Digi Axess

User Guide

Revision history—90002498

Revision	Date	Description
F	May 2025	**New features for the Connect Sensor XRT-M** ■ More features are available in the updated Digi Axess Mobile app: Use the Digi Axess Mobile app to manage your devices ■ Updated MQTT topics to remove Beta test statement **Updates for all device variants** ■ Update Digi Axess account creation process: Step 1: Create a Digi Axess account and initial admin user ■ User feedback form is now available: User feedback options and customer support **Updates for Connect Sensor** ■ Updated hardware list: Applicable hardware **Updates for the Z45 Controller** ■ Updated input and output pins information for automation control • Configure input pins on the Z45 Controller • Configure output pins on a Z45 Controller ■ Added dashboard groups configuration • Configure the local and remote dashboard groups ■ Updated password requirements: Change the password or user level for a Z45 Controller
E	March 2025	**Updates for the Connect Sensor XRT-M** ■ Documented how to change the cellular connection type: Change the cellular connection type (Connect Sensor XRT-M only) **New feature documentation for the Z45 Controller** ■ Enable a default SIM slot ■ Configure the RS485 port for a sensor wired to the port. ■ Added a note about accessing a Z45 Controller from the Device Summary page when using OpenVPN: Access the device's web UI from the Device Summary page
D	December 2024	**New feature documentation** ■ **New** device status option: Filter the location pins by location status and Display device tiles in a grid format ■ External battery power change notification: Notification types

Revision	Date	Description
		■ Battery status display as a graphic: Review status information for a Connect Sensor and Digi Axess Location Status information ■ Configure input pins: Numeric, Digital, and Hex: Configure input pins on the Connect Sensor XRT-M ■ Configure output pins: Numeric, Digital, and Hex: Configure output pins on a Connect Sensor XRT-M ■ Create a customer account on your own: Step 1: Create a Digi Axess account and initial admin user ■ Configure MQTT: Data Export: Manage MQTT configuration (Connect Sensor XRT-M only) and Configure MQTT for a device from the web UI (Connect Sensor XRT-M only) ■ Configure event queues: Data Export: Configure Event Queues ■ Review Device Reports: Device Reports: Review in Digi Axess Admin ■ **Reference Device** feature available when adding a formula: Add a device group formula in the web UI and Add a formula from the Administration dashboard ■ Updated device schedule: Configure the data collection and push schedule ■ Mobile App for initial device connection:Use the Digi Axess Mobile app to manage your devices
C	August 2024	■ Added Manage notification pop-ups. ■ Added Install Digi Axess as a stand-alone application ■ Added device group formula topics: Formulas: Manage in Digi Axess Admin (Connect Sensor only) ■ Updated the Formulas: Manage from the web UI automation control topics.
	April 2024	Digi Axess 24.4 Release ■ Added documentation for Digi Connect Sensor XRT-M. ■ Updated Notifications topics. ■ New feature: Device registration through the Admin UI.

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Include the document title and part number (Welcome to Digi Axess, 90002498 C) in the subject line of your email.

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Welcome to Digi Axess

Digi Axess is a web-based application that brings alarms, reports and control to your web browser.

Applicable hardware

This manual supports configuration on hardware listed below. Hardware information is available as follows:

- Connect Sensor family: *Digi Connect Sensor Family Hardware Guide*
- Z45 Controller and RMS Z45: *Digi Z45 Family Industrial Controller Hardware Guide*

Digi Connect Sensor XRT-M

SKU	Description
CSENSE-M110	Digi Connect Sensor XRT-M ▪ DIN rail mountable modular telemetry

Digi Connect Sensor XRT-M NEMA

SKU	Description
CSENSE-M210	Digi Connect Sensor XRT-M NEMA ▪ NEMA case ▪ Batteries are included
CSENSE-M210-N	Digi Connect Sensor XRT-M NEMA, no batteries ▪ NEMA case ▪ Batteries are not included

Digi Connect Sensor+

SKU	Description
CSENSE-S210	Connect Sensor+, LTE Verizon (Digi Axess)

Z4500x Industrial Controllers--Ethernet

SKU	Description
CTK-Z4500A2X	Z45 Industrial Controller Ethernet, Automation Control

Z4550x Industrial Controllers--Cellular

SKU	Description
CTK-Z4550A2M	Z45 Industrial Controller 4G/LTE, Automation Control
CTK-Z4550A2W	Z45 Industrial Controller Wi-Fi, Automation Control
CTK-Z4550A2M-RMS	NEMA Kit with Power Supply and Antenna

Digi Axess update banner

A Digi Axess update banner displays when you log into Digi Axess, and includes information about updates to Digi Axess. You can also ignore the banner so that it does not display.

- **Don't Show Again**: Click **Don't Show Again** to permanently turn off the banner. It will not display when you log into Digi Axess.
- **Ignore**: Click **Ignore** to close the banner. It displays the next time you log into Digi Axess.

Get started with Digi Axess

Digi Axess offers a comprehensive solution for collecting and presenting data from your remote infrastructure and assets. When you log in to Digi Axess, a location map that includes complete information about each of the monitoring devices that are connected to Digi Axess displays. The devices are displayed in a list on the side of the map as well as noted by location pins on the map.

This process explains how to access the Digi Axess map, assemble your devices and connect them to the cellular network, and then view the devices on the map.

Safety information

Before you begin, you should review the safety statements for the devices that you want to configure.

Device	Safety information
Connect Sensor+	■ Safety notices ■ Technical specifications
Connect Sensor XRT-M NEMA	■ Safety notices ■ Technical ratings
Connect Sensor XRT-M	Safety notices

Step 1: Create a Digi Axess account and initial admin user

You can create your Digi Axess account after you have purchased a Connect Sensor or a Z45 Controller and have the device's serial number or IMEI.

Account creation includes entering an email address for the initial admin user. When this process is completed by Digi, Digi Axess sends an email to the initial admin user, notifying the admin to complete their account setup and set a password for their Digi Axess account.

Note If you already own devices that you want to connect to Digi Axess, contact the Digi Support Team for help registering a pre-owned device.

Before you begin

You should gather the required account information before you begin creating a Digi Axess account.

- The serial number or IMEI of the device you have purchased.
- A descriptive name for your customer account.

- A unique customer account ID. The ID must be at least 4 characters long and contain only letters and numbers.
- An email address for the account administrator.

To create a new Digi Axess account:

1. Navigate to digiaxess.com in your web browser.
2. Click **Login**. The **Digi Axess Log In** page displays.
3. Click **Create New Account**. The **Create New Digi Axess Account** page displays.
4. Enter the account fields.
    - **Serial number**: (Required): Enter the serial number or IMEI of the device you have purchased.

      As an alternative, click the **Scan Barcode** button next to the field and use a camera or a saved image to enter an identifier.
    - **Company Name**: (Required) Enter a descriptive name for your customer account.
    - **Account ID**: (Required) Enter a unique customer account ID. The ID must be at least 4 characters long and contain only letters and numbers.
    - **Email**: (Required) Enter the account administrator's email address.
    - **First Name** and **Last Name**: Enter the first and last name of the account administrator.
5. Click **Create Account**.
6. Digi Axess sends an email to the initial admin user, notifying the admin to complete their account setup and set a password for their Digi Axess account.

NEXT STEP: Proceed to Step 2: Assemble and power your devices.

Step 2: Assemble and power your devices

To ensure that you can see the devices on the Digi Axess device list and can configure your devices, you should assemble and power your devices.

- Assemble the Connect Sensor+ hardware
- Assemble the Connect Sensor XRT-M NEMA hardware
- Assemble the Connect Sensor XRT-M
- Assemble the Z45 Controller hardware
- Assemble the RMS Z4550 hardware

NEXT STEP: Proceed to Step 3: Register your device.

Step 3: Register your device

You must register the devices that you want to access and manage from Digi Axess. The process uses the device's serial number or IMEI as a unique identifier.

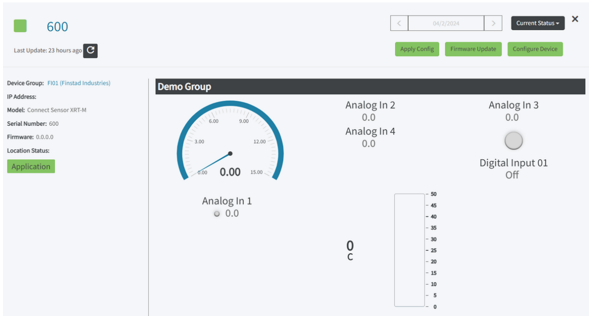
- **Connect Sensor family**: Register a Connect Sensor device
- **Z45 Controller**: Register a Z45 Controller

NEXT STEP: Proceed to Step 4: Verify device registration.

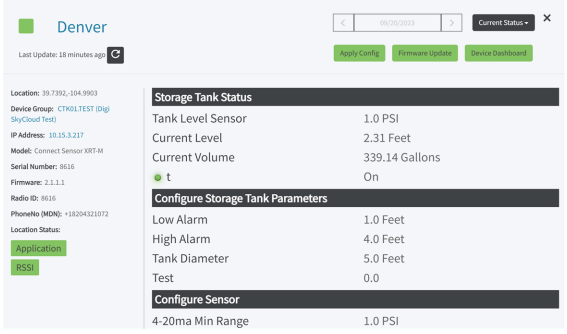
Step 4: Verify device registration

After you have registered your device, you can log into Digi Axess and verify that it is mapped correctly.

1. **Connect Sensor only**: Wake the Connect Sensor using a magnet. See Manually wake a Connect Sensor.
2. Log into Digi Axess.
3. Find the registered device using one of the following methods.
   - Use the **Search Devices** field in the toolbar to find the device that you just registered. You can search by serial number or location name.
   - Click on the device's location pin in the map.
   - Select a device from the list of mapped devices.
   - Display the devices in the table format, and search for the device.
4. Click on the device location pin or device name from the list of devices to display the device's Device Summary page. The information that displays in the Device Summary page depends on the configuration option you chose during initial registration.
   - **Demo Configuration**: This is the default configuration, and displays basic information in the Device Summary page: Analog in Voltage, Digital in, and Case temperature.



   - **Blank Configuration**: No data displays. You must manually configure the device in the device's **Administration** page.
   - **Saved Configuration**: Data for the options in the saved configuration display.



Set up is complete!

Step 5: Experience Digi Axess and configure your devices

After you have assembled your devices and connected to a network, you can log into Digi Axess and configure your devices, review device information, and manage the Digi Axess map and administration features, such as device registration and passwords.

Devices can also be configured from the device's web UI. You can access a device's web UI from Digi Axess or by logging into a device from a browser window.

Working with the Digi Axess map

The Digi Axess device map displays as the main page when you log into Digi Axess. A location pin displays on the map for each device that has location coordinates assigned.

- Log in to Digi Axess: Log into Digi Axess
- Information about the map, toolbars, and location pins is found here: Digi Axess map overview
- Information about the status of a device displays in the Device Summary page. The page is displayed from the Digi Axess map by clicking on a location pin or on a device name from the mapped device list. Information about the Device Summary page is here: Review device status information in the Device Summary page.
- Information about the features in the **User Profile** is found here: Digi Axess User Profile menu options. You can use the **User Profile** menu options to change your password, register a device, edit your contact preferences, set your map display preferences, allow pop-up notifications, and log out of Digi Axess.

Configuring a device

You can configure a device by logging into its web user interface, either from the Device Summary page from the Digi Axess map, or by logging into the web UI from a browser window.

- Device Summary page in the Digi Axess map: Access the device's web UI from the Device Summary page
- Connect Sensor web UI: Log in to a Connect Sensor device's web UI using a network connection
- Z45 Controller web UI: Log in to the Z45 Controller

Configuration information for each device family is available here:

- Configure a device in the Connect Sensor family from the web UI
- Configure a Z45 Controller from the web UI

Use the Digi Axess Mobile app for initial device connection

You can use the Digi Axess Mobile app to log into Digi Axess to monitor all of your devices, and receive and manage notifications from Digi Axess.

In addition, you can easily connect to your Connect Sensor devices from the Digi Axess Mobile app. The app uses Bluetooth to find and connect to the Connect Sensor devices near you that are awake and have the mobile app service enabled on the device.

- Use the Digi Axess Mobile app to manage your devices

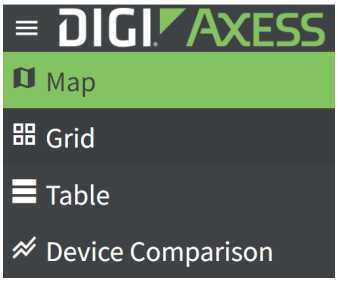
Digi Axess map overview

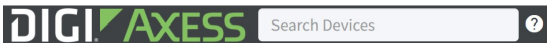
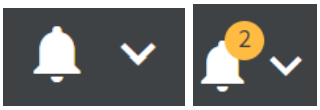
The Digi Axess device map displays as the main page when you log into Digi Axess. A locator pin displays on the map for each mapped industrial control and monitoring device.

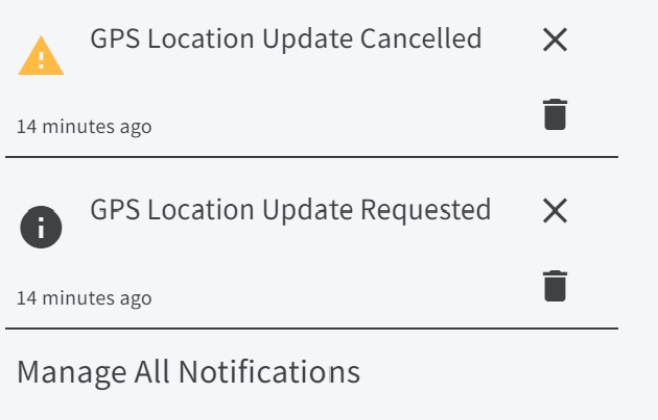
Item	Description
Toolbars	Use the toolbar items at the top of the page and in the left pane to display lists of devices: mapped devices, other devices, or device groups. You can also search for a device. See Digi Axess map toolbar.
Location pins	Devices that have latitude and longitude coordinates assigned are noted with a location pin on the Digi Axess map. See Location pins on the Digi Axess map.
Map view settings	The Digi Axess map settings determine the map design and which location pins are displayed in the map. See Specify Digi Axess map display style.
Mapped device list	The mapped device list is a list of up 20 devices that have assigned latitude and longitude coordinates, and that are in the viewable map area. As you change the focus of the map, or zoom in or out, the list is updated to match the devices displayed on the map. You can hover or click on a device name to display more information about the device. See Digi Axess mapped device list.
Map view	Use the icons on the lower right corner of the map to manage the map view. See Manage the Digi Axess map view.

Digi Axess map toolbar

The table below includes information on the Digi Axess map toolbar.

Option	Description
Details	Use the icons in the toolbar in the left pane to display the map, device information, and device comparisons. The icons display by default. To expand the toolbar to include the icon names, click the hamburger icon in the upper left corner of the page.  ■ **Map**: Display the default map page. ■ **Grid**: Display device information in a grid format. You can filter and sort the devices. See Display device tiles in a grid format. ■ **Table**: Display device information in a table format. You can filter and sort

Option	Description
	the devices. See Display devices in a table format. ■ **Device comparison**: Display application automation information for up to 10 devices in the selected group in graphs. See Create device comparison graphs in Digi Axess.
Search Devices	Search for a device by an identifying feature: serial number, model, device group, location name, or IP address. The search field is available only when the map page is in the **Map** or **Grid** views. 
All Device Groups	Filter the devices displayed on the map page by device group. The default is **All Device Groups**. Only the device groups associated with your log in credentials display. Click the down arrow to display a list of groups to choose from. 
User profile	The user name for the user currently logged in displays in the toolbar. Click the down arrow next to the address for a list of user profile management options. See Digi Axess User Profile menu options.
Notifications	View and manage any Digi Axess notifications.  The colored dot on the bell shows how many new notifications you have and the color of the dot signifies the notification level. ■ **Green**: A process has completed successfully. ■ **Yellow**: At least one warning notification as been sent. A process has not completed as expected ■ **Red**: At least one danger notification as been sent. A process has not completed and requires attention. ■ **Gray**: Information about a process is provided. Click the down arrow next to the notification bell to display options. ■ **List of notifications**: A list of the current notifications displays. • Click the notification name to review the notification. • Click **X** to remove the notification from this list. It is still available on the Notifications page. • Click the **Delete** icon to delete the message. ■ **Manage all Notifications**: Click to access the Notifications page.

Option	Description
	

Location pins on the Digi Axess map

Devices that have latitude and longitude coordinates assigned are noted with a location pin on the Digi Axess map.

Assigning coordinates

The latitude and longitude coordinates can be assigned manually or automatically, depending on the device type.

Method	Device Type		
	Connect Sensor+	Connect Sensor XRT-M	Z45 Controller
Manually You can assign the coordinates to the device from the web UI.	Yes Configure a Connect Sensor+ location with manually defined coordinates	Yes Configure the location for a Connect Sensor XRT-M with manually defined coordinates	Yes Configure the location for a Z45 Controller with defined coordinates
Automatically The coordinates are assigned using the GPS on the device. The device must have a cellular connection and the GPS feature enabled to be able to automatically assign coordinates.	N/A	Yes Configure the location for a Connect Sensor XRT-M device with GPS-defined coordinates	Yes Enable and use GPS location services for a Z45 Controller

Location pin color

The color of the location pin shows the status of the location. The color is determined by the Location Status items, which are a set of metrics tracked by the firmware.

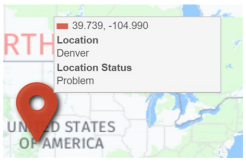
- **Red**: At least one of the **Location Status** items is red.
- **Yellow**: At least one of the **Location Status** items is yellow. The rest may be green or yellow, but none are red.
- **Green**: All of the **Location Status** items are green.
- **Gray**: The device has not connected to Digi Axess within the last 24 hours.

Location pin with a blue center

A location pin has a blue center if the device has an Automation input configured that evaluates either a threshold or an on/off state, and is then received by Digi Axess from the device. The input configuration is user-defined.

Hover over a location pin

When you hover over a location pin on the map, a dialog that shows information about the location displays: the latitude and longitude of the location, and the location name and status.

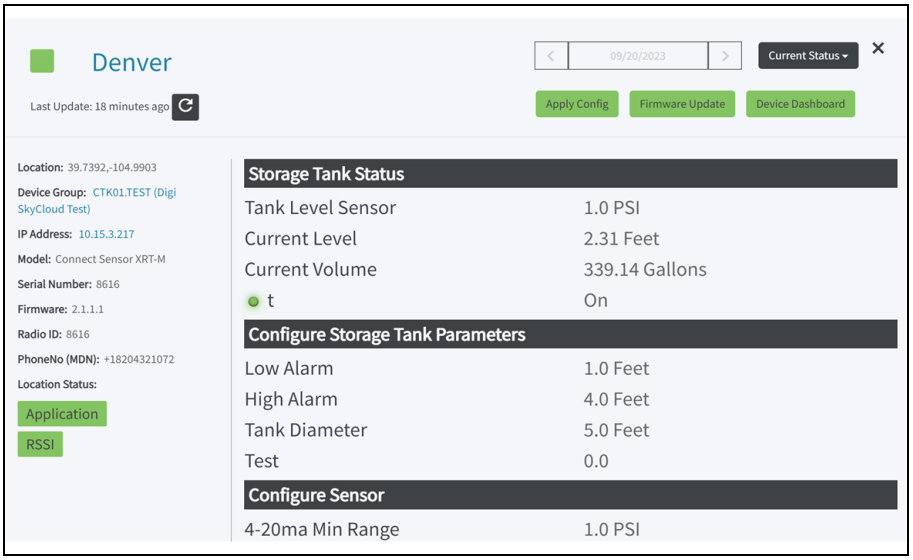


Item	Description
Color bar	Denotes the status of the location, which matches the location pin color.
Coordinates	The latitude and longitude of the device's physical location. ■ **Connect Sensor+**: Location coordinates are configured manually. See Configure a Connect Sensor+ location with manually defined coordinates. ■ **Digi Connect Sensor XRT-M NEMA**: Location coordinates can be configured manually or using the device's GPS. See Configure the location for a Connect Sensor XRT-M with manually defined coordinates or Configure the location for a Connect Sensor XRT-M device with GPS-defined coordinates. ■ **Connect Sensor XRT-M**: Location coordinates can be configured manually or using the device's GPS. See Configure the location for a Connect Sensor XRT-M with manually defined coordinates or Configure the location for a Connect Sensor XRT-M device with GPS-defined coordinates. ■ **Z45 Controller**: If the Z45 Controller has a cellular network connection, the coordinates can be determined using the GPS on the device. You can also manually assign a latitude and longitude. For more information, see Configure the location coordinates for a Z45 Controller.
Location Name	The name assigned to the device.
Location Status	The status of the location, which coordinates with the color assigned to the location pin. The location status is determined by the Location Status items, which are a set of metrics tracked by the firmware.

Item	Description
	■ **OK**: Green color bar. All of the **Location Status** items are green. ■ **Warning**: Yellow color bar. At least one of the **Location Status** items is yellow. The rest may be green or yellow, but none are red. ■ **Problem**: • Red color bar. At least one of the **Location Status** items is red. • Gray color bar. The device has not connected to Digi Axess within the last 24 hours.

Click a location pin

Click a location pin to display the Device Summary page with status information about the device. For information about this page, see Review device status information in the Device Summary page.

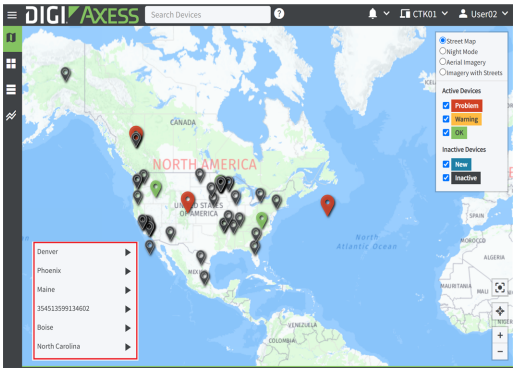


Digi Axess mapped device list

A list of the mapped devices displays in the lower left corner of the map. Only devices that have latitude and longitude coordinates assigned display in the list.

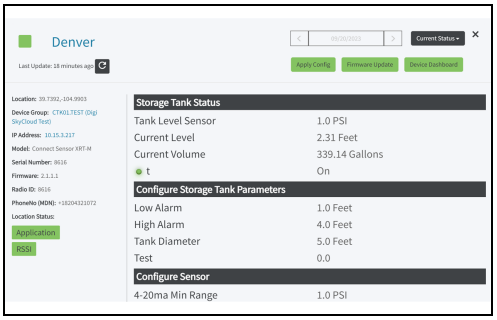
Up 20 devices are included in the list, and match the devices that are in the viewable map area. As you change the focus of the map, or zoom in or out, the list is updated to match the devices displayed on the map.

You can hover or click on a device name to display more information about the device.



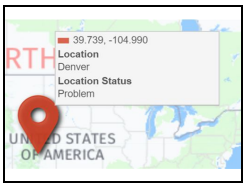
Click a device name

Click the name of a device to display the Device Summary page with status information about the device. For information about this page, see Review device status information in the Device Summary page.



Hover over a device name

When you hover over a name in the list or over a location pin on the map, a dialog that shows information about the location displays: the latitude and longitude of the location, and the location name and status.

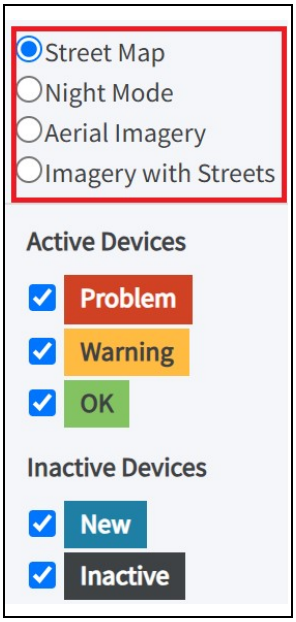


Item	Description
Color bar	Denotes the status of the location, which matches the location pin color.
Coordinates	The latitude and longitude of the device's physical location. ■ **Connect Sensor+**: Location coordinates are configured manually. See Configure a Connect Sensor+ location with manually defined coordinates. ■ **Digi Connect Sensor XRT-M NEMA**: Location coordinates can be configured manually or using the device's GPS. See Configure the location for a Connect Sensor XRT-M with manually defined coordinates or Configure the

Item	Description
	location for a Connect Sensor XRT-M device with GPS-defined coordinates. ■ **Connect Sensor XRT-M**: Location coordinates can be configured manually or using the device's GPS. See Configure the location for a Connect Sensor XRT-M with manually defined coordinates or Configure the location for a Connect Sensor XRT-M device with GPS-defined coordinates. ■ **Z45 Controller**: If the Z45 Controller has a cellular network connection, the coordinates can be determined using the GPS on the device. You can also manually assign a latitude and longitude. For more information, see Configure the location coordinates for a Z45 Controller.
Location Name	The name assigned to the device.
Location Status	The status of the location, which coordinates with the color assigned to the location pin. The location status is determined by the Location Status items, which are a set of metrics tracked by the firmware. ■ **OK**: Green color bar. All of the **Location Status** items are green. ■ **Warning**: Yellow color bar. At least one of the **Location Status** items is yellow. The rest may be green or yellow, but none are red. ■ **Problem**: • Red color bar. At least one of the **Location Status** items is red. • Gray color bar. The device has not connected to Digi Axess within the last 24 hours.

Specify Digi Axess map display style

A set of Digi Axess map imagery options displays on the map page in the upper right corner by default. You can choose the imagery option that provides the level of detail you need.



Option	Description
Street Map	A flat street map without aerial imagery. This is the default.
Night Mode	A flat street map without aerial imagery in night (dark) mode.
Aerial Imagery	A high resolution satellite aerial image.
Imagery with Streets	A high resolution hybrid aerial image with street names superimposed.

Filter the location pins by location status

A set of Digi Axess location pin filters displays on the map page in the upper right corner by default. You can filter the types of location pins that display in the map.

When a pin type is selected, pins of that type are displayed. By default, all active devices are displayed and inactive devices are not displayed.

Option	Description
Active Devices	The active devices are grouped by the status of the devices, which coordinates with the color assigned to the location pin. The location status and color is determined by the Location Status items, which are a set of metrics tracked by the firmware. ■ **Problem** (Red): At least one of the **Location Status** items is red. ■ **Warning** (Yellow): At least one of the **Location Status** items is yellow, and none are red. ■ **OK** (Green): All of the **Location Status** items are green.
Inactive Assets	■ **Inactive 24 hours** (Gray):The device has not connected to Digi Axess within the last 24 hours. ■ **New** (Blue): The device is registered to your account but has not yet reported to Digi Axess. The device remains in this status until it connects to Digi Axess and reports a status.

Manage the Digi Axess map view

You can use the icons on the lower right corner of the map to manage the map view.

Icon		Description
	**Center Map**	Click to center the map on the Digi Axess map page.
	**My location**	Click to center the map on the mapped location associated with your computer. Any location information available on the computer you are using to access Digi Axess is sent to Digi Axess to determine your location. A blue shaded circle displays over the most likely area of your location. **Note** Location information is between your laptop and the Digi Axess server over the network. Typically, the location determination is made by identifying the location of the first network element that your network traffic is passing through. The actual accuracy of this can vary significantly depending on the network architecture of your serving network. The location permission must be turned on for this feature to work as expected. ▪ **Location permission ON**: A blue location circle displays on the map at the location assigned to your computer. ▪ **Location permission OFF**: A dialog box displays a message about a geolocation error. To use this feature, click the lock icon next to the URL name in your browser window, and look for the location option for your browser. Turn the location permission option **ON**.
	**Zoom in**	Click to zoom in on the map.
	Zoom out	Click to zoom out on the map.
	Hand icon	The Windows hand icon displays in the map. Click and depress the left mouse button to move the map and focus on the desired area.

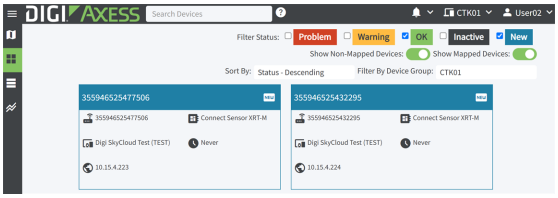
Display device tiles in a grid format

You can display device information in a grid format. Within the grid, you can filter and sort the devices.

Note You can also display devices in a table format. See Display devices in a table format.

Display the device grid

1. Log into Digi Axess.
2. Click the grid icon on the toolbar on the left side of the screen to display the device grid.



Filter the devices by location status

A set of Digi Axess location staAssign a location name to a Z45 Controllertus filters displays at the top of the grid. You can use these to specify which types of devices should be displayed. The location status and color is determined by the Location Status items, which are a set of metrics tracked by the firmware.

- **Problem** (Red): At least one of the **Location Status** items is red.
- **Warning** (Yellow): At least one of the **Location Status** items is yellow, and none are red.
- **OK** (Green): All of the **Location Status** items are green.
- **Inactive 24 hours** (Gray): The device has not connected to Digi Axess within the last 24 hours. By default, this option is not selected.
- **New** (Blue): The device is registered to your account but has not yet reported to Digi Axess. The device remains in this status until it connects to Digi Axess and reports a status.

Filter the devices by device group

You can filter the devices displayed on the map page by device group. From the **Filter By Device Group** list box, select a device group option.

The default is **All Device Groups**. Only the device groups associated with your login credentials display.

Sort the devices

You can sort the devices in ascending (A-Z, low-high) or descending order (Z-A, high-low). From the **Sort By** list box, select a sort order option:

- **Status - Ascending**: inactive, green, yellow, red
- **Status - Descending**: red, yellow, green, inactive
- **Location Name - (A-Z)** 0 - 9, then A - Z
- **Location Name - (Z-A)** Z - A, then 9 - 0
- **Serial Number - Ascending** 0 - 9
- **Serial Number - Descending** 9 - 0
- **Model - Ascending**: blank, 0 - 9, A - Z
- **Model - Descending** Z-A, 9-0, blank

Review the device grid

The device information in the grid is a subset of the information included in the Device Summary page.

Item	Description
Name banner	The colored location name banner shows the status of the location. The color is determined by the Location Status items, which are listed on the left pane. ■ **Green**: All of the **Location Status** items are green. ■ **Yellow**: At least one of the **Location Status** items is yellow. The rest may be green or yellow, but none are red. ■ **Red**: At least one of the **Location Status** items is red. ■ **Gray**: The device has not connected to Digi Axess within the last 24 hours.
Serial Number	The device's identifier. ■ Connect Sensor+: IMEI ■ Z45 Controller: Serial number
Model	The device model name.
Name	The name of the location. To change the location name, click the name to access the web UI for the device. ■ **Connect Sensor**: Change the location name for a Connect Sensor ■ **Z45 Controller**: Assign a location name to a Z45 Controller
Date and time	The date and time on which the device last connected to Digi Axess.
IP Address	The IP address assigned to the device.
Location	The latitude and longitude for the device's physical location. See the Assigning Coordinates table for details.
Location Status	A set of metrics tracked by the firmware. The color denotes the status of the metric. For detailed information, see Digi Axess Location Status information.

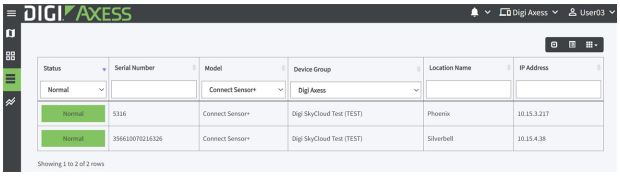
Display devices in a table format

You can display device information in a table format. Within the table, you can filter the devices.

Note You can also display devices in a grid format. See Display device tiles in a grid format.

Display the table

1. Log into Digi Axess.
2. Click the table icon on the toolbar on the left side of the screen to display the table.
3. Click a row in the table to display the Device Summary page for the device.



Filter the devices

Use the columns to filter the devices in the table.

Item	Description
Status	Click the **Status** list box and select the location status you want to display. The location status is a set of metrics tracked by the firmware. The color denotes the status of the metric. For detailed information, see Digi Axess Location Status information.
Serial Number	Enter the device's identifier. The device list is limited to matching entries as you type. ■ Z45 Controller: Serial number ■ Connect Sensor+: IMEI
Model	Select a device model from the list box.
Device Group	Select a device group from the list box.
Location	Enter the name of a device. The device list is limited to matching entries as you type.
IP Address	Enter the IP address of a device. The device list is limited to matching entries as you type.

Select the columns to display

By default, all of the columns display in the table. You can de-select the columns that you don't want to display.

Click the **Columns** button to display a list of the columns. By default, **Toggle All** is selected and all columns display. De-select the columns that you don't want to display. You can re-select a column at any time.

If you de-select **Toggle All**, only the **Status** and **Serial Number** columns display.

Change the pagination of the table

Click the **Hide/Show Pagination** icon at the top of the page to remove pagination.

Display the devices as cards

You can display the table as a set of cards.

Click the **Cards** icon at the top of the page to display the table as cards. Click the icon again to return to the table view.

Set your map page display defaults

You can configure the display defaults for the map page with the user profile **Preferences** options. These defaults are applied to the map page each time you log in.

1. Log into Digi Axess.
2. In the toolbar, click the down arrow next to your user name. The **User Profile** menu displays.
3. Click **Preferences**. A list of preference options displays. Click each option and select a default.
   - **Default Tab**: Click to display the map page display options: **Map**, Grid, Table, or Device Comparison. The default option is **Map**.
   - **Default Group**: Click to display all of the groups that you are able to view. The default option is **All Device Groups**.
   - **Theme**: Click to display the display theme options: **Browser Default**, **Light** or **Dark**. The default option is **Browser Default**.
   - **Default Map**: Click to display the map display options: **Street**, **Night**, **Satellite**, or **Hybrid**. The default option is **Street**.
   - **Show Inactive Devices**: Click to specify whether you want to include location pins for inactive devices in the map. Location pins for inactive devices are gray. Options are **Yes** or **No**. The default option is **No**.
4. Click **Save** to save and apply your choices.

User feedback options and customer support

You can use the green question mark symbol on the bottom of every page in Digi Axess to access a set of feedback options, a link to the Digi Axess user guide, and access to customer support.

Option	Description
What's New	Displays an announcement dialog with current information about Digi Axess.
Report an issue	Capture information about an issue in Digi Axess.
Send a feature request	Share ideas about enhancements for Digi Axess.
Rate your experience	Tell us how we're doing! Click the stars and enter any comments.
Documentation	Open the Digi Axess online help.
Contact Support	Launch the Digi Support page.

Review device status information in the Device Summary page

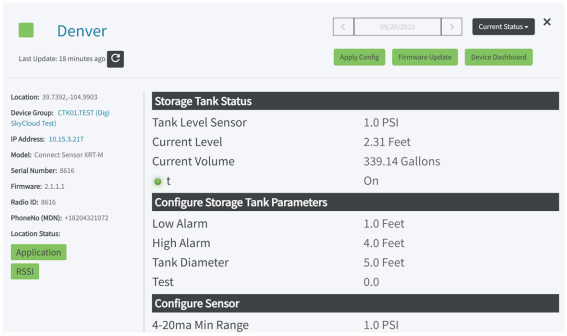
Information about the status of a device displays in the Device Summary page. The page is displayed from the Digi Axess map by clicking on a location pin or on a device name from the mapped device list.

You can also configure some aspects of the page.

Display the Device Summary page

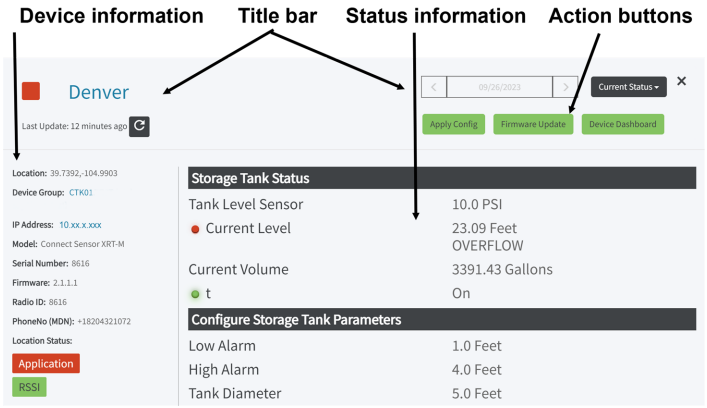
Information about the status of a device displays in the Device Summary page.

1. Log into Digi Axess. The Digi Axess map displays.
2. Select the device for which you want to display the Device Summary page and use one of the following methods to display the page:
   - Click on a location pin on the map.
   - Click on a device name from the mapped device list.



Review device information in the Device Summary page

You can display the Device Summary page by clicking on a location pin or on a device name from the mapped device list.



Action buttons

Button	Description
Apply Config	Click **Apply Config** to apply a configuration update to the device. This button displays only if the user logged in is an Admin. See Apply a configuration file to a Connect Sensor from the Device Summary page. **Note** This option is available only for Connect Sensor devices.
Firmware Update	Click **Firmware Update** to schedule a firmware update for the device. This button displays only if the user logged in is an Admin. See Update the Connect Sensor firmware from the Device Summary page. **Note** This option is available only for Connect Sensor devices.
Configure Device	Click **Configure Device** to access the web UI for the device. See Access the device's web UI from the Device Summary page.

Device information

Item	Description
Location	The latitude and longitude for the device's physical location. See the Assigning Coordinates table for details.
Device Group	The device group in which this device is included. See Device Management: Manage in Digi Axess Admin.
GPS Course	The course (direction) in which a device is moving. This is reported if the following conditions are met: ■ GPS is enabled on the device. ■ The device is connected to a cellular network.

Item	Description
	Note Z45 Controller only.
Speed	The speed in which a device is moving. This is reported if the following conditions are met: ■ GPS is enabled on the device. ■ The device is connected to a cellular network. **Note** Z45 Controller only.
IP Address	The IP address assigned to the device.
Model	The device model name.
Serial Number	The device's identifier. ■ Z45 Controller: Serial number ■ Connect Sensor: IMEI
Firmware	The firmware version currently installed on the device.
Radio ID	The IMEI assigned to the device.
PhoneNo (MDN)	The phone number associated with the wireless account.
Location Status	A set of metrics tracked by the firmware. The color denotes the status of the metric. For detailed information, see Digi Axess Location Status information.

Title bar

Item	Description
Status indicator	The colored square next to the location name shows the status of the location. The color is determined by the Location Status items, which are listed on the left pane. ■ **Green**: All of the **Location Status** items are green. ■ **Yellow**: At least one of the **Location Status** items is yellow. The rest may be green or yellow, but none are red. ■ **Red**: At least one of the **Location Status** items is red. ■ **Gray**: The device has not connected to Digi Axess within the last 24 hours.
Blue Status indicator	A second colored square, which is always blue, displays if the device has an Automation input configured that evaluates either a threshold or an on/off state, and is then received by Digi Axess from the device. The input configuration is user-defined.
Name	The name of the location. Click the location name to launch the web UI for the device. **Note** If the device is a Z45 Controller, you are required to log into the device's web

Item	Description
	UI with the user name and password for the device.
Date	Determines the date for the historical data that displays. The current date is the default. Click the **Date** to display a calendar pop-up. Select a day to display a historical view of network management data that is displayed on the device, radio, and network tabs. Click the **Previous Day** (left arrow) and **Next Day** (right arrow) to display data from the previous or the next day.
	**Z45 Controller only**: Click the icon to pull current data from the device. The device must be connected to the cellular network to be able to pull current data.
Last Update	The last time at which the device data was updated. Click the refresh button to refresh the data. 

Status information

The data available depends on the device. An overview of the sections that may display is in the table below.

For more detailed information, see:

- Review status information for a Z45 Controller
- Review status information for a Connect Sensor

Item	Description
Current Status list box	Select the items that you would like to display in the body of the page. The information in each section is dependent on the device. ■ **Show all**: Show all of the available information. This is the default. ■ **Device-specific automation groups**: Any automation that has been programmed to collect data from the device displays as an option. ■ **Analysis**: Show only the graphed analysis of the collected data. ■ **System Status**: Show hardware information. ■ **Network Status**: Show cellular network information. ■ **Data Usage** (Z45 Controller only): Show information about the cellular data plan usage. ■ **Config Status** (Connect Sensor only): Show information about the synchronization of the device configuration with Digi Axess.

Review status information for a Connect Sensor

The system status, network status, and configuration information for a Connect Sensor can be displayed in the Device Summary page.

Automation Control Groups

Any automation control groups that have been assigned a group name display as a section on this page. The groups are unique to each Connect Sensor.

As an alternative, you can also review automation control group data in the Automation Dashboard page.

System Status

The system status information is calculated for the current data as of the last time that the device reported information.

Item	Description
Battery Status	A battery graphic describes the status of the battery. ▪ **Full green**: Battery status good. ▪ **Partial green**: Battery status good. ▪ **Yellow**: Battery should be changed soon. ▪ **Red**: Battery needs to be changed. ▪ **Dash**: Battery is not plugged in.
Case Temperature	The temperature of the Connect Sensor+ enclosure.
CPU Temperature	The temperature of the Connect Sensor+ device.
Firmware Version	The current firmware version installed on the device.

