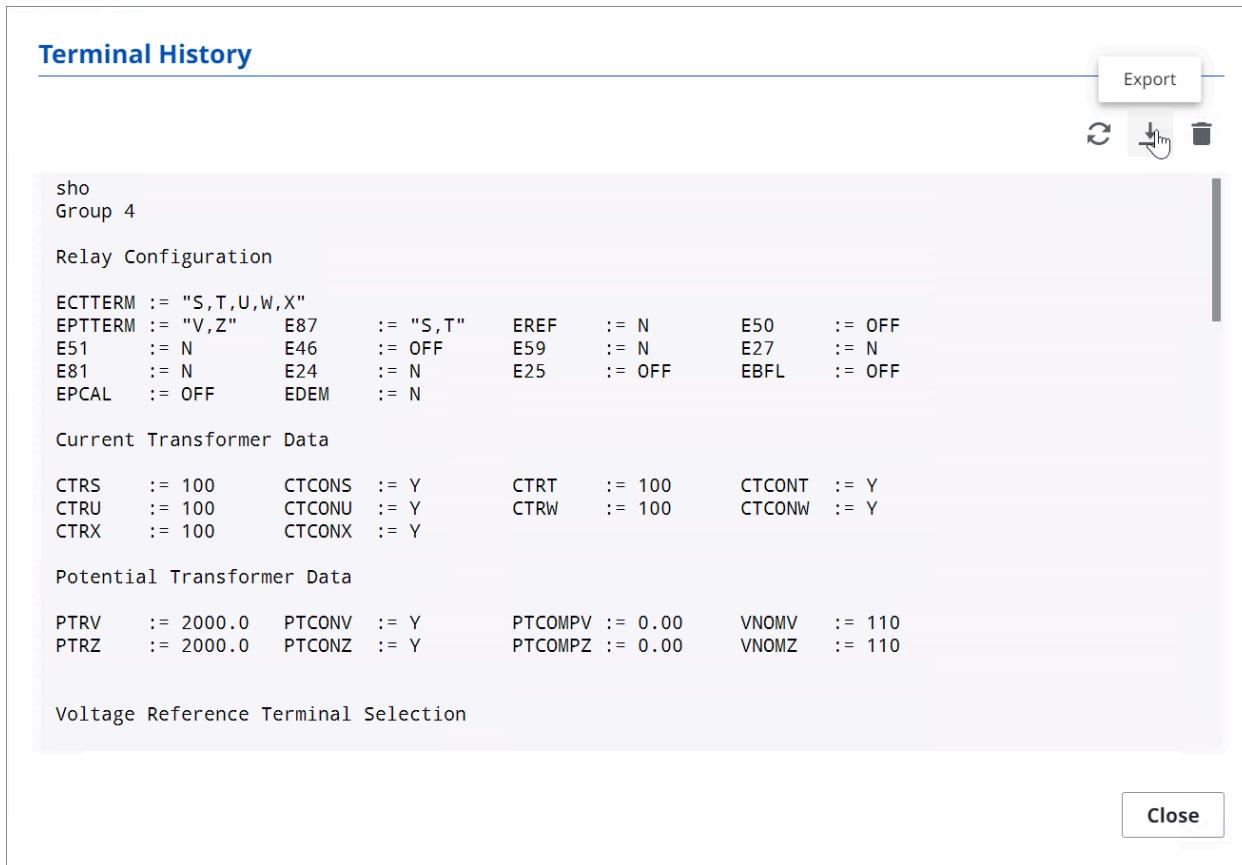
Normal text file length: 48,236 lines: 1,001 Ln:1 Col:1 Sel:0|0 Windows (CR LF) UTF-8 INS .

Figure 6.126 Pasted Text From the Terminal Window

SEL Grid Configurator stores as many as 70,000 lines of text, which you can view by selecting **Terminal History** from the Terminal window drop-down menu, as shown in *Figure 6.127*.

Terminal and Logging**Figure 6.127 Select Terminal History**

From the Terminal History window, you can view and scroll through all available history. You can copy and paste text you select in this window to any text editor you choose. You can also choose to export the history directly to a file by selecting **Export**, as shown in *Figure 6.128*. The Export menu item is also available from the drop-down menu in the main Terminal window. After you select **Export**, the Save As dialog displays. From this dialog, you can supply a name and location for the exported file.

**Figure 6.128 Export Terminal History**

As with the Export option, there is a button available to clear the terminal history, as shown in *Figure 6.129*. Selecting the Delete button completely discards all Terminal window history. You can also clear the terminal history by selecting **Clear Terminal** from the drop-down menu in the Terminal bar.

```

sho
Group 4

Relay Configuration

ECTTERM := "S,T,U,W,X"
EPTTERM := "V,Z"      E87     := "S,T"    EREF     := N       E50      := OFF
E51      := N         E46     := OFF     E59      := N       E27      := N
E81      := N         E24     := N       E25     := OFF     EBFL     := OFF
EPCAL    := OFF       EDEM    := N

Current Transformer Data

CTRS     := 100       CTCNS   := Y       CTRT     := 100     CTCONT   := Y
CTRU     := 100       CTCNU   := Y       CTRW     := 100     CTCONW   := Y
CTRX     := 100       CTCNX   := Y

Potential Transformer Data

PTRV     := 2000.0    PTCONV  := Y       PTCOMPV  := 0.00   VNOMV    := 110
PTRZ     := 2000.0    PTCONZ  := Y       PTCOMPZ  := 0.00   VNOMZ    := 110

Voltage Reference Terminal Selection
  
```

Figure 6.129 Clear Terminal Window History

Read and Send Files From the Terminal Window

When you connect a device, the drop-down menu in the Terminal bar displays options for you to select a File Read or File Send operation, as shown in *Figure 6.130*.

**Figure 6.130** Terminal Window File Read/Send

Selecting the **Terminal File Read** option initiates a read process by prompting you for the file you want to read, as shown in *Figure 6.131*.

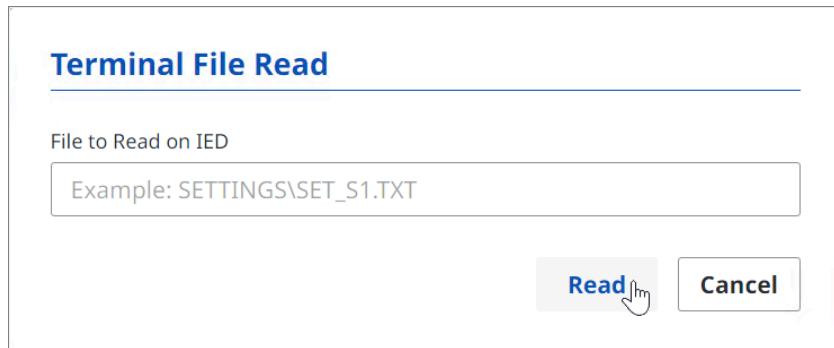


Figure 6.131 Terminal File Read

Enter the file path and name and select **Read** to download the file. When the download is complete, a prompt appears requesting you to supply a name for the file and the location to which you want to save the downloaded file, as shown in *Figure 6.132*.

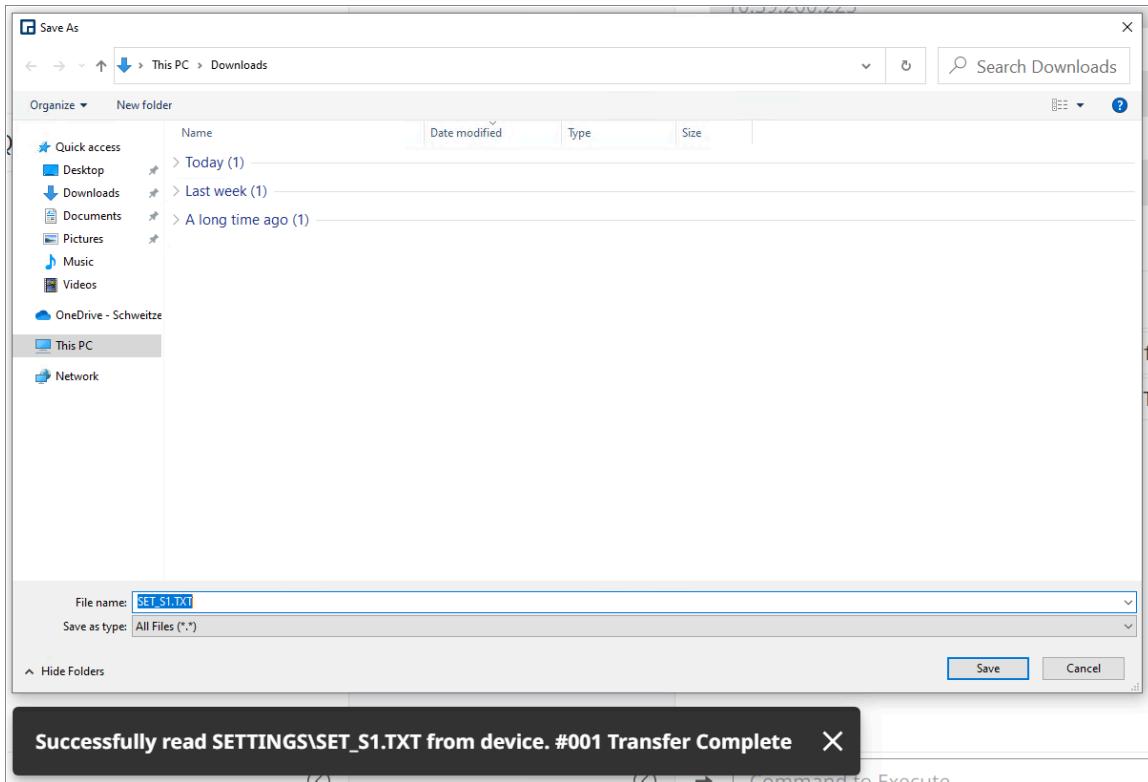
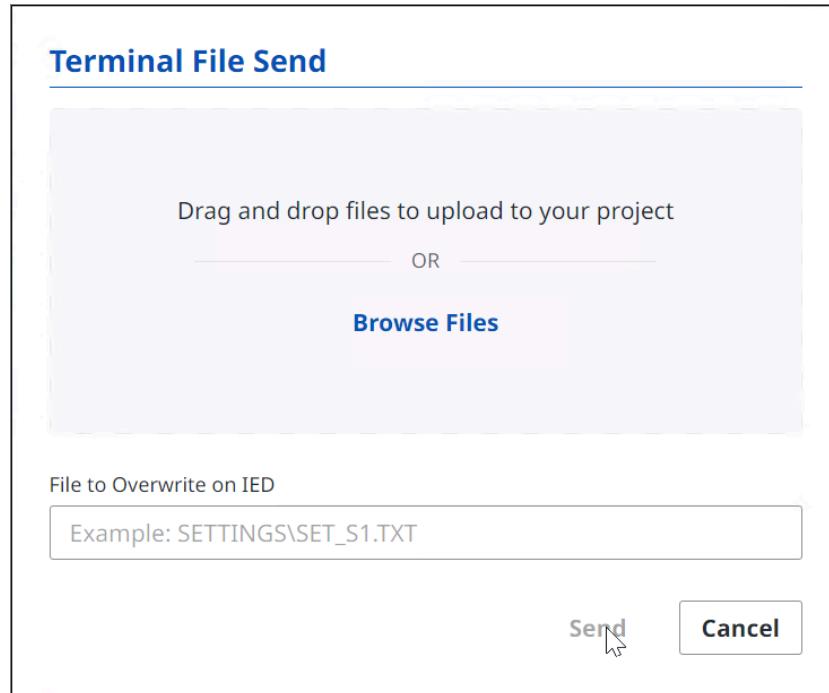


Figure 6.132 File Save

Selecting the **Terminal File Send** option from the drop-down menu in the Terminal bar initiates a send process that begins with display of a prompt for you to provide both the file you want to send and the file you want to overwrite on the relay, as shown in *Figure 6.133*. Selecting **Send** sends the file to the relay.

**Figure 6.133 Terminal File Send**

Following transmission of the file to the relay, the Send Report tab opens and shows the status of the send operation, as shown in *Figure 6.134*. Select the relay tab to return to the Terminal window.

Device	Start Time	End Time	Status
Test Device 1	8/8/2022 11:17:41	8/8/2022 11:17:49	✓ Success

Test Device 1

Operation Details

Status:
Successfully sent SETTINGS\SET_S1.TXT to device.
#001 Transfer Complete
Start Time: 8/8/2022 11:17:41
End Time: 8/8/2022 11:17:49
Progress: 1 out of 1 file processed

File Status

File	Status
SETTINGS\SET_S1.TXT	✓ Sent

Figure 6.134 Terminal File Send Status

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S E C T I O N 7

System View

As your system of device projects in the Grid database expands, you may need an easy method for finding all devices that share certain attributes, such as the firmware ID or part number. The System view provides a fast mechanism for filtering the devices in your system without requiring you to open each device project.

Opening the System View

Select the ellipsis button in the Title Bar, as shown in *Figure 7.1*, and select **System View**. *Figure 7.2* shows the resulting System view. Alternatively, select the + button in the tab bar and then select **System View**, as shown in *Figure 2.2*.