Network Status

Item	Description
APN	The APN assigned to the device. ▪ **(Auto)**: The APN is not yet known. This may occur if the Connect Sensor+ has not yet connected to Digi Axess. ▪ **<APN number>**: The actual APN string that was used during the most recent connection between Connect Sensor+ and Digi Axess, or the APN that was manually assigned in the web UI.
Cell Modem Model	Name of the cell modem model in the device.
Cell Modem Firmware	The current version of the cell modem firmware.
Provider	The name of the cellular carrier.
ICCID	The SIM card identifier.
IMSI	The unique International Mobile Subscriber Indentity assigned to the SIM card.
RSSI	The average, low, and high signal strength for the selected date.

Item	Description
(Avg/Low/High)	
EC/IO (Avg./Low/High)	The average, low, and high measure of the quality of the signal from the tower to the cell modem.
Cell ID	The unique number by a cell tower can be identified within a location area code (LAC) or a GSM network.
Last Disconnect Reason	The reason for the last time the device disconnected from a cell tower.

Config Status

Item	Description
Sync Status	Information about the next synchronization between Digi Axess and the device.
Last Sync	The date and time of the last full configuration synchronization between Digi Axess and the device.

Review status information for a Z45 Controller

The system status, network status, and data usage information for a Z45 Controller can be displayed in the Device Summary page.

System Status

The system status information is calculated for the current data as of the last time that the device reported information.

Item	Description
Temperature (Avg./Low/High)	The average, low, and high device temperatures for the selected date.
Voltage (Avg./Low/High)	The average, low, and high voltage measurements for the selected date.
OS Uptime	How long the device has been powered and running on the selected date.
OS Uptime Pct.	The percentage of the time on the selected date that the device has been powered and running.

Data Usage

Data usage is calculated over an entire billing cycle. The **Starting Day** notes the day in the billing cycle the current date is on. The **Current** values show the value on the date selected from the Date pop-up calendar. The **Previous** values show the values on the same day in the billing cycle from the previous billing cycle.

Item	Description
Starting Day	The in the billing cycle that the current date is on.
Current Sent	The total data amount used to send data from the device to Digi Axess through the selected date.
Current Received	The total data amount used to receive data sent from Digi Axess to the device through the selected date.
Current Total	The total current data usage: **Current Sent** + **Current Received**
Previous Sent	The total data amount used to send data from the device to Digi Axess through the same day in the billing cycle from the previous billing cycle.
Previous Received	The total data amount used to receive data sent from Digi Axess to the device tthrough the same day in the billing cycle from the previous billing cycle.
Previous Total	The total previous data usage: **Previous Sent** + **Previous Received**

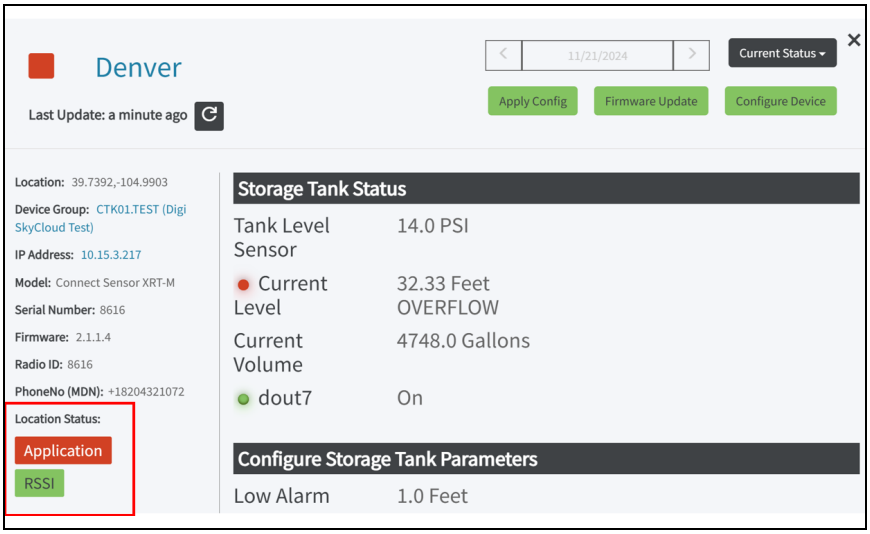
Network Status

Item	Description
Record Start Time	The start date and time on which information for the selected day was collected.
Record End Time	The end date and time on which information for the selected day was collected. If the current date is selected, the end time is the last time a connect was made.
Band	The cellular frequency band.
Carrier ID	The carrier identification code.
Network SID	The network security identifier. The number of times this changed during the selected date is noted.
Network Service	The cellular network currently being used. The number of times this changed during the selected date is noted.
Roaming	Specifies whether roaming is being used for the cellular connection. The number of times this changed during the selected date is noted.
RSSI (Avg/Low/High)	The average, low, and high signal strength for the selected date.
Connection Attempts/Success	The number of cellular connection attempts made and the number that of attempts that were successful.
Total Connection Time	The total length of time the device was connected to the cellular network on the selected day.
Connection Time	The average length of time of all connection events on the selected day.

Item	Description
Avg.	
Connection Time Min	The minimum length of time of a connection event on the selected day.
Connection Time Max	The maximum length of time of a connection event on the selected day.
Connection Time Pct.	The percent of the total connected time that the device was connected to the cellular network on the selected day.

Digi Axess Location Status information

The location status information is a set of metrics tracked by the firmware and displays in the asset list.



The metric color is determined by the thresholds assigned to the metric.

Metric	Description
Application	The application metric is a combination of the automation configurations defined for the device. Each automation is assigned thresholds that determine green, yellow, or red status. To determine the application metric status, Digi Axess considers the status of all of the automations. ▪ **Green**: All automation configurations are green. ▪ **Yellow**: At least one automation configuration is yellow. The rest may be green or yellow, but none can be red. ▪ **Red**: At least one automation configuration is red.
Battery	A battery graphic describes the status of the battery. ▪ **Full green**: Battery status good. ▪ **Partial green**: Battery status good.

Metric	Description
	■ **Yellow**: Battery should be changed soon. ■ **Red**: Battery needs to be changed. ■ **Dash**: Battery is not plugged in.
Data	Data is at the threshold defined in TCOPlus WAN management feature.
GPS	The number of minutes from the last location update during the defined interval. ■ **Green**: Equal to or above 900 minutes. ■ **Yellow**: Between 3600 and 900 minutes. ■ **Red**: Equal to or more than 3600 minutes.
RSSI	Signal strength. ■ **Green**: -88 or above. ■ **Yellow**: Less than -88. ■ **Red**: Less than -98.
Uptime	Percentage of time the network was available. ■ **Green**: Equal to or above 90%. ■ **Yellow**: Between 75% and 90%. ■ **Red**: Less that or equal to 75%.

Access the device's web UI from the Device Summary page

You can log in to a device's web UI from Device Summary page in the Digi Axess map.

1. Log in to Digi Axess. The Digi Axess map displays.
2. Find the device that you want to configure, using one of the following methods, and display the Device Summary page.
   - Click on the device's location pin on the map.
   - If your device is mapped, scroll through the mapped device list displayed on the lower left of the Digi Axess map. Click on the device name.
   - Use the search feature in the toolbar. As you type, a list of matching devices displays. Click on the tile for the device you want to configure.
   - Click the Grid or Table icons on the left side of the map to display a list of devices. Use the search features to limit the devices displayed. Click on the tile or the row for the device you want to configure.
3. In the Device Summary page, click the device name or the **Configure Device** button to access the web UI for the device.
   - **Connect Sensor**: The web UI for the device displays in Digi Axess. Any changes you make are stored and then pushed from Digi Axess the next time that the Connect Sensor wakes and connects to the network. See Configuration overview for a Connect Sensor.

- **Z45 Controller**: The web UI log in page for the device displays. Enter the user name and password for the device and click **Login**. The Z45 Controller must be powered on and connected to the network before you can access the device from the Digi Axess Admin page. See Configuration overview for a Z45 Controller in Digi Axess.

> **Note** In some situations when you are using Digi Axess VPN to monitor your Z45 Controllers that are registered with Digi Axess, the **Configure Device** button may not immediately connect you to the web UI log in page for the device. If this happens, disconnect from OpenVPN and then reconnect. Return to the Device Summary page and click **Configure Device** again.

Define the Device Summary page and display options

You can choose the default data display style and the auto-refresh interval for the Device Summary page.

1. Access the device's web UI from the Device Summary page.
2. If you have logged into a Z45 Controller, click **Admin Main**.
3. In the **Options** section, click **Dashboard Settings**. The **Dashboard Settings** page displays.
4. Scroll down to the **Dashboard Options** section.
5. From the **Display Template** list box, determine the Device Summary page display style.
   - **Default**
   - **Tabular**
6. From the **Default View** list box, determine the data display style:
   - **Detailed**
   - **Overview**
   - **Analysis**
7. In the **Auto-Refresh Time** field, enter the time interval at which the data should automatically refresh. The time is measured in seconds.
   - Connect Sensor+: The default is **0** seconds
   - Z45 Controller: The default is **5** seconds
8. Click **Update**.

Define dashboard display groups

You can assign the device to a dashboard display group, which is a display group used on the Digi Axess Device Summary page and in the device comparison graphs page. This feature can be used to group similar devices together for easy comparison.

You can also create a new dashboard display group if needed. A dashboard display groups can be selected when configuring an input pin or an output pin.

- Configure input pins on the Connect Sensor XRT-M
- Configure input pins on the Z45 Controller
- Configure output pins on a Connect Sensor XRT-M
- Configure output pins on a Z45 Controller

Note For best results in the device comparison graphs page, the devices in a device group should have similar dashboard groups.

1. Access the device's web UI from the Device Summary page.
2. If you have logged into a Z45 Controller, click **Admin Main**.
3. In the **Options** section, click **Dashboard Settings**. The **Dashboard Settings** page displays.
4. In the **Dashboard Groups** section, determine which dashboard groups are displayed on the Device Summary page.
   - **Show All Panels on Dashboard**: Click this option to include all of the dashboard groups. This option toggles with the **Default** option.
   - **Default**: Click this option to specify a default dashboard group. This will be the only group displayed on the dashboard. This option can be selected for only one dashboard group, and if this option is selected, the **Show All Panels on Dashboard** is deselected.
   - **Hide**: Click this option for the dashboard groups that you don't want to display on the dashboard. If **Show All Panels on Dashboard** is selected, the dashboard groups that have **Hide** selected do not display on the dashboard.
5. You can add a dashboard display group.
   a. Click **Add Group**. An additional group field displays.
   b. Enter a descriptive name for the dashboard display group.
6. Click **Update**. A confirmation dialog displays.
7. Click **OK**.

Digi Axess User Profile menu options

You can manage your Digi Axess user profile options from the **User Profile** menu in the Digi Axess map page. Log in to Digi Axess to access the menu.

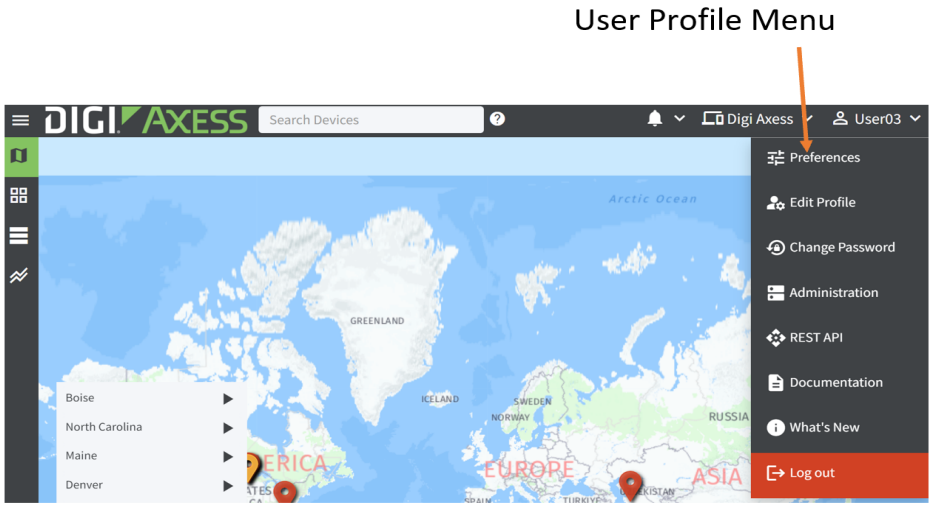
Menu option	Description
Preferences	Click **Preferences** to select your defaults for the map page. These defaults are applied to the map page each time you log in. See Set your map page display defaults.
Edit Profile	Click **Edit Profile** to change your contact information, such as name, email, and phone numbers, and set your screen style. See Manage your contact information.
Change Password	Click **Change Password** to change your log in password for Digi Axess. See Change your Digi Axess password.
Administration	Click **Administration** to access the Digi Axess Admin dashboard. In the administration pages, you can manage contacts, services, devices and device groups, device configuration, and user profiles. See Digi Axess Administration Dashboard overview. **Note** Only users assigned the **Admin** or **Device User** roles can access the Digi Axess Admin dashboard.
Register Device	Click **Register Device** to register a device for use in Digi Axess. See Register a device from the Digi Axess User Profile menu.
REST API	Click **REST API** to access the Digi Axess REST API documentation. The Digi Axess REST API enables owners to retrieve device sensor data for further processing.
Documentation	Click **Documentation** to launch the Digi Axess User Guide in a new browser window.
What's New	Click **What's New** to display a list of recent updates. This is the same list that can be accessed from the update banner.
Enable Push Notification	Click **Enable Push Notification** to enable the feature and allow notifications to display as pop-up messages on your computer. When the feature is enabled, the menu option does not display in the **User Profile** menu. For more information, see Manage notification pop-ups.
Install As	Click **Install As Application** to install Digi Axess as a stand-alone application on

Menu option	Description
Application	your PC or other device. After you have installed it as an application, this menu option is no longer included in the list of menu options. For more information, see Install Digi Axess as a stand-alone application.
Log out	Click **Log out** to log out of Digi Axess. The Digi Axess log in page displays.

Access the User Profile menu

The **User Profile** menu is associated with your user profile name on the Digi Axess map page.

1. Log into Digi Axess.
2. Make sure you are on the Digi Axess map page. If you are not, click the map icon to access the page.
3. Click the down arrow next to your user name. The **User Profile** menu displays.



Manage your contact information

You can update the contact information associated with your user profile from the **User Profile** menu in the Digi Axess map page.

1. Log into Digi Axess to access the Digi Axess map page.
2. In the toolbar, click the down arrow next to your user name. The **User Profile** menu displays.
3. Click **Edit Profile**. The **Update Profile** page displays.
4. Click the **Contact Information** tab to update your contact information. Make updates to your contact information as needed in the **First name**, **Last name**, **Email**, **Phone Number**, and **Phone Number 2** fields.
5. Click the **Preferences** tab to update your screen style option. Options are **Browser Default**, **Light**, or **Dark**.
6. Click **Save** to save your choices.

   If you don't want to save your changes, click **Home** to return to the Digi Axess map page.

Manage Digi Axess passwords

You can change the password associated with your Digi Axess user log in name.

Change your Digi Axess password

You can change your Digi Axess password.

1. Log into Digi Axess.
2. Click the down arrow next to your user name in the upper right corner of the page to display the user profile menu.
3. Click **Change Password**. The **Digi Axess Change Password** page displays.
   a. In the **Current Password** field, enter your current password.
   b. In the **New Password** field, enter your new password. The password requirements are listed.
   c. In the **Confirm Password** field, re-enter your new password. The entries in the **New Password** and the **Confirm Password** fields must match.
4. Click **Submit**. An email is sent to Digi Axess. After a few minutes, an email is sent to the email address you entered with further instructions.

   If you choose not to change your password, click **Cancel** to return to the previous page.

Forgot your Digi Axess password

You can reset your Digi Axess password if needed, such as if you forgot your password.

1. Navigate to **digiaxess.com** in your web browser. The **Digi Axess Log In** page displays.
2. Click **Forgot Password**. The **Digi Axess Reset Password** page displays.
3. In the **Username** field, enter your email address.
4. Click **Submit**. An email is sent to Digi Axess. After a few minutes, an email with further instructions is sent to the email address you entered.

Digi Axess Administration Dashboard overview

When you access the Digi Axess Admin page, the Admin page dashboard displays.

The Digi Axess administration dashboard options are used to apply device configurations, view firmware update history, create and update devices and device groups, manage notification contacts and groups, and create and maintain user profiles.

Dashboard

You can access the admin features from the dashboard or from the toolbar on the left of the page.

- **Data Export**: Export the data from Digi Axess.
  - Data Export: Manage MQTT configuration (Connect Sensor XRT-M only)
  - Data Export: Configure Event Queues
- **Device Configuration Management**: Apply a saved device configuration to a device or a group of devices.

  - Device Configuration Management: Manage in Digi Axess Admin
  - Formulas: Manage in Digi Axess Admin (Connect Sensor only)
- **Device Firmware History**: Review the Digi Axess firmware updates that have been applied,
  - Device Firmware History: Manage in Digi Axess Admin.
- **Device Management**: Manage device groups and apply a configuration to a device.
  - Device Management: Manage in Digi Axess Admin.
- **Notification Management**: Manage Digi Axess contact information and view the available services.
  - Notification Management: Manage in Digi Axess Admin.

Note Only users with **Admin** privileges can access the **Notification Management** section.

- **User Management**: Manage Digi Axess users.
  - User profiles: Manage in Digi Axess Admin.

Note Only users with **Admin** privileges can access the **User Management** section.

Map icon

Click the map icon in the upper right corner of the page to return to the Digi Axess map. See Digi Axess map overview.

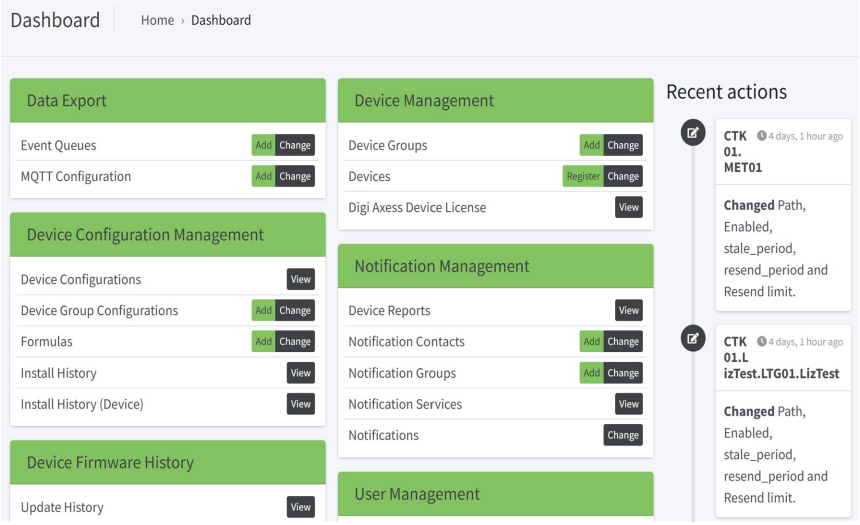
User profile icon

Click the profile icon in the upper right corner of the page for more features.

- **Change Password**: Click to change your Digi Axess password. See Change your Digi Axess password.
- **Log out**: Click to log out of Digi Axess. The Digi Axess log in page displays.

Recent Actions

The **Recent Actions** section on the right side of the page shows a time line list of the changes the user that is logged in has made. You can also review the history for device groups, devices, notification contacts, and notification groups in the associated page. See Review the update history.



Access the Digi Axess Admin page

Note You must have **Admin** or **Device User** privileges to access Digi Axess Administration page. However, only users with **Admin** privileges can access the **Notification Management** and **User Management** sections.

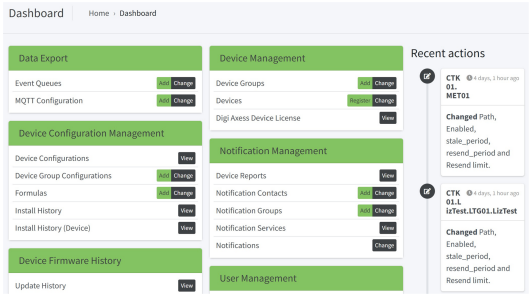
1. Log into Digi Axess.
2. In the toolbar, click the down arrow next to your user name. The **User Profile** menu displays.
3. Click **Administration**. The **Digi Axess Admin** page displays. For information about the page features, see Digi Axess Administration Dashboard overview.

Review the update history

When reviewing device groups, devices, notification contacts, and notification groups, you can review an event log that shows a list of changes that have occurred for the selected item.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Device Groups**, **Devices**, **Notification Contacts**, or **Notification Groups**.
3. Find the item that you want to review. You can scroll through the list or use the **Search** box.
4. Click on the name of the item.

5. Click the **History** button. A time line of updates displays on the right side of the screen.



Register a device from the Digi Axess User Profile menu

You must register the devices that you want to access and manage from Digi Axess. The process uses the device's serial number or IMEI as a unique identifier.

- **Connect Sensor family**: Register a Connect Sensor device
- **Z45 Controller**: Register a Z45 Controller

Note You can also register devices from the Devices page.

Register a Connect Sensor device

Your device must be registered with Digi Axess so that you can access and manage the device from Digi Axess.

Before you begin

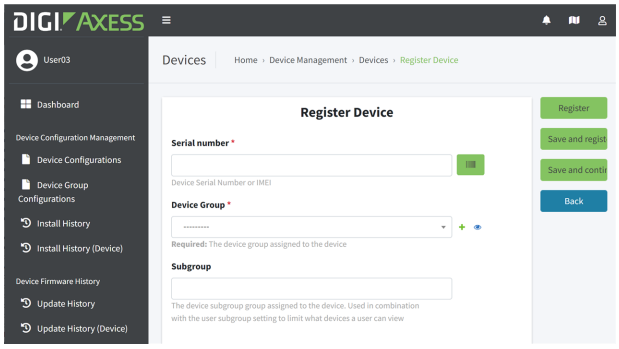
You will need this information to register your device:

- Serial number or IMEI
- The device group in which the device should be included.

To register your device:

1. Log into Digi Axess.
2. Access the Digi Axess **Register Device** page.
   a. In the toolbar, click the down arrow next to your user name. The **User Profile** menu displays.

b. Click **Register New Device**. The **Register Device** page displays.



3. In the **Serial Number** field, enter the unique identifier for the device. You can enter the device's serial number or IMEI. As an alternative, click the **Scan Barcode** button next to the field and use a camera or a saved image to enter an identifier.
4. From the **Device Group** list box, select a device group from the drop-down list.
5. (Optional) In the **Subgroup** field, enter a subgroup name.
6. Click **Register**. The **Set Device Location Source** page displays.
7. Name and define the device's physical location.
   a. In the **Location Name** field, enter a descriptive name for the device's physical location. If you leave this field blank, the device's serial number is used by default.
   b. Select a **Location Source** option, which defines the method used to configure the physical location for the device.
      - **None**: No physical location is defined. The device is unmapped and won't appear on the Digi Axess map. You can specify a location at a later time.
      - **Manual**: Manually enter the latitude and longitude of the physical location of the device.
      - **GPS**: The physical location is determined by the device's internal GPS. The location is updated the next time the device wakes and connects to Digi Axess.

        Note This feature is not available for Connect Sensor+.

8. In the **Set Device Configuration** page, from the **Choose a Configuration** list box, select an initial configuration for the device.
   - **Demo Configuration**: This is the default configuration, and displays basic information in the Device Summary page: **Analog in Voltage**, **Digital in**, and **Case Temperature**.
   - **Blank Configuration**: No data displays. You must manually configure the device in the device's **Administration** page.
   - **Saved Configuration**: Select a configuration that you have previously created and saved. The configuration is applied to this device.
9. Click **Set** to save your selections.
10. Verify that the location and configuration selections are available. You need to wake the device, and when the device connects to Digi Axess, the configuration is pushed from Digi Axess to the Connect Sensor device.

    For detailed information, see Verify device registration.

Register a Z45 Controller

Your device must be registered with Digi Axess so that you can access and manage the device from Digi Axess.

Before you begin

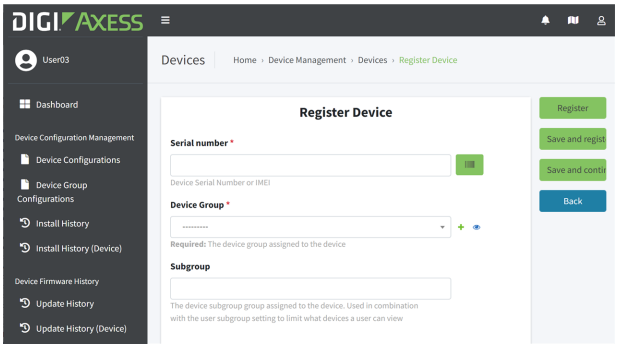
You will need this information to register your device:

- Serial number or IMEI
- The device group in which the device should be included.

To register your device:

1. Log into Digi Axess.
2. Access the Digi Axess **Register Device** page.
   a. In the toolbar, click the down arrow next to your user name. The **User Profile** menu displays.

b. Click **Register New Device**. The **Register Device** page displays.



3. In the **Serial Number** field, enter the unique identifier for the device. You can enter the device's serial number or IMEI. As an alternative, click the **Scan Barcode** button next to the field and use a camera or a saved image to enter an identifier.
4. From the **Device Group** list box, select a device group from the drop-down list.
5. (Optional) In the **Subgroup** field, enter a subgroup name.
6. Click **Register**.

Install Digi Axess as a stand-alone application

You can choose to install Digi Axess as a stand-alone application on your PC or other device. This enables you to access Digi Axess in a separate window rather than from a browser. When installed, webpush notifications from Digi Axess can be received on the device on which the app was installed.

Note After you have installed it as an application, this menu option is no longer included in the list of menu options.

1. Log into Digi Axess.
2. In the toolbar, click the down arrow next to your user name. The **User Profile** menu displays.
3. Click **Install As Application**. The **Install App** window displays.
4. Click **Install**. The application is installed.
5. A message window displays, asking if you want to pin the application to your taskbar.
   - Click **Yes** to pin the application.
   - Click **No, thanks** if you don't want to pin the application.
6. To run the application, click the pinned application icon from the taskbar, or search your device for the Digi Axess app.

Manage notification pop-ups

You can enable the **Enable Push Notification** feature to allow notifications to display as pop-up messages on your computer. The feature can be disabled if needed.

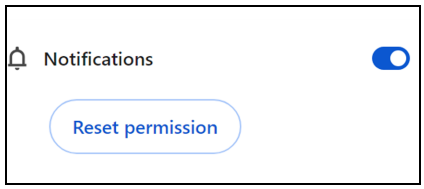
Enable push notifications

1. Log into Digi Axess.
2. Click the down arrow next to your user name in the upper right corner of the page to display the user profile menu.
3. Click **Enable Push Notification**. A confirmation dialog displays beneath the URL search bar in the browser window. The message **Get notifications** displays in the search bar.
4. Click **Allow** to enable feature.

   As an alternative, click **Block** to block all notification pop-up messages.
5. The **Enable Push Notification** menu option is no longer on the **User Profile** menu.

Disable push notifications

1. Log into Digi Axess.
2. In the URL search bar, click the **View site information** icon on the left. A site information menu displays.
3. In the **Notifications** menu section, click **Reset permission**.



4. Reload the map page. The **Enable Push Notification** menu option is available on the **User Profile** menu.

Log into Digi Axess

Launch Digi Axess and log in using the user name and password for your Digi Axess account.

1. Navigate to digiaxess.com in your web browser.
2. Click **Login**. The **Digi Axess Log In** page displays.
3. Enter your user name and password.
   - **User name**: Enter the user name for your Digi Axess account. Verify the user name with your system administrator.
   - **Password**: Enter the password for your Digi Axess account.
4. Click **Submit** to log in to Digi Axess. The Digi Axess update banner displays, on top of the Digi Axess map. If the banner does not display, it has been ignored in a previous session.
   - Click **Don't Show Again** to permanently turn off the banner.
   - Click **Ignore** to close the banner.

Data Export: Manage MQTT configuration (Connect Sensor XRT-M only)

You can configure MQTT for a Connect Sensor and enable or disable the MQTT service from the Administration dashboard in Digi Axess or from a Connect Sensor web UI.

Note Any MQTT configurations created in the Digi Axess Administration menu can be applied to a device from the device's web UI. The device must be in the device group selected for the MQTT configuration. See Configure MQTT for a device from the web UI (Connect Sensor XRT-M only).

Review the MQTT configurations

You can review the existing MQTT configurations.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Data Export** section in the Admin dashboard, click **MQTT Configuration**. As an alternative, you can click **MQTT Configuration** from the dashboard pane to the left of the page. A list of the MQTT configurations displays.
3. Review the information for each configuration.

Field	Description
MQTT Broker Host	The MQTT broker host configuration. Click the MQTT broker host link to display the configuration details.
MQTT Broker Port	The number of the MQTT Broker port to which data should be sent.
Description	The descriptive name for the configuration. The name is unique for the device group.
Device Group	The device group for which the MQTT is configured.
MQTT Enabled	Confirms whether the MQTT service is enabled. ▪ **Enabled**: A check mark displays in a green circle. ▪ **Disabled**: An x displays in a red circle.
MQTT Spec	Currently the only supported format is the standard MQTT format, with raw data being sent. The **MQTT on Device - No Formula Support** option is selected by default.

Add an MQTT configuration

You can configure MQTT for a device group.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Data Export** section in the Admin dashboard, click **Add** next to the **MQTT Configuration** label. As an alternative, you can click **MQTT Configuration** from the dashboard pane to the left of the page and then click **Add MQTT Configuration** at the top of the page. The **General Settings** page displays.
3. Begin configuration in the **General Settings** page.
   a. From the **Device Group** list box, select the device group for which you want to configure MQTT. This configuration is available for all devices in the device group.
   b. In the **Description** field, enter a descriptive name for the configuration. The name must be unique for the device group.
4. Click the green arrow at the top of the page. The **MQTT Configuration** page displays.
5. Enable the MQTT service and continue with configuration in the **MQTT Configuration** page.

Field	Description
MQTT Enabled	Click **MQTT Enabled** to enable the MQTT service. The toggle button is green when the service is enabled.
MQTT Spec	Currently the only supported format is the standard MQTT format, with raw data being sent. The **MQTT on Device - No Formula Support** option is selected by default.
Send Sample Date to Digi Axess	Enable **Send Sample Date to Digi Axess** if you want to send sample data to Digi Axess for further processing. This is disabled by default, and when it is disabled, no data is sent to Digi Axess.
QoS	Currently only one MQTT quality of service level is available. The **0 - at most once** option is selected by default.
MQTT topic prefix	In the **MQTT topic prefix** field, enter the MQTT topic prefix to use. The following variables are supported: **$Model**, **$LocationName**, and **$SerialNumber**. The **MQTT topic preview** space previews what the topic will be when the variables are resolved and the postfix is added.

6. Click the green arrow at the top of the page. The **MQTT Broker Configuration** page displays.
7. Configure the MQTT broker.

Field	Description
MQTT Broker Host	Enter MQTT the broker host to which data is sent. The MQTT broker host must be unique.
MQTT Broker Port	Enter the number of the MQTT Broker port to which data should be sent.
Username	Enter the user name to authenticate with the broker.
Password	Enter the password to authenticate with the broker. Click the eye icon next to the field to toggle the password display.
TLS Enabled	Enable TLS.
TLS Cert Check	Enables checking the broker identity with a certificate.

8. Click **Add**. The MQTT configuration is saved. The **MQTT Configuration** page displays, and includes the new configuration.

Edit an MQTT configuration

You can edit an MQTT configuration.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.

2. From the **Data Export** section in the Admin dashboard, click **Change** next to the **MQTT Configuration** label. As an alternative, you can click **MQTT Configuration** from the dashboard pane to the left of the page and then click the link for the MQTT configuration. The **MQTT Configuration** page displays.
3. Click each tab to edit the configuration. For details about each item, see Add an MQTT configuration.
4. When changes are complete, click **Save**. You are returned to review page, and the message "The MQTT configuration was changed successfully" displays in a green banner.

Delete an MQTT configuration

You can delete an MQTT configuration that is no longer needed.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Data Export** section in the Admin dashboard, click **MQTT Configuration**. As an alternative, you can click **MQTT Configuration** from the dashboard pane to the left of the page. A list of the MQTT configurations displays.
3. Select the configuration(s) that you want to delete.
   - Click the check box next to each configuration you want to delete. You can select more than one.
   - Click the **MQTT broker host** check box to select all of the configurations.
4. From the **Go** list box, select the **Delete selected MQTT Configuration** option.
5. Click **Go**. The **Delete Multiple Objects** page displays and overview of the group(s) and related items that will be deleted.
6. Click **Yes, I'm sure** to complete the deletion process. You are returned to the **MQTT Configuration** page. A green banner with a **Successfully deleted** message displays at the top of the page.
   - Click **No, take me back** if you don't want to complete the deletion.

Data Export: Configure Event Queues

You can create and use event queues to collect data from Digi Axess and save it until you ask for the data using an API call. The event queue consists of the data streams from the devices in a device group. This feature reduces the number of calls you need to make to collect the data you want.

You can save the event queue data to a location of your choice, where you can examine the data. Once you have read the data with the API call, the data is deleted from Digi Axess.

You can pull up to 1,000 events at a time. If you have more than 1,000, the next call shows the remaining events.

The event queue API calls are listed in the **Event Queue** section of the API REST documentation.

Review the event queues

You can review a list of the event queues.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Data Export** section in the Admin dashboard, click **Event Queues**. As an alternative, you can click **Event Queues** from the dashboard pane to the left of the page. The **Event Queues** page displays.
3. The table below describes the **Event Queues** page.

Item	Description
Add Event Queue button	Click **Add Event Queue** to add an event queue.
Go button	Click **Go** to delete selected event queues.
Device Group	The name of the device group for which data is collected by the event queue. Click the device group name to edit the event queue.
Description	The event queue name.
Enabled	Specifies whether the event queue is enabled and can collect data. ■ Green circle: The event queue is enabled and can collect data. ■ Red circle: The event queue is disabled and cannot collect data.
Last Event	The date and time on which the last event was queued.
Last Query	The date and time on which the last event query was made.
Unread events	The number of stored events.

Add an event queue

You can create and use event queues to collect data from Digi Axess and save it until you ask for the data using an API call.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Data Export** section in the Admin dashboard, click **Add** next to the **Event Queues** label. As an alternative, you can click **Event Queues** from the dashboard pane to the left of the page and then click **Add Event Queue** at the top of the page. The **Event Queues General Settings** page displays.
3. From the **Device Group** list box, select a device group. The data streams from the devices in this device group are included in the event queue.
4. In the **Description** field, enter a descriptive name for this event queue.
5. From the **Format** list box, select the format in which the data will be sent.
6. Determine the devices for which data will be collected.

- **Include Device Group Devices**: Select this option to collect events for all of the devices in the device group.
- **Include Child Device Group Devices:** Select this option to collect events for all devices in the child device groups

7. Click **Add**. You are returned the **Event Queues** page. The event queue you just created is in the event queue list.

Edit an event queue

Delete this text and replace it with your own content.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Data Export** section in the Admin dashboard, click **Event Queues**. As an alternative, you can click **Event Queues** from the dashboard pane to the left of the page. The **Event Queues** page displays.
3. In the list of event queues, click on the device group name of the queue that you want to edit.
4. Click the **Current Status** tab, to enable or disable the event queue, and review information about the queue.
   - Click the **Enabled** toggle to enable and disable the event queue.
     - **Enabled**: When enabled, the toggle is green and event queue data is collected.
     - **Disabled**: When disabled, the toggle is gray and event queue data is not collected.
   - **Last event**: The date and time on which the last event was queued.
   - **Last query**: The date and time on which the last event query was made.
   - **Unread events**: The number of stored events.
5. Click the **General Settings** tab to review and update the event queue configuration. For information about each field, see Add an event queue.
6. Click the **Supported Events** tab to specify whether device data events will be queued.
   - Click the **Queue Device Data Events** toggle to determine whether device data events are queued.
     - **Enabled**: When enabled, the toggle is green and device data events are collected. This is the default.
     - **Disabled**: When disabled, the toggle is gray and device data events are not collected.
7. Click **Save** if you have made any changes. You are returned to the **Event Queues** page and the message "The Event Queue was changed successfully" displays in a green banner.

Delete an event queue

You can delete an event queue that is no longer needed.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Data Export** section in the Admin dashboard, click **Event Queues**. As an alternative, you can click **Event Queues** from the dashboard pane to the left of the page. The **Event**

Queues page displays.

3. Select the event queue(s) that you want to delete.
    - Click the check box next to each queue you want to delete. You can select more than one.
    - Click the check box in the header to select all of the configurations.
4. From the **Go** list box, select the **Delete selected Event Queues** option.
5. Click **Go**. The **Delete Multiple Objects** page displays and overview of the queue(s) that will be deleted.
6. Click **Yes, I'm sure** to complete the deletion process. You are returned to the **Event Queues** page. A green banner with a **Successfully deleted x Event Queues** message displays at the top of the page.
    - Click **No, take me back** if you don't want to complete the deletion.

Access event queue API calls

The event queue API calls are listed in the **Event Queue** section of the API documentation.

1. Log into Digi Axess. The Digi Axess map displays.
2. Click the down arrow next to your user name in the upper right corner of the page to display the user profile menu.
3. Click **Change Password**. Click **REST API**. The **Digi Axess REST API** page displays.
4. Scroll down to the **Event Queue** section to review the API calls.

Device Configuration Management: Manage in Digi Axess Admin

In the **Device Configuration Management** pages you can apply a configuration to one device or to a group of devices. You can also create a device group configuration, which enables you to apply a configuration to the devices in a device group.

The list of configurations available includes the device configurations that have been backed up and saved, for the devices that are in a device group to which you have access, plus all of the default configurations that are provided with your Digi Axess account.

Other ways to apply a configuration to a device

You can apply a configuration file from the Digi Axess Admin menu only to Connect Sensor devices.

- **Connect Sensor devices**: You can also apply a configuration to a Connect Sensor device from the Device Summary page.
- **Z45 Controller**: Configurations can be applied to a Z45 Controller from the device's web UI.

Before you begin

You should have saved a configuration that you want to apply to other devices, or have access to a default configuration. Configurations are created and saved from a device's web UI.

Create a device group configuration

You can create a device group configuration that enables you to apply the same device configuration to all of the devices of a selected device model in a device group. This feature is useful when you want to ensure that all of the devices in a group have the same configuration.

After you have created the device group configuration, it is included in the list of configurations in the Device Group Configurations page.

Device configuration

You can select one device configuration that will be applied to the devices in the device group. The list of configurations available includes the device configurations that have been backed up and saved, for the devices that are in a device group to which you have access, plus all of the default configurations that are provided with your Digi Axess account.

Device models

The configuration is applied only to one selected device model. If your device group includes multiple device models, the selected configuration is applied only to the models of the type selected. For example, if your device group includes both Connect Sensor+ and Connect Sensor XRT-M NEMA

devices, and the model selected for the configuration is Connect Sensor XRT-M NEMA, the configuration is applied only to the Connect Sensor XRT-M NEMA devices.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Configuration Management** section in the Admin dashboard, click **Add** next to the **Device Group Configurations** label.

   As an alternative, you can click **Device Group Configurations** from the dashboard pane to the left of the page. The **Device Group Configurations** page displays. Click **Add Device Group Configuration**.
3. From the **Device Group** list box, select the device group for which you want to create a device group configuration.

   Note Click the green plus sign next to the list box to create a new device group.
4. From the **Device Model** list box, select the device model to which the configuration should be applied.
5. From the **Device Config** list box, select the device configuration that should be applied to the devices.
6. The **Apply To Existing Devices** option displays, and is enabled by default. When you save the device group configuration, the selected configuration is applied to the devices of the selected type in the device group.

   If you want to apply the configuration at a later date, deselect this option. You can reapply the configuration when needed.
7. Click **Add**. The **Device Group Configurations** page is updated to display messages at the top of the screen to verify that the device configuration was initiated.
   - **Device configuration initiated**: This message displays if the **Apply To Existing Devices** was enabled. Click the **here** link to review the installation history for the device group configuration.
   - **The Device Group Configuration was added successfully**: This message displays to confirm that the device group configuration was a created. Click the link to review the device group configuration
8. Click **Back** to return the previous screen or **Reapply Device Configuraion** to apply the device group configuration.

Select a configuration and apply to one device

You can apply a device configuration to one selected Connect Sensor device. The configuration is applied the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually using a magnet.

Note You can apply a configuration file from the Digi Axess Admin menu only to Connect Sensor devices. Configurations can be applied to a Z45 Controller from the device's web UI.

The list of configurations available includes the device configurations that have been backed up and saved, for the devices that are in a device group to which you have access, plus all of the default configurations that are provided with your Digi Axess account.

Note You can apply a configuration to a Connect Sensor device using this method or other methods. See Apply a configuration to a device or a device group: Overview.

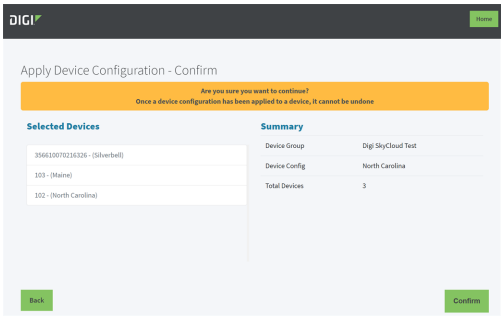
1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Configuration Management** section in the Admin dashboard, click **Device Configurations** or **View** next to that label.

   As an alternative, you can click **Device Configurations** from the dashboard pane to the left of the page. The **Device Configurations** page displays a list of configurations that can be applied.
3. Find the configuration that you want to apply. To find a configuration, you can scroll through the list or use the **Device Model** and/or a **Device Group** fields to filter the list.
4. For the desired configuration, click **Apply Config**. The **Apply Device Configuration - Select Devices** page displays.
5. From the **Device select** list box, select **Single Device**. A list of devices displays.
6. To find a device, scroll through the list or use the **Filter** field to filter the list. As you type in the field, the list of devices is filtered to match the entry. Click on the device to which you want to apply the configuration. Only one device can be selected.

   The selected device is moved to the right side of the page and displays in a green banner in the **Selected Device** window.

   Note To deselect a selected option in the **Selected Device** window, click it. It is moved to the left side of the page and you can select a different device.
7. Click **Next**. The **Apply Device Configuration - Confirm** page displays, showing the device to which the configuration will be applied, and information about the configuration.

   Note A yellow warning banner displays at the top of the screen, to alert you that applying a device configuration that cannot be undone.



8. Click **Confirm** to continue and apply the configuration.

   Note If you have changed your mind, click **Back** to return to the previous screen.
9. The **Apply Device Configuration - Results** page displays a summary of the update.
10. Click **View Results** to navigate to the Install History page to view more information.
    - **Install Details**: Shows the name of the device configuration and the device group to which it was applied.

- **Device Config**: Click the device configuration name to display information about the configuration.
- **Device Group**: Click the device group name to display information about the device group.

- **Install Status**: Shows the completion progress of the configuration application.
- **Devices**: Contains a list of the devices to which the configuration was applied.

Select a configuration and apply to a device group

You can apply a device configuration to the Connect Sensor devices in a selected device group. Some device groups may have devices of more than one device model. In this situation, the configuration is applied to only those devices of the same device model specified for the configuration.

The configuration is applied the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually using a magnet.

Note You can apply a configuration file from the Digi Axess Admin menu only to the Connect Sensor devices in the group. Configurations can be applied to a Z45 Controller from the device's web UI.

The list of configurations available includes the device configurations that have been backed up and saved, for the devices that are in a device group to which you have access, plus all of the default configurations that are provided with your Digi Axess account.

Note You can apply a configuration to a Connect Sensor device using this method or other methods. See Apply a configuration to a device or a device group: Overview.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Configuration Management** section in the Admin dashboard, click **Device Configurations** or **View** next to that label.

   As an alternative, you can click **Device Configurations** from the dashboard pane to the left of the page. The **Device Configurations** page displays a list of configurations that can be applied.
3. Find the configuration that you want to apply. To find a configuration, you can scroll through the list or use the **Device Model** and/or a **Device Group** fields to filter the list.
4. For the desired configuration, click **Apply Config**. The **Apply Device Configuration - Select Devices** page displays.
5. From the **Device select** list box, select **Device Group**. A list of device groups displays.
6. To find a device group, scroll through the list or use the **Filter** field to filter the list. As you type in the field, the list of device groups is filtered to match the entry. Click on the group to which you want to apply the configuration. Only one group can be selected.

   The selected group is moved to the right side of the page and displays in a green banner in the **Selected Device Group** window.

   Note To deselect a selected option in the **Selected Device Group** window, click it. It is moved to the left side of the page and you can select a different group.

7. Click **Next**.

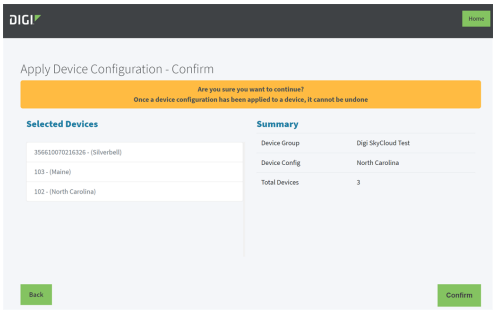
   If you selected a device group that did not have a device model specified, the **Apply Device Configuration - Select Model** page displays.

   a. Select a model from the **Models** list. The selected model is moved to the right side of the page and displays in a green banner in the **Selected Models** window. Only one model can be selected.

   b. Click **Next**

8. The **Apply Device Configuration - Confirm** page displays, showing the devices to which the configuration will be applied, and information about the configuration.

   Note A yellow warning banner displays at the top of the screen, to alert you that applying a device configuration that cannot be undone.



9. Click **Confirm** to continue and apply the configuration.

   If you have changed your mind, click **Back** to return to the previous screen.

View information about a device configuration

You can view information about a device configuration, such as the name and the device model type to which the configuration can be applied, in the Device Configurations page.

The list of configurations available includes the device configurations that have been backed up and saved, for the devices that are in a device group to which you have access, plus all of the default configurations that are provided with your Digi Axess account.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Configuration Management** section in the Admin dashboard, click **Device Configurations** or **View** next to that label.

   As an alternative, you can click **Device Configurations** from the dashboard pane to the left of the page. The **Device Configurations** page displays a list of configurations that can be applied.
3. Select a configuration that you want to review. You can scroll through the list or filter it. Select a **Device Model** and/or a **Device Group** and then click **Search** to display configurations that match the filters.
4. Click on a configuration name. The **Device Configurations** page displays.
5. Information about the configuration can be reviewed and updated.

- **Name**: The name of the configuration. You can type in a new name, but a name is required.
- **Device Group**: The device group connected to the configuration. The device configuration is available to all devices in the device group and its child groups. Click the device group name to access the Device Groups page and review details about the device group.
- **Device Model**: The type of device to which the configuration can be applied.
  - The default configurations have **None** as the **Device Model** option, which means that the demo configuration can be applied to any Connect Sensor device models.
  - Some device groups may have devices of more than one device model. In this situation, the configuration is applied to only those devices of the same device model specified for the configuration.
- **Device Configuration Type**: The type of device configuration, such as application.

6. Determine the next action.
   - **Save**: Save any changes made to the configuration and close the page.
   - **Delete**: Delete this configuration. See Delete a device group configuration.
   - **Save and continue editing**: Save any changes made to the configuration and remain on this page.
   - **History**: Display the change history for the configuration.

Reapply a device group configuration

You can apply a device group configuration to the devices in a device group as needed. This ensures that the configuration for the device models of the same type are in sync.

Note You can apply a configuration file from the Digi Axess Admin menu only to the Connect Sensor devices in the group. Configurations can be applied to a Z45 Controller from the device's web UI.

The list of configurations available includes the device configurations that have been backed up and saved, for the devices that are in a device group to which you have access, plus all of the default configurations that are provided with your Digi Axess account.

Note You can apply a configuration to a Connect Sensor device using this method or other methods. See Apply a configuration to a device or a device group: Overview.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Configuration Management** section in the Admin dashboard, click **Device Group Configurations**.

   As an alternative, you can click **Device Configurations** from the dashboard pane to the left of the page. The **Device Group Configurations** page displays.
3. Scroll through the list of device group configurations to find the one that you want to reapply.
4. In the row for the group you want to update, click **Reapply Device Configuration**. The **Confirm Device Configuration Reapplication** page displays, showing a list of the devices in the device group.

5. Click **Continue** to reapply the configuration. The **Device Group Configurations** page is updated to display a message at the top of the screen to verify that the device configuration was initiated. Click the **here** link to review the installation history for the device group configuration.
    - Click **Back** to return to the previous page. The configuration is not reapplied.

Delete a device group configuration

You can delete a device group configuration that is no longer needed.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Configuration Management** section in the Admin dashboard, click **Device Group Configurations**.

   As an alternative, you can click **Device Group Configurations** from the dashboard pane to the left of the page. The **Device Group Configurations** page displays.
3. Click the check box next to each of the device group configurations that you want to delete.
4. From the list box next to the **Go** button, select the **Delete Selected Device Group Configurations** option.
5. Click **Go**. The **Delete multiple objects** page displays.
6. Review the deletions.
7. To complete the deletion, click **Yes, I'm sure**. You are returned to the **Device Group Configurations** page. A banner displays, with the message "Successfully deleted x Device Group configuration."

   If you don't want to delete anything, click **No, take me back** to return to the **Notification Contacts** page.

Review the device configuration install history for a device

You can review the configurations that have been applied to a selected device.

Note This process is only for Connect Sensor devices.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Configuration Management** section in the Admin dashboard, click **Install History (Device)** or **View** next to that label. As an alternative, you can click **Install History (Device)** from the dashboard pane to the left of the page.

   The **Install History (Device)** page displays a list of configurations that have been applied, from most recent applied date to least recent.
3. Use the search fields to filter the list of devices.
    - **Completed**: Limit the updates included in the list to those with the selected completion status:
        - **Yes**: The update completed.
        - **No**: The update did not complete.
        - **Unknown**: Completion status is inconclusive.

- **Error**: Limit the updates included in the list to those with the selected error reporting option:
  - **Yes**: An error occurred during the configuration update.
  - **No**: An error did not occur during the configuration update.
  - **Unknown**: Error status is unknown.
- **Devices**: Select one device from the list.
- **Start Time - UTC**: Limit the updates in the list to those that started within one of the time intervals:
  - **Today**: The current date.
  - **Past 7 days**: The last seven days.
  - **This month**: The last month.
  - **This year**: The last year.
- **Complete Time - UTC**: Limit the updates in the list to those that completed within one of the time intervals:
  - **Today**: The current date.
  - **Past 7 days**: The last seven days.
  - **This month**: The last month.
  - **This year**: The last year.
  - **No date**: The update does not have a completion date.
  - **Has date**: The update has a completion date that does not fit into a time interval option.

4. Click **Search** to apply the filters and limit the display to the selected device.
5. The **Scheduled**, **Completed**, and **Installed Success** columns show the status of the device configuration application on the selected device.
   - **Green check**: Action completed successfully.
   - **Red X**: Action did not complete successfully.
   - **Gray question mark**: Action incomplete.
6. In the **Device Config Install History** column, click the name of the device configuration to display additional information. A page of detailed information displays.
   - **Install Details**: Shows the name of the device configuration and the device to which it was applied
     - **Device Config Install History**: Click the device configuration name to display information about the device configuration history. See Review the device group configuration installation history.
     - **Device**: Click the device name to display information about the device. See Review and update device information.
   - **Intall Status**: Shows the completion progress of the device configuration installation.
   - **Device Status**: Shows the device configuration currently applied to the device. See Review and update device information.
7. Click **Close** to return to the **Install History (Device)** page.

Review the device group configuration installation history

You can review information about the configurations that have been applied to a selected device group.

Note This process is only for Connect Sensor devices.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Configuration Management** section in the Admin dashboard, click **Install History** or **View** next to that label. As an alternative, you can click **Install History** from the dashboard pane to the left of the page.

   The **Install History** page displays a list of configurations that have been applied, from most recently applied to least recent.
3. Use the search fields to filter the list of devices.
   - **Completed**: Limit the updates included in the list to those with the selected completion status:
     - **Yes**: The update completed.
     - **No**: The update did not complete.
     - **Unknown**: Completion status is inconclusive.
   - **Device Groups**: Limit the updates included in the list to the device group selected from the list.
   - **Device Configurations**: Limit the updates included in the list to the device configuration selected from the list.
   - **Start Time - UTC**: Limit the updates included the list to those that started within one of the time intervals:
     - **Today**: The current date.
     - **Past 7 days**: The last seven days.
     - **This month**: The last 30 days.
     - **This year**: The last year.
   - **Complete Time - UTC**: Limit the updates included the list to those that completed within one of the time intervals:
     - **Today**: The current date.
     - **Past 7 days**: The last seven days.
     - **This month**: The last 30 days.
     - **This year**: The last year.
     - **No date**: The update does not have a completion date.
     - **Has date**: The update has a completion date that does not fit into a time interval option.
4. Click **Search** to apply the filters.
5. Find the device group configuration application event that you want to review. The **Scheduled**, **Completed**, and **Installed Success** columns show the status of the application.

- **Green check**: Action completed successfully.
- **Red X**: Action did not complete successfully.
- **Gray question mark**: Action incomplete.

6. Click a name in the **Device Config** column to display detailed information about the device group configuration.
   - **Install Details**: Shows the name of the device configuration and the device group to which it was applied.
     - **Device Config**: Click the device configuration name to display information about the configuration.
     - **Device Group**: Click the device group name to display information about the device group.
   - **Install Status**: Shows the completion progress of the configuration application.
   - **Devices**: Contains a list of the devices to which the configuration was applied.
7. Click **Close** to return to the **Install History** page.

Formulas: Manage in Digi Axess Admin (Connect Sensor only)

Note This feature is for Connect Sensor family variants only.

Formulas use the input data collected from a device and apply calculations to provide a meaningful output. A formula is connected to an input on a device, and the formula runs every time data is collected on the device for that input.

Formulas are built as a set of sequential steps. For each step, you choose a formula option and a formula operator to create an output which can be reviewed in Digi Axess.

Where are formulas used?

After a formula has been created, you can connect the formula to an input configuration on an input pin, and then enable the configuration. If you want the data from the input configuration to be included in the Device Summary page, you can select a display group.

Stop a formula from running

When you no longer want the formula to run, you can remove it from the input.

Managing formulas

From the Administration dashboard, you can add, edit, and delete formulas.

Note Formulas, as well as formulas for a specific device, can be created and managed from the web UI for the device. See Formulas: Manage from the web UI.

Add a formula from the Administration dashboard

Note This feature is for Connect Sensor family variants only.

You can create a formula that will be available to all devices in the selected device group and to the devices in any child groups.

Note A formula created in the **Formula** section in the Administration dashboard is also available in the device's web UI. See Add a device group formula in the web UI.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.

2. From the **Device Configuration Management** section in the Admin dashboard, click **Formula** or **Add** next to that link. As an alternative, you can click **Formula** from the dashboard pane to the left of the page and then click **Add** at the top of the page.
3. In the **Name** field, enter a descriptive name for the formula. The name must be unique within the selected device group.
4. From the **Device group** list box, select a device group. The formula you are creating will be available to all devices in the selected device group and to the devices in any child groups.
5. Click **Save** to save the formula. The **Formula Definition** page displays.
6. If needed, you can change the name in the **Formula Name** field.
7. If you are adding an input pin or an output pin to the formula, you can use the **Reference Device** field. From the **Reference Device** field, select a device that has a similar configuration to the devices that will be in the new formula you are creating. The configured pins from the reference device are available when adding an input pin or an output pin to the formula. The input pin and output pin options that you can select from the list box are limited to those that are configured for the reference device.

   This feature allows you to easily reuse a pin configuration and eliminates the need to manually enter the number of a configured input pin or output pin.
8. Create a formula by adding steps.
   a. Select a formula option from the first list box in the step. Information about the option displays in the screen.
   b. If a parameter list displays, enter an appropriate value for the selected formula.
      - **Input Pin**: You are required enter the number of the input pin or, if a list box is available, to select the name of a configured and enabled input pin for a Connect Sensor XRT-M or a Z45 Controller.

        Using the Reference Device field

        This field is used only if the following conditions are met:

        - You are maintaining a formula in the Administration dashboard or a device group formula from the web UI.
        - You have added an input pin to the formula. You are required to enter a pin number or select an option from the parameter list box.

        If you selected a device from the **Reference Device** field, the parameter field is a list box with options are limited to the input pins configured for the selected reference device. You can select an appropriate input pin that works for your formula.

        If you didn't select a device from the **Reference Device** field, you must manually enter the an input pin number.
      - **Output Pin**: You are required enter the number of the output pin or, if a list box is available, to select the name of a configured and enabled output pin for a Connect Sensor XRT-M or a Z45 Controller.

        Using the Reference Device field

        This field is used only if the following conditions are met:

        - You are maintaining a formula in the Administration dashboard or a device group formula from the web UI.

- You have added an output pin to the formula. You are required to enter a pin number or select an option from the parameter list box.

  If you selected a device from the **Reference Device** field, the parameter field is a list box with options are limited to the output pins configured for the selected reference device. You can select an appropriate output pin that works for your formula.

  If you didn't select a device from the **Reference Device** field, you must manually enter the an output pin number.

c. From the **Add** list box, select a formula operator.

d. Determine the next action for the formula.
   - **Add below**: Add a step to the formula below the current step.
   - **Add above**: Add a step to the formula above the current step.
   - **Delete**: Delete the current step.
   - **Don't choose an option**: Do not choose an option if the formula is complete.

e. Repeat the process to add more items to the formula.

9. Click **Save** to save the formula. A confirmation dialog displays.
10. Click **OK** to confirm the change. A green banner displays the message "Formula Successfully Updated."
11. Click **Back** to return to the **Formulas** page. The page is updated to show the date and time on which the formula was added and updated.

Edit a formula from the Administration dashboard

Note This feature is for Connect Sensor family variants only.

You can edit the formula name and the steps in a formula.

Note You cannot change the device group selected for the formula.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Configuration Management** section in the Admin dashboard, click **Formula** or **Change** next to that link. As an alternative, you can click **Formula** from the dashboard pane to the left of the page.
3. Find the formula that you want to edit.
   - Scroll through the list of formulas.
   - Limit the list by selecting a device group from the **Device Group** list box.
   - Use the search field to search for a device group by name.
4. Click **Edit Formula** for the formula that you want to edit. The **Formula Definition** page displays.
5. If desired, update the name in the **Formula Name** field.
6. If you are adding an input pin or an output pin to the formula, you can use the **Reference Device** field. From the **Reference Device** field, select a device that has a similar configuration to the devices that will be in the new formula you are creating. The configured pins from the

reference device are available when adding an input pin or an output pin to the formula. The input pin and output pin options that you can select from the list box are limited to those that are configured for the reference device.

This feature allows you to easily reuse a pin configuration and eliminates the need to manually enter the number of a configured input pin or output pin.

7. Edit the formula as needed. For information about the fields, see Add a formula from the Administration dashboard.
8. Click **Save** to save the changes. A confirmation dialog displays.
9. Click **OK** to confirm the change. A green banner displays the message "Formula Successfully Updated."
10. Click **Back** to return to the **Formulas** page. The page is updated to show the date and time on which the formula was updated.

Edit a formula from the review page in the Administration dashboard

Note This feature is for Connect Sensor family variants only.

You can edit the formula name and the steps in the formula from the formula review page.

Note You cannot change the device group selected for the formula.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Configuration Management** section in the Admin dashboard, click **Formula** or **Change** next to that link. As an alternative, you can click **Formula** from the dashboard pane to the left of the page.
3. Find the formula that you want to edit.
   - Scroll through the list of formulas.
   - Limit the list by selecting a device group from the **Device Group** list box.
   - Use the search field to search for a device group by name.
4. Click on the formula name in the **Name** column. The **Device Formula** section in the **Formulas** page displays.
5. Click the blue **Edit Formula** button. The **Formula Definition** page displays.
6. If desired, update the name in the **Formula Name** field.
7. If you are adding an input pin or an output pin to the formula, you can use the **Reference Device** field. From the **Reference Device** field, select a device that has a similar configuration to the devices that will be in the new formula you are creating. The configured pins from the reference device are available when adding an input pin or an output pin to the formula. The input pin and output pin options that you can select from the list box are limited to those that are configured for the reference device.

   This feature allows you to easily reuse a pin configuration and eliminates the need to manually enter the number of a configured input pin or output pin.

8. Edit the formula as needed. For information about the fields, see Add a formula from the Administration dashboard.
9. Click **Save** to save the changes. A confirmation dialog displays.
10. Click **OK** to confirm the change. A green banner displays the message "Formula Successfully Updated."
11. Click **Back** to return to the **Formula** page. The page is updated to show the date and time on which the formula was added and updated.

Review formula details from the Administration dashboard

Note This feature is for Connect Sensor family variants only.

You can review the details about a formula if needed.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Configuration Management** section in the Admin dashboard, click **Formula** or **Change** next to that link. As an alternative, you can click **Formula** from the dashboard pane to the left of the page.
3. Find the formula that you want to review.
   - Scroll through the list.
   - Limit the list by selecting a device group from the **Device Group** list box.
   - Use the search field to search for a device group by name.
4. Click on the formula name in the **Name** column. The **Device Formula** section in the **Formulas** page displays. You can review and make changes in the page.
5. You can review the following items:
   - **Name**: The formula name displays in the **Name** field. You can change the name if needed. If you change the name, click **Save**. You are returned to the **Formulas** page.
   - **Device Group**: The selected device group displays in the **Device Group** field. Click the device group name to view details about the group in the **Device Group** page. See Review device group details.
   - **Created**: The date and time on which the formula was created.
   - **Modified**: The date and time on which the formula was last updated.
6. You can use the buttons on the right side the page to perform these functions:
   - **Edit Formula**: Click **Edit Formula** to change the formula calculations. See Edit a formula from the review page in the Administration dashboard.
   - **Delete**: Click **Delete** to delete the formula. See Delete a formula from the review page in the Administration Dashboard.

Delete a formula using the Go button from the Administration dashboard

Note This feature is for Connect Sensor family variants only.

You can delete a formula that is no longer needed by clicking the **Go** button on the **Formulas** page. The formula is deleted from the **Formulas** page and is also deleted from the Formula Definition page in the device's web UI.

If the formula has been connected to an input pin on a device, you are not allowed to delete the formula. The **Delete Multiple Objects** page displays a list of the devices to which the formula is assigned to an input pin. Before you can delete the formula, you must select a different formula for those input pins or disable the pin.

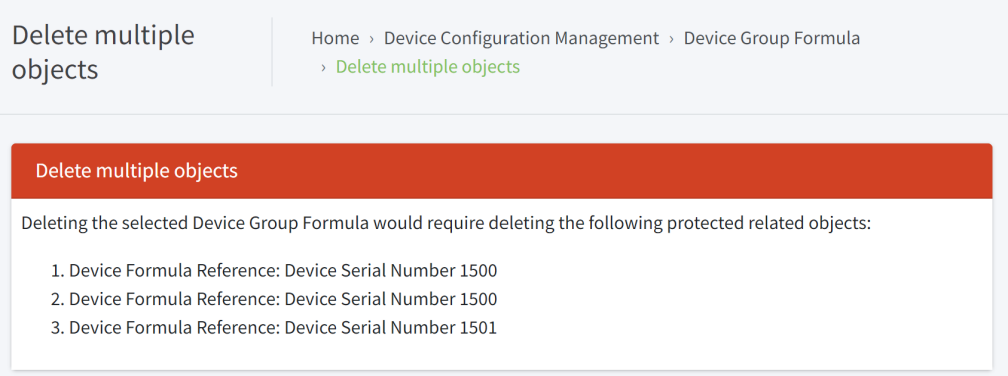
1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Configuration Management** section in the Admin dashboard, click **Formula** or **Change** next to that link. As an alternative, you can click **Formula** from the dashboard pane to the left of the page.
3. Click the check box next to each of the formulas that you want to delete.

   To choose items to delete, you can scroll through the list or use the search fields to limit it.
4. From the list box next to the **Go** button, select the **Delete Selected Formulas** option.
5. Click **Go**. The **Delete multiple objects** page displays.
6. Review the deletions.
   - To complete the deletion, click **Yes, I'm sure**. You are returned to the **Formulas** page. A banner displays, with the message "Successfully deleted x Formulas."

     If you don't want to delete anything, click **No, take me back** to return to the **Formulas** page.

   - If the formula has been connected to an input pin on a device, you are not allowed to delete the formula. A list of the devices to which the formula is assigned to an input pin displays. Before you can delete the formula, you must select a different formula for

those input pins or disable the pin.



Delete a formula from the review page in the Administration Dashboard

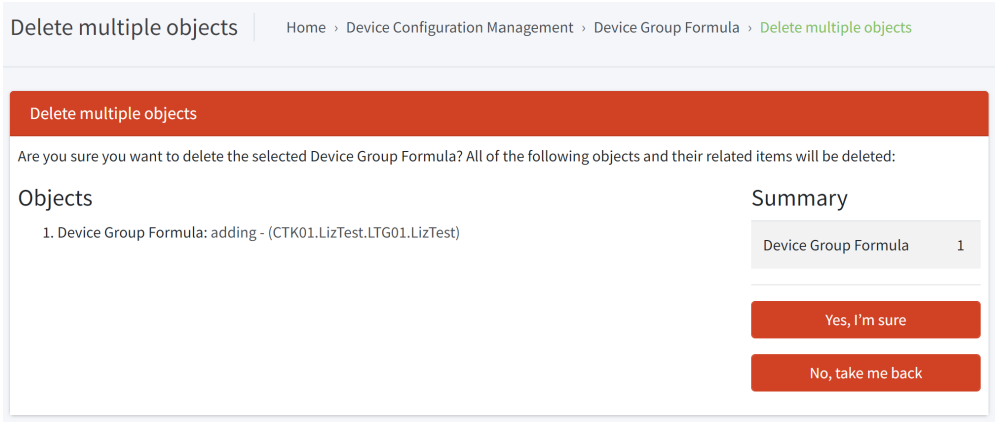
Note This feature is for Connect Sensor family variants only.

You can delete a formula that is no longer needed by clicking the red **Delete** button when reviewing information about a formula. The formula is deleted from the **Formulas** page and is also deleted from the Formula Definition page in the device's web UI.

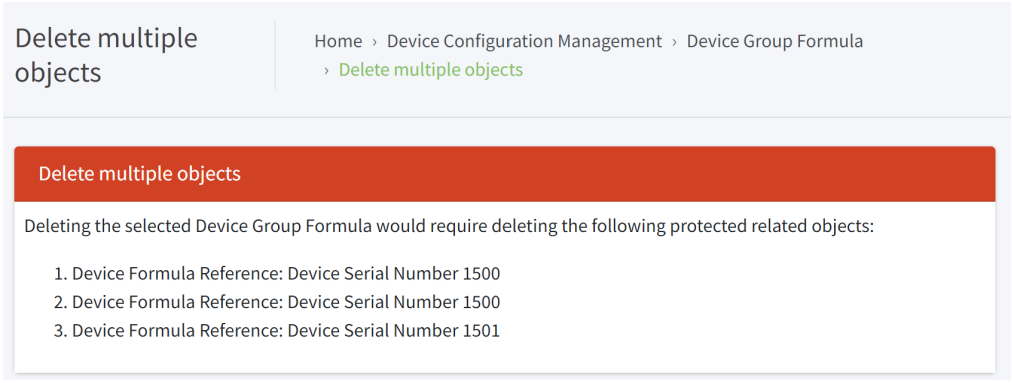
If the formula has been connected to an input pin on a device, you are not allowed to delete the formula. The **Delete Multiple Objects** page displays a list of the devices to which the formula is assigned to an input pin. Before you can delete the formula, you must select a different formula for those input pins or disable the pin.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Configuration Management** section in the Admin dashboard, click **Formula** or **Change** next to that link. As an alternative, you can click **Formula** from the dashboard pane to the left of the page.
3. Find the formula that you want to review and delete.
   - Scroll through the list.
   - Limit the list by selecting a device group from the **Device Group** list box.
   - Use the search field to search for a device group by name.
4. Click on the formula name in the **Name** column. The **Device Formula** section in the **Formulas** page displays.
5. Click **Delete** to delete the formula.
6. Review the deletions.
   - To complete the deletion, click **Yes, I'm sure**. You are returned to the **Formulas** page. A banner displays, with the message "The Formula was deleted successfully."

     If you don't want to delete anything, click **No, take me back** to return to the **Formulas** page.



- If the formula has been connected to an input pin on a device, you are not allowed to delete the formula. A list of the devices to which the formula is assigned to an input pin displays. Before you can delete the formula, you must select a different formula for those input pins or disable the pin.



Device Firmware History: Manage in Digi Axess Admin

You can review the history of the Connect Sensor firmware updates that have been applied to a selected device or device group. You can also cancel an update that is scheduled to occur at a future date.

Note These processes are only for Connect Sensor devices.

Review firmware update history

Where?	One selected device	All Connect Sensor devices in a device group	Description
Update History page		X	Review the Connect Sensor firmware update history for a device group
Update History (Device) page	X		Review firmware update history for a Connect Sensor

Cancel a scheduled firmware update

Where?	One selected device	All Connect Sensor devices in a device group	Description
Update History page		X	Cancel a firmware update for the Connect Sensor devices in a device group
Update History (Device) page	X		Cancel a firmware update for a Connect Sensor device

Review firmware update history for a Connect Sensor

You can review the history of the Connect Sensor firmware updates that have been applied to a selected device. You can also cancel an update that is scheduled to occur at a future date.

Note This process is only for Connect Sensor devices.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Firmware History** section in the Admin dashboard, click **Update History (Device)** or **View** next to that label. As an alternative, you can click **Update History (Device)** from the dashboard pane to the left of the page.

   The **Update History (Device)** page displays a list of Digi Axess firmware updates that have been applied, starting from the most recent applied date.
3. Use the search fields to filter the list of devices.
   - **Completed**: Limit the updates included in the list to those with the selected completion status:
     - **Yes**: The update completed.
     - **No**: The update did not complete.
     - **Unknown**: The update completion status is inconclusive.
   - **Error**: Limit the updates included in the list to those with the selected error reporting option:
     - **Yes**: An error occurred during the firware update.
     - **No**: An error did not occur during the update.
     - **Unknown**: Error status is unknown.
   - **Devices**: Select one device from the list.
   - **Start Time - UTC**: Limit the updates in the list to those that started within one of the time intervals:
     - **Today**: The current date.
     - **Past 7 days**: The last seven days.
     - **This month**: The last month.
     - **This year**: The last year.
   - **Complete Time - UTC**: Limit the updates in the list to those that completed within one of the time intervals:
     - **Today**: The current date.
     - **Past 7 days**: The last seven days.
     - **This month**: The last month.
     - **This year**: The last year.
     - **No date**: The update does not have a completion date.
     - **Has date**: The update has a completion date that does not fit into a time interval option.
4. Click **Search** to apply the filters.
5. To view additional information about a configuration application, click on a name in the **Firmware Update History** list. A page of detailed information displays.
   - **Update Details**: Shows the name of the device configuration and the device to which it was applied

- **Firmware Update History**: Click the firmware version name to display information about the firmware version update history. See Review the Connect Sensor firmware update history for a device group.
- **Device**: Click the device name to display information about the device. See Review and update device information.

- **Update Status**: Shows the completion progress of the configuration application.
- **Device Status**: Shows the device configuration currently applied to the device.

Review the Connect Sensor firmware update history for a device group

You can review the history of the Connect Sensor firmware updates that have been applied to a selected device group. You can also cancel an update that is scheduled to occur at a future date.

Note This process is available only for Connect Sensor devices.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Firmware History** section in the Admin dashboard, click **Update History** or **View** next to that label. As an alternative, you can click **Update History** from the dashboard pane to the left of the page.

   The **Update History** page displays a list of firmware updates that have been applied, starting with the most recent.
3. Use the search fields to filter the list of devices.
   - **Completed**: Limit the updates included in the list to those with the selected completion status:
     - **Yes**: The firmware update completed.
     - **No**: The firmware update did not complete.
     - **Unknown**: The firmware update completion status is inconclusive.
   - **Device Groups**: Limit the updates included in the list to the device group selected from the list.
   - **Start Time - UTC**: Limit the updates in the list to those that started within one of the time intervals:
     - **Today**: The current date.
     - **Past 7 days**: The last seven days.
     - **This month**: The last month.
     - **This year**: The last year.
   - **Complete Time - UTC**: Limit the updates in the list to those that completed within one of the time intervals:
     - **Today**: The current date.
     - **Past 7 days**: The last seven days.
     - **This month**: The last month.
     - **This year**: The last year.
     - **No date**: The update does not have a completion date.

- **Has date**: The update has a completion date that does not fit into a time interval option.

4. Click **Search** to apply the filters.
5. To view additional information about a firmware update event, click on a name in the **Firmware Type** column. A page of detailed information displays.
   - **Update Details**: Includes the firmware type, firmware version, and the device group that was updated. Click on the device group to review the device group details.
   - **Update Status**: Includes the update start and end times, update success, and error messages.
   - **Devices**: Includes a list of the devices in the device group.
     - Click on the identifier in the **Device** column to access device information in the Update History (Device) page.
     - Click **Cancel Update** to cancel a Digi Axess firmware update that is scheduled for a future date. For details, see Cancel a firmware update for a Connect Sensor device.
6. Actions can be taken using the buttons on the page:
   - **Cancel Update**: Click **Cancel Update** to cancel a Digi Axess firmware update that is scheduled for a future date. For details, see Cancel a firmware update for a Connect Sensor device.
   - **Close**: Click **Close** to return to the previous screen.
   - **History**: Click **History** to view the update firmware change history for the device group.

Cancel a firmware update for a Connect Sensor device

You can cancel a firmware update for a Connect Sensor device that is scheduled for a future date.

Note This process is available only for Connect Sensor devices.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Firmware History** section in the Admin dashboard, click **Update History (Device)** or **View** next to that label. As an alternative, you can click **Update History (Device)** from the dashboard pane to the left of the page.

   The firmware update history for the Connect Sensor devices displays.
3. Use the search fields to filter the list of devices.
4. In the row for your selected device, click **Cancel Update**. The **Confirm Firmware Update Cancellation** page displays.
5. Click **Continue**. The firmware update is canceled, and a confirmation page displays.
6. Click the **Update Status** tab to confirm the cancellation. In the **Error Message** section, a note displays: "Firmware Update Canceled".
7. Click **Close** to close the page.

Cancel a firmware update for the Connect Sensor devices in a device group

You can cancel a firmware update for a device group that is scheduled for a future date. The firmware update is canceled for all of the Connect Sensor devices in the group.

Note This process is available only for Connect Sensor devices.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Firmware History** section in the Admin dashboard, click **Update History** or **View** next to that label. As an alternative, you can click **Update History** from the dashboard pane to the left of the page.

   The firmware update history for the device groups displays.
3. Use the search fields to filter the list of device groups.
4. In the row for your selected device group, click **Cancel Update**. The **Confirm Firmware Update Cancellation** page displays.
5. Click **Continue**. The firmware update is canceled, and a confirmation page displays.
6. Click the **Update Status** tab to confirm the cancellation. In the **Error Message** section, a note displays: "Firmware update for one or more devices canceled. Check device tab for more details".
7. Click **Close** to close the page.

Device Management: Manage in Digi Axess Admin

You can use the device groups feature in Digi Axess to create groups of similar types of devices, or a device hierarchy. For example, you can create regional device groups, groups of devices where device reports are sent to the same group of users, or groups of devices that have the same configuration. This feature is useful when your organization has multiple devices that can be managed as a group.

Device and device group overview

The sections below include details about devices, device groups, and sub-groups.

Devices

Each device that you purchase that can connect to Digi Axess is added to your Digi Axess by the Digi support team. When you log into Digi Axess, you can view the devices from the Digi Axess map or, if you have Digi Axess Admin privileges, from the Digi Axess Admin page.

You can associate each device with one device group.

Device groups

A master device group is available by default in your Digi Axess. This ensures that if a device group is needed when using a feature, one is available even if you decide not to create or use device groups.

If you decide to use device groups, Digi recommends that you make a plan of your device group hierarchy before you begin creating device groups. This may help you determine the purpose for your device groups and decide how many levels you need and which devices and users should be attached to each device group.

Device sub-groups

A device sub-group is a way to further categorize devices within a device group. Device groups and sub-groups are assigned to both devices and user profiles, and these work together to create a way to limit device access to a set of users within a device group.

Note A device sub-group name is entered as free-form text. Be sure you remember the sub-group names you have entered and enter it correctly for other devices or user profiles. This ensures that you don't accidentally create undesired sub-groups due to a misspelling.

Example

You have a device group named REGIONS, and you have devices in that group that are located in New York and in California.

Within the REGIONS device group, you want users in New York to have access to only the devices in New York, and users in California to have access to only the devices in California. You can create an EAST sub-group for New York and a WEST sub-group for California.

- **EAST sub-group**: For each device in New York AND for each user profile in New York, you would select the REGIONS device group, and enter EAST as the device sub-group.
- **WEST sub-group:** For each device in California AND for each user profile in California, you would select the REGIONS device group, and enter WEST as the device sub-group.

Result

The users in the REGIONS device group and WEST sub-group can only see devices that are in the same device group/sub-group combination.

The users in the REGIONS device group and EAST sub-group can only see devices that are in the same device group/sub-group combination.

Using sub-groups in a device group hierarchy

Sub-groups are recognized within a device group hierarchy as well. User profiles assigned to a device group and sub-group in a parent device group can only see devices in any child device group that are assigned the same device group/sub-group combination.

Example

The REGIONS device group is a child group under the WORLD device group.

Result

User profiles assigned to the WORLD device group and the WEST sub-group can see devices assigned to the WEST sub-group in both the WORLD and REGIONS device groups.

User profiles assigned to the WORLD device group and the EAST sub-group can see devices assigned to the EAST sub-group in both the WORLD and REGIONS device groups.

Apply a configuration to a device or a device group: Overview

You can apply a device configuration to one selected Connect Sensor device in a device group, or to all of the devices in a group that are the same model. The configuration is applied the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually using a magnet.

- **All devices of the same model type**: Apply a device group configuration to the devices of the same model in a device group as needed. This ensures that the configuration for the device models of the same type are in sync.
- **One device in a device group**: You can apply a device group configuration to only one device in a device group or to one that is not in a device group. This is useful if you have one device in a group that should have a different configuration.

Note You can apply a configuration file from the Digi Axess Admin menu or from the map only to Connect Sensor devices. Configurations can be applied to a Z45 Controller from the device's web UI.

The table below contains all of the methods available for applying a configuration to a Connect Sensor.

Update one device

Digi Axess Admin Menu	Information
Pick a device, then pick the configuration. **Device Management** > **Devices**	Select one device and apply a configuration
Pick a configuration, then pick a device. **Device Configuration Management** > **Device Configurations**	Select a configuration and apply to one device

Digi Axess Map	Information
Device Summary page	Apply a configuration file to a Connect Sensor from the Device Summary page

Update all devices of the same model in a device group

Digi Axess Admin Menu	Update one device
Pick a group, then pick a device model and configuration combo from the **Configurations** tab. **Device Management** > **Device Groups**	Select a device group and apply a configuration from the Configurations tab
Pick a group, then a device model, then a configuration. **Device Management** > **Device Groups**	Select a device group from the Device Groups page and apply a configuration
Pick a group, then a device model, then a configuration, then click the blue **Apply Config** button. **Device Management** > **Device Groups**	Select a device group and use the blue Apply Config button
Pick a configuration and model combo, then pick a device group. **Device Configuration Management** > **Device Configurations**	Select a configuration and apply to a device group
Pick a device group, model, and configuration combo. **Device Configuration Management** > **Device Configurations**	Reapply a device group configuration

Device Groups: Manage in Digi Axess

You can create devices groups for a set of devices that are similar. This feature is useful for applying device group configurations to multiple devices at the same time or for creating a group of devices for

a certain group of users.

Add a device group

You can create device groups as needed. You can use device groups to create groups of similar types of devices.

After a device group has been created, you can assign it to devices and user profiles.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Add** next to **Device Groups**.

   As an alternative, you can click **Device Groups** from the dashboard pane on the left of the screen, then click **Add Device Group**.
3. The **Device Groups** page displays, and you can create a new group.
   - **Group Name**: Enter a descriptive name for the device group. A name displays by default, but can be changed. An entry is required.
   - **Parent Group**: From the list box, select a parent device group. An entry is required. If this new group should be at the top level of a hierarchy, select the master device group for your organization.
   - **New Group ID**: Enter a unique identifier for the device group. An entry is required.
4. Click **Add** to save the change. Other options are **Save and add another** and **Save and continue editing**.

Review device group details

You can review details about the device groups from the **Device Groups** page. Some details can be updated, and you can change the stale notifications thresholds and reapply a configuration to the devices of the same device model in the group.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Device Groups** or **Change** next to **Device Groups**. As an alternative, click **Device Groups** from the dashboard pane on the left of the screen.

   The **Device Groups** page displays.
3. In the **Group Name** column, click on the name of the device group that you want to review. To find a group, scroll through the list of names, or limit the list using the search field. Type a search term in the search field and then click **Search**.
4. The **Device Groups** page displays pages of information about the group.
   - **Group Settings** tab: Review and update the group name, parent group, and group ID. See Update the device group name, ID, and parent group.
   - **Stale Notifications** tab: Determine the thresholds for all of the devices in a device group that determine whether a notification is stale. See Stale notifications for a device group.

- **Configurations** tab: Review the configurations available for this group. You can also reapply a configuration to the devices of the same device model in the group. See Select a device group and apply a configuration from the Configurations tab.
- **Devices** tab: Review information about the devices in the group: serial number, physical location description, and device model.
- **Users** tab: Review information about the users in the group: user name, first name, last name, and email address.
- **Child Groups** tab: Review the group name and group path information about the child groups assigned to this group. Click the pencil icon to navigate to the Group Settings tab for the child group.

Stale notifications for a device group

You can determine the thresholds for all of the devices in a device group that determine whether a stale notification is sent to the users that are connected to the device group. A device becomes stale when it has not connected to Digi Axess during the specified time period.

By default, the stale notification configuration is inherited from the device group's parent group.

Note You can change the notification settings for a device if desired.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Device Management** section.
2. From the **Device Management** section in the Admin dashboard, click **Change** next to **Device Groups**. As an alternative, you can click **Device Groups** from the dashboard pane on the left of the screen.

   The **Device Groups** page displays.
3. In the **Group Name** column, click on the name of the device group that you want to review. The **Device Groups** page for that device displays.

   To find a group, scroll through the list of names, or limit the list using the search field. Type a search term in the search field and then click **Search**.
4. Click the **Stale Notifications** tab.
5. Disable **Inherit Settings**. **Enable Stale Notifications** is enabled by default.
6. Make the desired updates.
   - **Stale period**: Enter time period in hours since the device last connected to Digi Axess. The default is 24 hours.
   - **Resend period**: Select a time period option to determine when another stale notification should be sent. The default is 1 day.
   - **Resend limit**: Enter the maximum number of times a stale notification can be sent. The default is 3.
7. Click **Save** to save the changes.