Figure 7.1 Opening the System View

Opening the System View

Path	Part Number	FID	Device Type	SVN	Connecti...	Serial Number	Description
/400G	0400G0X6X11B8XXH8D40XXX		SEL-400G	003	[Serial Connection]		
/451-6	04516RX0X400XC6H424XXXXXX		SEL-451-6	103	[Serial Connection]		
/Test Device 1	04516RXAX600XC7H424XXXXXX	SEL-451-6-R402-V0-Z102102-D20210521	SEL-451-6	102	10.203.129.107	10203129107	

Figure 7.2 System View

Use the search bar to do a quick search for a single attribute (all devices of a particular type, for example). You can combine terms to search across multiple attributes at the same time. The search will return results for every term entered using the logical OR function.

Although the Path column shows the folder hierarchy for the device, you can perform a successful search by directly entering a device project name.

S E C T I O N 8

Quick Connect

A device does not need to exist in the System Explorer for you to connect to it. You can connect to a device and then, once SEL Grid Configurator has learned the type and part number for the device, you can use the Quick Connect tool to add it to the System Explorer. As shown in *Figure 8.1*, select the + button in the Projects bar and select **Quick Connect** to initiate a new connection.

NOTE

You can also find the Quick Connect function in the Application menu.

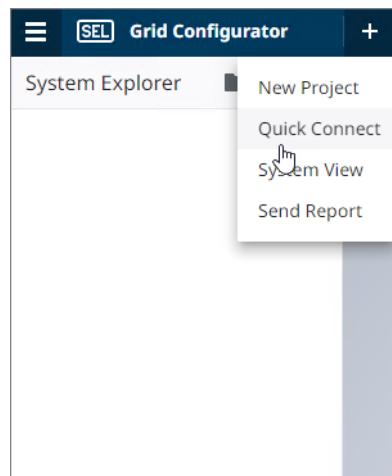


Figure 8.1 Initiating a Quick Connect Connection

SEL Grid Configurator displays a dialog, as shown in *Figure 8.2*, in which you can supply the information required to connect the device. Select **Connect** after you have entered all necessary connection information.

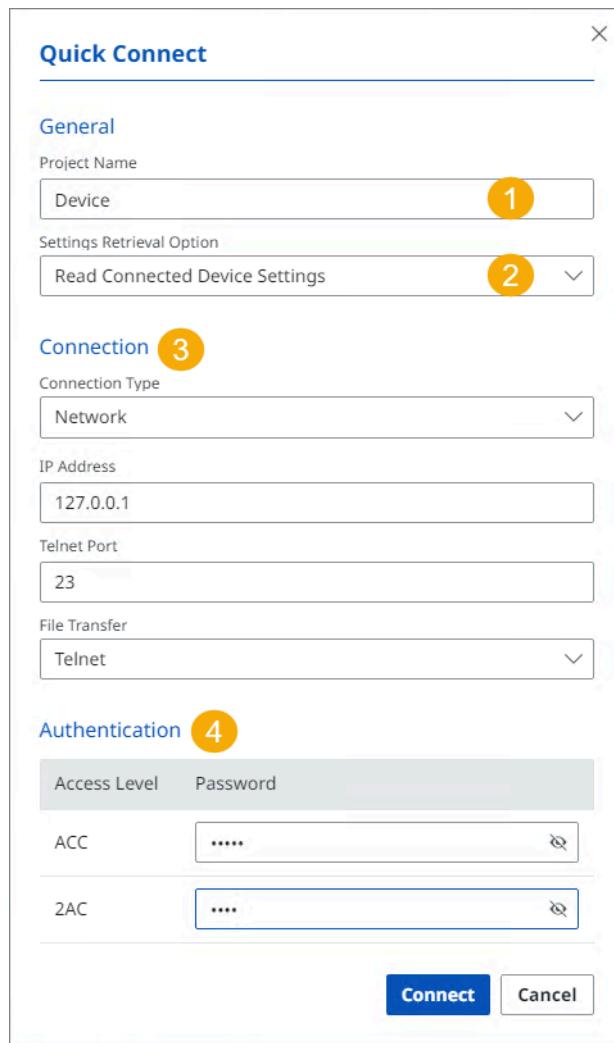


Figure 8.2 Device and Connection Information

1. **Project Name:** A unique name for the device being connected.
2. **Settings Retrieval Option:** Select an initial option for how you prefer to view settings in SEL Grid Configurator. Select **Read Connected Device Settings** to read all device settings immediately when connected. Select **Load Default Settings** to initiate a device connection without reading settings.
3. **Connection:** Communication settings required to connect to the device. Refer to *Section 2: Getting Started* to learn how to configure the connection information.
4. **Authentication:** The Authentication section is for device Access Level 1 and Level 2 passwords. SEL Grid Configurator fills in the default values. You can edit these values to match your device.

Once you have completed work with the temporary device project, you can choose to save that device to the System Explorer, as shown in *Figure 8.3*. Select **Save Project to System** and provide a permanent name for the device. SEL Grid Configurator places the device in the root folder of the System Explorer. Refer to *Section 4: System Explorer* for information about moving device projects to different folders.

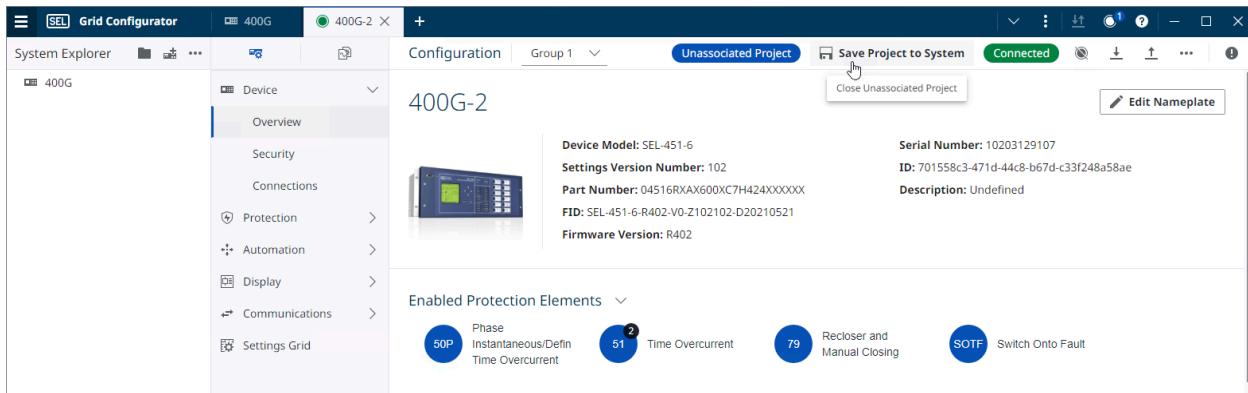


Figure 8.3 Save Quick Connect Device

Closing the Quick Connect device tab or disconnecting the device will provide a warning dialog, as shown in *Figure 8.4* and *Figure 8.5*. The device will then be deleted without saving it to the System Explorer.

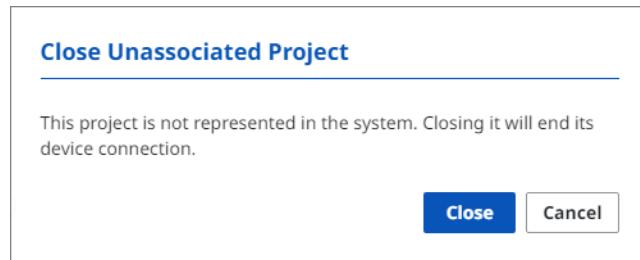


Figure 8.4 Close Tab

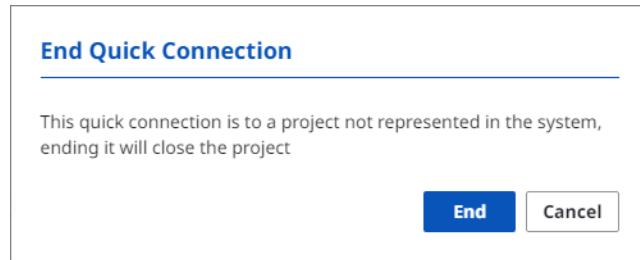


Figure 8.5 Close Connection

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S E C T I O N 9

Getting Help

SEL Grid Configurator software includes a number of features to support the software. You can open a help window by selecting the encircled question mark, as shown in *Figure 9.1*.



Figure 9.1 Help Button in the Title Bar

If you require the instruction manual, select the **Open** button, as shown in *Figure 9.2*, to retrieve a PDF copy of the instruction manual.

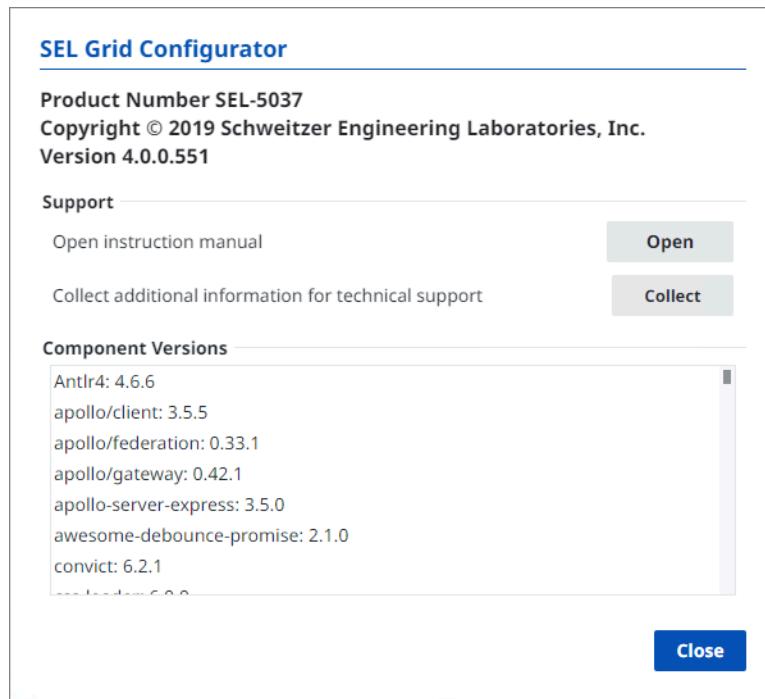


Figure 9.2 Help Window

Technical Support

If you require technical support for SEL Grid Configurator, please call SEL at +1.509.338.3838 or email support at PCSW@selinc.com.

The SEL technical support staff may ask for a copy of your log files for SEL Grid Configurator. To store a copy of all SEL Grid Configurator logs, which then may be sent to SEL, select **Collect** from the Help Window, as shown in *Figure 9.2*.

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A P P E N D I X A

Software and Manual Versions

Software

To find the software version of SEL Grid Configurator, select the encircled question mark in the Title Bar, as shown in *Figure A.1*, to open the Help Window.



Figure A.1 Title Bar

Within the header of the Help Window you will find the software version.

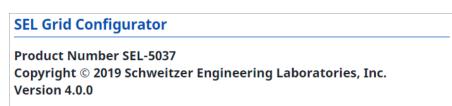


Figure A.2 SEL Grid Configurator Version Information

Table A.1 lists the software versions, a description of modifications, and the date code corresponding to the software version. The table lists the most recent software version first.

Starting with revisions published after March 1, 2022, changes that address security vulnerabilities are marked with "[Cybersecurity]". Other improvements to cybersecurity functionality that should be evaluated for potential cybersecurity importance are marked with "[Cybersecurity Enhancement]".

Descriptions marked as "[Breaking]" require an API client to be updated to maintain related API capabilities because the previous functionality has been altered or removed. A breaking change will always result in an incremented major version number.