Update the device group name, ID, and parent group

You can review and update the group name, parent group, and group ID in the **Group Settings** tab.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Device Groups** or **Change** next to **Device Groups**. As an alternative, click **Device Groups** from the dashboard pane on the left of the screen.

   The **Device Groups** page displays.
3. In the **Group Name** column, click on the name of the device group that you want to review. To find a group, scroll through the list of names, or limit the list using the search field. Type a search term in the search field and then click **Search**.
4. Click the **Group Settings** tab.
   - **Group Name**: (Required) Enter a descriptive name for the device group.
   - **Parent Group:** Click the down arrow next to the field to change the parent group.
   - **Updated Group ID**: (Required) Enter a unique ID for the device group. The ID must be at least 4 characters and can contain only numbers and letters.
5. Click **Save** to save the changes.

Select a device group and apply a configuration from the Configurations tab

You can apply a configuration to the devices of the same model type in a device group. This ensures that the configuration for the device models of the same type are in sync.

Note You can apply a configuration to a Connect Sensor device using this method or other methods. See Apply a configuration to a device or a device group: Overview.

Note You can apply a configuration file from the Digi Axess Admin menu only to the Connect Sensor devices in the group. Configurations can be applied to a Z45 Controller from the device's web UI.

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1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Device Groups**. As an alternative, you can click **Device Groups** from the dashboard pane to the left of the page. The **Device Groups** page displays.
3. In the **Group Name** column, click on the name of the device group that you want to review. To find a group, scroll through the list of names, or limit the list using the search field. Type a search term in the search field and then click **Search**.
4. Click the **Configurations** tab.
5. Determine the model type to which you want to reapply the device configuration, and click **Reapply Device Configuration** in that row. The **Confirm Device Configuration Reapplication** page displays, showing a list of the devices in the device group.
   - Click **Continue** to reapply the configuration. The **Device Group Configurations** page is updated to display a message at the top of the screen to verify that the device configuration was initiated. Click the **here** link to review the installation history for the device group configuration.
   - Click **Back** to return to the previous page. The configuration is not reapplied.

Select a device group from the Device Groups page and apply a configuration

You can apply a device configuration to all of the devices of one device model in a device group from the **Device Groups** page.

The configuration is applied the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually using a magnet.

Note You can apply a configuration file from the Digi Axess Admin menu only to Connect Sensor devices. Configurations can be applied to a Z45 Controller from the device's web UI.

The list of configurations available includes the device configurations that have been backed up and saved, for the devices that are in a device group to which you have access, plus all of the default configurations that are provided with your Digi Axess account.

Note You can apply a configuration to a Connect Sensor device using this method or other methods. See Apply a configuration to a device or a device group: Overview.

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1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Device Groups** or **View** next to that label.

   As an alternative, you can click **Device Groups** from the dashboard pane to the left of the page. The **Device Groups** page displays a list of configurations that can be applied.
3. Find the group to which the device you want to update is included. You can scroll through list or use the **Search** field to find the group.
4. For the desired group, click **Apply Config**. The **Apply Device Configuration - Select Model** page displays.
5. From the list of models, click on the device model that is the type that you want to update.

   The selected model is moved to the right side of the page and displays in a green banner in the **Selected Model** window.

   Note To deselect a selected option in the **Selected Model** window, click it. It is moved to the left side of the page and you can select a different device model.

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6. Click **Next**. The **Apply Device Configuration - Select Device Config** page displays, showing information about the configuration.
   a. From the **Device Configuration Type** list box, select the configuration type.
      - **Provided**: The device configuration is saved locally.
      - **Shared**: The device configuration is saved to Digi Axess.

   b. Select a configuration from the list of options. The selected configuration is moved to the right side of the page and displayed in the **Select Device Config** window.
7. Click **Next**. The **Apply Device Configuration - Confirm** page displays, showing the devices to which the configuration will be applied, and information about the configuration.
8. Click **Confirm** to continue and apply the configuration.

   If you have changed your mind, click **Back** to return to the previous screen.

Select a device group and use the blue Apply Config button

You can apply a device configuration to the Connect Sensor devices in a device group by clicking the blue **Apply Config** button in the **Device Groups** page.

The configuration is applied the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually using a magnet.

Note You can apply a configuration file from the Digi Axess Admin menu only to the Connect Sensor devices in the group. Configurations can be applied to a Z45 Controller from the device's web UI.

The list of configurations available includes the device configurations that have been backed up and saved, for the devices that are in a device group to which you have access, plus all of the default configurations that are provided with your Digi Axess account.

Note You can apply a configuration to a Connect Sensor device using this method or other methods. See Apply a configuration to a device or a device group: Overview.

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1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Configuration Management** section in the Admin dashboard, click **Device Configurations** or **View** next to that label.

   As an alternative, you can click **Device Configurations** from the dashboard pane to the left of the page. The **Device Configurations** page displays a list of configurations that can be applied. The **Device Groups** page displays.
3. In the **Group Name** column, click on the name of the device group that you want to update. To find a group, scroll through the list of names, or limit the list using the search field. Type a search term in the search field and then click **Search**. The **Device Groups** page for that device displays.
4. Click the blue **Apply Config** button on the right side of the page. The **Apply Device Configuration - Select Model** page displays.
5. Select a model from the **Models** list. The selected model is moved to the right side of the page and displays in a green banner in the **Selected Models** window. Only one model can be selected.
6. Click **Next**. The **Apply Device Configuration - Select Devices** page displays.
7. From the **Device Configuration** type list box, select the configuration type.
   - **Provided**: The device configuration is saved locally.
   - **Shared**: The device configuration is saved to Digi Axess.
8. Select a configuration from the list of options. The selected configuration is moved to the right side of the page and displayed in the **Select Device Config** window.
9. Click **Next**.
10. The **Apply Device Configuration - Confirm** page displays, showing the devices to which the configuration will be applied, and information about the configuration.

    Note A yellow warning banner displays at the top of the screen, to alert you that applying a

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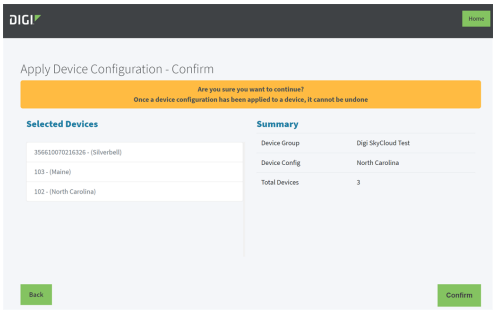
device configuration that cannot be undone.



11. Click **Confirm** to continue and apply the configuration.

    If you have changed your mind, click **Back** to return to the previous screen.

Update the firmware

You can schedule an update to the Connect Sensor firmware from the **Device Group** page. The update happens during the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually.

If the device is already scheduled for a firmware update, you are not allowed to schedule another update.

A device group may contain devices of more than one type. When you configure the firmware update, you are required to specify a device from the Connect Sensor family. Devices that are different from the selected type are ignored and the firmware update is not applied.

Update the Connect Sensor firmware from the Device Groups page

You can schedule an update to the Connect Sensor firmware from the **Device Group** page. The update happens during the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Device Groups** or **View** next to that label.

   As an alternative, you can click **Device Groups** from the dashboard pane to the left of the page. The **Device Groups** page displays a list of configurations that can be applied.
3. Find the group to which the device you want to update is included. You can scroll through list or use the **Search** field to find the group.
4. Click **Firmware Update** for that device group. The **Firmware Update - Select Model** page displays.
5. Click the Connect Sensor device model option. The selected option displays in the **Selected Model** column.

   Note To deselect the device model option, click the model option in the **Selected Model** column.
6. Click **Next**. The **Firmware Update - Select Firmware** page displays.

7. From the **Firmware Type** list box, select the **Standard** option.
8. Select the firmware version that you want to apply to the device. The selected firmware version displays in the **Selected Firmware** list.

   To find a version, you can either scroll through the list of versions, or use the **Firmware Versions** field to limit the list. As you type, the list is updated to include only the devices that match the entry.

   Note Click on the selected firmware update option in the **Selected Firmware** list to deselect it.

9. Click **Next**. The **Firmware Update - Confirm** page displays, showing the device that will be updated, and a summary of the selected firmware update. Devices in the device group that are not of the selected device model type are included in the Unavailable Devices list. The firmware update will not be scheduled for these devices.

   Note A yellow warning banner displays at the top of the screen, to confirm that a firmware update is selected to occur.

10. Click **Confirm** to continue and schedule the firmware update. The **Firmware Update - Results** page displays a summary of the update.
11. Click **View Results** to navigate to the Update History page to view more information.
    - **Update Details**: Includes the firmware type, firmware version, and the device group that was updated. Click on the device group to review the device group details.
    - **Update Status**: Includes the update start and end times, update success, and error messages.
    - **Devices**: Includes a list of the devices in the device group.
      - Click on the identifier in the **Device** column to access device information in the Update History (Device) page.
      - Click **Cancel Update** to cancel a Digi Axess firmware update that is scheduled for a future date. For details, see Cancel a firmware update for a Connect Sensor device.

Update the firmware for a device group using the blue Firmware Update button

You can schedule an update to the Connect Sensor firmware from the **Device Group** page. The update happens during the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Device Groups** or **View** next to that label.

   As an alternative, you can click **Device Groups** from the dashboard pane to the left of the page. The **Device Groups** page displays a list of configurations that can be applied.
3. In the **Group Name** column, click on the name of the device group that you want to review. The **Device Groups** page for that group displays.

   To find a group, scroll through the list of names, or limit the list using the search field. Type a search term in the search field and then click **Search**.
4. Click the blue **Firmware Update** button. The **Firmware Update - Select Model** page displays.

5. Click the Connect Sensor device model option. The selected option displays in the **Selected Model** column.

   Note To deselect the device model option, click the model option in the **Selected Model** column.

6. Click **Next**. The **Firmware Update - Select Firmware** page displays.
7. From the **Firmware Type** list box, select the **Standard** option.
8. Select the firmware version that you want to apply to the device. The selected firmware version displays in the **Selected Firmware** list.

   To find a version, you can either scroll through the list of versions, or use the **Firmware Versions** field to limit the list. As you type, the list is updated to include only the devices that match the entry.

   Note Click on the selected firmware update option in the **Selected Firmware** list to deselect it.

9. Click **Next**. The **Firmware Update - Confirm** page displays, showing the device that will be updated, and a summary of the selected firmware update. Devices in the device group that are not of the selected device model type are included in the Unavailable Devices list. The firmware update will not be scheduled for these devices.

   Note A yellow warning banner displays at the top of the screen, to confirm that a firmware update is selected to occur.

10. Click **Confirm** to continue and schedule the firmware update. The **Firmware Update - Results** page displays a summary of the update.
11. Click **View Results** to navigate to the Update History page to view more information.
    - **Update Details**: Includes the firmware type, firmware version, and the device group that was updated. Click on the device group to review the device group details.
    - **Update Status**: Includes the update start and end times, update success, and error messages.
    - **Devices**: Includes a list of the devices in the device group.
      - Click on the identifier in the **Device** column to access device information in the Update History (Device) page.
      - Click **Cancel Update** to cancel a Digi Axess firmware update that is scheduled for a future date. For details, see Cancel a firmware update for a Connect Sensor device.

Delete a device group

You can delete a device group that is no longer needed.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Device Groups** or **Change** next to **Device Groups**. As an alternative, click **Device Groups** from the dashboard pane on the left of the screen.

   The **Device Groups** page displays.

3. To find the group(s) that you want to delete, scroll through the list of names, or limit the list using the search field. Type a search term in the search field and then click **Search**.
4. Click the check box next to the names of the device groups that you want to delete. You can select more than one.
5. From the **Go** list box, select the **Delete Selected Device Groups** option.
6. Click **Go**. The **Delete Multiple Objects** page displays and overview of the group(s) and related items that will be deleted.
7. Click **Yes, I'm sure** to complete the deletion process. You are returned to the **Device Groups** page. A green banner with a **Successfully deleted** message displays at the top of the page.
    - Click **No, take me back** if you don't want to complete the deletion.

Devices: Manage in Digi Axess Admin

All of your devices that are registered with Digi Axess can be configured and information reviewed from the Digi Axess Admin page.

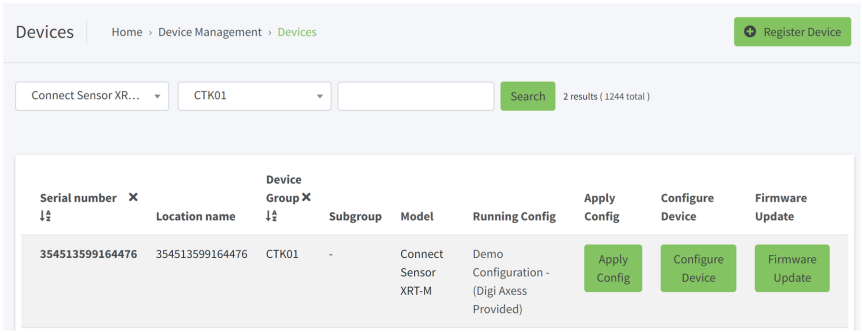
Access the Devices page from Digi Axess Admin

A list of the devices registered with Digi Axess is displayed in the **Devices** page. You can filter the list by device model and device group, and also search for a specific device.

You can also configure a device and update the Digi Axess firmware from the **Devices** page.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Device Management** section.
2. From the **Device Management** section in the Admin dashboard, click **Devices**. As an alternative, you can click **Devices** from the **Device Management** section in the dashboard pane on the left of the screen.

   The **Devices** page displays.



Devices page overview

Within the **Device** page, you can search for a particular device by an identifier or filter the list by model and device group and access the **Device Summary** page for the device.

Connect Sensor family only: You can apply a saved configuration to the device. If a device configuration has been applied to the selected device, the name of the configuration displays.

The table describes the actions you can perform in this page.

Item	Description
Register Device	Click **Register Device** to register a device with Digi Axess. See Register a device from the Devices page.
Filter the device list	You can apply filters to the list of devices to limit the devices displayed.
Sort the device list	You can use the column headers to sort the device list.
Serial number	Click the serial number for a device to access the device's information.
Running Config	Click the current configuration name in the **Running Config** column to review details about the configuration.
Apply Config	You can apply a device group configuration to one device. See Select one device and apply a configuration.
Configure Device	Click **Configure Device** to access the web UI for the device. You can use the options to configure the device. **Connect Sensor web UI** ▪ Configure a device in the Connect Sensor family from the web UI **Z45 Controller web UI** You are required to log into the device's web UI with the device's user name and password. ▪ Configure a Z45 Controller from the web UI

Filter and sort the device list in the Devices page

You can review a list of the devices that have been added to Digi Axess. Each Digi Axess device that you purchase (such as Connect Sensor+ devices and Z45 Controllers) is added to your Digi Axess by the Digi support team. When you log into Digi Axess, you can view the devices from the Digi Axess map or, if you have Digi Axess Admin privileges, from the Digi Axess Admin page.

Filter the device list

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Devices**. As an alternative, you can click **Devices** from the dashboard pane to the left of the page. The **Devices** page displays. For each device, the following information is available: **Serial Number**. **Location name**, **Device Group**, **Subgroup**, and **Model**. **Running config** shows the configuration currently running on the device.
3. You can limit the list by selecting a model or the devices in a particular device group, or by using the search feature. You can combine the search methods.
   - **Model**: Select a model option from the **Model** list box and click **Search**.
   - **Device Groups**: Select a device group form the **Device Groups** list box and click **Search**.

- **Search field**: Enter a search term in the search field and then click **Search**.

4. Click the **Serial Number** link to display detailed information about the device.

Sort the list of devices

You can sort the list of devices in ascending or descending order by identifier: serial number, location name, device group, or sub-group. By default, the devices are listed in descending order.

1. Access the Devices page from Digi Axess Admin.
2. Hover over an identifier name in the device list. The name turns green.
3. Click on an identifier name. The sort symbol displays.
   - Click the identifier name again to change the sort order.
   - Click the X next the identifier name to remove the sort order symbol.

Review and update device information

You can review details about a device from the **Devices** page. Some details can be updated, such as the location name and the stale notifications thresholds.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Devices** or **Change** next to **Devices**. As an alternative, click **Devices** from the dashboard pane on the left of the screen.

   The **Device Groups** page displays.
3. Search for the device that you want to update. You can scroll through the list or use the search fields to limit the list.
4. In the **Serial Number** column, click on the serial number of the device that you want to review and update.
5. The **Devices** page is updated to display pages of information about the group.
   - **Device**: Displays identifying information for the device, device group information, and information about the device group configuration currently running on the device.
     - **Serial number** and **IMEI**: The device's unique identifiers.
     - **Device Group** and **Subgroup**: The device group and subgroup to which the device is assigned, which you can change. See Change the device group for a device.
     - **Model**: The device model.
     - **Running Config** and **Config Status**: The device configuration currently running on the device and its status. Click the running configuration name or configuration status link to review configuration details.
   - **Location**: You can change the location name and review the location details.

     Note The GPS coordinates are configured in the device's web UI: Connect Sensor or Z45 Controller.
   - **Stale Notifications**: Determine the thresholds for a device that determine whether a notification is stale. See Stale notifications for a device.
   - **Logging**: You can enable system logging if needed. See Configure system logging for a Connect Sensor XRT-M in the Devices page.

- **Contact Groups**: You can add a device to or delete a device from a notification group. This ensures that any notifications from the device are sent to the users assigned to the notification group. See Update the notification groups for a device.
- **Device Notifications**: Review the notifications about this device.
- **Device Reports**: Review information about the device reports.

Register a device from the Devices page

You must register the devices that you want to access and manage from Digi Axess. The process uses the device's serial number or IMEI as a unique identifier.

Note You can also register a device in the Digi Axess User Profile menu from the map page.

Register a Connect Sensor from the Devices page

Your device must be registered with Digi Axess so that you can access and manage the device from Digi Axess.

Note You can also register a device in the Digi Axess User Profile menu from the map page.

Before you begin

You will need this information to register your device:

- Serial number or IMEI
- The device group in which the device should be included.

To register your device:

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Device Management** section.
2. From the **Device Management** section in the Admin dashboard, click **Devices** or **Register** next to that label.

   As an alternative, you can click **Devices** from the dashboard pane to the left of the page. The **Devices** page displays. Click **Register Device** in the top right corner of the page.
3. The **Register Device** section displays. In the **Serial Number** field, enter the unique identifier for the device. You can enter the device's serial number or IMEI. As an alternative, click the **Scan Barcode** button next to the field and use a camera or a saved image to enter an identifier.
4. From the **Device Group** list box, select a device group from the drop-down list.
5. (Optional) In the **Subgroup** field, enter a subgroup name.
6. Click **Register**. The **Set Device Location Source** page displays.
7. Name and define the device's physical location.
   a. In the **Location Name** field, enter a descriptive name for the device's physical location. If you leave this field blank, the device's serial number is used by default.
   b. Select a **Location Source** option, which defines the method used to configure the physical location for the device.

- **None**: No physical location is defined. The device is unmapped and won't appear on the Digi Axess map. You can specify a location at a later time.
- **Manual**: Manually enter the latitude and longitude of the physical location of the device.
- **GPS**: The physical location is determined by the device's internal GPS. The location is updated the next time the device wakes and connects to Digi Axess.

Note This feature is not available for Connect Sensor+.

8. In the **Set Device Configuration** page, from the **Choose a Configuration** list box, select an initial configuration for the device.
   - **Demo Configuration**: This is the default configuration, and displays basic information in the Device Summary page: **Analog in Voltage**, **Digital in**, and **Case Temperature**.
   - **Blank Configuration**: No data displays. You must manually configure the device in the device's **Administration** page.
   - **Saved Configuration**: Select a configuration that you have previously created and saved. The configuration is applied to this device.
9. Click **Set** to save your selections.
10. Verify that the location and configuration selections are available. You need to wake the device, and when the device connects to Digi Axess, the configuration is pushed from Digi Axess to the Connect Sensor device. For detailed information, see Verify device registration.

Register a Z45 Controller from the Devices page

Your device must be registered with Digi Axess so that you can access and manage the device from Digi Axess.

Note You can also register a device in the Digi Axess User Profile menu from the map page.

Before you begin

You will need this information to register your device:

- Serial number or IMEI
- The device group in which the device should be included.

To register your device:

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Device Management** section.
2. From the **Device Management** section in the Admin dashboard, click **Devices** or **Register** next to that label.

   As an alternative, you can click **Devices** from the dashboard pane to the left of the page. The **Devices** page displays. Click **Register Device** in the top right corner of the page.
3. In the **Serial Number** field, enter the unique identifier for the device. You can enter the device's serial number or IMEI. As an alternative, click the **Scan Barcode** button next to the field and use a camera or a saved image to enter an identifier.
4. From the **Device Group** list box, select a device group from the drop-down list.

5. (Optional) In the **Subgroup** field, enter a subgroup name.
6. Click **Register**.

Change the device group for a device

You can update the device group and subgroup assigned to the device. This information is initially assigned when the device was registered.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Device Management** section.
2. From the **Device Management** section in the Admin dashboard, click **Devices** or **Change** next to that label. As an alternative, you can click **Devices** from the dashboard pane to the left of the page. The **Devices** page displays.
3. Search for the device that you want to update. You can scroll through the list or use the search fields to limit the list.
4. In the **Serial Number** column, click the serial number for the device that you want to update. The **Device** tab displays.
5. From the **Device Group** list box, select a device group from the drop-down list.
6. (Optional) In the **Subgroup** field, enter a subgroup name.
7. Click **Save** to save your selections.

Access the device configuration web UI from Digi Axess Admin page

You can log in to a device's web UI from the Digi Axess Admin page Dashboard.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Devices**. As an alternative, you can click **Devices** from the dashboard pane to the left of the page. The **Devices** page displays.
3. Search for the device that you want to update. You can scroll through the list or use the search fields to limit the list.
4. Click the green **Configure Device** button.
   - **Connect Sensor+**: The web UI for the device displays in Digi Axess. Any changes you make are stored and then pushed from Digi Axess the next time that the Connect Sensor+ wakes and connects to the network.
   - **Z45 Controller**: The web UI log in page for the device displays. Enter the user name and password for the device and click **Login**. The Z45 Controller must be powered on and connected to the network before you can access the device from the Digi Axess Admin page.

Review details about the device's current configuration

You can review the device group configuration that is currently running on the device.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.

2. From the **Device Management** section in the Admin dashboard, click **Devices** or **Change** next to **Devices**. As an alternative, click **Devices** from the dashboard pane on the left of the screen.

   The **Device Groups** page displays.
3. Search for the device that you want to update. You can scroll through the list or use the search fields to limit the list.
4. Use one of the following methods to review details about the current configuration running on the device.
   - **Devices page**: From the **Devices** page, in the **Runnig Config** column, click the configuration name. The **Device Configurations > Device Configuration** screen displays.
   - **Device page**: From the **Devices** page, click the serial number in the **Serial Number** column. The **Device** page for the device displays. Scroll down to the **Running Config** section and click the name of the configuration. The **Device Configurations > Device Configuration** screen displays.
5. To review the installation status of the current configuration, click the link in the **Config Status** section. The **Install History (Device)** page displays, showing information about the installation status.

Update a device's location name

You can change the descriptive name for the device's location.

Note The location name can also be changed in the web UI for a Connect Sensor.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Devices** or **Change** next to **Devices**. As an alternative, click **Devices** from the dashboard pane on the left of the screen.

   The **Device Groups** page displays.
3. Search for the device that you want to update. You can scroll through the list or use the search fields to limit the list.
4. From the **Serial Number** column, click the serial number for the device you want to update.
5. Click the green arrows to navigate to the **Location** page.
6. In the **Location name** field, enter a descriptive name for the device's location.
7. Click **Save**. You are returned to the **Devices** page and the new name displays in the **Location name** column.

Update the notification groups for a device

You can add a device to one or more notification groups. All of the notification contacts in a notification group receive the same notifications from the devices in the notification group, such as device reports and automation threshold alarms.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Device Management** section.

2. From the **Device Management** section in the Admin dashboard, click **Devices** or **Change** next to that label. As an alternative, you can click **Devices** from the dashboard pane to the left of the page. The **Devices** page displays.
3. Search for the device that you want to update. You can scroll through the list or use the search fields to limit the list.
4. In the **Serial Number** column, click the serial number for the device that you want to update. The **Device** tab displays.
5. Click the green arrows to navigate to the **Contact Groups** page.
6. Add a contact group.

   From an empty or filled **Contact group** list box, click the down arrow to choose a contact group. You can use the search field to enter a search term and limit the list of options.

   To add the device to another notification group, click **Add another Contact Group** to add a new row to the page, and repeat the process.
7. Remove a device from a contact group.
   a. Click the check box in the **Delete?** column for the group you want to remove.
   b. Click **Remove**.
8. Click **Save** to save your changes.

Stale notifications for a device

You can determine the thresholds for a device that determine whether a stale notification is sent to the users that are connected to this device. A device becomes stale when it has not connected to Digi Axess during the specified time period.

By default, the stale notification configuration is inherited from the device's parent group.

Note You can change the notification settings for all devices in the parent group if desired.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Device Management** section.
2. From the **Device Management** section in the Admin dashboard, click **Change** next to **Devices**.

   As an alternative, you can click **Devices** from the dashboard pane on the left of the screen.
3. Search for the device that you want to update. The search results display in a list.
4. From the **Serial Number** column, click the serial number of the device that you want to change. The **Devices** page for that device displays.
5. Click the arrow buttons to scroll to the **Stale Notifications** page.
6. Disable **Inherit Settings**. **Enable Stale Notifications** is enabled by default.
7. Make the desired updates.
   - **Stale period**: Enter time period in hours since the device last connected to Digi Axess. The default is 24 hours.
   - **Resend period**: Select a time period option to determine when another stale notification should be sent. The default is 1 day.
   - **Resend limit**: Enter the maximum number of times a stale notification can be sent. The default is 3.
8. Click **Save** to save the changes.

Select one device and apply a configuration

You can apply a device configuration to one selected Connect Sensor device in a device group from the **Device Groups** page. This feature is useful if you have a new device in a group or if the configuration for one device is different from the others in the device group.

The configuration is applied the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually using a magnet.

Note You can apply a configuration file from the Digi Axess Admin menu only to Connect Sensor devices. Configurations can be applied to a Z45 Controller from the device's web UI.

The list of configurations available includes the device configurations that have been backed up and saved, for the devices that are in a device group to which you have access, plus all of the default configurations that are provided with your Digi Axess account.

Note You can apply a configuration to a Connect Sensor device using this method or other methods. See Apply a configuration to a device or a device group: Overview.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Devices** or **Change** next to that label.

   As an alternative, you can click **Devices** from the dashboard pane to the left of the page. The **Devices** page displays a list of configurations that can be applied.
3. Find the device that you want to update. You can scroll through list or use the **Search** field to find the group. You can also use the **Models** and **Device Groups** list boxes to filter the list of devices.
4. For the desired device, click **Apply Config**. The **Apply Device Configuration - Select Device Config** page displays.
5. From the **Device Configuration Type** list box, select the configuration type.
   - **Provided**: The device configuration is saved locally.
   - **Shared**: The device configuration is saved to Digi Axess.
6. A list of provided or shared configurations display. You can use the **Filter** field to search for a configuration.
7. Click on the configuration you want to apply to the device. The configuration is moved to the right side of the page in the **Selected Device Config** window, and displays in a green banner.
8. Click **Next**. The **Apply Device Configuration - Confirm** page displays, showing the device to which the configuration will be applied, and information about the configuration.
9. Click **Confirm** to continue and apply the configuration.

   Note If you have changed your mind, click **Back** to return to the previous screen.
10. The **Apply Device Configuration - Results** page displays a summary of the update.
11. Click **View Results** to navigate to the Install History page to view more information.
    - **Install Details**: Shows the name of the device configuration and the device group to which it was applied.

- **Device Config**: Click the device configuration name to display information about the configuration.
- **Device Group**: Click the device group name to display information about the device group.

- **Install Status**: Shows the completion progress of the configuration application.
- **Devices**: Contains a list of the devices to which the configuration was applied.

Clear historical sensor data from a device

You can clear the historical sensor data for a selected device from the Admin menu.

This feature is useful if you have changed the sensor connected to a pin on a device, and you want to see only data for the sensors that are currently connected to the device.

- **Connect Sensor+**: All of the historical sensor data is deleted.

  Note As an alternative, you can also delete Connect Sensor+ sensor data from the Connect Sensor+ web UI. See Clear Connect Sensor sensor data.

- **Z45 Controller**: All sensor data prior to the current day is deleted.

Note Once deleted, the sensor data cannot be recovered.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Change** next to **Devices**. As an alternative, you can click **Devices** from the dashboard pane on the left of the screen.

   The **Devices** page displays.
3. Search for the device for which you want to clear sensor data. You can limit the list by selecting a model or the devices in a particular device group, or by using the search feature. You can combine the search methods.
   - **Model**: Select a model option from the **Model** list box and click **Search**.
   - **Device Groups**: Select a device group form the **Device Groups** list box and click **Search**.
   - **Search field**: Enter a search term in the search field and then click **Search**.
4. Click the **Serial Number** link to display detailed information about the device.
5. Click **Clear Sensor Data**. The **Confirm Clear Sensor Data** page displays.
6. Review the messages, and then click **Confirm** to clear the sensor data. You are returned o the **Devices** page for the device. A green banner displays the message: **Device Sensor Data Cleared**.

Configure system logging for a Connect Sensor XRT-M in the Devices page

You can configure system logging for a Connect Sensor XRT-M in the **Devices** page for the device. This feature is useful as a support tool and does not need to be enabled unless you are instructed to do so.

Note You can also configure system logging for a device from the device's web UI.

When enabled, system events are stored on the device. Each time that the Connect Sensor XRT-M wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually with a magnet, a log is pushed from the device to Digi Axess. The logs are listed in the **Device Logs** window, and can be downloaded and saved on your computer.

The logs are collected for the number of days specified. When the time limit is reached, the logging feature is automatically disabled and logs are no longer collected from the device.

When new logs are sent from the device to Digi Axess, any logs over seven days old are automatically cleared. You can also manually clear any logs when needed.

Enable system logging for a Connect Sensor XRT-M

You must enable system logging if you want to use the feature.

Note You can also enable system logging from the Connect Sensor XRT-M web UI. See Configure system logging for a Connect Sensor XRT-M.

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1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Devices** or **Change** next to **Devices**. As an alternative, click **Devices** from the dashboard pane on the left of the screen.

   The **Device Groups** page displays.
3. Search for the device that you want to update. You can scroll through the list or use the search fields to limit the list.

   Note Make sure that the type in the **Model** column is **Connect Sensor XRT-M**.

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4. From the **Serial Number** column, click the serial number for the device you want to update.
5. Click the green arrows to navigate to the **Logging** page.
6. Click the **Enable Device Logging** slider button.
7. From the **Disable Logging In** list box, select the number of days logs should be collected. When the time limit is reached, the logging feature is automatically disabled and logs are no longer collected from the device.
8. Any logs display in the **Device Logs** window. When new logs are sent from the device to Digi Axess, any logs over seven days old are automatically cleared. You can also manually clear any logs when needed.
9. Click **Save**. You are returned to the **Devices** page.

Clear a system log on a Connect Sensor XRT-M

You can manually clear all of the system logs.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Devices** or **Change** next to **Devices**. As an alternative, click **Devices** from the dashboard pane on the left of the screen.

   The **Device Groups** page displays.
3. Search for the device that you want to update. You can scroll through the list or use the search fields to limit the list.

Note Make sure that the type in the **Model** column is **Connect Sensor XRT-M**.

4. From the **Serial Number** column, click the serial number for the device you want to update.
5. Click the green arrows to navigate to the **Logging** page.
6. Click **Clear Device Logs**.

Download system logs from a Connect Sensor XRT-M

Before the logs are automatically cleared, you can download the logs and save them on your computer. The log files are stored as a *.txt file.

Note You must have enabled the system logging feature. See Enable system logging for a Connect Sensor XRT-M.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page.
2. From the **Device Management** section in the Admin dashboard, click **Devices** or **Change** next to **Devices**. As an alternative, click **Devices** from the dashboard pane on the left of the screen.

   The **Device Groups** page displays.
3. Search for the device that you want to update. You can scroll through the list or use the search fields to limit the list.

   Note Make sure that the type in the **Model** column is **Connect Sensor XRT-M**.
4. From the **Serial Number** column, click the serial number for the device you want to update.
5. Click the green arrows to navigate to the **Logging** page.
6. Click **Download Device Logs**. The log files are downloaded onto your computer.
7. You can name and save the log to a desired location.

Notification Management: Manage in Digi Axess Admin

The notifications feature in Digi Axess lets you choose the type of device events that you want to know about, and which users should receive notifications and reports.

You can create notification contacts and groups from the Digi Axess Admin page. You must have **Admin** privileges to be able to add notification contacts and groups in the **Notification Management** section.

Notification	Description
Notification Contacts	A notification contact should be created for anyone who should receive information from Digi Axess, such as device reports and notifications. ▪ Manage Notification contacts
Notification Groups	A notification group is a set of notification contacts that should all receive the same notifications. ▪ Manage Notification Groups
Notification Services	Notification services consists of a list of pre-determined reports that you can associate with a notification group. The reports are sent to the contacts in the notification group. You can view the report options but not change a report or add a new one. ▪ Review Notification Services report options
Notifications	You can review all of the notifications that have been sent to you. The list can be filtered by when the notification was sent, notification type, urgency level, and source type. ▪ Review notifications

Manage Notification contacts

A notification contact should be created for anyone who should receive notifications from devices registered with Digi Axess, such as device reports and automation threshold alarms.

You can view the notification contacts in the **Notification Contacts** page. Contacts can be either associated with a user profile, or you can manually add a notification contact for a user that should receive notifications but does not have a user profile.

- **Contact information without a user profile**

  You can manually add contact information for users that should receive reports and alerts, but do not have a Digi Axess user profile. You can make any changes to the contact information as needed.

- **Contact information associated with a user profile**

  Contact information for each user is required when you create a user profile. You can access the user's contact information from the **Notification Contacts** page, but you can't change the user's contact information. A banner displays at the top of the page to alert you of this. You can, however, disable the notification contact so that the user does not receive notifications and you can add and update the notification contact groups for this user.

Add a notification contact for a user without a user profile

You can add contact information for anyone that should receive reports and alerts, but does have not a Digi Axess user profile.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Add** next to **Notification Contacts**.

   As an alternative, you can click **Notification Contacts** from the dashboard pane on the left of the screen, then click **Add Notification Contact**.
3. Click the **Contact Settings** tab.
   a. From the **Device Group** list box, select a device group. This is required.
   b. **Active**: Select **Active** if the contact is allowed to receive notifications (reports and alerts). This is the default. Deselect this option to suspend this contact. No notifications are sent to this contact.
   c. **Receive Reports**: Select **Receive Reports** so that this contact will receive notification reports. This is the default. Deselect this option to ensure reports are not sent to this contact.
   d. **Receive Alerts**: Select **Receive Alerts** so that this contact will receive notifications and automation threshold alarms originating from a device. This is the default. Deselect this option to stop sending notifications and alarms to this contact.
4. Click the **Contact Details** tab.
   a. Enter the contact information in the **Email**, **First name**, **Last name**, **Phone**, and **Phone2** fields. Entries in the **Email** and **First name** fields are required.
5. Click the **Contact Groups** tab.
   a. From the **Contact group** list box, select the contact group in which this contact should be included, if desired. This is optional.
   b. To add additional contact group, click **Add another Contact Group** to repeat the process.
6. Click **Add** to save the change. Other options are **Save and add another** and **Save and continue editing**.

Update notification contact information for a user without a user profile

You can update notification contact information from the **Notification Contact** page only for contacts that are not connected to a user profile.

Note If a contact is connected to a user profile, a yellow caution banner displays the **Notification Contact** page, and you have limited options for updating the contact. See Update notification contact information for a user with a user profile.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Change** next to **Notification Contacts**.

   As an alternative, you can click **Notification Contacts** from the dashboard pane on the left of the screen.
3. Find the contact that you want to update. You can scroll through the list of contacts or use the **Search** field to search for a contact.
4. Click on the contact name. The contact information displays.
5. Make the changes as needed. For information about the fields, see Add a notification contact for a user without a user profile.
6. Click **Add** to save the change. Other options are **Save and add another** and **Save and continue editing**.

Delete a notification contact for a user without a user profile

You can delete a notification contact that is not connected to a user profile. When this occurs, that contact will no longer receive notifications.

Note If a contact is connected to a user profile, a yellow caution banner displays in the **Notification Contacts** page. The contact information cannot be deleted from the **Notification Contacts** page.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Change** next to **Notification Contacts**. As an alternative, you can click **Notification Contacts** from the dashboard pane on the left of the screen.
3. Find the contact you want to delete. You can scroll through the list or use the **Search** box.
4. Click the selection box next to the contact you want to delete.
5. From the list box next to the **Go** button, select **Delete selected Notification Contacts**.
6. Click **Go**. The **Delete multiple objects** page displays.
7. Review the deletions.
8. To complete the deletion, click **Yes, I'm sure**.

   If you don't want to delete anything, click **No, take me back** to return to the **Notification Contacts** page.

Suspend notifications for a notification contact for a user without a user profile

You can suspend notifications for an active contact that is not associated with a user profile. When this occurs, the contact information is considered inactive and that contact will no longer receive notifications or notification reports.

Note If a contact is connected to a user profile, a yellow caution banner displays the **Notification Contact** page, and you cannot update the contact information from this page. The contact information should be suspended from the user profile. See Activate or suspend a user profile.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Change** next to **Notification Contacts**.

   As an alternative, you can click **Notification Contacts** from the dashboard pane on the left of the screen.
3. Find the contact you want to change. You can scroll through the list or use the **Search** box.
4. Click the **Contact Settings** tab.
   - **Active**: De-select **Active** if the contact should not receive notifications (reports and alerts). No notifications are sent to this contact.
   - **Receive Reports**: De-select **Receive Reports** if the contact should not receive notification reports.
   - **Receive Alerts**: De-select **Receive Alerts** if the contact should not receive notifications and automation threshold alarms originating from a device.
5. Click **Add** to save the change. Other options are **Save and add another** and **Save and continue editing**.

Update notification contact information for a user with a user profile

You can access the notification contact information for a user with a user profile from the **Notification Contacts** page, but you can't change the user's contact information. A banner displays at the top of the page to alert you of this.

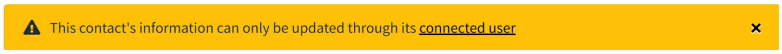
You can, however, disable the notification contact so that the user does not receive notifications and you can add and update the notification contact groups.

For more options, you can update the user profile from the **Users** page. See Update a user profile from the Digi Axess Admin page.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Change** next to **Notification Contacts**.

   As an alternative, you can click **Notification Contacts** from the dashboard pane on the left of the screen.

3. Find the contact that you want to update. You can scroll through the list of contacts or use the **Search** field to search for a contact.
4. Click on the contact name. The contact information displays. If the notification contact is associated with a user profile, a yellow banner displays across the page as an alert.



Note Click the **connected user** link to access the user profile for this notification contact.

5. Click the **Contact Settings** tab.
   a. De-select **Active** if the contact should not receive notifications (reports and alerts). No notifications are sent to this contact.
6. Click the **Contact Groups** tab.
   a. From the **Contact group** list box, select the contact group in which this contact should be included, if desired. This is optional.
   b. To add additional contact group, click **Add another Contact Group** to repeat the process.
7. Click **Add** to save the change. Other options are **Save and add another** and **Save and continue editing**.

Manage Notification Groups

You can create notification groups for a set of notification contacts that should all receive the same notifications from devices in the notification group, such as device reports and automation threshold alarms.

Each notification group is assigned a descriptive name and is associated with at least one device group. You can also add notification contacts and devices that are not in the selected device group(s).

Notification contacts: Who will receive a notification?

- Users in the device group(s) selected for the notification group.
- Individual notification contacts (with or without a user profile) that are not in the device group (s) selected but are assigned to the notification group.

Note The **Active** option in the notification contact must be enabled for any user to be able to receive notifications. See Add a notification contact for a user without a user profile and Update notification contact information for a user with a user profile.

Devices: Which devices send notifications?

- Devices in the device group(s) specified for the notification group send a notification.
- Devices that are not in a specified device group but are individually assigned to the notification group send a notification.

Add a notification group

A notification group is a set of notification contacts that should receive reports and notifications from the devices and device groups assigned to the notification group.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Add** next to **Notification Groups**.

   As an alternative, you can click **Notification Groups** from the dashboard pane on the left of the screen, then click **Add Notification Group**.
3. Click the **Group Settings** tab.
   a. From the **Device Group** list box, select a device group. This is required.
   b. Enter a name for the notification group in the **Name** field. This is required.
   c. By default, a new notification group is active and the **Active** option is selected. If you want to make the notification group inactive, de-select the **Active** option.
   d. **Include Device Group Devices**: Select this option if you want to automatically include all devices from the configured device group in the notification group. If you don't select this option, you can associate a notification group with an individual device.
   e. **Include Device Group Contacts**: Select this option if you want to automatically include all notification contacts in the configured device group in the notification group. If you don't select this option, you can associate a notification group with an individual notification contact.
   f. **Include Child Device Group Devices**: Select this option if you want to automatically include all child device groups of the configured device group in this notification group. This applies only to devices.
4. Click the **Services** tab.
   a. From the **Service** list box, select a report that you want to send to the contacts in the notification group. For information about the reports, see Review Notification Services report options.
   b. To select additional reports, click **Add another Services** and repeat the process.
5. Click **Add** to save the change. Other options are **Save and add another** and **Save and continue editing**.