Table A.1 Software Version History

Software Version Number	Summary of Revisions	Manual Date Code
6.5.0.x	<p>SEL-5037 Grid Configurator</p> <p>► Addressed an issue where versions of SEL Grid Configurator prior to version 6.2.2.5 could not directly update to version 6.4.1.8 or later.</p> <p>SEL-400G Settings Driver</p> <p>► Added support for SEL-400G-0, -1 Z007:</p> <ul style="list-style-type: none">➢ Added the High-Availability Seamless Redundancy (HSR) protocol feature to the five-port Ethernet card.➢ Added Port 5 setting BUSMODE to allow merged mode when using the five-port Ethernet card.	20250228

Software Version Number	Summary of Revisions	Manual Date Code
	<p>SEL-487E Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-487E-5 Z207: <ul style="list-style-type: none"> ➢ Added Group setting EATAP2 to allow manual or automatic calculation of TAP_m2 in A secondary (where m = S, T, U, W, X, Y). ➢ Increased the number of available Protection SELOGIC variables to 96. ➢ Increased the number of available Automation SELOGIC sequencing timers to 48. ➢ Increased the number of available display points to 256. ➢ Increased the number of available Automation SELOGIC latches to 80. ▶ Addressed an issue in the SEL-487E-5 Z206 where the Sampled Values Transmit Configuration settings were missing. 	
6.4.1.x	<p>SEL-5037 Grid Configurator</p> <ul style="list-style-type: none"> ▶ Addressed an issue where the installation of ACCELERATOR Database would fail if the machine it was being installed on did not have version x86 of Microsoft Visual C++ 2015–2022 Redistributable installed. ▶ Added a filter to the Settings Grid so that it only shows settings that are in an error state. ▶ Added the keyboard shortcut <Ctrl+F> to focus the search bar while in the Settings Grid. ▶ Added the keyboard shortcut <Ctrl+Tab> to move to the next device project tab. ▶ Added the keyboard shortcut <Ctrl+Shift+Tab> to move to the previous device project tab. ▶ Added the keyboard shortcut <Ctrl+W> to close the current device project tab. ▶ Added the keyboard shortcut <Ctrl+Shift+T> to open the most recently closed device project tab. ▶ Added the ability to rename dashboards by using a right-click menu. ▶ Added a tile to the Welcome Screen that will open the Device Project Comparison workspace. ▶ Optimized scrolling within the Settings Grid. ▶ Improved the application so that when users select the application logo and title, they are navigated to the Welcome Screen. 	20250108

Software Version Number	Summary of Revisions	Manual Date Code
6.4.0.x	<p>SEL-5037 Grid Configurator</p> <ul style="list-style-type: none"> ➤ [Cybersecurity] Improved Grid Configurator's Cross-Origin Resource Sharing (CORS) policy to be more restrictive on request origin. ➤ Added the ability to compare groups within a device project. ➤ Added an HMI dashboard feature in all SEL-411L drivers that allows users to view multiple HMIs simultaneously. ➤ Added the ability to reorder tabs through dragging and dropping the tab. ➤ Improved the application by adding an option to have the application theme match the system theme. ➤ Improved the application by adding the ability to have a baseline reference project in comparisons. ➤ Improved the application by adding a filter menu option that ignores comments when comparing settings values. ➤ Improved the application by adding the ability to add or remove projects from existing comparisons. ➤ Improved the application by adding the ability to compare projects with connected devices of different models and SVNs. ➤ Improved the application by adding a Group column to the settings comparison view. ➤ Improved the application by not allowing values to be propagated in comparisons when multiple columns are selected. ➤ Improved the application by adding a column for Device Model to the Settings Versioning workspace. ➤ Improved the tooltip for the Resource perspective when viewing a device project. ➤ Improved the logs on startup to be more descriptive when the application fails to start. ➤ Improved the application by adding visual indicators for settings warnings. ➤ Addressed an issue that caused the firmware update prerequisite check to fail on SEL-400G-0, -1 Z001, SEL-401 Z105, SEL-421-7 Z105, SEL-451-6 Z101, SEL-487B-2 Z201, and SEL-487E-5 Z201. ➤ Addressed an issue with the Compare Versions workspace being named Compare Settings. ➤ Addressed an issue in the Settings Grid workspace where selecting the arrow for a node in the tree view selected the node in addition to expanding it. ➤ Addressed an issue where navigating by using arrow keys and then typing within a Device Comparison table could enter text in the wrong cell. ➤ Addressed an issue that caused comparisons between many devices to not scroll correctly. All columns in the comparison are now visible and can be scrolled to. ➤ Addressed an issue that caused a settings version comparison to break if a settings conversion was started. ➤ Addressed an issue that caused comparison reports between settings versions to not display column headings correctly. ➤ Addressed an issue that caused settings comparisons to not display read-only settings as gray. ➤ Addressed an issue that caused TiDL Merging Units (TMUs) to indicate they had a connection configured in the System View workspace. ➤ Addressed an issue where downloading a TiDL Commissioning Report from a device in certain situations could cause the application to close unexpectedly. ➤ Addressed an issue in the Protection Elements workspace where the selected instance persisted after switching protection elements, regardless of whether that instance exists in other protection elements. <p>SEL-411L Settings Driver</p> <ul style="list-style-type: none"> ➤ Added driver and online HMI support for SEL-411L-0, -1 Z021. ➤ Added online HMI support for SEL-411L-2, Z100–104. 	20241210
6.3.0.x	<p>SEL-5037 Grid Configurator</p> <ul style="list-style-type: none"> ➤ [Cybersecurity Enhancement] Updated PostgreSQL to version 16.4. <p>SEL-451-6 Settings Driver</p> <ul style="list-style-type: none"> ➤ Updated SEL-451-6 Z107: <ul style="list-style-type: none"> ➤ Added OFF to the range of the HIFLLRT setting. 	20241106

Software Version Number	Summary of Revisions	Manual Date Code
	<p>SEL-487E-5 Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-487E-5 Z206: <ul style="list-style-type: none"> ➢ Added second-harmonic blocking logic for all current terminals. ➢ Added the IEC 61850-9-2LE Sampled Values (SV) publication capability. This option includes support for the INT2, INT4, INTD, INT7, and INT8 I/O interface boards. ➢ Added support for the INTD I/O interface board for TiDL and SV subscriber models. ➢ Added the High-Availability Seamless Redundancy (HSR) protocol feature. ➢ Added Group setting ALTVm (where $m = S, T, U, W, X, Y$) to allow dynamic voltage source selection for each current terminal. ➢ Increased the number of available remote bits to 96. ➢ Modified software to allow different CT ratios for combined terminal applications. ➢ Added Port 5 setting BUSMODE for TiDL models to allow merged mode when using the five-port Ethernet card. ▶ Addressed an issue in the SEL-487E-5 Z202–Z204 versions where the TAPS–TAPX settings, if calculated automatically, were indicated as being in error when the corresponding TAPMAX/TAPMIN ratio was less than 35. 	
6.2.2.x	<p>SEL-5037 Grid Configurator</p> <ul style="list-style-type: none"> ▶ [Cybersecurity Enhancement] Updated to remove dependency on unsupported Microsoft C++ runtime redistributables. ▶ Addressed an issue that caused the application not to start if the database stored devices with the Blueframe connection type. 	20240904
6.2.1.x	<p>SEL-5037 Grid Configurator</p> <ul style="list-style-type: none"> ▶ [Cybersecurity Enhancement] Updated the database library. 	20240807
6.2.0.x	<p>SEL-5037 Grid Configurator</p> <ul style="list-style-type: none"> ▶ [Cybersecurity Enhancement] Updated third-party components to ensure continuity of support. ▶ Addressed an issue in versions 6.0.0.30 and 6.1.0.18 where 48 hours after the software was installed it could no longer communicate with devices. <p>SEL-451-6 Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-451-6 Z107: <ul style="list-style-type: none"> ➢ Added Relay Word bit CLDSTRT to indicate that a power cycle occurred. ➢ Added Relay Word bits LOL_A, LOL_B, and LOL_C to indicate loss of load for the HIF algorithms. ➢ Added Relay Word bits TUNSTLA, TUNSTLB, and TUNSTLC to indicate when HIF algorithms tuning is stalled. ➢ Added Relay Word bits TUNRSTA, TUNRSTB, and TUNRSTC to indicate when HIF algorithms tuning values are reset. ➢ Added Relay Word bits HIFARMA, HIFARMB, and HIFARMC to indicate when HIF algorithms are armed. ➢ Added the Group setting HIFLLRT to delay the reset of the tuned values of HIF algorithms following a loss of load. ➢ Added the Group setting HIFITND to specify the initial tuning duration of the HIF algorithms, instead of a fixed 24-hr duration. ➢ Added the Group settings HIFHSL and HIFNSL to specify high and normal HIF interharmonic algorithm sensitivity levels, respectively. ➢ Added the Group setting MPHDUR to define the time window used to detect arcing in multiple phases. ➢ Modified the default value of the setting HIFITUN from 0 to R_TRIG CLDSTRT. 	20240703

Software Version Number	Summary of Revisions	Manual Date Code
6.1.0.x	<p>SEL-400G Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-400G-0, -1 Z006: <ul style="list-style-type: none"> ➢ Added support for the 6U and 7U chassis ordering options. ➢ Added support for EIA-232 serial communications with the SEL-2664 Field Ground Module. ➢ Increased the resolution of Group settings 46Q1P1, 46Q1P2, 46Q2P1, and 46Q2P2. ➢ Modified Group setting EBUP to allow the enabling of both phase distance (21P) and voltage controlled/restrained overcurrent elements (51C/51V). ➢ Modified the default value of Group settings ULTRnn to include the RSTTRGT Relay Word bit (where $nn = 01\text{--}08$). ➢ Modified the front-panel rotating display settings to allow the use of insulation and stator ground meter screens. ➢ Added support for converting settings from Z001–Z005 to Z006 and later. 	20240605
6.0.0.x	<ul style="list-style-type: none"> ▶ [Cybersecurity Enhancement] Improved cipher strength for installer certificate generation. ▶ Added support for downgrading device firmware via FTP. ▶ Added support to allow for the conversion of projects between different setting versions and different supported settings models. ▶ Added Microsoft Windows 11 to the list of supported operating systems. ▶ Improved the application by displaying a message at startup if the ACCELERATOR Database version does not match the expected version. ▶ Improved folder import naming consistency. ▶ Improved SEL-487E Bay Control workspace screens to now sort by letter and number. ▶ Improved the application by modifying copy/paste functionality in the protection logic and automation logic workspaces. ▶ Updated Node.js to v21.7.3. ▶ Updated .NET runtime to version 8. ▶ [Breaking] Changed API: Removed SessionOwnershipKind enum. ▶ [Breaking] Changed API: Removed the SELogicSymbol interface and replaced it with a union symbol representing the types that used to implement SELogicSymbol. ▶ Addressed a tooltip display issue in the Settings Grid workspace. ▶ Addressed an issue that made certain text in the RDB importer difficult to read in the dark theme. ▶ Addressed an issue with the file version and copyright property being incorrect. ▶ Addressed an issue with the second instance of the Volts per Hertz element in SEL-400G projects. ▶ Addressed an issue in the find and replace behavior of the protection logic workspace. ▶ Addressed an issue that caused the RDB importer feature to freeze when importing settings. ▶ Addressed an issue in comparisons between projects that did not display differences correctly. ▶ Addressed an issue that could cause setting comparisons between devices with different settings versions not to display differences in the DNP Map 2–5 categories correctly. ▶ Addressed an issue that could cause the Quick Connect dialog to incorrectly appear when a user attempted to close the application. ▶ Addressed an issue that caused restored setting version changes not to save correctly if the PC was restarted prior to making other modifications. ▶ Addressed an issue with rows not being bolded when setting values differed in a settings comparison. ▶ Addressed an issue with disabled settings being modifiable in a settings comparison. <p>SEL-401 Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-401 Z109. ▶ Includes the same functions as the SEL-401 Z108 driver and maintains compatibility with internal firmware changes. 	20240515

Software Version Number	Summary of Revisions	Manual Date Code
	<p>SEL-411L-2 Grid Settings Driver</p> <ul style="list-style-type: none"> ► Added support for SEL-411L-2 Z104: <ul style="list-style-type: none"> ➢ Enhanced the loss-of-potential (LOP) logic by adding the LOPEXT SELOGIC control equation to initiate an LOP condition from an external device, such as a mini circuit breaker. ➢ Enhanced the loss-of-potential (LOP) logic by adding the LOPTC Group setting to supervise the LOP logic. ➢ Added the EHS (enable high-speed elements) setting to Group settings. ➢ Added the 87DDSUP (Disturbance Detector Supervision) SELOGIC control equation to Group settings. <p>SEL-421-7 Grid Settings Driver</p> <ul style="list-style-type: none"> ► Added support for SEL-421-7 Z109: <ul style="list-style-type: none"> ➢ Enhanced the loss-of-potential (LOP) logic by adding the LOPEXT SELOGIC control equation to initiate an LOP condition from an external device, such as a mini circuit breaker. ➢ Enhanced the loss-of-potential (LOP) logic by adding the LOPTC Group setting to supervise the LOP logic. ➢ Added the EHS (enable high-speed elements) setting to Group settings. <p>SEL-451-6 Grid Settings Driver</p> <ul style="list-style-type: none"> ► Added support for SEL-451-6 Z106: <ul style="list-style-type: none"> ➢ Added support for IEC 61850 SV publication. ➢ Enhanced the loss-of-potential (LOP) logic by adding the LOPEXT SELOGIC control equation to initiate an LOP condition from an external device, such as a mini circuit breaker. ➢ Enhanced the loss-of-potential (LOP) logic by adding the LOPTC Group setting to supervise the LOP logic. ➢ Added FLIA, FLIB, FLIC, FLIG, and FLIQ event summary analog quantities to DNP communications. 	
5.3.0.x	<p>SEL-851 Grid Settings Driver</p> <ul style="list-style-type: none"> ► Added support for SEL-851 Z002: <ul style="list-style-type: none"> ➢ Added Meter.Thres_Min to Protection settings. ➢ Extended the setting upper range for 27PP and 59PP elements from 300 V to 520 V when VTP.Conn = WYE. ➢ Updated setting name Port_02.LinkFail to Port_02.LinkForCov. ➢ Addressed an issue that could cause the connections workspace not to show available serial ports correctly. 	20240329
5.2.0.x	<ul style="list-style-type: none"> ► [Cybersecurity] Addressed a security vulnerability that could allow an authenticated attacker to execute arbitrary code when the computer starts. ► Addressed an issue where entering invalid data in the event reports workspace caused the application to close unexpectedly. <p>SEL-400G Grid Settings Driver</p> <ul style="list-style-type: none"> ► Added support for SEL-400G-0, -1 Z005: <ul style="list-style-type: none"> ➢ Modified the software to allow Overcurrent Element Levels 1–3 to be set independently instead of sequentially. ➢ Modified the default value of the settings ESERDEL, SRDLCNT, and SRDLTIM to Y, 10, and 0.5, respectively. ➢ Modified the default value of the setting ERDIG from S to A. ➢ Increased the upper range value of the thermal trip limit for the IEC 60255-149 thermal elements from 100% to 150%. ➢ Modified the default value of the setting CLn to include the CCn Relay Word bit (where $n = S, T, U, Y$). ➢ Added three SELOGIC settings, FTSSV[3] (where [3] is 1, 2, 3), to correctly calculate system frequency for dual breaker synchronizing systems. ➢ Modified the minimum range for the compensated and uncompensated sync-check angle settings, 25ANGn and 25ANGCn (where $n = S, T, U, Y$), from 3.0 deg to 0.1 deg. ➢ Addressed an issue in the SEL-400G Z001–Z004 versions where the 87STAP–87YTAP settings, if calculated automatically, were being indicated as in error when the corresponding TAPMAX/TAPMIN ratio was less than 35. 	20231229

Software Version Number	Summary of Revisions	Manual Date Code
5.1.0.x	<ul style="list-style-type: none"> ► [Cybersecurity] Addressed an issue where the application could be manipulated from another browser tab through the Grid Configurator API. ► [Cybersecurity Enhancement] Updated third-party software components to ensure continuity of support. ► Changed the firmware upgrade report to display time stamps in 24-hour format. ► Changed the application to display a warning when attempting to use an HMI screen while connected to a device that does not match the project type. ► Addressed an issue that caused the terminal command edit box to lose focus. ► Addressed an issue in SEL-851 projects where MWh.Rec incorrectly occupied a single register in Modbus Map settings. ► Addressed an issue with not recognizing some vendor serial cables. <p>SEL-401 Grid Settings Driver</p> <ul style="list-style-type: none"> ► Added support for SEL-401 Z108: <ul style="list-style-type: none"> ➢ Modified the default value of the settings ESERDEL, SRDLCNT, and SRDLTIM to Y, 10, and 0.5, respectively. ➢ Modified the default value of the setting ERDIG from S to A. <p>SEL-411L-2 Grid Settings Driver</p> <ul style="list-style-type: none"> ► Added support for SEL-411L-2 Z103: <ul style="list-style-type: none"> ➢ Modified the default value of the settings ESERDEL, SRDLCNT, and SRDLTIM to Y, 10, and 0.5, respectively. ➢ Modified the default value of the setting ERDIG from S to A. ➢ Added support for the TiDL communications board with SFP ports, which replaces the TiDL communications board with fixed ports. ➢ Increased the upper range value of the thermal trip limit for the IEC 60255-149 thermal elements from 100% to 150%. ➢ Addressed an issue where the Synchrophasor Alias settings were in error when identical values were entered in separate Synchrophasor Data Configurations. <p>SEL-421-7 Grid Settings Driver</p> <ul style="list-style-type: none"> ► Added support for SEL-421-7 Z108: <ul style="list-style-type: none"> ➢ Modified the default value of the settings ESERDEL, SRDLCNT, and SRDLTIM to Y, 10, and 0.5, respectively. ➢ Modified the default value of the setting ERDIG from S to A. ➢ Added support for the TiDL communications board with SFP ports, which replaces the TiDL communications board with fixed ports. ➢ Increased the upper range value of the thermal trip limit for the IEC 60255-149 thermal elements from 100% to 150%. <p>SEL-451-6 Grid Settings Driver</p> <ul style="list-style-type: none"> ► Added support for SEL-451-6 Z105: <ul style="list-style-type: none"> ➢ Modified the default value of the settings ESERDEL, SRDLCNT, and SRDLTIM to Y, 10, and 0.5, respectively. ➢ Modified the default value of the setting ERDIG from S to A. ➢ Added support for the TiDL communications board with SFP ports, which replaces the TiDL communications board with fixed ports. ➢ Increased the upper range value of the thermal trip limit for the IEC 60255-149 thermal elements from 100% to 150%. <p>SEL-487B-2 Grid Settings Driver</p> <ul style="list-style-type: none"> ► Added support for SEL-487B-2 Z104: <ul style="list-style-type: none"> ➢ Addressed an issue in the SEL-487B-2 Z101–Z103 versions where Check Zones elements CZ1–CZ3 were not available to be used as a value in Alias settings. ➢ Modified the default value of the settings ESERDEL, SRDLCNT, and SRDLTIM to Y, 10, and 0.5, respectively. ➢ Modified the default value of the setting ERDIG from S to A. ➢ Added support for the TiDL communications board with SFP ports, which replaces the TiDL communications board with fixed ports. 	20231114

Software Version Number	Summary of Revisions	Manual Date Code
	<p>SEL-487E-5 Grid Settings Driver</p> <ul style="list-style-type: none"> ➤ Added support for SEL-487E-5 Z205: <ul style="list-style-type: none"> ➤ Added the capability to configure Terminal Y as a single- or three-phase current input. This enhancement is available on model options with matching Terminal Y (IY1, IY2, and IY3) nominal current ratings. ➤ Added support for a sixth circuit breaker, Breaker Y. ➤ Added a second differential element. This feature is included as a relay ordering option. ➤ Enhanced the capability of the differential element by supporting as many as six three-phase current terminals. ➤ Added three-pole autoreclose functionality. This feature is included as a relay ordering option. ➤ Added Y to the range of Group setting ELOP. This allows forward-looking directional overcurrent elements to effectively become nondirectional during an LOP condition. ➤ Added the Group SELOGIC setting EXBFSPm (where $m = S, T, U, W, X, Y$) for additional breaker failure supervision. ➤ Increased the number of available inverse-time overcurrent elements to 20. ➤ Added the advanced Group setting 32GVSm (where $m = S, T, U, W, X, Y, 1, 2, 3, 4, L1$) to allow users to configure the voltage supervision threshold used in zero-sequence directional elements. ➤ Modified the default value of the settings TRm and CLm to include the OCm and CCm Relay Word bits, respectively (where $m = S, T, U, W, X$). ➤ Modified the software to allow overcurrent element Levels 1–3 to be set independently. Previously, these had to be configured sequentially. ➤ Modified the default value of the settings ESERDEL, SRDLCNT, and SRDLTIM to Y, 10, and 0.5, respectively. ➤ Modified the default value of the setting ERDIG from S to A. ➤ Added support for the TiDL communications board with SFP ports, which replaces the TiDL communications board with fixed ports. ➤ Replaced the Group settings PTCOMPV and PTCOMPZ with CTCOMPm (where $m = S, T, U, W, X, Y$) to allow an independent CT connection type on each current terminal. ➤ Modified the default value of the settings O87P and SLP1 to 0.3 and 0.15, respectively. ➤ Increased the number of available local bits to 96. ➤ Increased the number of available Automation SELOGIC conditioning timers to 48. ➤ Increased the number of available Automation SELOGIC latch bits to 64. ➤ Increased the upper range value of the thermal trip limit for the IEC 60255-149 thermal elements from 100% to 150%. ➤ Addressed an issue where RA001–RA256 were not removed from the range of AMB_M, T1_OILM, T2_OILM, and T3_OILM when IEC 61850 was disabled by the part number. ➤ Addressed an issue where the software would not hide the 87CORE setting when waveshape blocking was not used. ➤ Modified the software to remove zero-sequence analog quantities from setting ranges for applications that use delta-connected CTs or PTs. 	

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5.0.0.x	<ul style="list-style-type: none"> ▶ [Breaking] Changed query return type of the GetOperation endpoint for quick connect devices in the API. ▶ Added support for updating device firmware via FTP for devices supported by Grid Configurator. ▶ Added support for settings version management. ▶ Improved workflow for identifying and selecting required prerequisite settings prior to enabling protection elements. ▶ Improved new device workflows with double-click support of selections. ▶ Improved the User uninstallation workflow by adding the application to the programs and features menu in windows. ▶ Improved online HMI user interface to display a banner if no device connection is in place. ▶ Improved the connections workspace by displaying a warning if the user attempts to connect before saving their changes. ▶ Improved the connections workspace usability by changing the location of the save button to be more visible. ▶ Added API support for new endpoints for firmware updates and settings versioning. ▶ Addressed an issue where an empty tab might remain visible after closing multiple tabs quickly. ▶ Addressed an issue where importing GRX files that already existed in the system explorer failed. ▶ Addressed an issue where incomplete terminal responses could be returned to the software. 	20230925
4.5.0.x	<ul style="list-style-type: none"> ▶ [Cybersecurity] Addressed an issue where Grid could be accessed from another tab in a third-party browser through the Grid API. ▶ [Cybersecurity] Addressed an issue where a user could access the communications database to execute code with elevated permissions. <p>SEL-400G Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Addressed an issue in the SEL-400G Z001–003 versions where the software could incorrectly hide the E87UNB1 and E87UNB2 settings. ▶ Addressed an issue in the SEL-400G Z001–004 versions where the software could incorrectly hide the 87CORE1 and 87CORE2 settings. 	20230615
4.4.2.x	<p>SEL-400G Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-400G-0, -1 Z004: <ul style="list-style-type: none"> ▶ Added support for the five-port Ethernet card. This card provides Parallel Redundancy Protocol (PRP) for both the process bus and the station bus and a dedicated Ethernet port for engineering access. ▶ Modified rules to allow bipolar unblocking logic to be set independently of the negative-sequence percentage-restrained differential element or waveshape-based inrush detection logic. ▶ Addressed an issue in the SEL-400G SVN 002–003 versions, where DNP settings BO_101–BO_160 would not display an ellipsis button. This button is used to launch DNP map editor to configure DNP settings. <p>SEL-401 Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-401 Z107: <ul style="list-style-type: none"> ▶ Added support for the five-port Ethernet card. This card provides Parallel Redundancy Protocol (PRP) for both the process bus and the station bus and a dedicated Ethernet port for engineering access. ▶ Modified rules so that group settings Z2F, Z2R, and a2 can be set independent of group setting ORDER. ▶ Added support for 1000 lines of Automation SELOGIC. <p>SEL-411L-2 Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-411L-2 Z102: <ul style="list-style-type: none"> ▶ Added support for the five-port Ethernet card. This card provides Parallel Redundancy Protocol (PRP) for both the process bus and the station bus and a dedicated Ethernet port for engineering access. 	20230428

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	<p>SEL-421-7 Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-421-7 Z107: <ul style="list-style-type: none"> ➢ Added support for the five-port Ethernet card. This card provides Parallel Redundancy Protocol (PRP) for both the process bus and the station bus and a dedicated Ethernet port for engineering access. ➢ Modified rules so that group settings Z2F, Z2R, and a2 can be set independent of group setting ORDER. <p>SEL-451-6 Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-451-6 Z104: <ul style="list-style-type: none"> ➢ Added support for the five-port Ethernet card. This card provides Parallel Redundancy Protocol (PRP) for both the process bus and the station bus and a dedicated Ethernet port for engineering access. ➢ Modified rules so that group settings Z2F, Z2R, and a2 can be set independent of group setting ORDER. <p>SEL-487B-2 Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-411L-2 Z102: <ul style="list-style-type: none"> ➢ Added support for the five-port Ethernet card. This card provides Parallel Redundancy Protocol (PRP) for both the process bus and the station bus and a dedicated Ethernet port for engineering access. ➢ Updated to allow only 30 elements in Automation SELOGIC equations. <p>SEL-478E-5 Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-487E-5 Z204: <ul style="list-style-type: none"> ➢ Added support for the five-port Ethernet card. This card provides Parallel Redundancy Protocol (PRP) for both the process bus and the station bus and a dedicated Ethernet port for engineering access. 	
4.4.1.x	<ul style="list-style-type: none"> ▶ [Cybersecurity] Improved the security of communication to the SEL Configuration API. Addressed an elevation of privilege vulnerability that could occur in environments where Grid Configurator was installed on the same machine as a shared multiuser ACCELERATOR Database. Grid Configurator now creates an account with machine-specific credentials. 	20230328
4.4.0.x	<ul style="list-style-type: none"> ▶ Added support for copying settings between groups of the same type within a device. ▶ Added the ability for restored Quick Connect devices to use the last selected choice between reading settings or loading defaults. ▶ Added support in Device Overview for quick navigation of target LEDs and pushbuttons to their respective settings. ▶ Added support for direct device project creation from an imported .zip file containing settings files. ▶ Improved support for non-English date formats within the Reports view. ▶ SELOGIC single line editor now disables when multiple lines are selected in the freeform editor space. ▶ Addressed an issue in which no user feedback was provided when pasting 400G-0 part numbers in the Edit Nameplate dialog of a 400G-1 device project or vice versa. ▶ Addressed an issue preventing SELOGIC autocomplete for Automation Logic values. ▶ Addressed an issue that prevented users from editing the nameplate on Quick Connect devices. ▶ Enhanced exporting dialog to show that the Password field is optional. 	20230315