Delete a notification group

You can delete a notification group that is no longer needed. Choose from the following deletion methods.

Delete one or more notification groups

This process enables you to select multiple notification groups for deletion.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Change** next to **Notification Groups**. As an alternative, you can click **Notification Groups** from the dashboard pane on the left of the screen.
3. Find the notification group(s) you want to delete. You can scroll through the list or use the **Search** box.

4. Click the selection box next to each notification group you want to delete.
5. From the list box next to the **Go** button, select **Delete selected Notification Groups**.
6. Click **Go**. The **Delete multiple objects** page displays.
7. Review the deletions.
8. To complete the deletion, click **Yes, I'm sure**.

   If you don't want to delete anything, click **No, take me back** to return to the **Notification Contacts** page.

Delete one notification group

This process enables you to delete one notification group.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Change** next to **Notification Groups**. As an alternative, you can click **Notification Groups** from the dashboard pane on the left of the screen.
3. Find the notification group you want to delete. You can scroll through the list or use the **Search** box.
4. Click on the notification group name.
5. Click **Delete**. The **Delete multiple objects** page displays.
6. Review the deletion.
7. To complete the deletion, click **Yes, I'm sure**.

   If you don't want to delete anything, click **No, take me back** to return to the **Notification Contacts** page.

Search for a notification group

You can use the filters on the **Notifications Group** screen to filter the list of notifications group.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Change** next to **Notification Groups**.

   As an alternative, you can click **Notification Groups** from the dashboard pane on the left of the screen.
3. Use one of the following methods to filter the notifications to limit the list.
   - **Scroll**: You can scroll through the list to find the notification you want to review.
   - **Search**: In the blank search field, enter a search term, then click **Search**.
   - **Filter**: Use the filter options to filter the list. Click **Search** to apply the filters and limit the list.
     - **Name**: Select a name from the list.
     - **Device Group**: Select a device group. All of the notification groups that are assigned that device group display.

Update a notification group

You can update a notification group, and add notification contacts and devices that are not in the device group(s) assigned to the notification group.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Change** next to **Notification Groups**.

   As an alternative, you can click **Notification Groups** from the dashboard pane on the left of the screen.
3. Find the notification group that you want to update.
4. Click on the name of the group.
5. Update the notification group settings.
   a. Click the **Group Settings** tab.
   b. From the **Device Group** list box, select a different device group if desired. An entry is required.
   c. You can change the name for the notification group in the **Name** field. An entry is required.
   d. The **Active** option determines whether notifications are sent. Select the **Active** option to send notifications. If you want to make the notification group inactive, de-select the **Active** option.
   e. **Include Device Group Devices**: Select this option if you want to automatically include all devices from the configured device group in the notification group. If you don't select this option, you can associate a notification group with an individual device.
   f. **Include Device Group Contacts**: Select this option if you want to automatically include all notification contacts in the configured device group in the notification group. If you don't select this option, you can associate a notification group with an individual notification contact.
   g. **Include Child Device Group Devices**: Select this option if you want to automatically include all child device groups of the configured device group in this notification group. This applies only to devices.
6. Add notification contacts that aren't in the selected device group(s). This is useful if you want to add a notification contact that isn't associated with a user profile.
   a. Click the **Contacts** tab.
   b. From the **Contact** list box, select a notification contact.
   c. To add another contact, click the plus sign next to the **Contact** field or click **Add another Contact** and repeat the process.
7. Add devices that aren't in one of the device groups specified in the **Group Settings** tab.
   a. Click the **Devices** tab.
   b. From the **Device** list box, select a device.
   c. To add another device, click the plus sign next to the **Device** field or click **Add another Device** and repeat the process.
8. You can update the reports selected for the notification group.

a. Click the **Services** tab.
b. From the **Service** list box, select a report that you want to send to the contacts in the notification group. For information about the reports, see Review Notification Services report options.
c. To select additional reports, click **Add another Services** and repeat the process.

9. Click **Add** to save the change. Other options are **Save and add another** and **Save and continue editing**.

Turn off notifications from a notification group

You can turn off notifications sent from a notification group. This ensures that the notification contacts in the notification group do not receive notifications.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Change** next to **Notification Groups**. As an alternative, you can click **Notification Groups** from the dashboard pane on the left of the screen.
3. Find the notification group you want to change. You can scroll through the list or use the **Search** box.
4. Click on the name of the notification group that you want to change.
5. Click the **Group Settings** tab.
6. Deselect the **Active** option.
7. Click **Add** to save the change. Other options are **Save and add another** and **Save and continue editing**.

Review Notification Services report options

Notification services consists of a list of pre-determined reports that you can associate with a notification group. The reports are sent to the contacts in the notification group.

The report data is collected when the device connects to Digi Axess and transfers data. When Digi Axess detects a data change, it sends the report using the most recently collected data. Z45 Controllers generally sends data once a day. Connect Sensor+ devices send data, depending on each device's connection schedule.

The reports that have been sent can be reviewed in the Device Reports page.

Note You can view the report options but not change a report or add a new one.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **View** next to **Notification Services**. As an alternative, you can click **Notification Services** from the dashboard pane on the left of the screen.

3. Review the report options.
    - **PDF Monthly Plots**: Generates a summary report for the past month using the device configuration ranges. The report is sent after the first device data push of the month.
    - **PDF Email Auto-Range Plots**: Generates a summary report for the past day using the auto ranges. The report is sent after the first device data push of the day.
    - **PDF Email Plots (Defined Range)**: Generates a summary report for the past day using the device configuration ranges. The report is sent after the first device data push of the day.

Device Reports: Review in Digi Axess Admin

You can review the device reports that are sent to the contacts in a notification group. Up to three device reports can be selected for a notification group, and each contains daily or monthly information.

A device report is available for 30 days, and then automatically deleted. You can save a report to a different location if the data is needed for longer that 30 days. You can manually delete reports at any time.

Before you begin

- For reports to appear in this screen, you must have selected a device report for at least one notification contact group. See Add a notification group.
- You can review information about the reports to help you select a report. See Review Notification Services report options.

Review the device report list

You can review the list of reports that have been generated, and review information about a selected report.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Device Reports** or click **View** next to **Device Reports**. As an alternative, you can click **Device Reports** from the dashboard pane on the left of the screen. The **Device Reports** screen displays.
3. Use one of the following methods to filter the notifications to limit the list.
   - **Scroll**: You can scroll through the list to find the notification you want to review.
   - **Search**: In the blank search field, enter a search term, then click **Search**.
   - **Filter**: Use the filter options to filter the list. Click **Search** to apply the filters and limit the list.
     - **Serial number**: Select a device's serial number.
     - **Location name**: Select the name of the device.
     - **Device Group**: Select a device group.
     - **Report Type**: Select a report type.
     - **Report Generation Time**: Select a time range.
4. You can also review details about the device report.
   a. Click the serial number link for a report. The **Details** page displays.
      - **Device**: The serial number and device name display as a link. Click the link to display device information in the Devices page.
      - **Title**: The report title, which includes the location name, and the date and time range covered by the report.
      - **Report Type**: The report type.
      - **Attachments**: A PDF of the report is attached. Click the link to download the report PDF.
   b. Click **Close** to return to the **Device Reports** page.

Delete a device report

You can delete device report if needed.

Note A device report automatically deleted after 30 days.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Device Reports** or click **View** next to **Device Reports**. As an alternative, you can click **Device Reports** from the dashboard pane on the left of the screen.
3. Find the report(s) you want to delete. You can scroll through the list, use the **Search** box to search for a term, or use the search selectors to limit the list of reports.

4. Click the selection box next to each report you want to delete. You can select more than one. To select all of the reports, click the selection box in the title bar.
5. From the list box next to the **Go** button, select **Delete selected Device Reports**.
6. Click **Go**. The **Delete Multiple Objects** page displays and overview of the report(s) that will be deleted.
7. Click **Yes, I'm sure** to complete the deletion process. You are returned to the **Device Reports** page. A green banner with a **Successfully deleted x Device Report** message displays at the top of the page.

Review notifications

All of the notifications that were sent to you within the last 30 days are available for review. You can filter the notifications to limit the list, review the notifications, display more information, and mark a notification as read or unread.

Notifications: What types of notifications are sent?

- Depending on the device, different types of default notifications are collected and sent from the devices. For a detailed list, see Notification types.
- Alerts associated with an automation threshold alarm.

  A notification contact group can be assigned to an automation for a Connect Sensor+ device. When an automation threshold is met on Connect Sensor+ device, an alarm notification is sent to all of the contacts in the notification contact group.

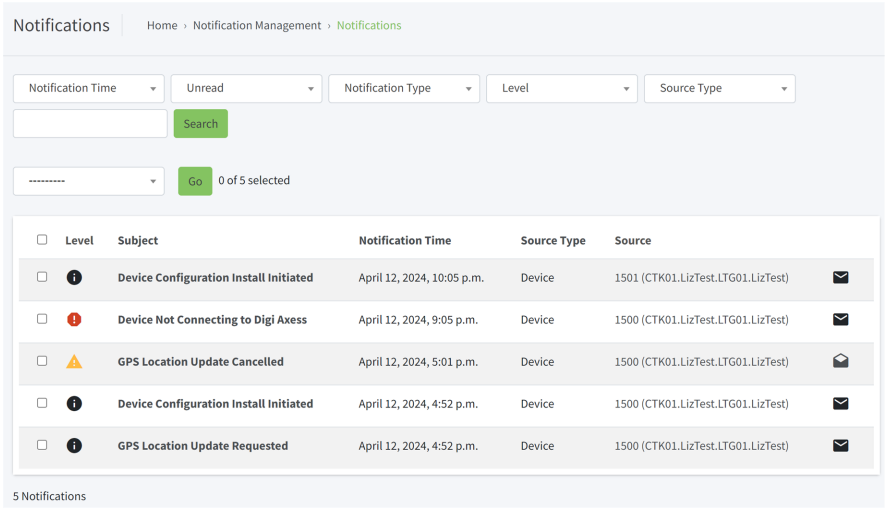
  For other devices, such as a Z45 Controller, contacts used to notify users of an automation threshold alarm are defined on the device's firmware. The contact list in Digi Axess is not used.

Note Notifications are automatically deleted 30 days after creation.

Access the Notifications page

You can review the notifications that have been sent to you. You can filter the list and review any of the messages.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Change** next to **Notifications**. As an alternative, you can click **Notifications** from the dashboard pane on the left of the screen. The **Notifications** page displays.



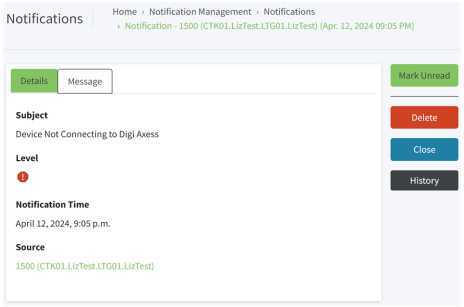
3. Use one of the following methods to filter the notifications to limit the list.
   - **Scroll**: You can scroll through the list to find the notification you want to review.
   - **Search**: In the blank search field, enter a search term, then click **Search**.
   - **Filter**: Use the filter options to filter the list. Click **Search** to apply the filters and limit the list.
     - **Notification Time**: Select a time period from the list of options: **Today**, **Past 7 Days**, **This Month**, **This Year**. Notifications are automatically deleted 30 days after creation.
     - **Unread**: Specify whether you want to display unread items (**Yes**) or read items (**No**).
     - **Notification Type**: Limit the messages to the selected type: **Battery**, **DeviceConfigInstall**, **FirmwareUpdate**, **GPSUpdate**, **Stale**. See Notification types for more information.
     - **Level**: Limit the messages by status level: **Danger**, **Warning**, **Success**, or **Info**. The level is noted by the icon next to the message subject in the grid. See Notification levels for more information.

Review a notification message

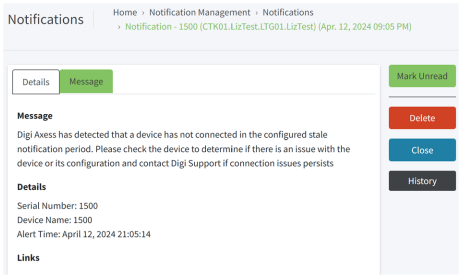
You can review the notification content. Detailed information about when and from where the notification was sent as well as the notification text.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with Admin privileges can access the **Notification Management** section.
2. From the **Notification Management** section in the Admin dashboard, click **Change** next to **Notifications**. As an alternative, you can click **Notifications** from the dashboard pane on the left of the screen. The **Notifications** page displays.
3. Filter the list to find the notification you want to review.
4. Click a notification subject line from the **Subject** column. Notification details display.
   - **Details** tab: Click the **Details** tab to show details about the notification. This tab displays by default. To review information about where the notification originated, click

the **Source** link.



- **Message** tab: Click the **Message** tab to show the notification text and review the message.



5. Click **Close** to return the **Notifications** screen.

Mark a notification as read or unread

You can change the status of a message as read or unread. An envelope icon displays for each notification.

- **Envelope closed**: The notification is unread.
- **Envelope open**: The notification has been read.

Change one notification from read to unread in the Messages page

1. Access the Notifications page and filter the notifications as described in the next step.
2. From the **Unread** list box, select **No**.
3. Click **Search**. All read notifications are displayed. The envelope icons are open.
4. From the **Subject** column, click on the link for the notification that you want to change. The **Details** and **Message** tabs become available.
5. Click **Mark Unread**. You are returned to the **Notifications** page. The envelope icon for the changed notification is closed.

Change one or more notifications from read to unread in the Notifications page

1. Access the Notifications page and filter the notifications as described in the next step.
2. From the **Unread** list box, select **No**.
3. Click **Search**. All read notifications are displayed. The envelope icons are open.

4. For each notification that you want to change to unread, click the check box for that notification. To select all of the notifications, click the check box in the header row.
5. From the list box next to **Go**, select **Mark selected notification as unread**.
6. Click **Go**. The envelope icons for the selected notifications are closed.

Change one or more notifications from unread to read in the Notifications page

1. Access the Notifications page and filter the notifications as described in the next step.
2. From the **Unread** list box, select **Yes**.
3. Click **Search**. All unread notifications are displayed. The envelope icons are closed.
4. For each notification that you want to change to read, click the check box for that notification. To select all of the notifications, click the check box in the header row.
5. From the list box next to **Go**, select **Mark selected notification as read**.
6. Click **Go**. The envelope icons for the selected notifications are open.

Delete a notification

You can delete a notification if desired. By default, notifications are automatically deleted 30 days after creation.

Delete one notification from the Messages page

1. Access the Notifications page and filter the list to find the notification you want to delete.
2. From the **Subject** column, click on the link for the notification that you want to delete. The **Details** and **Message** tabs become available.
3. Click **Delete**. The **Delete notifications** page displays.
4. Review information about the notification that you have selected to delete.
5. To delete the notification, click **Yes, I'm sure**. The notification is deleted and you are returned to the **Notifications** page.

   If you don't want to delete the notification, click **No, take me back** to return to the **Messages** page. Click **Close** to return to the **Notifications** page.

Delete one or more messages from the Notifications page

1. Access the Notifications page and filter the list to find the notification you want to delete.
2. For each notification that you want to delete, click the check box for that notification. To select all of the notifications, click the check box in the header row.
3. From the list box next to **Go**, select **Delete Selected Notifications**.
4. Click **Go**. The **Delete notifications** page displays.
5. Review information about the notification(s) that you have selected to delete.
6. To delete the notification(s), click **Yes, I'm sure**. The notification is deleted and you are returned to the **Notifications** page.

   If you don't want to delete the notification(s), click **No, take me back** to return to the **Messages** page. Click **Close** to return to the **Notifications** page.

Notification levels

The notification level describes the urgency status of the notification. The levels are noted by an icon in the **Notifications** page.

Icon	Level	Color	Description
	Success	Green	A process has completed successfully.
	**Warning**	Yellow	A process has not completed as expected. For example: ▪ GPS Location Update Cancelled
	**Danger**	Red	A process has not completed and requires attention. For example: ▪ Device not connecting to Digi Axess
	**Information**	Gray	Information about a process is provided. For example: ▪ GPS Location update requested ▪ Device Configuration Install Initiated

Notification types

The tables below explain the types of notifications that may be sent.

Stale Device Notifications alert

A stale device notification is sent when the device is no longer connecting to Digi Axess. The time threshold can be configured at the device and device group level, and defaults to 24 hours.

Notification statement	Available for:
Device not connecting to Digi Axess.	▪ Connect Sensor+ ▪ Connect Sensor XRT-M NEMA ▪ Connect Sensor XRT-M ▪ Z45 Controller

Battery alerts

A battery alert is sent when any of the battery conditions shown below are met.

Note All of the battery alerts are available for the Connect Sensor XRT-M NEMA and Connect Sensor XRT-M devices. The **Battery Replacement Required** alert is the only one available for Connect Sensor+ devices.

Notification statement	Available for:
Battery Replacement Required	▪ Connect Sensor+

Notification statement	Available for:
	■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M
Battery Replacement Recommended	■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M
Battery Has Been Removed	■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M
Battery Has Been Replaced	■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M
External Power State Change Detected (yellow banner) This notification is sent in a yellow warning banner when Digi Axess has detected that the external power has been disconnected and the device is running on battery power only.	■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M
External Power State Change Detected (green banner) This notification is sent in a green banner when Digi Axess has detected that the external power has been connected and the batteries are in backup mode.	■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M

Device Configuration alerts

A device configuration alert is sent when any of the conditions shown below are met.

Notification statement	Available for:
Device Configuration Installation	■ Connect Sensor+ ■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M
Device Configuration Install Initiated	■ Connect Sensor+ ■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M
Device Configuration Completed	■ Connect Sensor+ ■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M

Notification statement	Available for:
Device Configuration Completed with Errors	■ Connect Sensor+ ■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M

Firmware Update alerts

A firmware update alert is sent when any of the conditions shown below are met.

Notification statement	Available for:
Firmware Update Initiated	■ Connect Sensor+ ■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M
Firmware Update Completed	■ Connect Sensor+ ■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M
Firmware Update Completed with Errors	■ Connect Sensor+ ■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M
Firmware Update Cancelled	■ Connect Sensor+ ■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M

GPS Location Update alerts

A GPS location update alert is sent when any of the conditions shown below are met.

Notification statment	Available for:
GPS Location Update	■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M
GPS Location Update Requested	■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M
GPS Location Update Success	■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M
GPS Location Update Failed	■ Connect Sensor XRT-M NEMA

Notification statment	Available for:
	■ Connect Sensor XRT-M
GPS Location Update Cancelled	■ Connect Sensor XRT-M NEMA ■ Connect Sensor XRT-M

User profiles: Manage in Digi Axess Admin

A user profile should be created for each user that is allowed to log in to Digi Axess. A user profile consists of a user name and contact information. You must also assign each user to a device group and specify a user role, and determine what notifications the user should receive.

User profile information

Each user profile is defined by the information added into these sections.

Account Information

Item	Description
Username	The user name is the log in name for the user profile. A user name is required. When you save a new user profile, an email is sent to the user, who must reply to the email to activate their account.
Active	After a user profile has been created, the **Account Information** section includes an **Active** option. The **Active** option is grayed-out an unavailable until the user completes the user profile by replying to the activation email. When the reply is received, the **Active** option is selected by default. When the **Active** option is selected, you can de-select the option to suspend a user's account. See Activate or suspend a user profile.
Session timeout	You can set the length of time to automatically log the user out user if no activity detected.

Contact Information

You can add contact information for anyone that should receive device reports and automation threshold alert notifications sent by Digi Axess.

Contact information can be added or updated using either of these methods:

- Any user can add or update their own contact information from their user profile. See Manage your contact information.
- An Admin user can add or update contact information for anyone from the Digi Axess Admin page. See Update a user profile from the Digi Axess Admin page.

Note For a person that should have contact information but is not allowed to log into Digi Axess, contact information can be entered in the **Notification Contacts** page. See Add a notification contact for a user without a user profile.

Item	Description
Email	Enter the email at which the user can be receive the following information: ■ **Device reports**: Device reports are sent to the notification contacts in the notification groups assigned to the device reports. ■ **Automation threshold alert notifications**: Automation alert notifications can be set for an automation. When an automation threshold is met, a notification is sent to the notification contacts in the notification groups assigned to the automation. **Note** This contact information is used only when an automation threshold is met on Connect Sensor+ device, and an alarm notification is sent by Digi Axess. For other devices, such as a Z45 Controller, contacts used to notify users of an automation threshold alarm are defined on the device's firmware. The contact list in Digi Axess is not used.
Contact information	Enter the user's **Phone number**. A secondary **Phone number 2** can be entered. Enter the user's **First name** and **Last name**.

Permissions

In the **Permissions** section, you can specify a device group, which determines the notification groups this user profile is included in; a user role, and determine whether user should receive reports and alerts.

Item	Description
Device Group	Select the device group the user is assigned to. Users will be able to view all devices in this group and all of its children groups.
Device Subgroup	You can enter a device subgroup to limit the user to be able to view only the devices assigned the same subgroup.
User Role	Specify a **User Role**, which limits the user's actions. ■ **Admin**: User has read/write capability for all features. • Only users assigned **Admin** privileges can access the **User Management** section of the **Digi Axess Administration** page. • One user profile with **Admin** privileges is available by default in your Digi Axess. This ensures that at least one user is able to maintain configurations and access the Digi Axess Administration page. ■ **Device User**: User has read/write capability for all features, except for the **Notification Management** and **User Management** features in Digi Axess Administration.

Item	Description
	▪ **View Only**: User can only view information.
Receive Reports	User receives reports for all contact groups configured to send reports to the user's device group. This option is selected by default for **Admin** and **Device User** user roles.
Receive Alerts	User receives alerts for all contact groups configured to send alerts to the user's device group. This option is selected by default for **Admin** and **Device User** user roles.

Add a user profile

You can create a user profile for each user that is allowed to log into Digi Axess.

For more information about the sections in a user profile, see User profile information.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with **Admin** privileges can access the **User Management** section.
2. From the **User Management** section in the **Admin** dashboard, click **Add** next to **Users**.

   As an alternative, you can click **Users** from the dashboard pane on the left of the screen, then click **Add User**.
3. The **Account Information** page displays. This is used to identify the user account.
   a. In the **Username** field, enter a unique user name. Spaces are not allowed. An entry is required.
   b. Click the green arrow to advance to the next page.
4. The **Contact Information** page displays. For details about how this information is used, see Contact Information overview.
   a. In the **Email** field, enter an email address for the user. An entry is required.
   b. In the **Phone number** and **Phone number 2** fields, enter contact phone numbers for the user.
   c. In the **First name** and **Last name** fields, enter the user's name.
   d. Click the green arrow to advance to the next page.
5. The **Permissions** page displays.
   a. From the **Device Group** list box, select a device group for the user. The user has permission to manage and/or view the devices in this device group and receive notifications, depending on the assigned user role.
   b. In the **Device Subgroup** field, enter a device sub-group to limit access to this device only to users in the same device group and device sub-group. See Device sub-groups for more information.
   c. From the **User Role** list box, select the role for this user.
      ▪ **Admin**: User has read/write capability for all features.
        • Only users assigned **Admin** privileges can access the **User Management** section of the **Digi Axess Administration** page.

- One user profile with **Admin** privileges is available by default in your Digi Axess. This ensures that at least one user is able to maintain configurations and access the Digi Axess Administration page.

- **Device User**: User has read/write capability for all features, except for the **Notification Management** and **User Management** features in Digi Axess Administration.
- **View Only**: User can only view information.

d. Select **Receive Reports** if this user should receive reports for all contact groups configured to send reports to the user's device group. This option is selected by default for **Admin** and **Device User** roles.

e. Select **Receive Alerts** if this user should receive automation threshold alerts for all contact groups configured to send alerts to the user's device group. This option is selected by default for **Admin** and **Device User** roles.

6. Click **Add** to save the change. Other options are **Save and add another** and **Save and continue editing**.

Update a user profile from the Digi Axess Admin page

You can make changes to a user profile if needed.

By design, an Admin user is not able to update their own profile. When you have accessed your own user profile, a yellow banner displays at the top of the screen.

Note Any user can change their own contact information from their user profile, which is accessed from the **User Profile** menu in the Digi Axess map page. See Manage your contact information.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with **Admin** privileges can access the **User Management** section.
2. From the **User Management** section in the Admin dashboard, click **Change** next to **Users**.

   As an alternative, you can click **Users** from the dashboard pane on the left of the screen, then click **Add User**.
3. Find the user profile that you want to update. You can scroll through the list of user profiles or use the **Search** fields to search for a profile.
4. Click on the user profile name. The **Users** screen displays.
5. The **Account Information** page displays. This is used to identify the user account.
   a. In the **Username** field, you can change the user name. Spaces are not allowed. An entry is required.
   b. Click the **Active** option to suspend or activate a user profile. When a user profile is suspended, that user cannot log into Digi Axess. See Activate or suspend a user profile.
   c. Click the green arrow to advance to the next page.
6. The **Contact Information** page displays. For details about how this information is used, see Contact Information overview.
   a. You can update any of the contact information fields. An email address is required.
   b. Click the green arrow to advance to the next page.
7. The **Permissions** page displays.

a. From the **Device Group** list box, select a device group for the user. The user has permission to manage and/or view the devices in this device group and receive notifications, depending on the assigned user role.

> **Note** This field cannot be changed if you are updating your own user profile.

b. In the **Device Subgroup** field, enter a device sub-group to limit access to this device only to users in the same device group and device sub-group. See Device sub-groups for more information.

> **Note** This field cannot be changed if you are updating your own user profile.

c. From the **User Role** list box, select the role for this user.
   - **Admin**: User has read/write capability for all features.
     - Only users assigned **Admin** privileges can access the **User Management** section of the **Digi Axess Administration** page.
     - One user profile with **Admin** privileges is available by default in your Digi Axess. This ensures that at least one user is able to maintain configurations and access the Digi Axess Administration page.
   - **Device User**: User has read/write capability for all features, except for the **Notification Management** and **User Management** features in Digi Axess Administration.
   - **View Only**: User can only view information.

> **Note** This field cannot be changed if you are updating your own user profile.

d. Select **Receive Reports** if this user should receive reports for all contact groups configured to send reports to the user's device group. This option is selected by default for **Admin** and **Device User** roles.

e. Select **Receive Alerts** if this user should receive automation threshold alerts for all contact groups configured to send alerts to the user's device group. This option is selected by default for **Admin** and **Device User** roles.

8. Click **Add** to save the change. Other options are **Save and add another** and **Save and continue editing**.

Activate or suspend a user profile

You can use the **Active** option in a user profile to suspend or activate a user's profile. When a user profile is suspended, that user cannot log into Digi Axess.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with **Admin** privileges can access the **User Management** section.
2. From the **Admin** dashboard or the dashboard pane on the left of the screen, click **Users**. A list of user profiles displays.
3. Find the user profile that you want to update. You can scroll through the list of users or use the **Search** field to search for a profile.

4. The **Account Information** page should display by default. If not, click the green back arrow to navigate to that page.
    - To suspend the user profile, click the green **Active** check box.
    - To activate the user profile, click the white **Active** check box.
5. Click **Add** to save the change. Other options are **Save and add another** and **Save and continue editing**.

Change a user's Digi Axess password from the user profile

You can change a user's password from the user profile.

1. Access the Digi Axess Admin page. You must have **Admin** or **Device User** privileges to access this page. However, only users with **Admin** privileges can access the **User Management** section.
2. From the **User Management** section in the Admin dashboard, click **Change** next to **Users**.

   As an alternative, you can click **Users** from the dashboard pane on the left of the screen.
3. Find the user profile that you want to update. You can scroll through the list of user profiles or use the **Search** field to search for a profile.
4. Click on the user profile name. The **Users** screen displays.
5. Click **Send Reset Password**. An email is sent to the user, which contains a password reset link.

Create device comparison graphs in Digi Axess

Device comparison graphs show data collected from the automation applications configured for the devices. Each graph is an analytic input and shows processed data.

Each graph represents one automation application that collects and processes data configured on a device. The graph displays data from the device with a data line, which is labeled with the device name and represented by a unique line color. To ensure that data from more than one device is included in a graph, multiple devices should have an automation application configured with the same name, and should ideally collect the same type of data.

For example, you have 5 devices that collect air temperature data. Each device should be configured to have an automation application called Air Temperature, and that manipulates the air temperature data. When you view the device comparison graphs, you will see a graph called Air Temperature with five lines of data, one for each of the 5 devices.

The data is displayed in the following increments: current day, three days, one week, two weeks, or 30 days. Changing the increment in one graph changes the increment for all graphs. You can also zoom in on a particular section of a graph to see more detail.

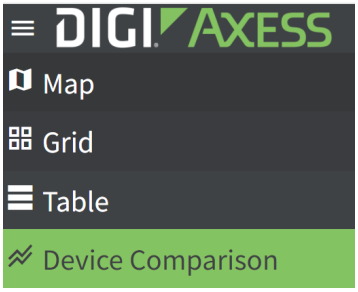
For best results

- The devices in the group should all be configured with automation applications that have the same names.
- The automation applications that have the same names should collect the same type of data.

The topics below explain how to view the graphs.

Display the device comparison graphs

1. Log into Digi Axess.
2. In the toolbar in the left pane, click the **Device Comparison** icon. You can click the hamburger icon in the toolbar to display the names of the icons.



3. The data is collected and the graphs display.

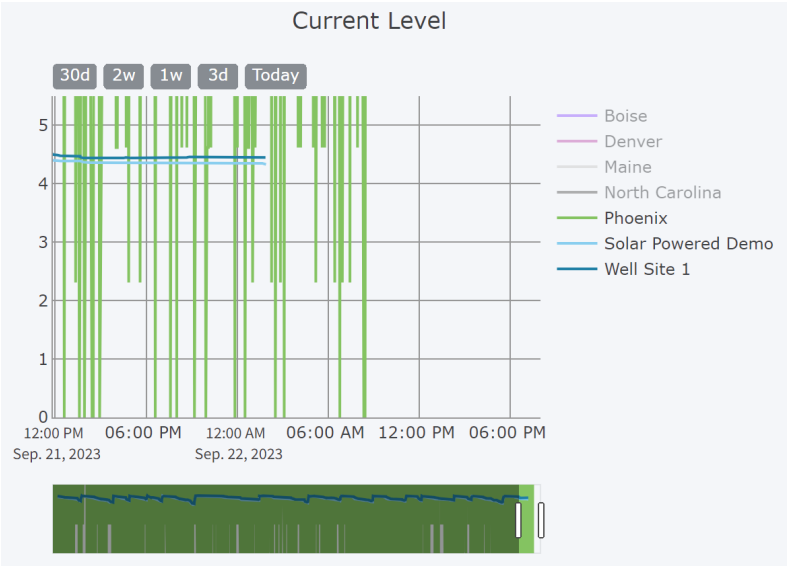
Toggle location data on and off

Each line in a graph represents the processed data from one device, and the data line for each device is assigned a unique color. The color for a device is the same in each graph. Data from up to 10 devices is included in the graphs.

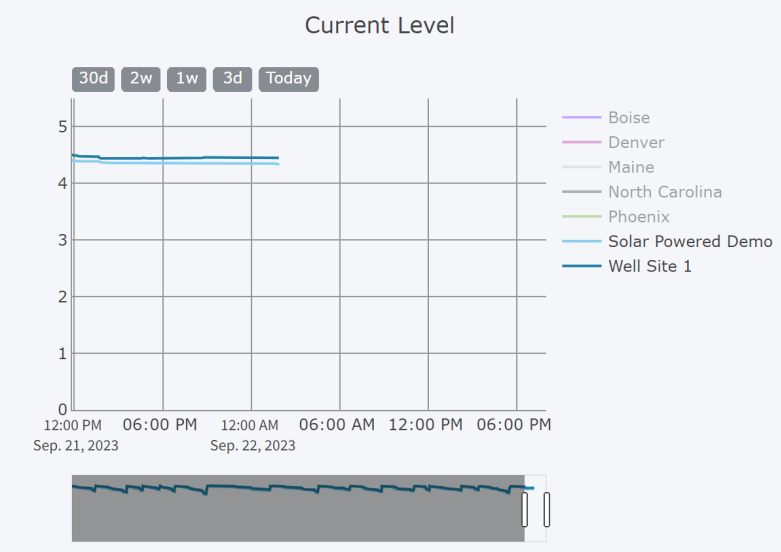
Toggle data for one device on and off

To limit the data in a graph, you can click on a location name to toggle data from that device off and on. The data is toggled from all of the graphs on the page.

In this example, Phoenix (green), Solar Powered Demo (light blue), and Well Site 1 (dark blue) are all toggled on. Colored lines display for each device.



Click Phoenix (green) to toggle off that data line. When Phoenix is toggled off, and only the Solar Powered Demo (light blue) and Well Site 1 (dark blue) data display. Phoenix and the color sample to the right of the graph are grayed out in the list of locations.



Toggle data on and off for all devices except for the selected device

You can toggle data on and off for all devices except for a selected device. The change is made in all of the graphs.

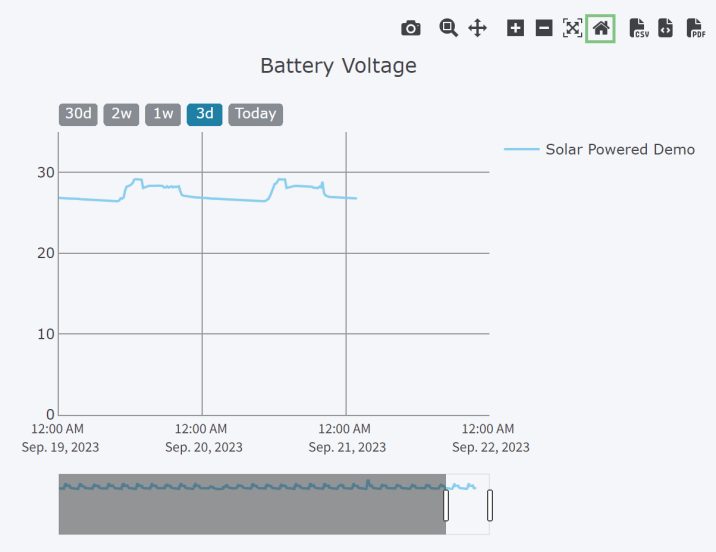
- Double-click on the device that has the data you want to display. Only data for that device is displayed on all the graphs.
- Double-click on the displayed device to display all device data in the graphs.

Change the time interval for a graph

You can show the graph data in different time intervals, choosing from the default set shown as buttons above each graph or by using the slider under the graph to zoom in or out on a specific time frame. Changing the time interval in one graph changes it for all graphs. By default, the graphs show data collected over the last three days.

Reset graphs to the default time interval

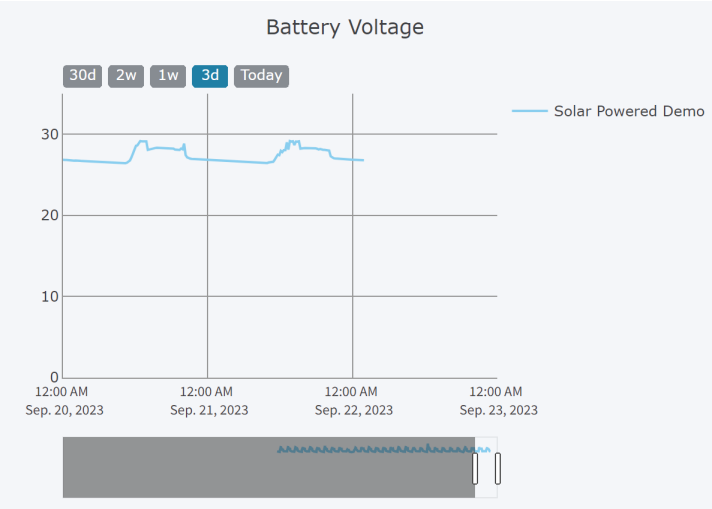
To reset the graphs to the default of three days, hover over a graph to display the graph toolbar. Click the **Home** icon in the toolbar above graph.



Use the time interval buttons

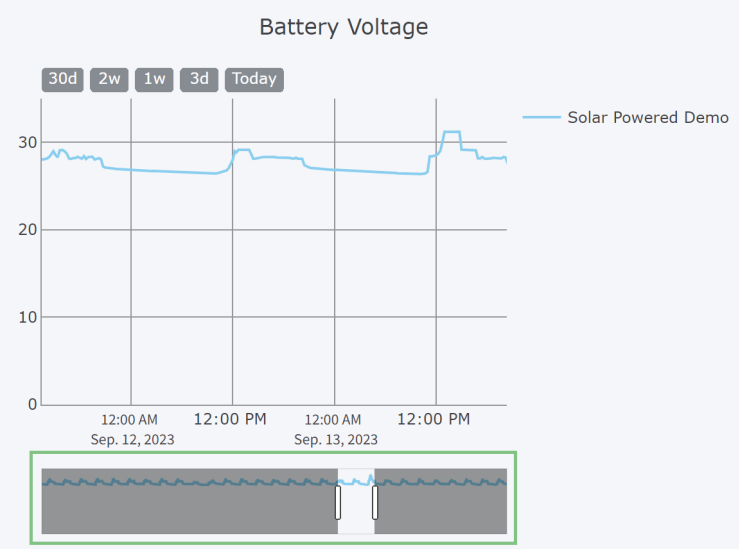
Click a time interval button above a graph to change the time interval in all the graphs. A day begins at 12:00 a.m.

- **30d**: Display the last 30 days of data.
- **2w**: Display the last 14 days of data.
- **1w**: Display the last 7 days of data.
- **3d**: Display the last 3 days of data. This is the default.
- **Today**: Display the data from the current day.



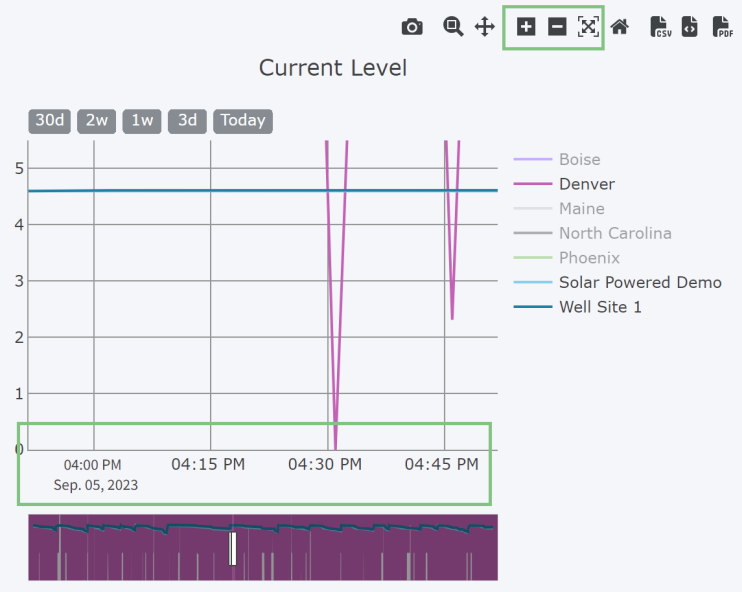
User the slider under a graph to zoom in or out

You can use the slider under each graph to zoom in or out. This feature is useful if you want to review date for a particular date or time frame that is not represented by the time interval buttons.



Display data in increments measured by hours or minutes

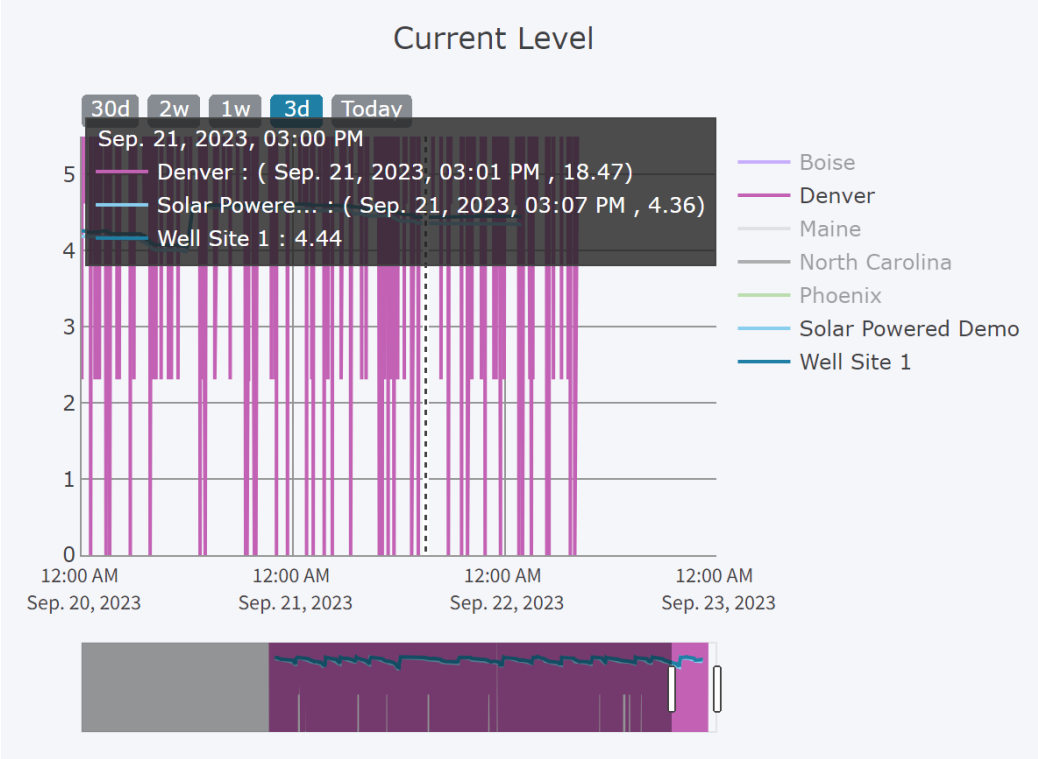
You can use the zoom buttons in the graph toolbar to zoom in or out on the graph. This feature is useful if you want to reduce the time interval to a certain hour or minute.