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4.3.0.x	<ul style="list-style-type: none"> ▶ [Cybersecurity Enhancement] Updated to support PostgreSQL version 14.5. ▶ [Cybersecurity Enhancement] Updated <i>Appendix C</i> as follows: <ul style="list-style-type: none"> ➢ Updated Ports and Services table. ➢ Clarified Access Control information. ➢ Updated active User Account table. ➢ Made minor text clarifications. ▶ Added visual and usability enhancements to the Import from .rdb tool. ▶ Addressed an intermittent behavior that prevented changes in the Free Form Logic Editors from being saved when the user navigated away from the editor immediately after making a change. ▶ Added support for importing and exporting a .zip folder of SET.TXT files. ▶ Added Find/Replace functionality to the Protection and Automation SELOGIC Editors. This function is available via a keyboard shortcut (<Ctrl+F>) and the magnifying glass icon. ▶ The Filters button in the Settings Grid now displays as blue when one or more filters are applied. ▶ Quick Connect is now available via the + tab, the Application menu, and the Connections Panel. 	20221122
4.2.2.x	<p>SEL-411L-2 Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-411L-2 Z101: <ul style="list-style-type: none"> ➢ Added support for PTP Power Utility Automation profile (IEC/IEEE 61850-9-3). ➢ Added support for Synchrophasor Measurement: IEC/IEEE 60255-118-1:2018 (IEEE Std C37.118.1-2011, 2014a). ➢ Added support for Broken Conductor Detection. ➢ Added rules to notify user of duplicate values in DNP settings. ➢ Added Relay Word bits supporting addition of IEC 61850 CILO Logical Node. ➢ Added support for 7U chassis with four I/O boards. ➢ Added support for one additional I/O board variant (INT8). ➢ Added Relay Word bits SPT_A, SPT_B, and SPT_C to Trip logic elements. ➢ Added Relay Word bits 87FDFID and FTMPH to Miscellaneous FID logic elements. ▶ Updated support for SEL-411L-2 Z100 and later: <ul style="list-style-type: none"> ➢ Addressed an issue where the autocalculation values were not correct for the k0A1, k0A, and k0AR settings when k0M1 was set to AUTO. 	20220928
4.2.1.x	<ul style="list-style-type: none"> ▶ Updated the instruction manual built into Grid Configurator to include release notes in <i>Appendix A</i> for version 4.1.1.x. The instruction manual in Grid Configurator version 4.2.0.x omitted release notes for version 4.1.1.x. 	20220826
4.2.0.x	<ul style="list-style-type: none"> ▶ Addressed an issue in the workspace. Collapsed state was not saved when closing tabs. ▶ Addressed an issue that made settings imports of text files only accept files with the extension .txt and not .TXT. ▶ Updated pop-up messages for improved visibility. ▶ Grid's client executable now supports a -path command line argument allowing the executable to be launched directly to a specific device or workspace. ▶ A new + button and containing menu has been added to the application bar. ▶ Added a default selection within the MIMIC selection dialog. ▶ Added support for a GraphQL API explorer called GraphiQL, which is hosted on the GraphQL API. 	20220824
4.1.1.x	<ul style="list-style-type: none"> ▶ [Cybersecurity] Improved security of stored data by encryption using a unique key generated when the database is installed. 	20220628

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4.1.0.x	<ul style="list-style-type: none"> ▶ Addressed an issue that prevented connecting or disconnecting from unsupported devices via the right-click menu in the System Explorer. ▶ Improved the Display Point helper dialog to include the Save and Cancel buttons. ▶ Modified the filtering behavior in the Device Comparison view to match other views. ▶ Improved the connections workspace by adding the ability to save and cancel changes. ▶ Modified the software to only support comparisons via the System Explorer menus. ▶ API: Improved the ImportAssetsOperation to include a field that links to the assets that were imported by the operation. ▶ Improved the settings Send and Read dialogs to have a default selection for settings files that include changes. ▶ Improved the settings Send and Read dialogs to list the settings class names that correspond to each settings file. ▶ Modified the software so that the "Welcome" tab to be the default software view. 	20220624
4.0.1.x	<p>SEL-400G Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-400G-0, -1 Z003: <ul style="list-style-type: none"> ➢ Added Relay Word bits to support the addition of IEC 61850 CILO logical node. ➢ Added support for IEC 61850-9-3. <p>SEL-401 Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ SEL-401 Z105 and later: <ul style="list-style-type: none"> ➢ Addressed an issue for PMUMODE where an error would not appear across Port settings and when setting multiple PMU modes. ➢ Addressed an issue for PROTO and SPEED where invalid options were still allowed and would not display in error if used. ▶ Added support for SEL-401 Z106: <ul style="list-style-type: none"> ➢ Added support for IEC 61850-9-3. ➢ Added settings EACC, E2AC, and EPAC to support port access control through the use of SELOGIC control equations. ➢ Added Relay Word bits to support the addition of IEC 61850 CILO logical node. ➢ Added Relay Word bits EACC and E2AC to support port access control SELOGIC control equations. ➢ Added rules to notify user of duplicate values in DNP settings. ➢ Added breaker monitor analog quantities matching firmware: accumulated trip current, last interrupted current, operating times, and number of operations. <p>SEL-411L-2 Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Addressed an issue in the SEL-411L-2 driver that caused the OPHDO setting to be set to an incorrect value when reading from a device with a different nominal current if the EGADVS setting was set to N. <p>SEL-421-7 Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-421-7 Z106: <ul style="list-style-type: none"> ➢ Added support for IEC 61850-9-3. ➢ Added settings EACC, E2AC, and EPAC to support port access control through the use of SELogic control equations. ➢ Added Relay Word bits to support the addition of IEC 61850 CILO logical node. ➢ Added Relay Word bits EACC and E2AC to support port access control SELOGIC control equations. ➢ Added rules to notify user of duplicate values in DNP settings. ➢ Addressed an issue where the autocalculation values were not correct for the k0A1, k0A, and k0AR settings when k0M1 was set to AUTO. ➢ Added breaker monitor analog quantities matching firmware: accumulated trip current, last interrupted current, operating times, and number of operations. ➢ Addressed an issue in the previous version of the SEL-421-7 driver (SVN 105) that caused the OPHDO setting to be set to an incorrect value when reading from a device with a different nominal current if the EGADVS setting was set to N. 	20220523

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	<p>SEL-451-6 Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-451-6 Z103: <ul style="list-style-type: none"> ➢ Added support for IEC 61850-9-3. ➢ Added Relay Word bits to support the addition of IEC 61850 CILO logical node. ➢ Updated to accept only valid Relay Word bits in SER Points and Aliases. ➢ Added rules to notify user of duplicate values in DNP settings. ➢ Addressed an issue in the previous version of the SEL-451-6 driver (SVN 202) that caused the OPHDO setting to be set to an incorrect value when reading from a device with a different nominal current if the EGADVS setting was set to N. <p>SEL-487B-2 Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-487B-2 Z102: <ul style="list-style-type: none"> ➢ Added support for IEC 61850-9-3. ➢ Added rules to notify user of duplicate values in DNP settings. ➢ Added settings EACC, E2AC, and EPAC to support port access control through the use of SELOGIC control equations. ➢ Added Relay Word bits EACC and E2AC to support port access control SELOGIC control equations. ➢ Addressed an issue in the previous version of the SEL-487B-2 driver (SVN 101) that caused the OPHDO setting to be set to an incorrect value when reading from a device with a different nominal current if the EGADVS setting was set to N. <p>SEL-487E-5 Grid Settings Driver</p> <ul style="list-style-type: none"> ▶ Added support for SEL-487E-5 Z203: <ul style="list-style-type: none"> ➢ Added support for IEC 61850-9-3. ➢ Added rules to notify user of duplicate values in DNP settings. ➢ Added voltage THD analog quantities. ➢ Added rules to LINEIL1 to check that the CTRn values are the same before allowing selection of combination terminals (where n = S, T, U, W, X). 	
4.0.0.x	<ul style="list-style-type: none"> ▶ [Cybersecurity] Modified the application by adding a service that occupies Ports 5039 or 5049, depending on the installation type. For more information, see <i>Appendix C: Cybersecurity Features</i>. ▶ Enhanced the software by updating the user interface to a more modern look and feel consistent with other SEL software. ▶ Modified the software to improve performance when editing settings. ▶ Addressed an issue where the software would not show errors for certain settings validation rules in the SEL-401 version 105. This affected the Port 2 and Port 3 settings classes. ▶ Addressed an issue that caused user install upgrades to fail from version 3.0.0.37 or earlier to 3.1.0.18. ▶ Added the ability to perform operations like read and send by right-clicking on the system explorer. ▶ Improved the Settings grid workspace to better support multiselect, copy, and paste. Additionally, the columns were reordered to increase readability. ▶ Added the ability to copy and paste data to and from the settings grid. ▶ Enhanced the software by reordering the settings grid, send report, and import settings dialogs to have columns in the order: Name, Value, Range (if applicable), Description (if applicable), and Group. ▶ Added the ability to cancel settings edits to the helper forms. ▶ Updated the protection elements workspace to improve the editing experience. ▶ Enhanced the software by adding the ability to navigate to the Protection Elements workspace when clicking on an element from the Device Overview workspace. ▶ Modified the display point settings helper form to show alias values for relay word bits that have aliases. In all previous versions of the software only the Relay Word bit name was shown. ▶ Addressed an issue where protection elements names were visually cut off. ▶ Modified the software to correctly determine the size of the monitor with automatic adjustment for operating system zoom on startup. In all previous versions of the software the monitor size was determined without adjusting for zoom. This could cause the window to not display the full content. ▶ Addressed an issue that caused SELOGIC setting editors to incorrectly highlight errors with incomplete statements. 	20220323

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	<ul style="list-style-type: none"> ➤ Addressed an issue in the software where typing long logic into the protection and automation logic workspaces, the view would not scroll to keep the cursor visible. In all previous versions of the software, the horizontal scroll of this view would remain as the line length grew. This caused the user to have to manually scroll to see where they were typing. ➤ Addressed an issue that caused SELLOGIC comments to incorrectly be underlined as an error. ➤ Addressed an issue where the software did not return an error when the user attempted to set the password value as blank. ➤ Addressed an issue that caused TMUs to not display port associations if connected relays were not opened after upgrade. ➤ Addressed an issue that could cause upgrades of the software to fail when upgrading to version 2.0.0.32 or 3.0.0.37. ➤ Addressed an issue that caused the application to fail to import settings due to communication issues between services. In previous versions of the application, uninstall failures could leave the application in a state where it could not communicate with the backing services and would fail to perform certain operations such as import. ➤ Addressed an issue that caused the System View to display device paths with incorrect capitalization. ➤ Addressed an issue that caused exports of comparison reports to fail. ➤ Addressed an issue that caused device project tabs to need to reload if certain setting values were entered. ➤ Addressed an issue that could cause the MDELEn settings in the Bay control group to incorrectly display errors for setting values with extra whitespace characters. ➤ Addressed an issue where the software did not notify the users of a backwards compatibility issue when importing .grx files. In version 3.1.0.18, if the user exported a .grx file and imported into a previous version of the application (3.0.0.37 or earlier), then the settings from the device projects would not be imported correctly. In version 4.0.0.x and above, a warning will be presented on export. Additionally in version 4.0.0.x and above, incompatible imports will fail. ➤ Added support for connecting to SEL devices that do not have a driver in SEL Grid Configurator and using the terminal. ➤ Improved editing of settings that use a drop-down editor. The drop-down now is integrated into the grid instead of launching a separate dialog. ➤ Modified the software to display a message when a project refresh from the RDB Importer Tool is in progress. ➤ Improved the application by allowing for horizontal resizing of the Automation and Protection Logic workspaces via clicking and dragging the vertical divider. ➤ Updated the settings grid to allow filtering based on column. ➤ Modified the software so that the settings grid filters which are available from the Filters button are inclusive instead of exclusive. In all previous versions of the software, these filters were exclusive, such as "Exclude Changed." The filters are now inclusive, such as "Changed" which displays changed settings. ➤ Added right-click menu to tabs which allows for closing one or all tabs. 	

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3.1.0.x	<p>SEL-487E Grid Settings Driver</p> <ul style="list-style-type: none"> ► Added support for SEL-487E-5 Z202: <ul style="list-style-type: none"> ➢ Added Group settings to support the new distance elements: ➢ Mho and Quadrilateral Distance Elements ➢ Phase and Ground Distance Fault Detectors ➢ Zero-Sequence Compensation Factor ➢ Zone Level Direction ➢ Distance Element Common Time Delay ➢ Directional Control Settings ➢ Out-of-Step Blocking ➢ Pole Open Detection ➢ Load Encroachment ➢ Switch-On-to-Fault ➢ Harmonic Blocking Logic ➢ Added Group setting ELOP to support control of loss-of-potential (LOP) supervision. ➢ Updated the default value for DIRBLKm setting to 87XBK2 OR 87XBK5 (where $m = S, T, U, W, X, 1, 2, 3, 4$). ➢ DIRBLK$m$ has been moved to the Winding category. ➢ Updated the default value for 50FPm, 50RPm, Z2Fm, Z2R, Z0Fm, and Z0Rm (where $m = S, T, U, W, X, 1, 2, 3, 4$). ➢ Updated the resolution of Group settings VNOMV and VNOMZ to two significant digits. ➢ Updated rules to ensure user-defined V/Hz settings are entered in increasing order. ➢ Added breaker monitor analog quantities matching firmware: accumulated trip current, last interrupted current, operating times, and number of operations. ➢ Modified the range of Group settings REFRF1, REFRF2, and REFRF3 to only include terminals with wye-connected current transformer connection matching the firmware update. ➢ Added differential compensation Matrix 13 support. Matrix 13 allows for user specified compensation angles with the option to include or remove zero-sequence current. ➢ Added support to include or remove zero-sequence current that use Group settings TmZSR (where $m = S, T, U, W, X$) for differential compensation Matrices 2, 4, 6, 8, and 10. ➢ Increased the allowable TAP mismatch for relays that use both 1 A and 5 A nominal CTs. ➢ Added support on the Part Number page for selection of distance elements in the MOT. ➢ Added Port access setting EPAC and Global access settings EACC and E2AC. ► Created protection element executive functions to support added distance elements. 	20220127
3.0.0.x	<ul style="list-style-type: none"> ► Added support for the SEL-851. ► Addressed an issue in previous software that caused serial port connection parameters to be set to default values when a project was copied and pasted. ► Modified the software to provide a more user-friendly error message when attempting to connect to a device while using an invalid password. ► Modified the software to allow for changing passwords on quick-connect devices. ► Addressed an issue that caused rows in the Compare feature to be displayed in the same color as the background. ► Modified the software to sort event records newest to oldest by default. ► Addressed an issue that caused the Compare feature to incorrectly display and operate on rows when filters such as "Hide Identical Values" were applied. ► Improved startup behavior on computers with slower processors. ► Addressed an issue in the software that caused the selected row in the Compare feature to show the wrong selection. 	20210830

Software Version Number	Summary of Revisions	Manual Date Code
2.0.0.x	<ul style="list-style-type: none"> ► Added support for the SEL-411L-2. ► Addressed an issue in previous software that caused serial ports to be set to default in pasted device projects. ► Modified the reports view to address a visual issue in dark theme. ► Modified protection element titles to better describe functionality. ► Updated distance protection elements to accurately describe settings operation. ► Modified the software so that the Directional Control protection element is accurately named. ► Reorganized workspaces to promote consistency across products. ► Added support for FTP file transfer. ► Modified the software to configure CTNOM on Sample Value and Time Domain Link supported devices. ► Modified the distance protection elements to better display shared settings. ► Added the SEL Settings Database Importer, which is a utility for importing settings from one or more Settings Databases (RDB files) into SEL Grid Configurator. <p>SEL-451 Grid Settings Driver</p> <ul style="list-style-type: none"> ► Updated support for SEL-451-6 Z102: <ul style="list-style-type: none"> ➢ Add support for Arc Sense technology (AST). ➢ Added settings EACC, E2AC, and EPAC to support port access control by using SELOGIC control equations. ➢ Modified rules so that group settings Z2F, Z2R, and a2 can be set independent of group setting ORDER. 	20210716
1.3.1.x	<ul style="list-style-type: none"> ► Added support for the SEL-401 and SEL-421-7. <p>SEL-400G Grid Settings Driver</p> <ul style="list-style-type: none"> ► Added support for SEL-400G-0, -1 Z002: <ul style="list-style-type: none"> ➢ Added settings EACC, E2AC, and EPAC to support port access control by using SELOGIC control equations. ➢ Added breaker monitor analog quantities for accumulated trip current, last interrupted current, operating times, and number of operations. ➢ Added conditioning timers to Automation SELOGIC. ➢ Increased the allowable TAP mismatch for relays that use both 1 A and 5 A nominal CTs. ➢ Added rules to force the V/Hz settings to be entered in increasing order. ➢ Increased the number of available local and remote bits to 64. ➢ Increased the number of DNP binary output points to 160. ➢ Increased the number of available display points to 192. ➢ Added SELOGIC variable SC850SM to enter the relay into IEC 61850 simulation mode. ► Addressed an issue in SEL-400G-0, -1 Z001 where the Local Bit Supervision and Local Bit Display Status was not forced to the default value when the associated Local Bit was not assigned. 	20210514
1.3.0.x	<ul style="list-style-type: none"> ► Added support for the SEL-487B-2. 	20210331
1.2.1.x	<ul style="list-style-type: none"> ► Modified the software to allow for configuring secondary input current for digital secondary systems (TiDL and Sampled Values) at device creation. Additionally, modifications to these options after device creation allow for resetting related settings to default. ► Updated the application to allow for configuring SEL-487E-5 settings version 201. ► Modified the software to display an error if duplicate mappings of the same TMU current input are configured. Version 1.1.0.20 of the software allowed duplicate mappings of current type channels. 	20210212

Software Version Number	Summary of Revisions	Manual Date Code
1.1.0.x	<ul style="list-style-type: none"> ► Added support for configuring and commissioning Time-Domain Link (TiDL) configurations in supported devices. ► Updated the software to include workspaces for editing freeform logic settings in supported devices. ► Added support for importing settings text files obtained from ACCELERATOR QuickSet. ► Enhanced the terminal to support sending files, copying and pasting large amounts of data, sending cancel commands (Ctrl+X), and using the arrow keys to reuse previous commands. ► Enhanced the reports workspace by allowing for the exporting of SOE data and triggering of new events. ► Enhanced the software to allow selection of which files to read from the device when reading the configuration. ► Modified the software to name event files collected from the relay similarly to the COMTRADE 2013 naming standard. ► Modified the software so that open connections of any type are closed when the final window of the application is closed. ► Addressed an issue where deleting a folder would leave device project tabs contained inside that folder open. ► Addressed an issue that in all previous versions of the software caused helper dialogs for list type settings to display the range incorrectly. ► Addressed an issue where the installer would continue if the installed ACCELERATOR Database version was incompatible. ► Modified the software to remove the comments column from the outputs table on the Device Overview workspace. 	20201211
1.0.1.x	<ul style="list-style-type: none"> ► Upgraded SEL Configuration API to version 1.2.2069 for compatibility. ► Upgraded SEL ACCELERATOR Database to version 2.1.0.1 for compatibility. ► Added upgrade support for user account installations. 	20200922
1.0.0.x	<ul style="list-style-type: none"> ► Initial version. 	20200612

Instruction Manual

The date code at the bottom of each page of this manual reflects the creation or revision date.

Table A.2 lists the instruction manual versions and revision descriptions. The most recent instruction manual version is listed first.

Table A.2 Instruction Manual Revision History

Date Code	Summary of Revisions
20250228	<p>Section 6</p> <ul style="list-style-type: none"> ► Updated <i>Live Updates</i>. <p>Appendix A</p> <ul style="list-style-type: none"> ► Updated for version 6.5.0.x.
20250108	<p>Section 1</p> <ul style="list-style-type: none"> ► Updated <i>Figure 1.1: Select Typical to Accept All Default Installation Options or Select Custom to View or Modify Them, Figure 1.2: Select the Install Location for SEL Grid Configurator, Figure 1.3: Select the Install Location for the ACCELERATOR Database, Figure 1.4: SEL Grid Configurator Installation Completed Successfully, and Figure 1.5: Option to Remove Database Data on Uninstallation (User Install Only)</i>. <p>Section 2</p> <ul style="list-style-type: none"> ► Updated <i>Figure 2.2: Add New Device Project Tab</i>. <p>Section 3</p> <ul style="list-style-type: none"> ► Updated <i>User Interface Sections</i>. ► Updated <i>Figure 3.2: Switching Between Themes and Figure 3.3: Dark Theme</i>.

Date Code	Summary of Revisions
	<p>Section 6</p> <ul style="list-style-type: none"> ► Updated <i>Using the Filter and Search Bar in Settings Grid View.</i> ► Updated <i>Figure 6.51: Filter Options in Settings Grid View.</i> ► Updated <i>HMI Dashboards in Online HMI Perspective.</i> <p>Appendix A</p> <ul style="list-style-type: none"> ► Updated for version 6.4.1.x.
20241220	<p>Appendix A</p> <ul style="list-style-type: none"> ► [Cybersecurity] Updated Summary of Revisions for version 6.4.0.x by changing [Cybersecurity Enhancement] to [Cybersecurity].
20241210	<p>Section 1</p> <ul style="list-style-type: none"> ► Updated <i>Overview.</i> <p>Section 3</p> <ul style="list-style-type: none"> ► Updated <i>Light and Dark Theme.</i> <p>Section 5</p> <ul style="list-style-type: none"> ► Updated <i>Layout and Usage of the Comparison View.</i> ► Added <i>Compare Settings Groups.</i> <p>Section 6</p> <ul style="list-style-type: none"> ► Updated <i>Figure 6.105: Example Online HMI Dashboard.</i> ► Added <i>HMI Dashboards.</i> ► Removed <i>Time Stamp.</i> ► Updated <i>Control Options.</i> ► Updated <i>Figure 6.120: Version History.</i> <p>Appendix A</p> <ul style="list-style-type: none"> ► [Cybersecurity Enhancement] Updated for version 6.4.0.x. <p>Appendix B</p> <ul style="list-style-type: none"> ► Updated Device Model column for SEL-411L. ► Added HMI Available column.
20241106	<p>Appendix A</p> <ul style="list-style-type: none"> ► [Cybersecurity Enhancement] Updated for version 6.3.0.x. <p>Appendix B</p> <ul style="list-style-type: none"> ► Updated Z-Number column for SEL-487E-5.
20240904	<p>Appendix A</p> <ul style="list-style-type: none"> ► Updated for version 6.2.2.x.
20240807	<p>Appendix A</p> <ul style="list-style-type: none"> ► Updated for version 6.2.1.x.
20240703	<p>Appendix A</p> <ul style="list-style-type: none"> ► Updated for version 6.2.0.x. <p>Appendix B</p> <ul style="list-style-type: none"> ► Updated Z-Number column for SEL-451.
20240605	<p>Appendix A</p> <ul style="list-style-type: none"> ► Updated for version 6.1.0.x. <p>Appendix B</p> <ul style="list-style-type: none"> ► Updated Z-Number column for SEL-400G.
20240515	<p>Section 1</p> <ul style="list-style-type: none"> ► Updated <i>Table 1.1: Minimum Requirements.</i> ► Added links to instructional videos for Grid Configurator. <p>Section 2</p> <ul style="list-style-type: none"> ► Added links to instructional videos for Grid Configurator.

Date Code	Summary of Revisions
	<p>Section 4 ► Added links to instructional videos for Grid Configurator.</p> <p>Section 5 ► Updated section to include information on device conversions. ► Added links to instructional videos for Grid Configurator.</p> <p>Section 6 ► Updated <i>Firmware Update in Grid Configurator</i>. ► Added links to instructional videos for Grid Configurator.</p> <p>Appendix A ► [Cybersecurity Enhancement] Updated for version 6.0.0.x. ► Corrected name of Meter.Thres_Min setting in version 5.3.0.x.</p> <p>Appendix B ► Updated Z-Number column for SEL-401, SEL-411L-2, SEL-421-7, and SEL-451-6.</p>
20240329	<p>Appendix A ► Updated for version 5.3.0.x.</p> <p>Appendix B ► Updated Z-Number column for SEL-851.</p>
20231229	<p>Appendix A ► [Cybersecurity] Updated for version 5.2.0.x.</p>
20231114	<p>Section 1 ► Updated <i>Table 1.1: Minimum Requirements</i>.</p> <p>Section 2 ► Updated <i>Figure 2.8: Connections View</i>. ► Updated <i>Figure 2.9: Configuring Communications Options</i>.</p> <p>Section 6 ► Updated <i>Figure 6.16: Connections View</i>. ► Updated <i>Figure 6.17: Serial Connection Parameters</i>.</p> <p>Appendix A ► [Cybersecurity] Updated for version 5.1.0.x.</p> <p>Appendix B ► Updated Z-Number column for SEL-401, SEL-411L-2, SEL-421-7, SEL-451-6, SEL-487B-2, and SEL-487E-5.</p> <p>Appendix D ► Updated <i>Figure D.2: Grid Configurator's Sandbox</i> and following paragraphs.</p>
20230925	<p>Section 1 ► Updated <i>Table 1.1: Minimum Requirements</i>.</p> <p>Section 4 ► Updated <i>Importing Device Projects From QuickSet and Grid Configurator</i> in <i>Working With Folders</i>.</p> <p>Section 6 ► Updated <i>Creating a New Device Project, Saving Changes in Connections View and Working With the Protection Elements Navigator</i> in <i>Configuration Perspective</i>, and <i>Overview</i> in <i>Online HMI Perspective</i>. ► Updated <i>Figure 6.18: Save and Cancel Buttons in Connections View</i>. ► Added <i>Figure 6.26: Notification of Pertinent Settings and Other Product Information</i>, and <i>Figure 6.27: Edit Setting(s) Dialog</i>. ► Added <i>Firmware Upgrade in Grid Configurator</i> in <i>Communications</i>. ► Added <i>Events Reports, Firmware History, and Settings Versions</i> in <i>Resources Perspective</i>.</p> <p>Appendix A ► Updated for version 5.0.0.x.</p>