View detailed data for specific date and time

You can display the data point for a specific date and time on the graph by hovering over the graph. A pop-up dialog displays and shows the selected date and time. As you move the pointer over the graph, the date and time changes.

For each device, the data point and the closest date and time on which data was collected displays.

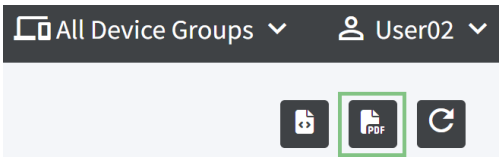


Create a PDF of a graph

You can create a PDF for one specific graph, or for all of the graphs. The PDF is saved to your download folder.

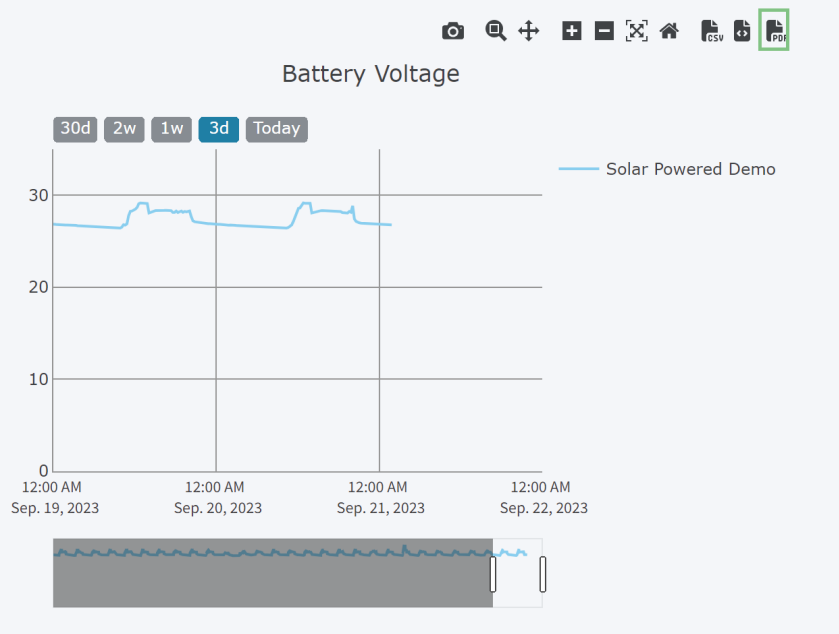
1. Log into Digi Axess.
2. In the toolbar in the left pane, click the Device Comparison icon to display the graphs.
3. To create a PDF of all of the graphs:

   From the toolbar at the top right of the page, click the **PDF** icon. The PDF is created and saved to your download folder.



4. To create a PDF of one graph:

a. Hover over the graph for which you want to create a PDF. A toolbar for the graph displays.
b. Click the **PDF** icon. The PDF is created and saved to your download folder.

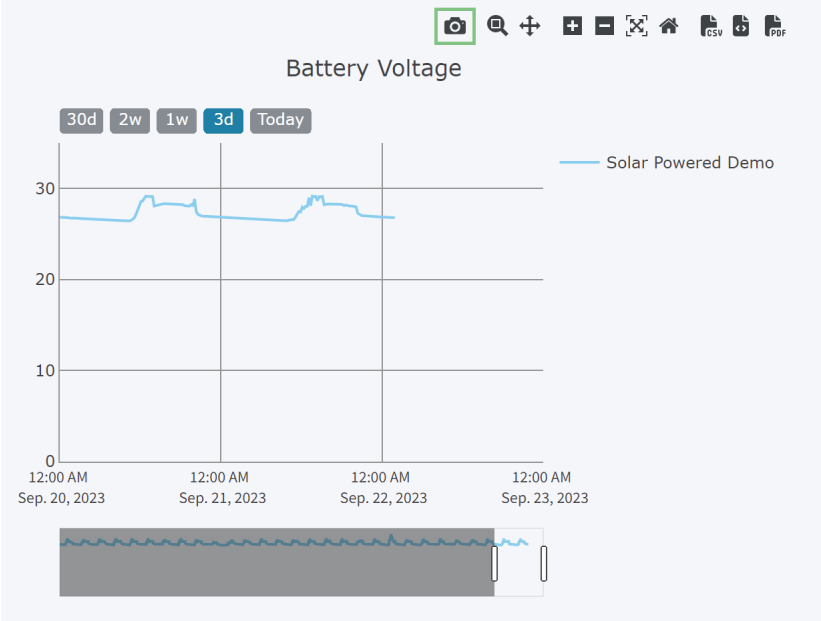


Create a PNG of a graph

You can create a PNG file of a graph.

1. Log into Digi Axess.
2. In the toolbar in the left pane, click the Device Comparison icon to display the graphs.
3. Hover over the graph for which you want to create a PNG. A toolbar for the graph displays.

4. Click the **PNG** icon. The PNG file is created and saved to your download folder.

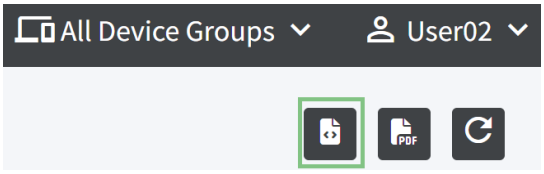


Download a JSON file for a graph

You can download a JSON file for one specific graph, or for all of the graphs.

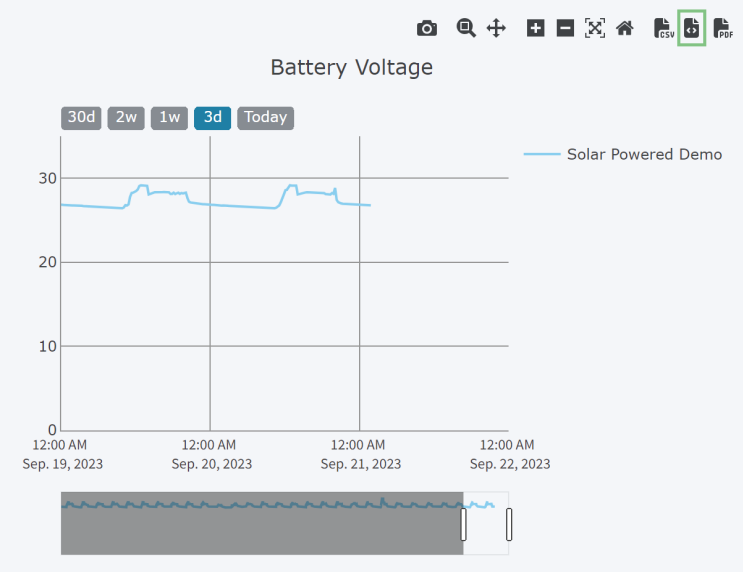
1. Log into Digi Axess.
2. In the toolbar in the left pane, click the Device Comparison icon to display the graphs.
3. To download code for all of the graphs:

   From the toolbar at the top right of the page, click the **JSON** icon. The file is created and saved to your download folder.



4. To download code for one graph:
   a. Hover over the graph for which you want to download a file. A toolbar for the graph displays.

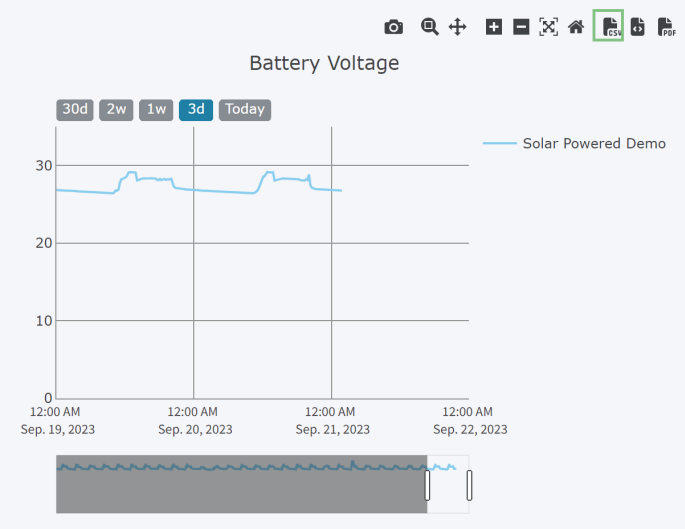
b. Click the **JSON** icon. The file is created and saved to your download folder.



Download graph data into a CSV file

You can download the data for one selected graph to a comma-separated values (CSV) file.

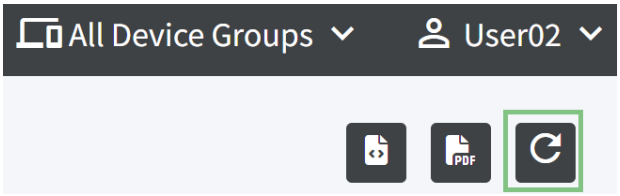
1. Log into Digi Axess.
2. In the toolbar in the left pane, click the Device Comparison icon to display the graphs.
3. Hover over the graph for which you want to create a PDF. A toolbar for the graph displays.
4. Click the **CSV** icon to create the CSV file and save it to your download folder.



Refresh the device data in the graphs

You can update the device data shown in the graphs. Any changes made from when you originally opened the graphs page or last refreshed are included in the graphs, such as uploaded data or changes made to the configuration of device.

1. Log into Digi Axess.
2. In the toolbar in the left pane, click the Device Comparison icon to display the graphs.
3. From the toolbar at the top right of the page, click the **Refresh** icon to update the graphs.



Use the Digi Axess Mobile app to manage your devices

You can use the Digi Axess Mobile app to log into Digi Axess to monitor all of your devices, and receive and manage notifications from Digi Axess.

In addition, you can easily connect to your Connect Sensor devices from the Digi Axess Mobile app. The app uses Bluetooth to find and connect to the Connect Sensor devices near you that are awake and have the mobile app service enabled on the device.

Get and install the Digi Axess Mobile app

The Digi Axess Mobile app is available from the app store, and can be installed on your phone.

- Install the Digi Axess Mobile app

General Digi Axess Mobile app use for all devices

These app features can be used with all of your devices.

Feature	Description
Access Digi Axess	You can launch and log into Digi Axess. ■ Monitor and configure your Connect Sensor XRT-M devices from the Digi Axess Mobile app
Review Digi Axess notifications	You can review notifications from Digi Axess. ■ Review Digi Axess notifications in the Digi Axess Mobile app

Connect Sensor only: Connect to your Connect Sensor devices from the Digi Axess Mobile app

You can use the Digi Axess Mobile app to quickly connect to the Connect Sensor devices near you that are awake and have the mobile app service enabled on the device.

This feature is intended to be used for the initial connection to a Connect Sensor. You can connect to a Connect Sensor and then verify that the sensors connected to the device are working as expected.

Step 1: Enable the mobile app service for the Connect Sensor

Step 2: Wake the Connect Sensor and connect to the device from the Digi Axess Mobile app

Install the Digi Axess Mobile app

The Digi Axess Mobile app is available from the app store, and can be installed on your phone.

1. On your phone, navigate to a web browser.
2. Click the appropriate link for your phone type:
   - Apple Store
   - Google Store
3. Click **Get** and install the app.

Enable the mobile app service for the Connect Sensor

You must enable the mobile app service for the Connect Sensor devices that you want to connect to from the Digi Axess Mobile app.

When you enable the service, you must also specify how long the service should remain enabled before it is automatically disabled. You can manually disable the service at any time.

1. Log into the Connect Sensor web UI from Digi Axess.
2. From the **Services** section, click **Digi Axess Services**. The **Digi Axess Services** page displays.
3. Click **Mobile App Connection**. The **Mobile App Connection Configuration** page displays.
4. Click the **Enable Mobile App Connection** toggle button. When the service is enabled, the toggle button is green.
5. From the **Automatically Disable Mobile App Connection** list box, select an option that determines how long the service should remain enabled. When the selected time limit is reached, the service is automatically disabled.

   The default is **2 days**.
6. Click **Update**. A confirmation dialog displays.
7. Click **OK** to complete the change.

NEXT STEP: After you have enabled the mobile app service you can wake your Connect Sensor and connect to the device from the Digi Axess Mobile app. See Wake the Connect Sensor and connect to the device from the Digi Axess Mobile app.

Manually disable the mobile app service

If you have enabled the mobile app service for your device, you can manually disable it before the time limit is reached for it to be automatically disabled.

1. Log into the Connect Sensor web UI from Digi Axess.
2. From the **Services** section, click **Digi Axess Services**. The **Digi Axess Services** page displays.
3. Click **Mobile App Connection**. The **Mobile App Connection Configuration** page displays.
4. If the mobile app service is enabled, the **Enable Mobile App Connection** toggle button is green and can be manually disabled. Click the **Enable Mobile App Connection** toggle button. When it is disabled, the toggle button is gray.
5. Click **Update**. A confirmation dialog displays.
6. Click **OK** to complete the change.

Wake the Connect Sensor and connect to the device from the Digi Axess Mobile app

You can use the Digi Axess Mobile app to quickly connect to the Connect Sensor devices near you that are awake. Once a device is connected to the app, you can verify that the sensors connected to the device are working as expected.

Before you begin

- Make sure that the Digi Axess Mobile app is installed on your phone.
- The mobile app service must be enabled on the Connect Sensor.
- To be able to wake the Connect Sensor with a magnet you must physically be near enough to the device to touch it.

To wake the device and connect to the device from the Digi Axess Mobile app:

1. Wake the Connect Sensor XRT-M.
   a. If the Connect Sensor XRT-M is in a NEMA enclosure, open the enclosure.
   b. Locate the magnet sensor sticker on the side of the device.

   c. Swipe a magnet across the magnet sensor sticker to wake the device.
   d. The LED on the edge of the SIM card slot shows the status of the device. When it is awake, the LED next to the SIM card slot blinks blue.
2. Open the Digi Axess Mobile app on your phone. The **Manage Devices** screen displays.
3. Click **Connect via Bluetooth**. The **Locating Nearby Devices** graphic displays in the **Find Device** page while the app searches for Connect Sensor devices.
4. When devices are found by the Digi Axess Mobile app, a list of the devices displays in the **Available Devices** lists.

   Note If no devices are found, the **No devices found** page displays. Troubleshooting information is displayed on the page. Make any adjustments and click **Retry** at the bottom of the page.

5. Click on a device in the list. The **Device Information** page displays a list of the sensors connected to the Connect Sensor.
6. Click on the name of a sensor in the **Select a Sensor to Read Data** section. The data from that sensor displays on the app screen. Repeat this step for any other sensor in the list.
7. When your review is complete, return to the **Manage Devices** page.
8. After you have connected to the Connect Sensor and verified sensor activity, you should disable the mobile app service.
   - **Automatically disable the mobile app service**: When you enable the mobile app service, you can specify how long the service should remain enabled before the service is automatically disabled.
     - Enable the mobile app service for the Connect Sensor

- **Manually disable the mobile app service**: You can manually disable the mobile app service when the connection to the Digi Axess Mobile app is no longer needed.
  - Manually disable the mobile app service

Monitor and configure your Connect Sensor XRT-M devices from the Digi Axess Mobile app

You can monitor your devices from the Digi Axess Mobile app. You can also choose to launch and log into Digi Axess for a device.

1. Open the Digi Axess Mobile app on your phone. The **Manage Devices** screen displays.
2. In the **Manage Devices** page, click **Devices monitoring**. The **Sign in to access device data** page displays.

   Note If you have already signed in to the app, this page does not display.

   a. Enter your Digi Axess user name and password in the **Username** and **Password** fields.
   b. Click **Sign In**. A list of the devices that you are allowed to access displays in the **Devices Monitoring** page.
3. Basic information about each sensor is displayed in a tile. Click a sensor tile to display more detailed information in the **Device Information** page.
   - Scroll through page to review the device information.
   - Click **Device Configuration** to log into Digi Axess.

Review Digi Axess notifications in the Digi Axess Mobile app

You can review notifications from Digi Axess in the Digi Axess Mobile app. New notifications display when you open the app, and you can access unread notifications from the menu in the **Manage Devices** page.

1. Open the Digi Axess Mobile app on your phone. The **Manage Devices** page displays.
2. Click the menu icon in the upper right corner of the **Manage Devices** page. The Digi Axess Mobile app menu displays.
3. Click **Notification Center**. The **Notifications** page displays.

   Note The number of unread messages displays next to the menu option in a green circle.

4. Click on a message to read the complete message and additional information about the device.
   - In the **Resources** section, click on the links to access more information about the message.
   - Scroll to the bottom of the page, and click **Open Device** to display additional information about the device in the **Device Information** page.

Digi Axess Mobile app menu

The Digi Axess Mobile app menu displays in the upper right corner of the **Manage Devices** page when you open the Digi Axess Mobile app if you are signed in to the app.

Note If the menu option does not display, then you must sign in to the app. Click **Devices Monitoring** in the **Manage Devices** page to sign in.

1. Open the Digi Axess Mobile app on your phone. The **Manage Devices** page displays.
2. Click the menu icon in the upper right corner of the **Manage Devices** page. The Digi Axess Mobile app menu displays.

Menu option	Description
Home	Click **Home** to return to the **Manage Devices** page,
Find Bluetooth Device	Click **Find Bluetooth Device** to find Connect Sensor devices. The **Locating Nearby Devices** graphic displays in the **Find Device** page while the app searches for devices. For more information, see Wake the Connect Sensor and connect to the device from the Digi Axess Mobile app.
Devices Monitoring	Click **Devices Monitoring** to display a list of the devices in the **Devices Monitoring** page that you are allowed to access. For more information, see Monitor and configure your Connect Sensor XRT-M devices from the Digi Axess Mobile app.
Notification Center	Click **Notification Center** to display notifications from Digi Axess in the **Notifications** page. The number of unread messages displays next to the menu option in a green circle. For more information, see Review Digi Axess notifications in the Digi Axess Mobile app.
Sign Out	Click **Sign Out** to end your Digi Axess Mobile app session. A confirmation dialog displays. ▪ **Cancel**: Click **Cancel** to close the dialog and remain logged in. ▪ **Sign Out**: Click **Sign Out** to sign out of the Digi Axess Mobile app.

Configure a device in the Connect Sensor family from the web UI

These sections explain how to configure a device in the Connect Sensor family from Digi Axess.

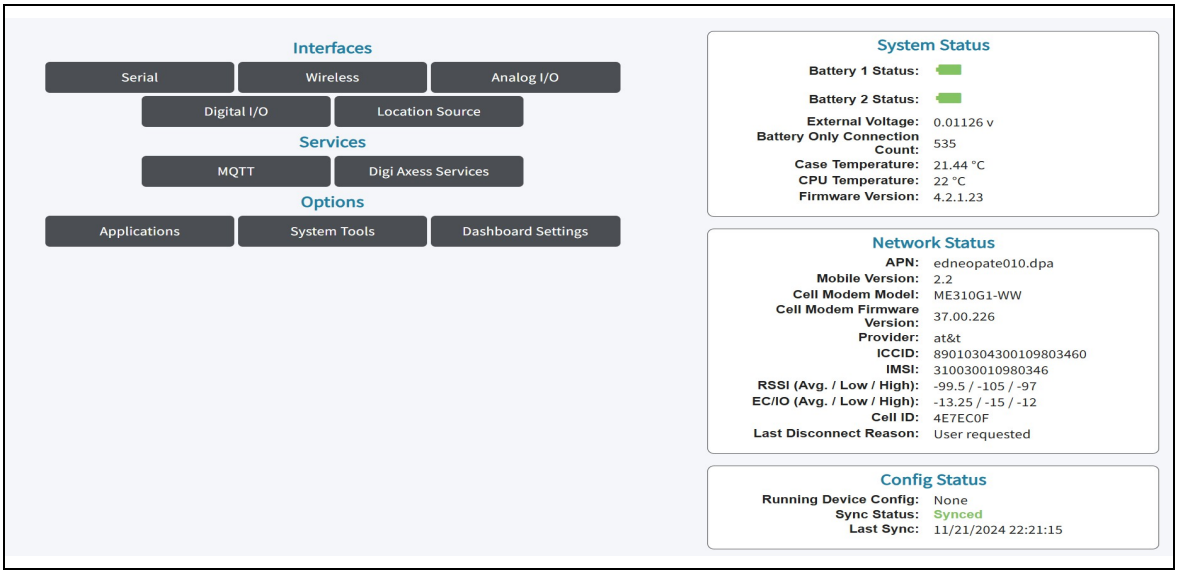
Connect Sensor family

The Connect Sensor family includes any of these devices:

- Digi Connect Sensor+
- Digi Connect Sensor XRT-M NEMA
- Digi Connect Sensor XRT-M

Configuration overview for a Connect Sensor

You can configure the Connect Sensor features using the buttons in the dashboard.



Interfaces

Button	Description
Serial	Configure the serial port on the Connect Sensor. ■ Configure the Connect Sensor serial port in Digi Axess
Wireless	Change the cellular connection type or the APN. ■ Change the cellular connection type (Connect Sensor XRT-M only) ■ Configure the APN for the Connect Sensor in Digi Axess **WARNING!** The APN of the SIM that came with the Connect Sensor is auto-detected. No changes should be made to the APN.
Analog I/O	Configure the analog I/O input pins, each of which you can configure as either a 4-20 mA current loop or a voltage input. ■ Configure analog inputs and power outputs for a Connect Sensor
Digital I/O	Configure the digital I/O input pin as a digital input or a pulse counter. ■ Configure a digital input for a Connect Sensor on the digital I/O pin ■ Configure a pulse counter for a Connect Sensor on the digital I/O pin
Location Source	Configure the physical location of a Connect Sensor+ or Connect Sensor XRT-M device. ■ Configure a Connect Sensor+ location with manually defined coordinates ■ Configure the location coordinates for a Connect Sensor

Services

Button		Description
MQTT	Configure MQTT for this device, or apply an MQTT configuration that was created in the Digi Axess Administration dashboard for a device group in which the current device is included. ■ Configure MQTT for a device from the web UI (Connect Sensor XRT-M only)	
Digi Axess Services	**Device Schedule**	You can configure the sensor data collection and push schedule for the device. ■ Configure the data collection and push schedule ■ Reset the device schedule to the factory default
	Server Configuration	You can update the Digi Axess server URL if necessary. Changes are not recommended.

Button		Description
		▪ Configure the Digi Axess server for Connect Sensor
	Mobile App Connection	You can use the Digi Axess Mobile app to perform the initial connection of your device to Digi Axess. ▪ Use the Digi Axess Mobile app to manage your devices

Options

Button			Description
Applications	**Automation Control**	**Inputs**	Configure and manage inputs pins. ▪ Configure input pins on the Connect Sensor XRT-M
		Outputs	Configure and manage output pins. ▪ Configure output pins on a Connect Sensor XRT-M
		Formulas	Create and manage formulas. ▪ Formulas: Manage from the web UI.
		Programs	Create and manage programs made from an internal function library. ▪ Programs
		I/O Modules	Introduce data into the system from a MODBUS source, the Z45 Controller, a Multi-Function IO Module, or any third-party supported I/O modules. ▪ Set up I/O modules
		Force Config Update	A full force configuration update overwrites the entire device configuration based on the Digi Axess configuration. Digi recommends forcing a configuration update only when the sync status shows as **Synced** but the device configuration is not properly synced and you have physical access to the device. ▪ Force a full configuration update on a Connect Sensor
	Automation Dashboard	The **Automation Dashboard** page graphically represents the information gathered by your devices.	

Button		Description
		■ View automation data in the Automation Dashboard
System Tools	**Backup/Restore**	Back up or restore the configuration on the Connect Sensor. ■ Back up a Connect Sensor configuration ■ Restore a Connect Sensor configuration
	Cellular Firmware Update	Update the cellular modem firmware version on the Connect Sensor. ■ Cellular modem firmware update: Connect Sensor.
	Clear Sensor Data	You can clear all of the Connect Sensor sensor data stored in Digi Axess. ■ Clear Connect Sensor sensor data
	Firmware Update	Update the Connect Sensor firmware. ■ Update the Connect Sensor firmware from the web UI.
	Logging	Enable system logging. ■ Configure system logging for a Connect Sensor XRT-M
Dashboard Settings		Manage the Connect Sensor's location name and Device Summary page display. ■ Define the Device Summary page and display options ■ Define dashboard display groups

Log in to a Connect Sensor device's web UI

You can log in to the local web UI on a Connect Sensor using one of the methods listed below.

- Device Summary page in the Digi Axess map: Access the device's web UI from the Device Summary page
- Browser window: Log in to a Connect Sensor device's web UI using a network connection

Log in to a Connect Sensor device's web UI using a network connection

If your Connect Sensor has a cellular network connection, you can log into the device from a browser window, using the IP address.

Any changes you make are stored and then pushed from Digi Axess the next time that the Connect Sensor wakes and connects to the network.

Before you begin

- Verify that the Connect Sensor is connected to a cellular network.
- Make sure you have the Connect Sensor's IP address.
- Make sure you have the correct user name and password for the Connect Sensor.

To log in to a Connect Sensor from a browser window:

1. Open a browser window on your computer.
2. In the search field, type in the Connect Sensor's IP address. The web UI log in window displays.
3. Enter the correct **User name** and **Password** for the device.
4. Click **Login**. The main web UI page displays.

Configure the Connect Sensor serial port in Digi Axess

You can configure the Connect Sensor serial port in Digi Axess.

1. Log into the Connect Sensor web UI from Digi Axess.
2. From the **Interfaces** section, click **Serial**. The **Serial Configuration** page displays.
3. In the **Serial Port 1** fields, configure the serial port. Refer to the table below for field descriptions.
4. Click **Update** to save the configuration.

Field	Description
Framing mode	Select the framing mode you want to use for Modbus. Options are: ▪ **ASCII** ▪ **RTU**. This is the default. Note This option is only used if you are using Modbus.
Baud	Select the baud rate needed to connect to Digi Axess. The default is **19200**.
Data bits	Select the number of data bits needed to connect to Digi Axess. The default is **8 Bits**.
Stop bits	Select the number of stop bits needed to connect to Digi Axess. The default is **1 Bit**.
Parity	Select the type of parity needed to connect to Digi Axess. The default is **None**.
Power output	Enables or disables the power output source. Options are: ▪ **Enabled** ▪ **Disabled**: This is the default.
Output voltage	Specifies the voltage level output for the power source. The default is **3.3 Volts**.
Read delay	Specifies the time in seconds that the sensor voltage is enabled before Connect Sensor reads its value. This allows the sensor to stabilize to get an accurate reading. The default is **0**. Note A higher read delay keeps the device powered on longer, which reduces battery life.

Configure the location coordinates for a Connect Sensor

You can configure the latitude and longitude coordinates of the physical location of a device in the Connect Sensor family. Depending on the device type, you can manually configure the coordinates and/or request the GPS location of the device.

- **Connect Sensor+**: Coordinates for the Connect Sensor+ can only be configured manually. See Configure a Connect Sensor+ location with manually defined coordinates
- **Connect Sensor XRT-M**: Coordinates for the Connect Sensor XRT-M can be configured manually or by GPS. When you choose the GPS method, a request is sent to the device. When the device wakes up and receives the request, it connects to the GPS satellites to determine its GPS coordinates, and then sends the information back to Digi Axess.
  - Configure the location for a Connect Sensor XRT-M with manually defined coordinates
  - Configure the location for a Connect Sensor XRT-M device with GPS-defined coordinates

Information about the current location displays in the **System Location Configuration** page.

- **Latitude**: The latitude coordinate of the device's physical location.
- **Longitude**: The longitude coordinate of the device's physical location.
- **Location Source**: The method used to determine the latitude and longitude.
  - **manual**: The coordinates were manually configured.
  - **gps**: The coordinates were updated by a GPS location request to the device. This may display only for a Connect Sensor XRT-M.
  - **error**: The device was unable to get its GPS location. In this situation, an error banner displays on the page and the location reverts to the last configured location coordinates. This may display only for a Connect Sensor XRT-M.
- **Last Update**: The last date and time on which the coordinates were updated.

Configure a Connect Sensor+ location with manually defined coordinates

The physical location for a Connect Sensor+'s location is determined by manually defining the device's coordinates in the **System Location Page**.

1. Determine the latitude and longitude coordinates for the device's location. You can use the physical address of where the device is located and a mapping application to discover the coordinates.
2. Access the device's web UI from the Device Summary page.
3. In the **Interfaces** section, click **Location Source**. For information about the fields on this screen, see Configure the location coordinates for a Connect Sensor.
4. Click **Manual Override**. The **Manual Location Override** section displays.
5. In the **Latitude** and **Longitude** fields, enter the latitude and longitude coordinates for the device's location.
6. Click **Update**.
7. Click **OK** to confirm update.

Configure the location for a Connect Sensor XRT-M with manually defined coordinates

The physical location for a Connect Sensor XRT-M's location can be determined by manually defining the device's coordinates in the **System Location Page**.

Note You can also request the location from the device, which is determined using the GPS. See Configure the location for a Connect Sensor XRT-M device with GPS-defined coordinates.

1. Determine the latitude and longitude coordinates for the device's location. You can use the physical address of where the device is located and a mapping application to discover the coordinates.
2. Access the device's web UI from the Device Summary page.
3. In the **Interfaces** section, click **Location Source**. For information about the fields on this screen, see Configure the location coordinates for a Connect Sensor.
4. Click **Manual Override**. The **Manual Location Override** section displays.
5. In the **Latitude** and **Longitude** fields, enter the latitude and longitude coordinates for the device's location.
6. Click **Update**.
7. Click **OK** to confirm update.

Configure the location for a Connect Sensor XRT-M device with GPS-defined coordinates

You can use GPS to find the latitude and longitude coordinates of a Connect Sensor XRT-M's physical location. When you choose the GPS method, a request is sent to the device. When the device wakes up and receives the request, it connects to GPS satellites to determine its GPS coordinates, and then sends the information back to Digi Axess, and the coordinates are updated.

If the device was unable to get its GPS location, an error banner displays on the page and the location reverts to the last configured location coordinates.

Note You can also manually define the location coordinates for a Connect Sensor XRT-M. See Configure the location for a Connect Sensor XRT-M with manually defined coordinates.

To determine the device's location using GPS:

1. Access the device's web UI from the Device Summary page.
2. In the **Interfaces** section, click **Location Source**. For information about the fields on this screen, see Configure the location coordinates for a Connect Sensor.
3. Click **Request GPS position** to start the process. A banner displays on the page: **GPS Location Update Pending Device Connection**. The banner displays until the process completes in one of the following ways:
   - **Coordinates are updated**: The device sends updated coordinates to Digi Axess. The **gps** option displays in the **Location Source** field and the coordinates are updated.
   - **Error occurs**: The device determines it cannot get the GPS coordinates. The **error** option displays in the **Location Source** field and the coordinates revert to the last configured location coordinates.
4. You can cancel the GPS request if needed. Click **Cancel GPS Request**.

Change the location name for a Connect Sensor

You can change the descriptive name for the device's location.

Note The location name can also be changed from the **Administration** menu.

1. Access the device's web UI from the Device Summary page.
2. In the **Interfaces** section, click **Location Source**. For information about the fields on this screen, see Configure the location coordinates for a Connect Sensor.
3. Click the **edit** icon next to the **Location Name** field.
4. Enter a new name in the field.
5. Click the **save** icon. A green banner with the message **Location Name Updated** displays.

Configure the Connect Sensor digital I/O pin

Connect Sensor has one digital I/O pin. You can configure the pin as a digital input or a pulse counter.

Configure a digital input for a Connect Sensor on the digital I/O pin

Connect Sensor has one digital I/O pin and you can configure the pin as a digital input.

Note You can also configure the digital I/O pin as a pulse counter. See Configure a pulse counter for a Connect Sensor on the digital I/O pin.

When configured as a digital input, Connect Sensor detects the presence of a voltage level that is either "high" or "low". Connect Sensor detects voltage levels during sleep cycles and reports them to Digi Axess when prompted by the **Wake device on** option for the pin, and during the device's scheduled reporting intervals.

To configure the digital I/O pin as a digital input:

1. Log into the Connect Sensor web UI from Digi Axess.
2. In the **Interfaces** section, click **Digital I/O**.
3. For **Type**, select **Digital Input**.
4. Configure the pin. Information about the fields is in the table below.
5. Click **Update** to save your changes.

Option	Description
Internal pullup resistor	Enable or disable the internal pull-up resistor to drive a logic level voltage. For example, use this to drive a logic voltage across a mechanical switch to read the value (open or closed) of the mechanical switch. Options are: ▪ **Enabled**: When **Digital Input** is selected, this option is automatically enabled. ▪ **Disabled**: This is the default.
Wake device on	Specifies when you want the Connect Sensor to wake up and push data to Digi Axess. Options are:

Option	Description
	■ **None**: Data is stored until the Connect Sensor wakes up at the next scheduled time. ■ **Rising Edge**: When the rising edge is met, the Connect Sensor wakes and sends data. ■ **Falling Edge**: When the falling edge is met, the Connect Sensor wakes and sends data. ■ **Rising and falling edges**: When the rising edge or the falling edge is met, the Connect Sensor wakes and sends data.
Power output	Enables or disables the power output source. Options are: ■ **Enabled** ■ **Disabled**: This is the default.
Output voltage	Specifies the voltage level output for the power source. The default is **3.3 Volts**.
Read delay	Specifies the time in seconds that the sensor voltage is enabled before Connect Sensor reads its value. This allows the sensor to stabilize to get an accurate reading. The default is **0**. **Note** A higher read delay keeps the device powered on longer, which reduces battery life.

Configure a pulse counter for a Connect Sensor on the digital I/O pin

Connect Sensor has one digital I/O pin and you can configure it as a pulse counter.

Note You can also configure the digital I/O pin as a digital input. See Configure a digital input for a Connect Sensor on the digital I/O pin.

When configured as a digital pulse counter, Connect Sensor continues to count pulses during sleep cycles and reports them to Digi Axess during normal reporting intervals.

For example, if Connect Sensor reports every hour, the sensor counts pulses during each hour Connect Sensor is in sleep mode. At the end of each hour, Connect Sensor wakes and reports the total pulse count for that hour to Digi Axess. The pulse counter resets to zero after each wake cycle and stores the values until the next reporting interval.

To configure a pulse counter on the digital pin:

1. Log into the Connect Sensor web UI from Digi Axess.
2. In the **Interfaces** section, click **Digital I/O**.
3. For **Type**, select **Pulse Counter**.
4. Configure the pin. Information about the fields is in the table below.
5. Click **Update** to save your changes.

Option	Description
Internal pullup resistor	Enable or disable the internal pull-up resistor to drive a logic level voltage. For example, use this to drive a logic voltage across a mechanical switch to read the value (open or closed) of the mechanical switch. Options are: ■ **Enabled** ■ **Disabled**: This is the default.
Power output	Enables or disables the power output source. Options are: ■ **Enabled** ■ **Disabled**: This is the default.
Output voltage	Specifies the voltage level output for the power source. The default is **3.3 Volts**.
Read delay	Specifies the time in seconds that the sensor voltage is enabled before Connect Sensor reads its value. This allows the sensor to stabilize to get an accurate reading. The default is **0**. Note A higher read delay keeps the device powered on longer, which reduces battery life.

Configure analog inputs and power outputs for a Connect Sensor

Connect Sensor has four analog inputs, each of which you can configure as either a 4-20 mA current loop or a voltage input.

Analog power outputs

You can enable and configure the analog power output options when you use Connect Sensor to power analog sensors. Each of the four analog inputs also has four corresponding power outputs to power sensors. The analog power outputs work independently: each one powers only its corresponding analog input.

When Connect Sensor powers multiple sensors, it powers only one sensor at a time for each sensor reading. This also allows you to set different voltage ranges for each power output.

1. Log into the Connect Sensor web UI from Digi Axess.
2. In the **Interfaces** section, click **Analog I/O**.
3. Configure the analog inputs: **Analog 1**, **Analog 2**, **Analog 3**, and **Analog 4**. Information about the fields is in the table below.
4. Click **Update** to save your changes.

Option	Description
Input	Determine the analog input type. Options are:

Option	Description
	■ **4-20mA Current Loop** ■ **Voltage Input**
Oversampling	Select the option that describes the desired value for the sampled data. Options are: ■ **Off**: Do not use this option. This is the default. ■ **Average** ■ **Minimum** ■ **Maximum** See Oversampling for a feature description. **Note** Reading a large number of data samples over a long interval reduces battery life.
Oversampling Delay	Specify the time interval between oversampling readings. The time is measured in milliseconds.
Oversampling count	Specify the number of data samples that must be taken.
High send trigger	Specify whether you want to generate a high trigger report. Options are: ■ **Disabled** ■ **Enabled**
High trigger	Specifies the input value that generates a high alarm report when the high trigger is enabled.
Low send trigger	Specify whether you want to generate a low trigger report. Options are: ■ **Disabled** ■ **Enabled**
Low trigger	Specifies the input value that generates a low alarm report when the low trigger is enabled.
Hysteresis	Specifies the input value to keep an alarm on or to shut off an alarm during high and low alarm states. ■ 0: hysteresis is off ■ 1 or more: hysteresis is on and managing alarms. The default is 1.0. See Hysteresis for more information.
Power output	Enables or disables the power output source. Options are: ■ **Enabled** ■ **Disabled**: This is the default.

Option	Description
Output voltage	Specifies the voltage level output for the power source. The default is **3.3 Volts**.
Read delay	Specifies the time in seconds that the sensor voltage is enabled before Connect Sensor reads its value. This allows the sensor to stabilize to get an accurate reading. The default is **0**. **Note** A higher read delay keeps the device powered on longer, which reduces battery life.

Oversampling

The oversampling feature enables you to increase the precision of a data sample collected at a scheduled reading by reading multiple samples. You can specify the number of samples that should be read and the time interval between each reading. You can also specify how the data samples should be manipulated to create the final data sample that is pushed: an average value of all of the samples, the minimum value, or the maximum.

For example, oversampling is configured to discover the average value of 10 readings taken 70 milliseconds apart. Whenever Connect Sensor needs a value for that sensor, it actually reads the sensor 10 times, 70 milliseconds apart; averages those results; and uses the averaged value as the sensor reading.

Note Reading a large number of data samples over a long interval reduces battery life.

Hysteresis

Sensor values may sometimes fluctuate during an alarm condition, which causes Connect Sensor to send multiple alarm reports.

Hysteresis works with the high and low alarm thresholds to tell the device when to keep an alarm on without sending additional alarm reports, or when to shut off an alarm. Use this to avoid repeated alarms during common sensor input value fluctuations.

For example, a pressure sensor input value increases to the high threshold and the device sends a high alarm report. However, the pressure sensor input value continues to increase and decrease repeatedly between normal and high thresholds during this alarm condition. If you have not set a hysteresis range, the Connect Sensor device sends an alarm report every time the sensor input value reaches the high threshold.

The following are examples of how high and low hysteresis works with a voltage input:

- **High hysteresis:** If your high threshold is 10 volts and your hysteresis value is 2 volts, then your high alarm hysteresis is 8 volts. This means that the alarm turns on when the sensor input value reaches 10 volts and remains on if the sensor input value stays above 8 volts. No additional alarm reports are sent during this alarm condition. The alarm turns off when the sensor input value falls below 8 volts.
- **Low hysteresis:** If your low alarm threshold is 2 volts and the hysteresis value is 3 volts, then your low alarm hysteresis is 5 volts. This means that the alarm turns on when the sensor input value reaches 2 volts and remains on if the sensor input value stays below 5 volts. No

additional alarm reports are sent during this alarm condition. The alarm turns off when the sensor input value rises above 5 volts.

Setting the hysteresis threshold to 0 (zero) causes Connect Sensor to send an alarm report every time the sensor input value exceeds a high or low alarm threshold.

Note Setting the hysteresis threshold to 0 (zero) may cause excessive data usage and reduce battery life.

Configure the APN for the Connect Sensor in Digi Axess

The APN of the SIM that came with the Digi device is auto-detected.

Note Any changes made to the APN Profile configuration may cause the device to no longer connect to the internet. Digi recommends making changes only when you have physical access to the device.

1. Log into the Connect Sensor web UI on Digi Axess.
2. From the **Interfaces** section, click **Wireless**. The **Wireless Interface Configuration** page displays.
3. Click **Edit**.
4. Specify a profile name. Options are:
   - **Detect Name Automatically**: Select this option to detect the default profile name.
   - **Define Name**: Select this option and enter a name in the field.
5. In the **Username** field, enter the user name.
6. Specify a password.
   - Select **Use Existing Password** to retain the current password.
   - Select **Update Password** to change the password. Enter the new password in the **New Password** field, and then enter the same password in the **Confirm Password** field.
7. Specify a PIN.
   - Select **Use Existing Pin** to retain the current PIN.
   - Select **Update Pin** to change the password. Enter the new password in the **New Pin** field, and then enter the same password in the **Confirm Pin** field.
8. In the **Mtu** field, enter the largest PDU that can be communicated.
9. Click **Update** to save the changes. Click **Cancel** to revert to the current configuration.