Date Code	Summary of Revisions
	<p>Appendix C</p> <ul style="list-style-type: none"> ► Updated <i>Table C.2: Grid Configurator Ports and Services</i>. ► Updated <i>Alerts and Logging</i>. <p>Appendix D</p> <ul style="list-style-type: none"> ► Updated <i>Launching the Grid Configurator Sandbox (No Internet Access Required)</i> in <i>Availability</i>.
20230615	<p>Section 6</p> <ul style="list-style-type: none"> ► Added <i>Connecting to Multiple Devices</i>. <p>Appendix A</p> <ul style="list-style-type: none"> ► Updated for version 4.5.0.x. <p>Appendix B</p> <ul style="list-style-type: none"> ► Updated Z-Number column for SEL-400G, SEL-400G-1, SEL-401, SEL-411L-2, SEL-421-7, SEL-451-6, SEL-487B-2, and SEL-487E-5. <p>Appendix C</p> <ul style="list-style-type: none"> ► Updated introductory paragraph and <i>Access Controls</i>.
20230428	<p>Appendix A</p> <ul style="list-style-type: none"> ► Updated for version 4.4.2.x.
20230328	<p>Appendix A</p> <ul style="list-style-type: none"> ► Updated for version 4.4.1.x.
20230315	<p>Section 4</p> <ul style="list-style-type: none"> ► Updated <i>Figure 4.8: Import Device Projects</i>. ► Added <i>Figure 4.10: Import Succeeded With Warnings</i> and <i>Figure 4.11: Import in Active Operations Window</i>. ► Updated <i>Importing Device Projects From ACCELERATOR QuickSet and Grid Configurator</i>. <p>Section 6</p> <ul style="list-style-type: none"> ► Updated <i>SEL Logic Editor Within the Freeform Logic Window</i>. ► Added <i>Copy Settings</i>. <p>Appendix A</p> <ul style="list-style-type: none"> ► Updated for version 4.4.0.x. <p>Appendix D</p> <ul style="list-style-type: none"> ► Added <i>Appendix D: Grid GraphQL and Apollo GraphQL Sandboxes</i>.
20221122	<p>Section 1</p> <ul style="list-style-type: none"> ► Updated <i>Table 1.1: Minimum Requirements</i> and <i>Table 1.2: Differences Between Admin Install and User Install</i>. <p>Section 2</p> <ul style="list-style-type: none"> ► Updated <i>Figure 2.2: Add New Device Project Tab</i> and <i>Figure 2.13: Send Report</i>. <p>Section 3</p> <ul style="list-style-type: none"> ► Updated <i>Figure 3.1: Grid Configurator User Interface Overview</i>, <i>Figure 3.2: Switching Between Light and Dark Themes</i>, and <i>Figure 3.3: Dark Theme</i>. <p>Section 4</p> <ul style="list-style-type: none"> ► Updated <i>Figure 4.1: Structure of Folders and Device Projects in System Explorer</i>, <i>Figure 4.2: Customize Folder and Device Project Structure in System Explorer</i>, <i>Figure 4.5: Create a New Device Project</i>, and <i>Figure 4.13: Copy a Device Project</i>. ► Updated <i>Export and Import Folders</i>. ► Added <i>Export Settings</i>. ► Updated <i>Importing Device Projects From ACCELERATOR QuickSet and Grid Configurator</i>.

Date Code	Summary of Revisions
	<p>Section 6</p> <ul style="list-style-type: none">► Added <i>Saving Changes in Connections View</i>.► Added text preceding the added <i>Figure 6.26: Search and Replace in the Freeform Protection Logic Editor</i>.► Added text following the updated <i>Figure 6.31: Freeform Automation Logic Editor</i>.► Updated text in Step 4 in <i>Import Into Grid</i>.► Updated <i>Figure 6.25: Freeform Protection Logic Editor</i>, <i>Figure 6.27: Terminals View</i>, <i>Figure 6.32: Bay Control View</i>, <i>Figure 6.42: Opening the Settings Grid View</i>, <i>Figure 6.43: View Specific Settings Category</i>, <i>Figure 6.47: Search Results</i>, <i>Figure 6.60: Import Settings</i>, <i>Figure 6.64: Settings Import</i>, <i>Figure 6.65: Import Window</i>, <i>Figure 6.67: I/O Interface</i>, <i>Figure 6.68: 4 CT Current Input Aliases</i>, <i>Figure 6.69: 8 CT Current Input Aliases</i>, <i>Figure 6.70: TiDL I/O Map View</i>, <i>Figure 6.71: Enable Port 6</i>, <i>Figure 6.72: Port Mapping</i>, <i>Figure 6.73: Add TMU to Device</i>, <i>Figure 6.74: Mapped SEL-TMU Device</i>, <i>Figure 6.75: I/O Mapping</i>, <i>Figure 6.76: TMU I/O Selection</i>, <i>Figure 6.77: Mapped I/O Signal</i>, <i>Figure 6.78: Multiple SEL-TMU I/O Signals</i>, <i>Figure 6.87: Send Report Tab</i>, <i>Figure 6.89: Send—Commissioning Report</i>, <i>Figure 6.93: Example SEL-851 HMI Display</i>, <i>Figure 6.103: Accessing the Grid Configurator Terminal</i>, and <i>Figure 6.116: Terminal File Send Status</i>. <p>Section 8</p> <ul style="list-style-type: none">► Updated screen captures and associated descriptions throughout the section. <p>Appendix A</p> <ul style="list-style-type: none">► Updated for version 4.3.0.x. <p>Appendix C</p> <ul style="list-style-type: none">► Updated descriptions throughout the appendix.
20220928	<p>Appendix A</p> <ul style="list-style-type: none">► Updated for version 4.2.2.x. <p>Appendix B</p> <ul style="list-style-type: none">► Updated Z-Number column for SEL-411L.
20220826	<p>Appendix A</p> <ul style="list-style-type: none">► Updated for version 4.2.1.x.
20220824	<p>Section 2</p> <ul style="list-style-type: none">► Added <i>Figure 2.2: Add New Device Project Tab</i>. <p>Section 3</p> <ul style="list-style-type: none">► Updated <i>Figure 3.1: Grid Configurator User Interface Overview</i>, <i>Figure 3.2: Switching Between Light and Dark Themes</i>, and <i>Figure 3.3: Dark Theme</i>. <p>Section 4</p> <ul style="list-style-type: none">► Updated <i>Figure 4.14: Copy a Device Project</i>. <p>Section 5</p> <ul style="list-style-type: none">► Updated <i>Figure 5.2: Create a Device Connection</i> and <i>Figure 5.4: Comparison View</i>. <p>Section 6</p> <ul style="list-style-type: none">► Updated <i>Figure 6.1: Creating a New Device Project</i>, <i>Figure 6.5: New Device Project in System Explorer</i>, <i>Figure 6.12: Device Overview</i>, <i>Figure 6.24: Freeform Protection Logic Editor</i>, <i>Figure 6.25: Terminals View</i>, <i>Figure 6.29: Freeform Automation Logic Editor</i>, <i>Figure 6.30: Bay Control View</i>, <i>Figure 6.40: Opening the Settings Grid View</i>, <i>Figure 6.41: View Specific Settings Category</i>, <i>Figure 6.45: Search Results</i>, <i>Figure 6.58: Import Settings</i>, <i>Figure 6.62: Settings Import</i>, <i>Figure 6.65: I/O Interface</i>, <i>Figure 6.66: 4 CT Current Input Aliases</i>, <i>Figure 6.67: 8 CT Current Input Aliases</i>, <i>Figure 6.68: TiDL I/O Map View</i>, <i>Figure 6.69: Enable Port 6</i>, <i>Figure 6.85: Send Report Tab</i>, <i>Figure 6.87: Send—Commissioning Report</i>, <i>Figure 6.91: Example SEL-851 HMI Display</i>, <i>Figure 6.99: Trigger New Event Button</i>, <i>Figure 6.101: Accessing the Grid Configurator Terminal</i>, and <i>Figure 6.114: Terminal File Send Status</i>.► Updated <i>Selecting a Diagram for a Device Project</i>.► Updated <i>Sending Device Settings</i>. <p>Section 7</p> <ul style="list-style-type: none">► Updated <i>Figure 7.1: Opening the System View</i> and <i>Figure 7.2: System View</i>.► Updated <i>Opening the System View</i>. <p>Section 8</p> <ul style="list-style-type: none">► Updated <i>Figure 8.5: Save Quick Connect Device</i>.

Date Code	Summary of Revisions
	Appendix A ► Updated for version 4.2.0.x.
20220628	Appendix A ► Updated for version 4.1.1.x.
20220624	Section 2 ► Updated <i>Figure 2.7: Connections View</i> , <i>Figure 2.8: Configuring Communications Options</i> , and <i>Figure 2.13: Opening the Send Report</i> . Section 3 ► Updated <i>Figure 3.1: Grid Configurator User Interface Overview</i> , <i>Figure 3.2: Switching Between Light and Dark Themes</i> , and <i>Figure 3.3: Dark Theme</i> . Section 5 ► Updated <i>Figure 5.4: Comparison View</i> , <i>Figure 5.5: Filtering Options for Comparison</i> , and <i>Figure 5.6: Comparison Report Options</i> . Section 6 ► Updated <i>Figure 6.5: New Device Project in System Explorer</i> , <i>Figure 6.12: Device Overview</i> , <i>Figure 6.40: Opening the Settings Grid View</i> , <i>Figure 6.41: View Specific Settings Category</i> , <i>Figure 6.45: Search Results</i> , <i>Figure 6.58: Import Settings</i> , <i>Figure 6.62: Settings Import</i> , <i>Figure 6.65: I/O Interface</i> , <i>Figure 6.66: 4 CT Current Input Aliases</i> , <i>Figure 6.67: 8 CT Current Input Aliases</i> , <i>Figure 6.68: TiDL I/O Map View</i> , <i>Figure 6.69: Enable Port 6</i> , <i>Figure 6.81: Read Settings Options</i> , <i>Figure 6.82: File Selection in Read Settings Window</i> , <i>Figure 6.84: Send Settings Options</i> , <i>Figure 6.85: Send Report Tab</i> , <i>Figure 6.86: TiDL Send</i> , <i>Figure 6.87: Send-Commissioning Report</i> , <i>Figure 6.91: Example SEL-851 HMI Display</i> , <i>Figure 6.99: Trigger New Event Button</i> , <i>Figure 6.101: Accessing the Grid Configurator Terminal</i> , and <i>Figure 6.114: Terminal File Send Status</i> . Section 7 ► Updated <i>Figure 7.1: Opening the System View</i> and <i>Figure 7.2: System View</i> . Section 8 ► Updated <i>Figure 8.5: Save Quick Connect Device</i> . Appendix A ► Updated for version 4.1.0.x.
20220523	Appendix A ► Updated for version 4.0.1.x. Appendix B ► Updated Z-Number column for SEL-400G, SEL-401, SEL-421, SEL-451, SEL-487B, and SEL-487E.
20220323	Section 1 ► Updated <i>ACCELERATOR QuickSet Compatibility</i> . ► Updated <i>Removing Database Data (User Install Only)</i> . Section 2 ► Updated screen captures and associated descriptions throughout section. Section 3 ► Updated screen captures and associated descriptions throughout section. ► Updated <i>User Interface Sections</i> . Section 4 ► Updated screen captures and associated descriptions throughout section. Section 5 ► Updated screen captures and associated descriptions throughout section. ► Updated <i>Opening Device Comparison From the System Explorer</i> . ► Updated <i>Create a Comparison Report</i> . Section 6 ► Updated screen captures and associated descriptions throughout section. ► Updated <i>Device Overview</i> . ► Updated <i>Using the Filter and Search Bar</i> . ► Updated <i>I/O Mapping</i> .

Date Code	Summary of Revisions
	<p>Section 7 ► Updated screen captures and associated descriptions throughout section.</p> <p>Section 8 ► Updated screen captures and associated descriptions throughout section.</p> <p>Section 9 ► Updated screen captures and associated descriptions throughout section.</p> <p>Appendix A ► Updated for version 4.0.0.x.</p> <p>Appendix C ► Updated <i>Service Ports for Admin Install</i>. ► Updated <i>Table C.3: Grid Configurator Ports and Services</i>.</p>
20220127	<p>Appendix A ► Updated for version 3.1.0.x.</p> <p>Appendix B ► Updated Z-Number column for SEL-400G, SEL-451, and SEL-487E.</p>
20210830	<p>Section 2 ► Updated <i>Getting Started</i>.</p> <p>Section 6 ► Added <i>Configuration Perspective</i>, <i>Online HMI Perspective</i>, and <i>Resources Perspective</i>.</p> <p>Section 8 ► Updated <i>Figure 8.5: Save Quick Connect Device</i>.</p> <p>Appendix A ► Updated for version 3.0.0.x.</p> <p>Appendix B ► Added SEL-851 as a supported device.</p>
20210716	<p>Appendix A ► Updated for version 2.0.0.x.</p> <p>Appendix B ► Added SEL-411L-2 as a supported device.</p>
20210514	<p>Appendix A ► Updated for version 1.3.1.x.</p> <p>Appendix B ► Added SEL-401 and SEL-421-7 as supported devices.</p>
20210331	<p>Appendix A ► Updated for version 1.3.0.x.</p> <p>Appendix B ► Added SEL-487B-2 as a supported device.</p>
20210212	<p>Section 6 ► Updated <i>Figure 6.3: Select Device Type</i>. ► Updated <i>Figure 6.58: Part Number View</i> and preceding paragraph.</p> <p>Appendix A ► Updated for version 1.2.1.x.</p> <p>Appendix B ► Added SEL-487E-5 as a supported device.</p>

Date Code	Summary of Revisions
20201211	Section 6 ► Added instructions for configuration and commissioning of Time-Domain Link (TiDL) supported devices. ► Added instructions for the Freeform Logic Editor. ► Updated information for new Terminal features. Appendix A ► Updated for version 1.1.0.x. Appendix B ► Added SEL-451-6 and SEL-TMU as supported devices.
20200922	Appendix A ► Updated for version 1.0.1.x.
20200612	► Initial version.

A P P E N D I X B

Supported Devices

The table lists the devices supported by SEL Grid Configurator and the earliest Z-number associated with each device type.

Device Family	Device Model	Z-Number	HMI Available
SEL-400G	SEL-400G	001–006	
	SEL-400G-1	001–006	
SEL-401	SEL-401	105–109	
SEL-411L	SEL-411L-0	021	X
	SEL-411L-1	021	X
	SEL-411L-2	100–104	X
SEL-421	SEL-421-7	105–109	
SEL-451	SEL-451-6	101–107	
SEL-487B	SEL-487B-2	101–104	
SEL-487E	SEL-487E-5	201–206	
SEL-851	SEL-851	001–002	X
SEL-TMU	SEL-TMU	001	

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A P P E N D I X C

Cybersecurity Features

SEL Grid Configurator is designed to run within regularly patched operating systems with securely configured user accounts and with firewalls enabled. Endpoints for GraphQL and HTTPS APIs rely on user authentication by the operating system to restrict access to authorized personnel. No internet connection is required to use SEL Grid Configurator, though user help functions need an internet connection to show SEL Grid Configurator video tutorials.

Installation Characteristics

SEL Grid Configurator does not add any items to the startup task list.

Services for Admin Install

Admin Install is accessible by all users on the same computer. User Install is accessible only to the user that installed the software.

Table C.1 Administrative Installation Services

Name	Account	Startup Type
ACSELERATOR Database	Network Service	Automatic
SEL Communications and Archive Services	Local System	Automatic

Ports and Services

Table C.2 provides a list of the default ports and descriptions for services running as part of SEL Grid Configurator. All ports must be enabled for proper operation of SEL Grid Configurator.

Table C.2 SEL Grid Configurator Ports and Services

IP Port Default (Admin Install)	IP Port Default (User Install)	Network Protocol	Default Port State	Service and Description
9877	9887	TCP	Enabled	Provides a link from SEL Grid Configurator to services that support communications with SEL devices.
7000–7020	7050–7070	TCP	Enabled	Provides storage and communications infrastructure for the SEL Communications and Archive services.

IP Port Default (Admin Install)	IP Port Default (User Install)	Network Protocol	Default Port State	Service and Description
5434	5438	TCP	Enabled	Encrypted Postgres connection between SEL Configuration API and the ACCELERATOR Database.
5232	5242	TCP	Enabled	Makes available to SEL Grid Configurator such configuration project information as settings, connectivity, and history.
5038	5048	TCP	Enabled	Provides access to settings validation and logic for SEL Grid Configurator.
5037	5047	TCP	Enabled	Provides access to the Project and Database management functions of the SEL Grid Configurator application API.
5039	5049	TCP	Enabled	Allows the SEL Grid Configurator client to use the SEL Grid Configurator application API.
5053	5063	TCP	Disabled	Allows SEL Grid Configurator to import settings from QuickSet .rdb files.

Refer to *Section 1: Installation* for information about installation types.

Access Controls

SEL Grid Configurator uses TLS with X.509 certificates to protect communications with and between local services.

At installation, SEL Grid Configurator randomly generates self-signed default certificates needed for TLS security. SEL Grid Configurator uses TLS versions 1.1, 1.2, and 1.3.

SEL Grid Configurator uses SHA-256 and RSA with a key size of at least 2048 bits.

When the PostgreSQL database is installed, the stored data are encrypted using a unique machine scope key provided by the installing user.

Alerts and Logging

For Admin and User Install, SEL Grid Configurator stores logs in the following location:

%LOCALAPPDATA%\SEL\Grid\Logs

These logs contain operation information from ACCELERATOR Database and SEL Grid Configurator. You can view these log files with any text editor program. The availability of free space on your hard drive limits the size of these logs.

Database Accounts

SEL Grid Configurator installs with a PostgreSQL database for storing device settings and other device information. *Table C.3* lists the default, nonsystem-level user accounts by which SEL Grid Configurator gains access to the database.

Table C.3 PostgreSQL User Accounts

User Account	Password
dm_engineer	Generated randomly at install time
sel_pgsql	Generated randomly at install time

Decommissioning

If you are removing a computer from service or no longer require SEL Grid Configurator, you can either uninstall only the application or also remove all stored device data. Refer to *Section 3: SEL Grid Configurator Interface* for detailed instructions.

If you use the Admin Install, you can find database backups at C:\ProgramData\SEL\AcSELERator\Backup. Remove these backups if you need to entirely remove device data from a computer.

If you use the User Install, the backups are located at C:\Users\<user name>\AppData\Local\SEL\AcSELERator\Backup. Confirm that these backups are removed after uninstalling SEL Grid Configurator.

Revision Management

Appendix A: Software and Manual Versions contains a list of SEL Grid Configurator releases and descriptions of each software update.

See the *SEL Process for Disclosing Security Vulnerabilities* at selinc.com/security_vulnerabilities/ for details on vulnerability disclosure.

Product Version Information

The SEL Grid Configurator software version number can be found by selecting the encircled question mark icon in the Title Bar of the SEL Grid Configurator user interface.

Update Verification

The SEL Grid Configurator installer is signed by SEL. For instructions on how to verify the signature, see selinc.com/company/verifying-software-downloads/.

Contact SEL

For further questions or concerns about product security, please contact SEL at security@selinc.com or +1.509.338.3838.

A P P E N D I X D

Grid GraphQL and Apollo GraphQL Sandboxes

Overview

SEL Grid Configurator uses a GraphQL (<https://graphql.org/>) Application Programming Interface (API) as a middle layer separating the visible user interactive part of SEL Grid Configurator from the logic processing and database side of SEL Grid Configurator.

NOTE

This information is provided for advanced users with a strong software engineering background.

In order to help facilitate the use of the API, SEL Grid Configurator includes an API sandbox that provides documentation on the API's endpoint topography, as well as assisting in reading information from the backend database (queries) and writing information to the backend database (mutations). The API sandbox installed with SEL Grid Configurator is available without an internet connection (offline), while another more feature-rich sandbox maintained by the Apollo Federation is only available with an internet connection (online).

SEL Grid Configurator Data Retention

Any changes you make to the data within the database using the API are permanent. If you need to test or explore the API, SEL recommends that you use an instance of SEL Grid Configurator that is isolated from your production environment.

Availability

As stated in the Overview, there are two ways to access GraphQL: offline and online. SEL Grid Configurator services must be running before either sandbox can access application data. After restarting your computer, launch the SEL Grid Configurator application to start the services. You can close the SEL Grid Configurator client at any time and continue to use a sandbox. The SEL Grid Configurator services will continue to run.

Launching the SEL Grid Configurator Sandbox (No Internet Access Required)

Step 1. Depending on the type of SEL Grid Configurator install you have, open a web browser and choose from the following web addresses.

- For Admin Install: <https://localhost:5039/graphql>
- For User Install: <https://localhost:5049/graphql>

Step 2. When you initially open a localhost sandbox site, your web browser will display a warning that your connection is not private. Select **Advanced** and then **Proceed to localhost** to access the GraphQL page, as seen in *Figure D.1*.



Your connection is not private

Attackers might be trying to steal your information from **localhost** (for example, passwords, messages, or credit cards). [Learn more](#)

NET::ERR_CERT_AUTHORITY_INVALID

To get Chrome's highest level of security, [turn on enhanced protection](#)

[Hide advanced](#)

[Back to safety](#)

This server could not prove that it is **localhost**; its security certificate is not trusted by your computer's operating system. This may be caused by a misconfiguration or an attacker intercepting your connection.

[Proceed to localhost \(unsafe\)](#)



Figure D.1 Connection Warning

This warning will not appear again unless you purge the browser history and cache.

As shown in *Figure D.2*, the localhost sandbox includes three panes.

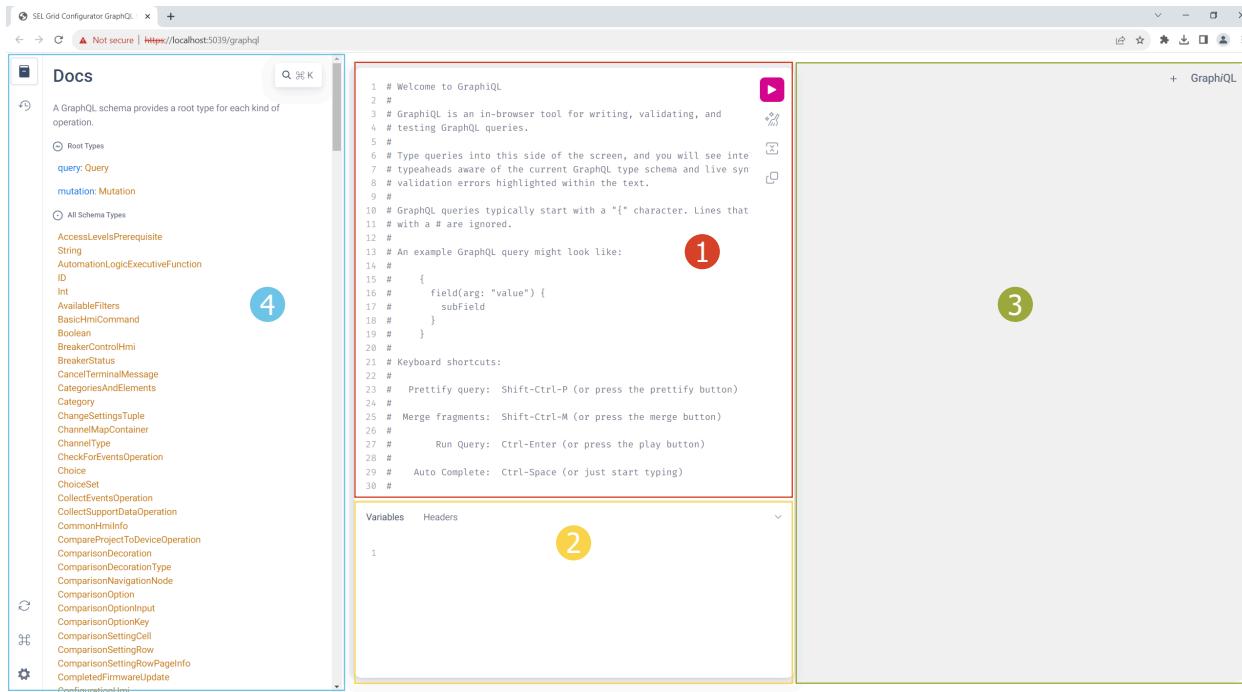


Figure D.2 SEL Grid Configurator's Sandbox

Pane 1 allows you to type in the GraphQL statement. Use Pane 2 to define the GraphQL variable parameters and request headers. Pane 3 displays the results of the GraphQL API calls. Press the play button in Pane 1 to run the GraphQL statement defined in Panes 1 and 2.

As shown in *Figure D.2*, select the top icon in the left-side control bar to expand the Docs page that describes the GraphQL API topography of SEL Grid Configurator. The topography is divided into queries and mutations. Each endpoint in the topography is a link that will navigate down to that endpoint. For example, on the line "query: Query", clicking on "Query" (the word on the right side) will open to display all the highest-level query endpoints.

The following are available keyboard shortcuts that can be used while defining GraphQL statements:

- Auto Complete: <Ctrl+Space>
- Run query: <Ctrl+Enter>
- Format (Prettify) query: <Ctrl+Shift+P>

Launching the Apollo GraphQL Sandbox (Internet Connection Required)

If you have internet access and want to use a more feature-rich sandbox, you can perform the following steps to connect your GraphQL server to Apollo GraphQL.

- Step 1. Open an internet browser and navigate to <https://studio.apollographql.com/sandbox/explorer>.
- Step 2. On this page, you must set the sandbox address to <https://localhost:5039/graphQL> or <https://localhost:5049/graphQL>, as seen in *Figure D.3*. The green indicator dot signifies that Apollo GraphQL is connected to the GraphQL server.

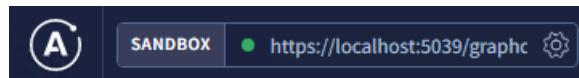


Figure D.3 Connected Server Indication

- Step 3. If the localhost address entered into the Sandbox text box has a red indicator dot, as seen in *Figure D.4*, Apollo GraphQL cannot connect to the GraphQL server. To resolve this, you need to first connect to the offline sandbox to allow connections to the GraphQL API by performing *Step 1* and *Step 2* in *Launching the SEL Grid Configurator Sandbox (No Internet Access Required) on page 164*.

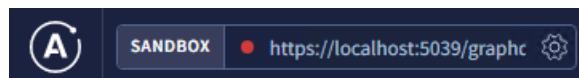


Figure D.4 Disconnected Server Indication

There are three panes in the Apollo GraphQL interface. The left pane allows you to explore and auto-input GraphQL API endpoints into the middle pane. The middle pane is where you enter the GraphQL API endpoints that you want to run. A section at the bottom of the middle pane allows you to define and assign variables used in GraphQL so that you do not need to define them in-line above. The **Query** button in the top right of the middle pane executes all the GraphQL API calls in the middle pane. The results of those API calls are displayed on the right pane.

Additional Information

To learn more about GraphQL and see examples, refer to <https://graphql.org/learn/>.



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