Change the cellular connection type (Connect Sensor XRT-M only)

By default, the cellular connection for a Connect Sensor XRT-M device is set to M1. You can change the connection type if needed, such as to an NB-IoT connection.

1. Log into the Connect Sensor web UI on Digi Axess.
2. From the **Interfaces** section, click **Wireless**. The **Wireless Interface Configuration** page displays.
3. Click **Edit**.
4. In the **Modem Configuration** section, click the **Iot Tech** list box.

5. Select the desired cellular connection option, such as **NB-IoT**.
6. Click **Update** to save the changes. Click **Cancel** to revert to the current configuration.

Configurations: Save and apply to a Connect Sensor

Back up a Connect Sensor configuration

You can back up a Connect Sensor's configuration that is saved in Digi Axess to the default download location on your computer.

1. Log into the Connect Sensor web UI from Digi Axess.
2. In the **Options** section, click **System Tools**. The **Tools and Utilities** page displays.
3. Click **Backup/Restore.** The **Load Configuration** page displays.
4. From the **Select an Option** section, click **Save/Backup**.
5. In the **Select a Location** section, select where the configuration should be saved.
   - **Local Storage**: Select this option to save the backup to your computer. This is the default.
   - **Shared Digi Axess**: Select this option to save the backup to Digi Axess. The **Axess Group** list box displays. Select the group with which you want to share this configuration.
6. In the **Select a Module** section, the **Automation Control** option is selected by default.
7. In the **File Name** field, enter the file name for the saved configuration. The file is given a unique name by default but you can change it.
8. Click **Submit**. The back up file is downloaded onto your computer and saved to the default download location. You can move the file to a new location if needed.

Restore a Connect Sensor configuration

You can restore the configuration for a Connect Sensor from a backup saved on your computer or choose to restore these settings to the default configuration: all the analog, digital, and serial settings, the device profile, and all of the automation control settings.

The configuration is restored during the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually.

1. Log into the Connect Sensor web UI from Digi Axess.
2. In the **Options** section, click **System Tools**. The **Tools and Utilities** page displays.
3. Click **Backup/Restore.** The **Load Configuration** page displays.
4. From the **Select an Option** section, click **Install**.
5. Determine the configuration type you want to install: from a configuration back up file or to restore the configuration to default settings.
   - **Previously saved back up file**
     a. In the **Select a Location** section, click **Local Storage**.
     b. Click **Choose File** and navigate to a saved back up file.
     c. Click **Open**.

d. Click **Submit** to store the install instruction. The configuration install occurs the next time that the Connect Sensor wakes and connects to Digi Axess.

- **Restore to default settings**
  a. In the **Select a Location** section, click **Provided**.
  b. From the **Select a Configuration** list box, select **Blank Configuration**.
  c. Click **Submit** to store the install instruction. The configuration install occurs the next time that the Connect Sensor wakes and connects to Digi Axess.

Apply a configuration file to a Connect Sensor from the Device Summary page

You can apply a selected device configuration to a Connect Sensor from the device's Device Summary page. The update happens during the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually.

The device configurations are created from a saved back up of a configuration file from a device. See Back up a Connect Sensor configuration.

Note You can also apply a configuration to a Connect Sensor device or device group from the Administration menu. See Device Configuration Management: Manage in Digi Axess Admin

Note You can apply a configuration file to only Connect Sensor devices.

1. Log into Digi Axess. The Digi Axess map displays.
2. From the mapped device list, find the Connect Sensor device for which you want to update the Connect Sensor firmware.
3. Click the device name in the mapped device list. The Device Summary page displays.
4. Click the **Apply Config** button. The **Apply Device Configuration - Select Device Config** page displays.
5. From the **Device Configuration Type** field, select the configuration type.
   - **Provided**: The device configuration is saved locally.
   - **Shared**: The device configuration is saved to Digi Axess.
6. Select device configuration.
   - **Provided Device Configuration**: If you selected **Provided**, the **Provided Device Configuration** field displays. You can use this field to limit the configurations that are included in the list. As you type, the list is updated to include only the configurations that match the entry. You can also simply select a configuration from the list.
   - **Shared Device Configuration**: If you selected **Shared**, the **Shared Device Configuration** field displays. You can use this field to limit the configurations that are included in the list. As you type, the list is updated to include only the configurations that match the entry. You can also simply select a configuration from the list.
7. Click on a configuration from the list. The selected device or device group displays in the **Selected Device Config** window.

   Note Click on the selected device configuration option in the **Selected Device Config** list to deselect it.

8. Click **Next**. The **Apply Device Configuration - Confirm** page displays, showing the device to which the configuration will be applied, and information about the configuration.

   Note A yellow warning banner displays at the top of the screen, to alert you that applying a device configuration that cannot be undone.

9. Decide whether you want to apply the configuration:
   - **Confirm**: Click **Confirm** to continue and apply the configuration.
   - **Back**: Click **Back** to return to the previous screen.
   - **Home**: Click **Home** to return the main Digi Axess map page.

Force a full configuration update on a Connect Sensor

Forcing a full configuration update overwrites the entire Connect Sensor configuration on the device based on the Connect Sensor configuration stored in Digi Axess.

The update happens during the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually.

Digi recommends only forcing a configuration update when the Sync Status in the Device Summary page shows as **Synced** but the device configuration is not properly synced and you have physical access to the device.

1. Log into the Connect Sensor web UI on Digi Axess.
2. In the **Options** section, click **Applications**. The **Available Applications** buttons display.
3. Click **Automation Control**. The **Management & Administration** buttons display.
4. Click **Force Full Config**. The **Force Full Device Config Update** page displays.
5. Click **Force Full Config** to force a full configuration update for the device. The device's configuration in Digi Axess is pushed to the device and overwrites the device's existing configuration.

Firmware update and cancel: Connect Sensor

You can update the Connect Sensor firmware on a selected device or all of the Connect Sensor devices in a device group. The update happens during the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually.

You can cancel a Digi Axess firmware update that is scheduled for a device or a device group for a future date. The firmware update for the device or for all of the Connect Sensor devices in the device group is canceled.

The tables below explain the update, review, and cancellation options.

Note You can update the firmware on a device from the Digi Axess Admin page, or from the device's web UI. The history of the device's firmware updates and canceling a schedule firmware update can only be done from the Digi Axess Admin page.

Firmware update

Where?		One selected device	All Connect Sensor devices in a device group	Description
Device Groups page	Digi Axess Admin dashboard		X	Update the Connect Sensor firmware from the Device Groups page
Device Summary page	Digi Axess map	X		Update the Connect Sensor firmware from the Device Summary page
Device's web UI	Digi Axess web UI	X		Update the Connect Sensor firmware from the web UI

Review firmware update history

Where?		One selected device	All Connect Sensor devices in a device group	Description
Update History page	Digi Axess Admin dashboard		X	Review the Connect Sensor firmware update history for a device group
Update History (Device) page	Digi Axess Admin dashboard	X		Review firmware update history for a Connect Sensor

Cancel a scheduled firmware update

Where?		One selected device	All Connect Sensor devices in a device group	Description
Update History page	Digi Axess Admin dashboard		X	Cancel a firmware update for the Connect Sensor devices in a device group
Update History (Device) page	Digi Axess Admin dashboard	X		Cancel a firmware update for a Connect Sensor device

Update the Connect Sensor firmware from the Device Summary page

You can schedule an update to the Connect Sensor firmware from the device's Device Summary page. The update happens during the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually.

If the device is already scheduled for a firmware update, you are not allowed to schedule another update.

1. Log into Digi Axess. The Digi Axess map displays.
2. From the mapped device list on the Digi Axess map, find the Connect Sensor device for which you want to update the Connect Sensor firmware.
3. Click the device name in the mapped device list. The Device Summary page displays.
4. Click the **Firmware Update** button. The **Firmware Update - Select Firmware** page displays.
5. From the **Firmware Type** list box, select the **Standard** option.
6. Select the firmware version that you want to apply to the device. You can either scroll through the list of versions, or use the **Firmware Versions** field to limit the list. As you type, the list is updated to include only the devices that match the entry. The selected firmware version displays in the **Selected Firmware** list.

   Note Click on the selected firmware update option in the **Selected Firmware** list to deselect it.

7. Click **Next**. The **Firmware Update - Confirm** page displays, showing the device that will be updated, and a summary of the selected firmware update.

   Note A yellow warning banner displays at the top of the screen, to confirm that a firmware update is selected to occur.

8. Decide whether you want to schedule the firmware update:
   - **Confirm**: Click **Confirm** to continue and schedule the firmware update.
   - **Back**: Click **Back** to return to the previous screen.
   - **Home**: Click **Home** to return the main Digi Axess map page.

Update the Connect Sensor firmware from the web UI

You can schedule an update to the cConnect Sensor firmware. The update happens during the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually.

A banner displays at the top of the screen to alert you whether a Connect Sensor firmware update is currently running. If the device is already scheduled for a firmware update, you are not allowed to schedule another update.

1. Log into the Connect Sensor web UI from Digi Axess.
2. In the **Options** section, click **System Tools**. The **Tools and Utilities** page displays.
3. Click **Firmware Update**. The **Update Firmware** screen displays. Information about the current cell modem firmware displays in the **Device Reported Firmware** section
4. From the **Select a Firmware Type** list box, select the **standard** option.
5. From the **Select a Firmware Version** list box, select the firmware version that you want to update to.
6. Click **Schedule Update** to store the update instruction. The firmware update occurs the next time that the Connect Sensor wakes and connects to Digi Axess.

Cellular modem firmware update: Connect Sensor

You can schedule an update to the cellular modem firmware on the Connect Sensor. The update happens during the next time that the Connect Sensor wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually.

A banner displays at the top of the screen to alert you whether a cellular modem firmware update is currently running.

1. Log into the Connect Sensor web UI on Digi Axess.
2. In the **Options** section, click **System Tools**. The **Tools and Utilities** page displays.
3. Click **Cellular Firmware Update**. The **Update Cellular Firmware** page displays. Information about the current cell modem firmware displays in the **Device Reported Cellular Firmware** section.
4. From the **Select a Cellular Firmware Version** list box, select the firmware version that you want to update to.
5. Click **Schedule Update** to store the update instruction. The firmware update occurs the next time that the Connect Sensor wakes and connects to Digi Axess.

Configure MQTT for a device from the web UI (Connect Sensor XRT-M only)

You can configure MQTT for a Connect Sensor and enable or disable the MQTT service from the web UI for a Connect Sensor XRT-M only.

You can choose to create an MQTT configuration for this device only, or to apply an MQTT configuration that was created for the device group in which this device is included. MQTT configurations are created for a device group in the Digi Axess Administration menu.

Add MQTT configuration for a device from the web UI (Connect Sensor XRT-M only)

You can configure MQTT for a Connect Sensor XRT-M.

Note This MQTT configuration cannot be shared with another device.

1. Access the device's web UI from the Device Summary page.
2. In the **Services** section, click **MQTT**. The **MQTT Configuration** page displays.
3. From the **Active MQTT Configuration** list box, select **Current Device Only**.
4. Click the **MQTT Enable** slider button. When MQTT is enabled, the button is green. The **MQTT Configuration** page updates to display more options.
5. Configure the options in the **MQTT Configuration** section.

Field	Description
MQTT Enabled	Click **MQTT Enabled** to enable the MQTT service. The toggle button is green when the service is enabled.
MQTT Spec	Currently the only supported format is the standard MQTT format, with raw data being sent. The **MQTT on Device - No Formula Support** option is selected by default.
Send Sample Date to Digi Axess	Enable **Send Sample Date to Digi Axess** if you want to send sample data to Digi Axess for further processing. This is disabled by default, and when it is disabled, no data is sent to Digi Axess.
QoS	Currently only one MQTT quality of service level is available. The **0 - at most once** option is selected by default.
MQTT topic prefix	In the **MQTT topic prefix** field, enter the MQTT topic prefix to use. The following variables are supported: **$Model**, **$LocationName**, and **$SerialNumber**. The **MQTT topic preview** space previews what the topic will be when the variables are resolved and the postfix is added.

6. Configure the options in the **Broker Configuration** section.

Field	Description
MQTT Broker Host	Enter MQTT the broker host to which data is sent. The MQTT broker host must be unique.
MQTT Broker Port	Enter the number of the MQTT Broker port to which data should be sent.
Username	Enter the user name to authenticate with the broker.
Password	Enter the password to authenticate with the broker. Click the eye icon next to the field to toggle the password display.
TLS Enabled	Enable TLS.
TLS Cert Check	Enables checking the broker identity with a certificate.

7. Click **Update** to save and apply the MQTT configuration.

Apply a device group MQTT configuration

You can apply an MQTT configuration that was created for the device group in which this device is included. MQTT configurations are created for a device group in the Digi Axess Administration menu.

1. Access the device's web UI from the Device Summary page.
2. In the **Services** section, click **MQTT**. The **MQTT Configuration** page displays.
3. From the **Active MQTT Configuration** list box, select a device group MQTT configuration option. The **MQTT Configuration** page is updated to show the device group MQTT configuration.
4. You an also choose to create a new device group MQTT configuration or edit the selected configuration.
   - **Add MQTT Configuration**: Click the plus icon to launch a new browser window, which displays the **MQTT Configuration** page in the Digi Axess Administration dashboard. You can create and save a new device group MQTT configuration.

     When complete, close the Digi Axess Administration dashboard browser window and return to the browser window with the web UI **MQTT Configuration** page. The MQTT configuration you just created is automatically selected.
   - **Edit MQTT Configuration**: Click the pencil icon to launch a new browser window, which displays the **MQTT Configuration** page in the Digi Axess Administration dashboard. The configuration for the MQTT configuration you selected in the web UI displays. Update the configuration as needed.

     When complete, close the Digi Axess Administration dashboard browser window and return to the browser window with the web UI **MQTT Configuration** page. The MQTT configuration you just updated is also updated in the web UI.
5. Click **Update** to save the selection.

Configure system logging for a Connect Sensor XRT-M in the web UI

You can configure system logging for a Connect Sensor XRT-M in the device's web UI. This feature is useful as a support tool and does not need to be enabled unless you are instructed to do so.

Note You can also configure system logging for a device from the **Devices** page.

When enabled, system events are stored on the device. Each time that the Connect Sensor XRT-M wakes up and connects to Digi Axess, either at the scheduled wake time or if it is done manually with a magnet, a log is pushed from the device to Digi Axess. The logs are listed in the **Device Logs** window, and can be downloaded and saved on your computer.

The logs are collected for the number of days specified. When the time limit is reached, the logging feature is automatically disabled and logs are no longer collected from the device.

When new logs are sent from the device to Digi Axess, any logs over seven days old are automatically cleared. You can also manually clear any logs when needed.

Configure system logging for a Connect Sensor XRT-M

You can enable and configu

Note You can also enable system logging from the Connect Sensor XRT-M Devices page in the Administration menu. See Enable system logging for a Connect Sensor XRT-M.

1. Log into the Connect Sensor XRT-M web UI on Digi Axess.
2. In the **Options** section, click **System Tools**. The **Tools and Utilities** page displays.
3. Click **Logging**. The **System Logging Configuration** page displays.
4. Click **Enable Device Logging**. When enabled, the slider is green.
5. From the **Disable Logging In** list box, select the time period for which you want to collect and store system logs. When the time limit is reached, the logging feature is automatically disabled and logs are no longer collected from the device.
6. Any logs display in the **Device Logs** window. When new logs are sent from the device to Digi Axess, any logs over seven days old are automatically cleared. You can also manually clear any logs when needed.
7. Click **Update**.
8. Click **OK** to confirm the update.

Download system logs for a Connect Sensor XRT-M

Before the logs are automatically cleared, you can download the logs and save them on your computer. The log files are stored as a *.txt file.

Note You must have enabled the system logging feature. See Configure system logging for a Connect Sensor XRT-M.

1. Log into the Connect Sensor XRT-M web UI on Digi Axess.
2. In the **Options** section, click **System Tools**. The **Tools and Utilities** page displays.
3. Click **Logging**. The **System Logging Configuration** page displays.

4. Click **Download Device Logs**. The log file is downloaded onto your computer.
5. You can name and save the log to a desired location.

Clear a system log on a Connect Sensor XRT-M

You can manually clear the system logs.

1. Log into the Connect Sensor XRT-M web UI on Digi Axess.
2. In the **Options** section, click **System Tools**. The **Tools and Utilities** page displays.
3. Click **Logging**. The **System Logging Configuration** page displays.
4. Click **Clear Device Logs**.

Configure the Digi Axess server for Connect Sensor

You can configure the Digi Axess and NTP servers, and specify a group ID in the **Digi Axess Service Configuration** page.

Digi Axess server

The URLs for the Digi Axess and the NTP servers are defined during the initial set up, and should not be changed. The server name depends on the release in which the device was configured.

- **digiaxess.com**: Displays for devices configured after Digi Axess rebranding, release 24.2 or later.
- **digiskycloud.com**: Displays for devices configured in release 23.10 or earlier.

WARNING! Any changes made to the Digi Axess Server URL configuration may cause the device to no longer connect with Digi Axess. Digi recommends making changes to this section only when you have physical access to the device.

NTP server

The Connect Sensor retrieves and synchronizes to the time provided by an NTP server.

Digi Axess Group ID

You can also define the Digi Axess group ID. The **Cloud Group ID** binds all endpoints having the same Cloud ID into a single cloud for management and display purposes. This field is required for all Digi Axess services.

To configure servers and the group ID:

1. Log into the Connect Sensor web UI on Digi Axess.
2. In the **Services** section, click **Digi Axess Services**. The **Digi Axess Services** page displays.
3. Click **Server Configuration**. The **Server Configuration** page displays.
4. Click **Edit** to allow changes to be made to the page.
5. Update the Digi Axess and the NTP servers.
    - **Digi Axess Server**: In the **Digi Axess Server** field, enter the URL of the Digi Axess server that this device should connect to.

- **NTP Server**: In the **NTP Server** field, enter the URL of the NTP server to which the Connect Sensor connects to synchronize time.
- **Reset both servers to factory defaults**: If you want to reset both the Digi Axess and the NTP server to the factory default URLs, click **Reset Server Config**.

6. In the **Cloud Group ID** field, enter the ID for the Digi Axess sub-group ID for the device.
7. Click **Update** to save your changes. A confirmation dialog displays.
8. Click **OK** to complete the change.

Configure the data collection and push schedule

You can configure the sensor data collection and push schedule for the device.

You can configure the wake-up interval for the device, and specify how often sensor data is read, and the number of reads that should occur before data is pushed to Digi Axess.

You can also reset the schedule to the factory default.

The schedule is displayed in a graph, and shows when data was read, when it was pushed, and when the schedule was reset. The total number of reads (**Total Reads**) and pushes (**Total Pushes**) made during the 24-hour time period noted in the graph.

Configure the wake up interval for a Connect Sensor

You can configure a schedule for a device that determines the first wake-up time, the time interval between reading the sensor connected to the Connect Sensor, and how many reads should occur before data is pushed from the device to Digi Axess.

By default, the Connect Sensor is configured to wake up and connect to Digi Axess every 12 hours.

1. Log into the Connect Sensor web UI on Digi Axess.
2. In the **Services** section, click **Digi Axess Services**. The **Digi Axess Service** page displays.
3. Click **Device Schedule**.
4. Click **Edit** to allow changes to be made to the page.
5. Configure the configuration synchronization schedule.
   a. In the **First Report** field, enter the first time that the Connect Sensor should wake up, connect to Digi Axess, push sensor data, and receive data pushed from Digi Axess.
   b. In the **Read Interval** fields, enter the time interval between data collection from the sensors.
   c. In the **Report Interval** field, enter the number of reads that should occur before Connect Sensor pushes data to Digi Axess.
6. Click **Update** to save your changes. A confirmation dialog displays.
7. Click **OK** to complete the change.

Reset the device schedule to the factory default

You can reset a device's wake up and data collection schedule to the factory default.

1. Log into the Connect Sensor web UI on Digi Axess.
2. In the **Services** section, click **Digi Axess Services**. The **Digi Axess Service** page displays.
3. Click **Device Schedule**.
4. Click **Edit** to allow changes to be made to the page.
5. Click **Reset Schedule Config**. A confirmation dialog displays.
6. Click **OK** to complete the change.
7. Click **Update** to save your changes. A confirmation dialog displays.
8. Click **OK** to complete the change.

Clear Connect Sensor sensor data

You can clear all of the Connect Sensor sensor data stored in Digi Axess.

This feature is useful if you have changed the sensor connected to a pin on the Connect Sensor, and you want to see only data for the sensors that are currently connected to the device.

Note Once deleted, the sensor data cannot be recovered.

Note As an alternative, you can also delete Connect Sensor sensor data from the **Device Management** section from the Admin menu. See Clear historical sensor data from a device.

To configure servers and the group ID:

1. Log into the Connect Sensor web UI on Digi Axess.
2. In the **Services** section, click **Options**. The **Available Tools** buttons display.
3. Click **Clear Sensor Data**. The **Clear Sensor Data** page displays.
4. Click **Clear sensor data**. A confirmation dialog displays.
5. Click **OK** to complete the process.

Manually wake a Connect Sensor

You can manually wake a Connect Sensor using a magnet.

Manually wake the Connect Sensor+

If Connect Sensor+ is powered and all LEDs are off, it is in sleep mode. You can wake the device manually, if needed.

Note The LED indicators only light up when you wake the device by manual intervention: pressing the Wake button inside the device or using a magnet. When the device automatically wakes up as scheduled to take and push readings, the LEDs do not light up since no one may be physically present to see the LED start-up sequence. See Connect Sensor LED start-up sequence.

Manually wake the device: Magnet swipe

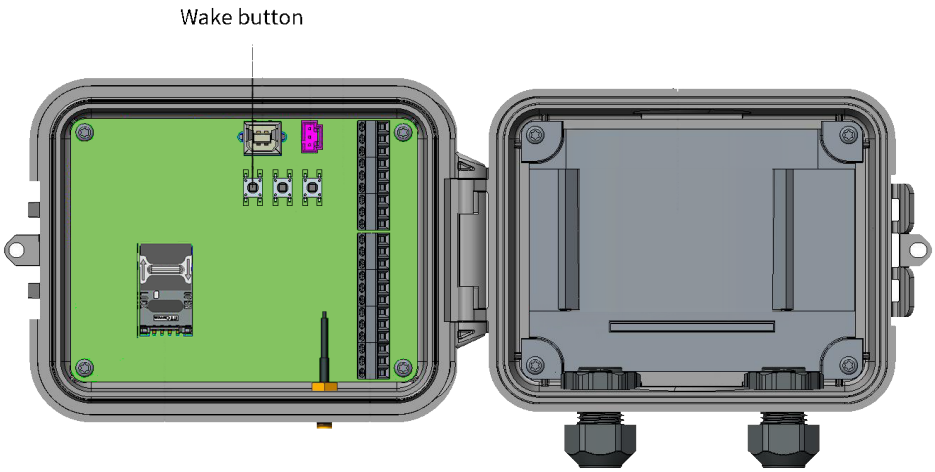
You can swipe a magnet across the top of the device to wake the Connect Sensor+.

When you wake Connect Sensor+, the LED indicators light up in a predetermined sequence as the device wakes up.

Manually wake the device: Wake button

You can wake the Connect Sensor+ by pressing the Wake button inside the device.

1. Open the device.
2. Press the Wake button inside the device.



3. When you wake Connect Sensor+, the LED indicators light up in a predetermined sequence as the device wakes up.
4. Close the cover on the device. The cover snaps into place.

> **Note** The Connect Sensor+ enclosure may require some force to close. This is intended as part of the design to ensure a robust seal in damp or dusty environments. For details about closing the Connect Sensor+ enclosure, see Closing the Connect Sensor+.

Connect Sensor+ LED start-up sequence

The LED indicators light up in a predetermined sequence when you manually wake the Connect Sensor+.

1. Press the Wake button inside the device or swipe a magnet across the device.
2. The cellular and battery LEDs light up purple for one second and then turn off.
3. The sensor LED blinks green as readings are taken and then turns off when readings are complete.
4. If Bluetooth is enabled, the Bluetooth LED blinks yellow for 30 seconds. If a Bluetooth device is attached, the Bluetooth LED turns solid and remains lit.

> **Note** If Bluetooth is not enabled, the Bluetooth LED does not light up.

5. Connect Sensor+ takes and pushes data readings.
   a. The cellular LED blinks red while the Connect Sensor+ attempts to bring up the modem and connect to the cellular network.
   b. The Connect Sensor+ takes a battery life reading. The battery LED blinks either blue or red, depending on the status of the battery life.
   c. The cellular LED blinks blue until the connection to Digi Axess is complete.
   d. The Connect Sensor+ pushes the data. When the data transfer is complete, the cellular LED

is solid blue.

e. After a few seconds, the cellular LED turns off.

Closing the Connect Sensor+

All Connect Sensor+ products are shipped to you closed. You will need to open the device to install the battery, the SIM card, and to wire third-party sensors to the Connect Sensor+ I/O interface. After you have opened the enclosure, it may require some force to close. This is intended as part of the design to ensure a robust seal in damp or dusty environments.

Note Using gaskets, seals, glands or plugs other than those supplied by Digi may void certifications and regulatory approvals.

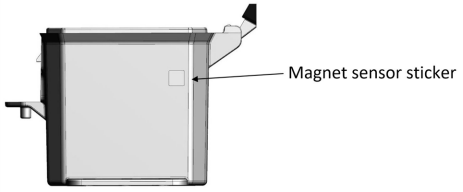
If you have problems closing the enclosure after either of these operations, please follow these instructions:

1. Ensure the gasket is fully seated in the groove on the enclosure.
2. Place the device on a flat, stable surface.
3. Apply pressure to the top of the Connect Sensor+ and pull the front door clip closed with your finger.

Manually wake the Connect Sensor XRT-M NEMA

The Connect Sensor XRT-M NEMA is in sleep mode until it wakes to connect to Digi Axess at a scheduled time. You can wake the device manually, if needed, using the magnet supplied with the device. Waking the Connect Sensor XRT-M NEMA manually forces a connection to Digi Axess.

1. You must physically be near enough to the Connect Sensor XRT-M NEMA to touch it.
2. Locate the magnet sensor sticker on the side of the device.



3. Swipe a magnet across the magnet sensor sticker to wake the Connect Sensor XRT-M NEMA.

4. The LED on the edge of the SIM card slot shows the status of the device. Refer to the LED wake sequence in the table below.
5. The Connect Sensor XRT-M NEMA connects to Digi Axess when it successfully connects to the cellular network.

LED wake sequence

The LED on the edge of the SIM card slot shows the status of the device. When the device wakes, the device connects to Digi Axess and pushes any collected data, and collects any configuration changes that are pushed from Digi Axess. This process make take a few minutes.

Behavior	LED indication
Wake by user (as by magnet)	Red & Blue on together for 1 sec
While sensors are being sampled	Blue LED flashes (2Hz), generally on for a very short period
Cell initialized, trying to connect	Green LED flashes (2Hz)
Cell has connection	Green LED on solid
Cell completes with success	Blue LED on solid 3 sec
Cell completes with failure	Red LED on solid 3 sec
During firmware update	Toggle quickly between Red and Blue LED

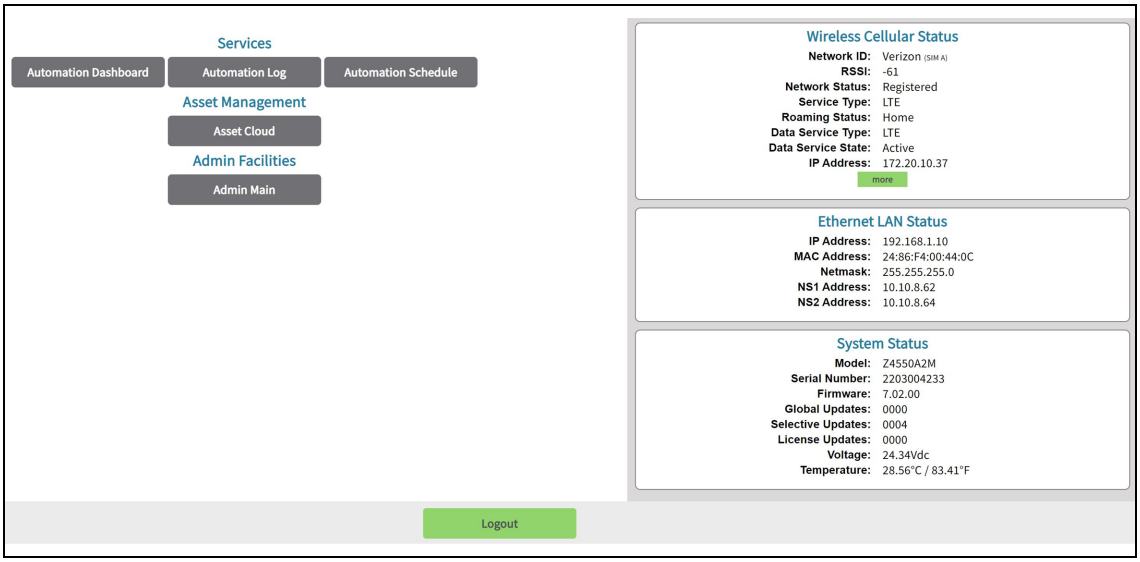
Configure a Z45 Controller from the web UI

These sections explain how to configure a Z45 Controller from the Controller's web UI.

Configuration overview for a Z45 Controller in Digi Axess

You can configure the Z45 Controller features using the buttons in theDigi Axess **Quick Panel** page.

Quick Panel page



Services

Button	Description
Automation Dashboard	The **Automation Dashboard** page graphically represents the information gathered by your devices. ■ View automation data in the Automation Dashboard
Automation Log	The **Automation Control Log** records the value or state of inputs and outputs over time. Inputs and outputs to be logged are selected during input and output configuration. ■ Automation Control Log

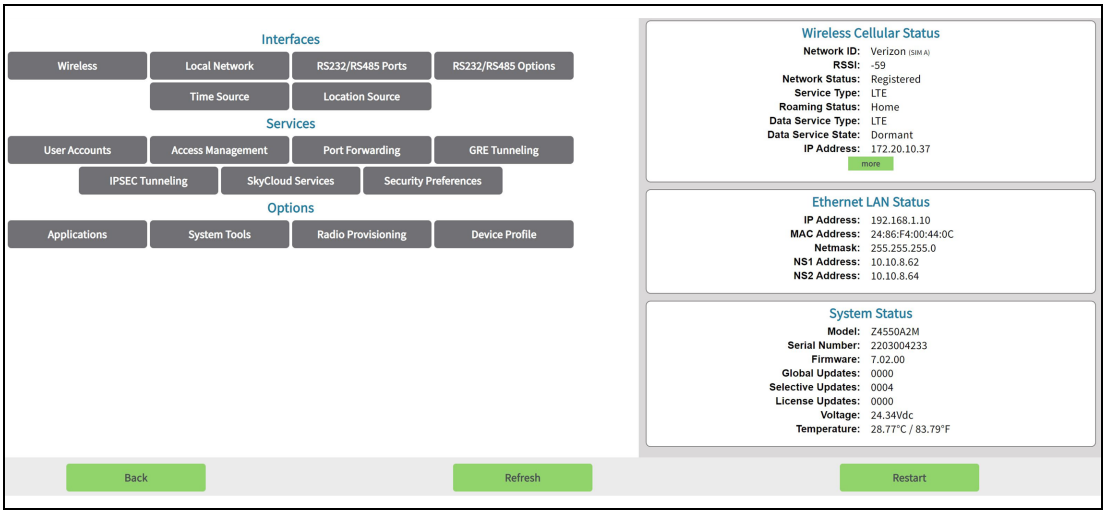
Asset Management

Button	Description
User-defined name	You can use the button in the **Asset Management** section to quickly access the Digi Axess log in screen. The name on the button is user-defined, and can be updated. ▪ Quick access to Digi Axess

Admin Facilities

Button	Description
Admin Menu	Display additional feature buttons. For more information, see the Admin Menu table below.

Admin Menu buttons



Interfaces

Button	Description
Wireless	You can use the options in the **Wireless Interface Configuration** page to enable a SIM slot on the Z45 Controller, change the network connection type, and mange the APN profile configuration. ▪ Enable a default SIM slot ▪ Update the APN when you use your own SIM card for a cellular network

Button	Description
	connection
RS232/RS485 Ports	You can configure the RS485 port to so that the Z45 Controller can communicate with a sensor wired to the port. ■ Configure the RS485 port
Time Source	Configure the time synchronization between the Z45 Controller and Digi Axess. ■ Synchronize the Z45 Controller time with Digi Axess
Location Source	Configure the physical location of a device. ■ Configure the location for a Z45 Controller with defined coordinates ■ Enable and use GPS location services for a Z45 Controller

Services

Button	Description
User Accounts	User accounts control who can log in to a device, and what privileges they have. ■ Add a user account to a Z45 Controller ■ Change the password or user level for a Z45 Controller
Access Management	For each page in the Z45 Controller web UI, specify which user level can view and/or edit that page. You can also rename the page, which is the name shown on the button you click to access a page. ■ Specify an access level for Z45 Controller Digi Axess pages
Digi Axess Services	Configure the Digi Axess and DDNS services. ■ Rename the Digi Axess quick access button ■ Enable and use GPS location services for a Z45 Controller
Security Preferences	Configure security preferences for the following: ■ General security configuration for a Z45 Controller ■ Create an IP White List to limit access to the Z45 Controller ■ Enable HTTP access and allow LAN and WWAN port access on a Z45 Controller ■ Configure SSH Access for a Z45 Controller

Options

Button		Description
System Tools	**Backup/Restore**	Backup and restore the configuration.

Button		Description
		■ Back up the Z45 Controller configuration ■ Install a saved configuration file on a Z45 Controller ■ Back up the Z45 Controller event logs ■ Install a packaged factory application on a Z45 Controller
	Firmware Update	Configure access to the firmware update server, and update the firmware. ■ Configure access to the firmware server ■ Update the Z45 Controller firmware ■ Schedule a firmware update on the Z45 Controller
	WAN Usage Tracking	■ Configure a locked login message and disable web server access on a Z45 Controller
Radio Provisioning	**Radio Update**	The Z45 Controller contains a multi-carrier, software-defined radio that you can configure for proper operation on a specific network. ■ Radio configuration and activation on a Z45 Controller
Device Profile		Configure the local dashboard group names and display status. ■ Configure the local and remote dashboard groups

Log in to the Z45 Controller

You can log in to the local web UI on a Z45 Controller using one of the methods listed below.

Log in to a Z45 Controller's web UI using a cellular network connection

If your Z45 Controller has a cellular network connection, you can log into the device from a browser window, using the IP address.

Enabling a public static IP address for this IoT device allows convenient remote access to its web-based user interface. While convenient, it also exposes the device to the open internet, increasing its susceptibility to cyber threats. For optimal security, consider using a private network or VPN with restricted access.

You can also choose to purchase Digi Axess VPN, which is a virtual private network you can use to access and monitor the devices that are registered with Digi Axess. For more information, see Use Digi Axess VPN to monitor your Z45 Controllers (Optional).

Before you begin

- Verify that the Z45 Controller is connected to a cellular network.
- Make sure you have the Z45 Controller's IP address.
- Make sure you have the correct user name and password for the Z45 Controller.

To log in to a Z45 Controller from a browser window:

1. Open a browser window on your computer.
2. In the search field, type in the Z45 Controller's IP address. The web UI log in window displays.
3. Enter the correct **User name** and **Password** for the device.
4. Click **Login**. The main web UI page displays.

Log in to a Z45 Controller's web UI using an Ethernet cable

If your Z45 Controller does not have a cellular network connection, you can log into your device's web UI by connecting your Z45 Controller to your computer with an Ethernet cable. You must be physically close to the Z45 Controller.

Before you begin

- Obtain an Ethernet cable.
- Make sure you have the Z45 Controller's IP address.
- Make sure you have the correct user name and password for the Z45 Controller.

To log in to a Z45 Controller using an Ethernet cable:

1. Connect the Ethernet cable.
   a. Connect one end of the Ethernet cable to the Ethernet port on the front of the Z45 Controller.
   b. Connect the other end of the Ethernet cable to the Ethernet port on your computer.
2. Open a browser window on your computer.
3. In the search field, type in the Z45 Controller's IP address. The web UI log in window displays.
4. Enter the correct **User name** and **Password** for the device.
5. Click **Login**. The main web UI page displays.

Log in to a Z45 Controller's web UI from Digi Axess

You can log in to a Z45 Controller's web UI from the Device Summary page in the Digi Axess map.

1. Log in to Digi Axess. The Digi Axess map displays.
2. Find the device that you want to configure, using one of the following methods, and display the Device Summary page.
   - Click on the device's location pin on the map.
   - If your device is mapped, scroll through the mapped device list displayed on the lower left of the Digi Axess map. Click on the device name.
   - Use the search feature in the toolbar. As you type, a list of matching devices displays. Click on the tile for the device you want to configure.
   - Click the **Grid** or **Table** icons on the left side of the map to display a list of devices. Use the search features to limit the devices displayed. Click on the tile or the row for the device you want to configure.
3. In the Device Summary page, click the device name or the **Configure Device** button to access the web UI for the device.
4. Enter the user name and password for the Z45 Controller and click **Login**.

Synchronize the Z45 Controller time with Digi Axess

You can synchronize the time between a Z45 Controller and Digi Axess. You can choose from one of the following options:

- **Cellular Network**: The Z45 Controller retrieves and synchronizes to the time provided by the cellular network. To use this feature, the device must be connected to a cellular network, and at least one cellular antenna (primary antenna) must be connected to the device.
- **GPS**: The Z45 Controller retrieves and synchronizes to time provided by the GPS or GLONASS constellation. To use this feature, GPS must be enabled on the device, and a both a cellular antenna (primary antenna) and a GPS antenna (secondary antenna) must be connected to the device.
- **NTP Server**: The Z45 Controller retrieves and synchronizes to time provided by an NTP server. You must specify the IP address for the NTP server is provided on the screen.
- **TIME Server**: The Z45 Controller retrieves and synchronizes to the time provided by the TIME servers (nist.gov) used by the NIST Internet Time Service (ITS). Note that not all of the nist.gov time servers support the TIME protocol. NIST recommends using the NTP protocol.

To configure time synchronization:

1. Log into the Z45 Controller's web UI.
2. Click **Admin Main**.
3. In the **Interfaces** section, click **Time Source**. The **System Date/Time Configuration** page displays.
4. From the **Time Source** list box, select the time source option for the device.
5. If you selected the **NTP Server** or **Time Server** options, enter the enter the IP address or URL for the NTP Server or TIME server in the **Time Server Address** field.

   Note If you selected the **Cellular Network** or **GPS** options, an entry in this field is not required.

6. From the **Region** list box, select the region where the device is located.
7. Click **Update**.

Assign a location name to a Z45 Controller

You can assign an identifying name to each device location. The name displays in the Device Summary page and on the location pin on the map, and in the **Administration** menu.

Note The location name can also be changed from the **Administration** menu.

1. Log into the Z45 Controller's web UI.
2. Click **Admin Main**.
3. In the **Interfaces** section, click **Location Source**. The **System Location Configuration** page displays.
4. Click the **edit** icon next to the **Location Name** field.
5. In the **Location Name** field, enter the location's name.
6. Click **Update**.

Configure the location coordinates for a Z45 Controller

You can configure the location (latitude and longitude coordinates) for a Z45 Controller to ensure that the device appears in theDigi Axess location map.

- You can manually define the coordinates for a Z45 Controller. This feature is useful for stationary installations for which you do not want to use a GPS antenna, or if the device does not regularly connect to the cellular network. See Configure the location for a Z45 Controller with defined coordinates.
- The location of a Z45 Controller can be determined using the GPS location service in the Z45 Controller. When this feature is enabled, the Z45 Controller's location coordinates are discovered and sent to Digi Axess. See Enable and use GPS location services for a Z45 Controller.

Configure the location for a Z45 Controller with defined coordinates

You can manually configure the physical location for a Z45 Controller's location by defining the device's coordinates.

This feature is useful for stationary installations for which you do not want to use a GPS antenna, or if the device does not regularly connect to the cellular network.

Note If you have a cellular connection, you can use a GPS antenna to determine location coordinates. The **Current Status** in the **GPS Status** section is used only when the GPS location service has been selected. See Enable and use GPS location services for a Z45 Controller.

---

1. Determine the latitude and longitude coordinates for the device's location. You can use the physical address of where the device is located and a mapping application to discover the coordinates.
2. Log into the Z45 Controller's web UI.
3. Click **Admin Main**.
4. In the **Interfaces** section, click **Location Source**.
5. If you have a cellular connection and the GPS feature is enabled, the **Location Source** list box displays. Select the **Use lat/long below** option. This disables the cellular discovery of the location coordinates.
6. In the **Latitude** and **Longitude** fields, enter the latitude and longitude coordinates for the device's location.
7. Click **Update**.

Enable and use GPS location services for a Z45 Controller

The location of a Z45 Controller can be determined using the GPS location service in the Z45 Controller. When this feature is enabled, the Z45 Controller's location coordinates are discovered and sent to Digi Axess.

GPS Status

The **Current Status** describes whether the GPS location service has determined the GPS location of the device.

- **Ready**: The GPS coordinates are known.
- **Not Ready**: The GPS coordinates are not known yet.

Before you begin

This feature requires cellular access to the internet and a cellular antenna attached to the device.

Note If you do not have a cellular connection, you can manually enter the Z45 Controller's location coordinates. See Configure the location for a Z45 Controller with defined coordinates.

Step 1: Enable the GPS location service

1. Log into the Z45 Controller's web UI.
2. Click **Admin Main**.
3. From the **Services** section, click **Digi Axess Services**.
4. Scroll down to the **Digi Axess Location Services** section.
5. From the **Status** list box, select **Enable Location Services**.
6. In the **Update Rate** field, enter how often the Z45 Controller should report its location to Digi Axess. Enter the length of time and select the time measurement: **Minutes** or **Hours**.
7. Click **Update**.
8. Click **Home** to return to the main screen.

Step 2: Enable the GPS coordinates option

1. You should already be logged into the Z45 Controller's web UI. If not, Log into the Z45 Controller's web UI.
2. In the **Interfaces** section of the main screen, click **Location Source**. The **System Location Configuration** page displays.
   a. Click **Update**.
   b. Click **Home** to return to the main screen.
3. Make sure you can see the **System Location Options** section.
4. From the **Location Source** list box, select the **GPS (Internal)** option.
5. From the **Reset Interval (min)** list box, select a time interval at which you want the GPS location service to update the device's location. The default is **0**.

   This feature is useful if you move the device to a new location. You can choose an interval other than **0** to force a GPS location reset, and then after the location has been updated, change it back to **0**.
6. Click **Update**.
7. Click **Home** to return to the main screen.

Wireless Interface Configuration

The options in the **Wireless Interface Configuration** page to enable a SIM slot on the Z45 Controller, change the network connection type, and mange the APN profile configuration.

Enable a default SIM slot

The Z45 Controller has two SIM card slots. At least one SIM card is required for cellular connection. By default, SIM Slot A is enabled. You can change the default SIM slot to Slot B.

1. Log into the Z45 Controller's web UI.
2. Click **Admin Main**.
3. In the **Interfaces** section, click **Wireless**. The **Wireless Interface Configuration** page displays.
4. Change the default SIM slot in the **Data Connection Configuration** section of the page.
   a. From the **Connection State** list box, select **Enabled**.
   b. From the **Default SIM** list box, select **SIM B**.
5. Click **Update**.

Security for the Z45 Controller

Security features for the Z45 Controller and network access can be managed from the **Security Preferences** page. Additional security is found by log in control and access levels assigned to users and web UI pages.

- User levels and access levels for the Z45 Controller
- Z45 Controller factory default settings
- Log in security on the Z45 Controller
- Configure a locked login message and disable web server access on a Z45 Controller
- General security configuration for a Z45 Controller
- Enable HTTP access and allow LAN and WWAN port access on a Z45 Controller
- Create an IP White List to limit access to the Z45 Controller
- Configure SSH Access for a Z45 Controller

Z45 Controller factory default settings

Factory default settings disable all access options, with the exception of HTTP access on port 80.

For information on how to reset a device to the default factory settings, see Reset a Z45 Controller to the default factory settings.

Setting or parameter	Factory default
Administrative User name	admin
Administrative password	The unique password found on the device label.
Administrative IP address	192.168.1.10
Network Configuration	Gateway
DHCP Server	For cellular devices: Disabled
Administrative LAN and WAN port	Port 80. See Security for the Z45 Controller.
Firewall Status	Enabled. See General security configuration for a Z45 Controller.

Setting or parameter	Factory default
WAN Ping Response	Disabled. See General security configuration for a Z45 Controller.
NAT Traffic to WAN	Enabled. See General security configuration for a Z45 Controller.
XML Interface	Disabled. See General security configuration for a Z45 Controller.
IP White List	Disabled. See Create an IP White List to limit access to the Z45 Controller.
SMS Management	Disabled. See Create an IP White List to limit access to the Z45 Controller.
SMS White List	Disabled. See Create an IP White List to limit access to the Z45 Controller.
SSH (Secure Shell) Access	Disabled. See Configure SSH Access for a Z45 Controller.
SSH User ID	root. See Configure SSH Access for a Z45 Controller.
SSH Password	pass. See Configure SSH Access for a Z45 Controller.
Enable HTTPS	Disabled. See Enable HTTP access and allow LAN and WWAN port access on a Z45 Controller.
Connection State (WAN)	For cellular devices: Enabled
Time Source	For cellular devices: Cellular Network. See Synchronize the Z45 Controller time with Digi Axess.
Location Source	For cellular devices: GPS (Internal) See Configure the location coordinates for a Z45 Controller.
DNS Address Source	For cellular devices: Acquire from Wireless Network
Radio module firmware	For cellular devices: Verizon - SWI9X15C_05.05.63.01 or newer

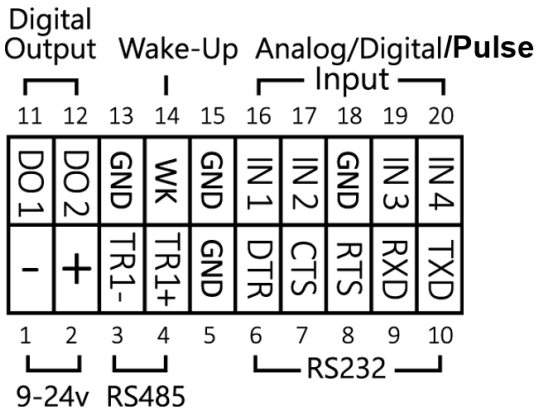
Reset a Z45 Controller to the default factory settings

You can use the **Default** switch on the Z45 Controller to reset the device to the default factory settings.

1. Orient the device so the back is facing you.
2. Press and hold the **Default** switch for 5 seconds.
3. When the **Service** and **Link** LEDs blink orange/red in unison, release the **Default** switch.
4. The device automatically reboots (power cycles) and returns to service with the factory defaults in place.

Z45 Controller upper and lower terminal blocks

Below is a diagram of the Z45 Controller block terminations.



Lower terminal block

Pin	Name	Description
1 and **2**	**Power Input**	The device requires 9-24v DC. The power input also has reverse polarity protection. ■ Step 2: Wire a power supply to the Z45 Controller and power the device
3 and **4**	**RS-485 Serial Interface**	A two-wire RS485 interface is available. ■ TR1-: Data coming in. ■ TR1+: Data going out. It is also recommended to use the one of the available ground pins (GND) to minimize signal interference. See Configure the RS485 port.
5	**GND**	Ground pin
6 through **10**	**RS-232 Serial Interface**	A complete RS-232 DCE type interface is provided on pins 6-10. See the RS-232 Serial Interface section below.

Upper terminal block

Pin	Name	Description
11 and **12**	**Digital Outputs**	The Z45 Controller supports two digital outputs. Each output is an open drain configuration rated for 250 ma at 24 Vdc.
13	**GND**	Ground pin
14	**Wake-Up**	A wake-up signal allows the device to come out of low power state on trigger.

Pin	Name	Description
15	**GND**	Ground pin
16 through **20**	**Analog/Digital/Pulse Inputs**	The Z45 Controller has four available inputs that can be configured as either digital, pulse or analog. See the Analog/Digital/Pulse Inputs section below.

Analog/Digital/Pulse Inputs (DIP switches)

The Z45 Controller has four available input pins (pins **16**, **17**, **19**, and **20**) that can be configured as either digital, pulse or analog. You need to set the switches for each port to the input type you want for the input: Digital, Voltage or Current.

By default all the switches are up.

The mode of operation is user selectable using the dip switches on the bottom of the device. Configuration options associated with the four inputs differ between Revision A units and Revision B units.

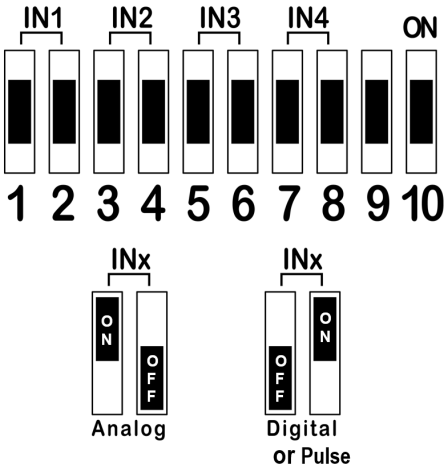
The images below show the dip switch configuration for Revision A and Revision B units.

Digital/Pulse Input Configuration on Revision A and B Units

In digital/pulse mode, an internal pull up to 3.3Vdc allows for direct connect of dry contacts. You may also configure an external pull up or digital source of up to 24 Vdc if required.

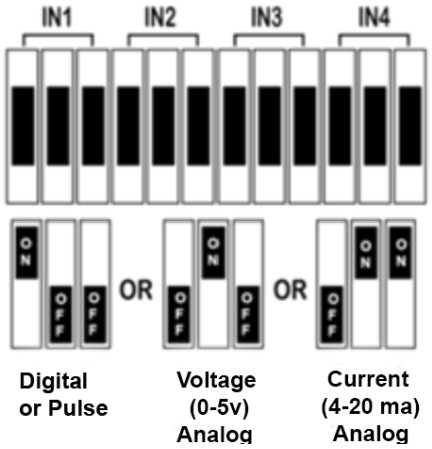
Analog Inputs on Revision A Units

In analog mode, inputs may be configured for sensing standard 0-5 Vdc sources.



Analog Inputs on Revision B Units

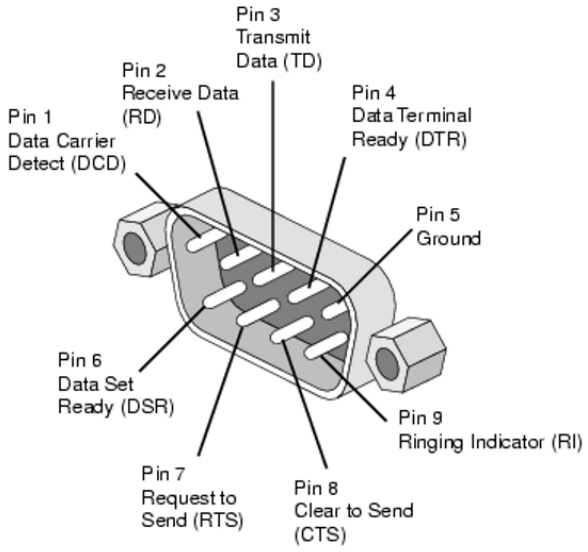
In analog mode, inputs may be configured for sensing standard 0-5 Vdc or 4-20ma sources.



RS-232 Serial Interface

A complete RS-232 DCE type interface is provided on pins 6-10. The table below shows the pins and signal direction. To avoid confusion, the corresponding pins for a standard DB9 connector are also shown.

Signal (Z45x Pin)	D89 Pin	Direction
DTR (6)	4	Input
CTS (7)	8	Output
RTS (8)	7	Input
RXD (9)	2	Output
TXD (10)	3	Input



Log in security on the Z45 Controller

Multiple Failed Login Attempts

By default, a "locked" screen displays after 3 consecutive failed log in attempts on either the LAN or the WAN interface. Once the "locked" condition occurs the user must wait for 30 minutes with no further log in attempts before it clears.

In addition, you can configure a lockout alert to be sent. See Configure a locked login message and disable web server access on a Z45 Controller.

View log in attempts after a reboot

Navigate to the SSH command line utility, and use the `authlogread` command to determine the last 20 log in attempts since the unit was last rebooted.

Configure a locked login message and disable web server access on a Z45 Controller

In addition to the default lock-out feature, you can enable intrusion detection. When enabled, and when a user has 3 failed log in attempts on a Z45 Controller, access to the device's web UI over a cellular interface is disabled.

Note If this happens, you can still access the device locally from an Ethernet interface.

You can also choose to send an SMS alert message to a specified phone number.

1. Access the device's web UI from the Device Summary page.
2. Click **Admin Main**.
3. In the **Options** section, click **System Tools**. The **Tools and Utilities** page displays.
4. Click **WAN Usage Tracking**. The **WAN Usage Tracking** page displays.
5. Scroll down to the **WAN Admin Access & Intrusion Prevention** section.
6. From the **Disable Access on Intrusion Attempt** list box, select **Yes** to disable access to the Z45 Controller's web UI over a cellular interface when a user has 3 failed log in attempts.
7. You can also send an SMS alert.
   a. Select **Yes** from the **SMS Alert on Intrusion Attempt** list box.
   b. In the **SMS Address** field, enter the phone number to which the SMS message should be sent.
   c. In the **SMS Message** field, enter the text message.
8. Click **Save**.

General security configuration for a Z45 Controller

The **General Configuration** section of the **Security Preferences** screen enables you to manage access to the Z45 Controller interface from the web UI.

1. Access the device's web UI from the Device Summary page.
2. Click **Admin Main**.
3. In the **Services** section, click **Security Preferences**. The **Security Preferences** screen displays.
4. Scroll to the **General Configuration** section.

5. To enable the firewall, select **Enabled** from the **Firewall Status** list box.

   When enabled, the firewall blocks all WAN traffic except for port 80 and the serial pad port if, and only if, the serial pad is active. Since an SMS command can be used to temporarily open ports for ad-hoc maintenance there are very few reasons to ever disable the firewall.
6. Determine the **XML Interface** status. It can be enabled to open port 5060 for XML applications
   - **Enabled**: Select **Enabled** to open port 5060 for XML applications.
   - **Disabled**: Select **Disabled** to close the port.
7. Determine the WAN ping response status. From the **WAN Ping Response** list box, choose:
   - **Disabled**: Disable the WAN ping response.
   - **Enabled**: Enable the WAN ping response to test the network performance.
8. Determine whether to allow NAT traffic to the WAN. From the **NAT Traffic to WAN** list box, choose:
   - **Disabled**: Selecting this option is discouraged.
   - **Enabled**: This is the default and it should not be changed.
9. Click **Update**.

Enable HTTP access and allow LAN and WWAN port access on a Z45 Controller

The **Web Administration** section of the **Security Preferences** screen enables you to enable or disable HTTP access through the WAN, LAN, or both. You can also specify an IP port number other than 80 for HTTP access through the WAN, LAN, or both.

1. Access the device's web UI from the Device Summary page.
2. Click **Admin Main**.
3. In the **Services** section, click **Security Preferences**. The **Security Preferences** page displays.
4. Display the **Web Administration** section.
5. Select **Allow on LAN Interface Port** if you want to allow web access over a LAN port. In the port field, enter the IP port number. The default is 80.
6. Select **Allow on WWAN Interface Port** if you want to allow web access over a WWAN port. In the port field, enter the IP port number. The default is 80.
7. Select **Enable HTTPS** if you want to use secure HTTP. If you do not select this option, non-secure HTTP is used.
8. In the **Session Timeout** field, enter the maximum amount of idle time that is allowed before a session times out. The time is measured in minutes. The default is 10 minutes.
9. Click **Update**.

Create an IP White List to limit access to the Z45 Controller

You can enable the white list feature to limit access to specified addresses or ranges of addresses. The white list applies to both WAN and LAN connections. You can also choose to send SMS text messages to a set of phone numbers.

1. Access the device's web UI from the Device Summary page.
2. Click **Admin Main**.

3. In the **Services** section, click **Security Preferences**. The **Security Preferences** screen displays.
4. Scroll to the **IP White List** section.
5. Select **Enabled** from the **White List Status** list box.
6. In the **IP Address** fields, enter an allowed IP address or mask bit.

   Note If you entered a mask bit, you must also create an entry for LAN access. This is used when you are on your local network and connected to the network using an Ethernet cable.

7. Specify the phone numbers to which you want to send a text message.
   a. Scroll to the **IP White List** section and make sure that **Enabled** is selected in the **White List Status** list box.
   b. Scroll to the **SMS Management** section.
   c. From the **SMS Services** list box, select **Enabled**.
   d. From the **White List Status** list box, select **Enabled**.
   e. In the **Phone Number** fields, enter the phone numbers to which a text message should be sent.
8. Click **Update**.

Configure SSH Access for a Z45 Controller

Enable SSH access to allow SSH access from LAN Only, WAN Only, or both.

1. Log into the Z45 Controller's web UI.
2. Click **Admin Main**.
3. In the **Services** section, click **Security Preferences**. The **Security Preferences** page displays.
4. Scroll down to display the **SSH Access** section.
5. To enable SSH, choose **Enabled** from the **SSH Service** list box.
6. In the **Port** field, enter the port number used for the SSH service.
7. Use the password fields to set or change the password for SSH access.
8. Click **Update**.

Manage the Z45 Controller user accounts

User accounts control who can log in to a device, and what privileges they have.

More than one user can log into the web UI at the same time using the same log in credentials.

Administrator

An administrator (Super User) account is created for each Z45 Controller. You should always have at least one admin account to ensure that you can access all of the Z45 Controller web UI features. The default account can be modified but cannot be deleted.

- The default user name for the admin account is: **admin**
- The default password is the unique password on the device label.

Change the password or user level for a Z45 Controller

You can change the password that is used to log in to the Z45 Controller's web UI. You can also change the user level assigned to a user, which defines the privileges level for the user account.

Password

Each Z45 Controller has a unique default password, which you use to log in to the device's web UI. The default password is printed on the device label. You can change the password as needed.

The password requirements are:

- Length: 8 - 20 characters
- 1 uppercase character
- 1 lowercase character
- 1 number
- 1 special character

User level

You can change the user level when the access privileges for a user have changed. The user level works in conjunction with the access level options assigned to each Digi Axess page. For information, see User levels and access levels for the Z45 Controller.

1. Log in to the Z45 Controller.
2. Click **Admin Main**.
3. From the **Services** section, click **User Accounts**. The **User Account Management** page displays.
4. From the **Active Accounts** section, find the user account that you want to update.
5. You can update the password.
   a. In the **New Password** field, enter the new password. Make sure that the new password meets the password requirements.
   b. In the **Confirm New Password** field, re-enter the same password.
6. You can change the user level from the **User Level** field. Select the privileges level for the user account
   - **Super User**: The user should have admin privileges.
   - **Disabled**: The user should not be allowed to log in to the Z45 Controller.
   - **Level 1-8**: The appropriate level user privileges for this user. The privileges for each level are unique to your organization. You can define the privileges for each level in the User Access Management page.
7. Click **Update**.

Add a user account to a Z45 Controller

User accounts control who can log in to a Z45 Controller, and what privileges they have. An account can be used by multiple users at the same time.

For each user account, you can assign a unique user name, password, and a user privileges level.

1. Log in to the Z45 Controller.
2. Click **Admin Main**.

3. From the **Services** section, click **User Accounts**. The **User Account Management** page displays.
4. Scroll to the **Add New Account** section.
5. In the **Username** and **Password** fields, enter a unique user name and password for the Z45 Controller.
6. In the **Confirm Password** field, re-enter the password.
7. From the **User Level** field, select the privileges level for the user account.

   Note The user level works in conjunction with the access level options assigned to each Digi Axess page. For information, see User levels and access levels for the Z45 Controller.

   - **Super User**: The user should have admin privileges.
   - **Disabled**: The user should not be allowed to log in to the Z45 Controller.
   - **Level 1-8**: The appropriate level user privileges for this user. The privileges for each level are unique to your organization. You can define the privileges for each level in the User Access Management page.
8. Click **Add**.

Specify an access level for Z45 Controller Digi Axess pages

For each page in the Z45 Controller web UI, you can specify which user level can view and/or edit that page. You can also rename the page, which is the name shown on the button you click to access a page.

The access level assigned to the pages work in conjunction with the user level assigned to the user accounts. Only the user accounts with a privilege level that matches the level assigned to page can view or edit the page. For a complete discussion of how these work together, see User levels and access levels for the Z45 Controller.

1. Log in to the Z45 Controller.
2. Click **Admin Main**.
3. In the **Services** section, click **Access Management**. The **User Access Management** page displays.
4. Scroll through the list of pages to find the page you want to update.
5. In the **Page Name** field, enter a new name for the page. This changes the name shown on the button you click to access a page.
6. Specify which users can view the page in the **View Access Level** list box.
   - **Super User**: Only user accounts assigned the **Super User** level can view this page.
   - **Level 1-8**: Only users assigned the same level or a lower level can view this page.
   - **Disabled**: No users can view or edit this page. The button to access this page no longer displays.
7. Specify which users can edit the page in the **Edit Access Level** list box.
   - **Super User**: Only user accounts assigned the **Super User** level can edit this page.
   - **Level 1-8**: Only users assigned the same level or a lower level can edit this page.
   - **Disabled**: No users can edit this page.
8. Click **Update**.

User levels and access levels for the Z45 Controller

User levels (assigned to a user account) and access levels (assigned to a web UI page) work together to manage which web UI pages each user can view and edit.

The levels of Super User and Levels 1-8 (where Level 1 is the lowest and Level 8 is the highest) can be assigned to user accounts and to either view or edit a web page. A user that has a level that is equal to or lower than the level assigned to a web UI page can either view or edit the page.

For example, a user is assigned Level 4. A web UI page is assigned to Level 4 to view the page and Level 8 to edit the page. The user can view the web page, but cannot edit the web page. Another user is assigned Level 8. This user can both view and edit the web page.

- **User levels**: You assign a user level when you add a user account. See Add a user account to a Z45 Controller.
- **Access levels**: You can define the access levels when you configure a page. See Specify an access level for Z45 Controller Digi Axess pages.

Note You should always have at least one account that is assigned the **Super User** user level to ensure that you can access all of the Z45 Controller web UI features.

Radio configuration and activation on a Z45 Controller

Note By default, the radio is configured for Verizon. Radio configuration is necessary only if you are using an alternate to the M2M Wireless SIM card, or any non-Verizon SIM card.

The Z45 Controller contains a multi-carrier, software-defined radio that must be configured for proper operation on a specific network. By default, the Z45 Controller has Verizon firmware loaded in the radio module, the default Verizon Internet APN selected, and the WAN enabled.

The Z45 Controller provides four options with network-specific radio firmware and configuration information, specifically APN selection and the default WAN connection status.

- AT&T
- Verizon
- Sprint
- Generic: The generic area is designed to accommodate most of the legacy GSM carriers and can actually contain numerous generic carrier configurations, each identified by the combination of the Country Code and Carrier Code portions of the unit's IMEI.

Configure the Z45 Controller network operation

Follow this process to configure a Z45 Controller:

1. Load a radio firmware image on a Z45 Controller
2. Configure the Radio Firmware and Perform Network Activation

Load a radio firmware image on a Z45 Controller

You can used the radio provisioning feature to install network-specific firmware onto your Z45 Controller. You should select the network firmware that matches your SIM card's cellular network. By default, the radio is configured for Verizon.

Any changes made to the radio configuration are automatically saved in the designated network area identified by the IMEI found on an installed SIM card.

1. Prepare the Z45 Controller.
   a. Unplug the Z45 Controller from the main power supply.
   b. Remove any SIM cards inserted in the Z45 Controller.
   c. Install your new SIM card for the new carrier.
   d. Plug the Z45 Controller into a main power supply.
2. Access the device's web UI from the Device Summary page.
3. Click **Admin Main**.
4. From the **Options** section, click **Radio Provisioning**. The **Radio Provisioning** screen displays.
5. Click **Radio Update**. The **Radio Firmware Programming** page displays. The currently installed firmware displays in the **Current Firmware** field.
6. From the **Select a Network** list box, select the correct firmware for the network you are using. Options are:
   - **Verizon**. This is the default.
   - **AT&T**
   - **Sprint**
   - **Generic**. Choose this option if you are connecting to T-Mobile or another international carrier.
7. Click **Update Radio** to start the installation process. During the process, the SVC and Link LEDs begin an alternating green pattern, and the **Get Status** button on the **Radio Firmware Programming** page displays the network firmware that is being loaded. This process takes between 2 and 3 minutes to complete.

   Note If the programming step encountered a problem the LEDs simultaneously blink red/yellow. If this happens, restart or power cycle the Z45 Controller.

8. When complete, the **Get Status** button changes to indicate that the radio programming has completed and the LEDs simultaneously blink green indicating that the programming was successful.

Configure the Radio Firmware and Perform Network Activation

This process requires that a SIM card issued by a carrier matching the currently loaded radio firmware image must be installed to insure that configuration changes are saved in the area associated with the installed firmware image.

1. Load the radio firmware that matches the network provider for your SIM card. See Load a radio firmware image on a Z45 Controller.
2. Access the device's web UI from the Device Summary page.
3. On the wireless configuration screen verify that the correct APN is selected.
   a. Click **Admin Main**.
   b. From the **Interfaces** section, click **Wireless**.
   c. From the **Data Connection Configuration** section, select **Enabled** from the **Connection**

State list box.

d. In the **APN Profile Configuration** section, select the appropriate APN.

4. Restart the Z45 Controller, by unplugging it from the main power source and then plugging it back in. When the device reconnects to the network, the Link LED is lighted. The selected APN and WAN connection status are saved in the appropriate firmware area.

Back up and restore the Z45 Controller configuration

You can save the Z45 Controller configuration as a file onto a USB flash drive. You can then reinstall the saved configuration onto the same or a different Z45 Controller.

Back up the Z45 Controller configuration

You can choose to back up the entire configuration of a Z45 Controller onto a USB flash drive or your computer's hard drive.

If you back up a configuration to a flash drive, you can use it as a template and install the same configuration on other Z45 Controllers.

1. If you are backing up the configuration to a USB flash drive, connect a USB flash drive to the Z45 Controller.
2. Access the device's web UI from the Device Summary page.
3. Click **Admin Main**.
4. From the **Options** section, click **System Tools**. The **Tools and Utilities** page displays.
5. Click **Backup/Restore**.
6. From the **Select a Location** section, click **Local Storage** or **USB Drive**.
7. From the **Select an Option** section, click **Save/Backup**.
8. From the **Select a Module** section, click **Entire System**. The **File Name** field displays.
9. In the **File Name** field, enter a unique name for the saved file.
10. Click **Submit**. When the backup is complete, a success message displays on a green banner.
11. If you backed up the configuration to a USB flash drive, remove the USB drive.

Install a saved configuration file on a Z45 Controller

This process installs the Z45 Controller configuration from a back up file saved on your computer or to a USB flash drive.

Note The network loaded on the Z45 Controller (AT&T, Verizon, Sprint, or Generic) on which you are installing a back up file must match the network that was on the Z45 Controller that was backed up.

1. If you are installing a saved configuration from a USB flash drive, connect the USB flash drive to the Z45 Controller.
2. Access the device's web UI from the Device Summary page.
3. Click **Admin Main**.
4. From the **Options** section, click **System Tools**. The **Tools and Utilities** page displays.
5. Click **Backup/Restore**.
6. From the **Select a Location** section, click **Local Storage** or **USB Drive**.

7. From the **Select an Option** section, click **Install**.
8. From the **Select a Module** section, click **Entire System**. The **Select a File** list box displays.
9. From the **Select a File** list box, select the back up file that you want to install.
10. Click **Submit**. When the backup is complete, a success message displays on a green banner.
11. If you installed the configuration from a USB flash drive, remove the USB drive.
12. Power down the Z45 Controller.
13. Insert an active SIM card. The SIM card network (AT&T, Verizon, Sprint, or Generic) must match the network for the installed configuration.
14. Power up the Z45 Controller.
15. Verify a network connection (Link LED) on the desired APN.

Back up the Z45 Controller event logs

You can choose to back up the Z45 Controller's event logs onto a USB flash drive or your computer's hard drive.

1. If you are backing up the logs to a USB flash drive, connect a USB flash drive to the Z45 Controller.
2. Access the device's web UI from the Device Summary page.
3. Click **Admin Main**.
4. From the **Options** section, click **System Tools**. The **Tools and Utilities** page displays.
5. Click **Backup/Restore**.
6. From the **Select a Location** section, click **Local Storage** or **USB Drive**.
7. From the **Select an Option** section, click **Save/Backup**.
8. From the **Select a Module**, section click **Logs**.
9. Click **Submit**. When the backup is complete, a success message displays on a green banner.
10. If you backed up the log file to a USB flash drive, remove the USB drive.

Install a packaged factory application on a Z45 Controller

This process installs a packaged factory application on a Z45 Controller. This feature enables you to quickly set up automation controls for third-party hardware.

1. Access the device's web UI from the Device Summary page.
2. Click **Admin Main**.
3. From the **Options** section, click **System Tools**. The **Tools and Utilities** page displays.
4. Click **Backup/Restore**.
5. From the **Select a Location**section, click **Local Storage**.
6. From the **Select an Option** section, click **Install**.
7. From the **Select a Module** section, click **Factory Applications**. The **Select a File** list box displays.
8. From the **Select a File** list box, select the factory application that you want to install.
9. Click **Submit**. When the backup is complete, a success message displays on a green banner.
10. Restart the web UI.

11. Verify the installation.
    a. From the main screen, click **Admin Main**.
    b. From the **Options** section, click **Applications**.
    c. Click **Automation Dashboard**.
    d. Select **Show All** from the list box.

Configure the local and remote dashboard groups

You can assign a name to each local dashboard group and configure which groups display on the Automation Dashboard.

1. Log into the Z45 Controller's web UI.
2. Click **Admin Main**.
3. From the **Options** section, click **Device Profile**. The **Device Profile** page displays.
4. Scroll down to the **Dashboard Groups** section. The first five groups are displayed.

   Note If needed, you can display all of the groups. Click the green **Edit All** button to the right of section name.

5. (Optional) Enter a descriptive name in the name field for the groups that you want to use. If you don't enter a name, only the group number displays.
6. By default, the **Show All Panels on Dashboard** option is selected. A panel for each group that has data will display on the Automation Dashboard.
   - **Hide**: Select **Hide** for each of the groups that you don't want to display on the Automation Dashboard.
   - **Default**: If you want only one group to display in the Automation Dashboard, select **Default** for that group. This toggles with the the **Show All Panels on Dashboard** option, and that option is de-selected when Default is selected for a group.
7. Click **Update**.

Update the Z45 Controller firmware

You can update the firmware on the Z45 Controller, either automatically on a defined schedule or manually at any time.

You must first configure the firmware update server. Each time a Z45 Controller requests a firmware update, the Z45 Controllerconnects to the server and the update is pushed to the Z45 Controller.

Configure access to the firmware server

Before the Z45 Controller firmware can be updated, you must configure a connection from the Z45 Controller to the firmware server. The firmware server is controlled by Digi, and when a new firmware update is available, Digi puts the firmware file on the server.

Note You can verify the firmware version currently installed on the Z45 Controller on the main Digi Axess screen or on the **Firmware Updates** page. See Review the Z45 Controller firmware update counters.

1. Access the device's web UI from the Device Summary page.
2. Click **Admin Main**.
3. In the **Options** section, click **System Tools**. The **Tools and Utilities** page displays.
4. Click **Firmware Update**. The **Firmware Update** page displays.
5. Configure the Z45 Controller with the information needed to connect to the update server.
    - **Server Address/URL**: Enter the routable (public or private) IP address or URL of the update server.
    - **File Path**: Enter the location on the server at which the firmware update file has been stored.
    - **Username** and **Password**: Enter the user name and password for the update server:
        - **Username**: DIGI-ZSERIES
        - **Password**: support_55343
6. Click **Save** to save the entries.
7. To ensure the changes take effect, log out of Digi Axess and then login again to the web UI.

Update the Z45 Controller firmware

You can update the firmware on the Z45 Controller at any time by manually updating the firmware. The firmware is updated to the most recent version available.

1. Make sure you have configured access to the firmware update server.
2. Access the device's web UI from the Device Summary page.
3. Click **Admin Main**.
4. In the **Options** section, click **System Tools**. The **Tools and Utilities** page displays.
5. Click **Firmware Update**.
6. In the **Auto-Update Configuration** section, select **Never** from the **Update Frequency** list box.
7. Click **Start Update** to immediately start the firmware update.
8. When the update is complete, the Z45 Controller web UI automatically reboots.
9. Log in to the web UI.
10. Verify the firmware version currently installed on the Z45 Controller on the main Digi Axess screen or on the **Firmware Updates** page. See Review the Z45 Controller firmware update counters.

Schedule a firmware update on the Z45 Controller

You can schedule daily, weekly, or monthly Z45 Controller firmware updates.

The starting date and time for a scheduled firmware update is determined when you select a schedule option and click **Start Update** or reboot the Z45 Controller. This causes the Z45 Controller to look for updates on the server and to establish its day/time reference.

1. Make sure you have configured access to the firmware update server.
2. Access the device's web UI from the Device Summary page.
3. Click **Admin Main**.
4. In the **Options** section, click **System Tools**. The **Tools and Utilities** page displays.
5. Click **Firmware Update**.

6. In the **Auto-Update Configuration** section, select an update frequency option from the **Update Frequency** list box.
    - **Never**: Updates are not performed automatically. Choose this option if you want to manually update the firmware. See Update the Z45 Controller firmware.
    - **Daily**: Firmware updates are done daily.
    - **Weekly**: Firmware updates are done weekly.
    - **Monthly**: Firmware updates are done monthly.
7. Click **Start Update** to start the initial firmware update and establish the starting day/time reference for the next scheduled update.
8. When the update is complete, the Z45 Controller web UI automatically reboots.
9. Log in to the web UI.
10. Verify the firmware version currently installed on the Z45 Controller on the main Digi Axess screen or on the **Firmware Updates** page. See Review the Z45 Controller firmware update counters.

Review the Z45 Controller firmware update counters

A set of firmware update counters is displayed to show the sequence of updates applied to the Z45 Controller. Each one reports on a different type of firmware update.

- **Global Updates**: Updates are applied to all Z45 Controllers of a specific model and hardware revision.
- **Selective Updates**: Updates are applied to one or more Z45 Controllers, as selected by the customer.
- **License Updates**: Updates specific applications on a single Z45 Controller, as identified by its serial number.

Order of update application

When a firmware update occurs, and if more than one type of update is available for the Z45 Controller, the order of application is **Global**, **Selective**, then **License**.

View update counters

You can view the update counters here in the web UI:

- **Quick Panel**: The update counters are displayed in the **System Status** box in the **Quick Panel**.
- **Firmware update page**: Navigate to **Admin Main** > **System Tools** > **Firmware Update**. The update counters are displayed in the **Update Counts** section.

Tunneling and Encryption

GRE Tunnels

The Z45 Controller allows for the configuration of up 2 GRE tunnels over the cellular wireless interface.

Parameter	Options
Tunnel Select	None/1/2/Both
WAN MTU/MRU	Increase for tunnel overhead (Yes/No)
TTL Value	Time for a packet to live in a tunnel (seconds)
Multicast Support	Enable/Disable
GRE Tunnel Definition (1/2)	**Remote Router IP**: Routable address of the remote router) **Remote Tunnel IP**: Address used for the remote end of the tunnel) **Remote Subnet IP/Netmask**: Base address of the subnet connected through the tunnel **Local Tunnel IP/Netmask**: Address used to construct local end of the tunnel

IPsec tunnels

The Z45 Controller supports 8 concurrent IPsec tunnels. For each tunnel the configuration options below are available.

System-wide IPsec tunnel options

Parameter	Options
Tunnel Select	Tunnel to be configured (up to 8)
IPSEC	System level Enable/Disable of IPSEC tunnels
Security Level	**Allow Internet and Secure Traffic**: In this mode IP traffic addressed for the IPsec tunnel will be transmitted through the tunnel. Other traffic will continue to route over the open IP network. This setting allows web type traffic to co-exist with secure traffic on the same Z45 Controller. **Allow Only Secure Traffic**: In this mode only IP traffic addressed for the IPsec tunnel will be transmitted. Since this precludes the use of the standard routing feature the Routing button in the main menu is disabled in this mode of operation.

Individual IPsec Tunnel Options

The remaining portion of the IPsec configuration deals with tunnel specific parameters meaning that each parameter must be set for each tunnel deployed. The configurable options can be seen in the table below.

Phase 1 and Phase 2 under IPSec Key Exchange refer to IKE Phase 1 and IKE phase 2. During IKE phase 1 IKE authenticates IPSec peers and negotiates IKE Security Associations (SAs), setting up a secure channel for negotiating IPSec SAs in phase 2.During IKE phase 2 IKE negotiates IPSec SA parameters and sets up matching IPSec SAs in the peers. The selection choices with this panel for Phase 1 and Phase 2 are identical but repeated so that different choices can be applied to Phase 1 and Phase 2.

Parameter	Options
Tunnel	Enable/Disable an individual tunnel
Auto-connect	Sends ICMP request as the defined interval in seconds to the router subnet to maintain the tunnel connection alive.
Local Router Definition	**Local Security Type**: Available option are FQDN, USER FQDN, KEY ID or NONE **Security ID**: The identifier corresponding to the selected security type **IP Address**: IP address of the remote router **Subnet IP Address/Netmask**: IP Address and netmask of remote router
Authentication/Encryption	**Pre-Shared Key**: Text string used by both ends of the tunnel for authentication. **Exchange Mode**: Available settings are Main or Aggressive. Defines the number of exchanges used to complete IKE Phase 1. Main is the more robust setting while aggressive mode uses few exchanges and is therefore somewhat more risky. **Dead Peer Detection (DPD)**: Defines the intervals (in seconds) between DPD messages following idle periods. A zero (0) setting disables DPD.
IPSEC Key Exchange	**Encryption**: Choices are 3des, or aes128, aes192, ase256 **Authentication**: Choices are sha1, or md5. **DH Group**: Defines what size modulus to use for Diffie-Hellman calculation. Choices are 768,1024, 1536, or 2048 **PFS DH Group**: Choices are No PFS, 768, 1024, 1536, or 2048. You specify the Diffie – Hellman group in Phase 2 only when you select Perfect Forward Secrecy (PFS). PFS makes keys more secure because new keys are not made from previous keys. When you specify PFS during Phase 2, a Diffie-Hellman exchange occurs each time a new SA is negotiated. The DH group you choose for Phase 2 does not need to match the group you choose for Phase 1. **SA Lifetime (Phase 1 & Phase 2)**: The lifetime parameter controls the duration (in minutes) for which the SA is valid. A zero (0) setting disables SA Lifetime timeouts.

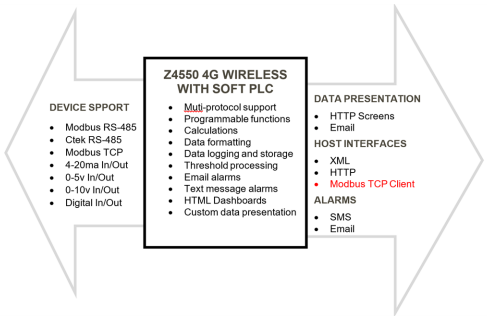
Modbus TCP Client for Automation Control

The Z45 Controller cellular application platforms contain an Automation Control environment that allows anyone to create complete, autonomous, monitoring and control systems anywhere they may be required. Many of these monitoring and control systems act as complete, stand-alone SCADA systems and this has made it unnecessary to communicate with the typical SCADA server.

However, in more complex environments, there are often servers in place that act as central monitoring and control points for numerous sub-systems. In support of this, the Z45 Controller has a Modbus TCP client that allows the typical SCADA server to easily monitor and control functions that are hosted on Automation Control.

Since the Automation Control environment acts as a complete SCADA system, it still performs all of its server functions while communicating downstream to another SCADA server via the Modbus TCP Client. The Z45 Controller continues to support its own network of devices over Modbus RS-485, Modbus TCP master and all of the other sensor interfaces that are available. Through the Modbus TCP

Client, a remote SCADA server can reach out to control or monitor data from any of the devices being supported on the Automation Control environment.



Internal data types

Within Automation Control, raw data is brought in from a wide range of devices and transformed into application-specific data so that calculations and decision logic may be created. For instance a binary value from an A/D input might be transformed into a floating point value representing gallons of water or a binary value from a pulse counting input might be transformed into a floating point value representing flow rate in gallons per minute.

The following internal data types are supported as both inputs and outputs.

Digital Pin

A single bit with a value of one or zero. Digital outputs may be used to set the value of external physical devices or may be user defined virtual inputs/outputs.

Numeric Pin

A 32 bit floating point value or a 32 bit signed or unsigned integer value. Numeric pins may be configured to provide 0, 2 or 6 places of fractional accuracy. It is important to note that setting fractional accuracy to 0, sets the pin to integer mode. Numeric values may originate from a wide range of A/D, pulse, or Modbus register devices since simple conversion facilities allow values from any of those physical sources to be normalized and converted to meaningful engineering values. Numeric inputs may also be user defined virtual inputs.

Hex Pin

A 32 bit integer value that may be processed in either 32 or 16 bit mode. Hex values may come from a wide variety of physical register based devices such as Modbus devices. Hex values may also be user defined virtual inputs/outputs.

Modbus client data type mapping

Each internal data type provided by Automation Control is accessible through the Modbus TCP Client Support. This section defines all available mapping options and mapping options are also provided at the end of this section in table format.

Reading a Digital Input

- Any digital input (virtual or physical) may be read.
- A dgital input may be read using the Modbus Read Discrete Inputs function or Modbus Read

Coils function.

- Multiple Input reads are supported.

Writing a Digital Input

- Only virtual digital inputs may be written. Physical inputs cannot be written.
- A value may be written to a virtual digital input using the Modbus Write Single Coil function or Modbus Write Multiple Coils function.
- Multiple digital input writes are supported.

Reading a Digital Output

- Any digital output (virtual or physical) may be read.
- A digital output may be read using the Modbus Read Coils function or Modbus Read Discrete Inputs function.
- Multiple digital output reads are supported.

Writing a Digital Output

- Any digital output (virtual or physical) may be written.
- A digital output may be written using the Modbus Write Single Coil function, or Modbus Write Multiple Coils function.
- Multiple digital output writes are supported.

Reading a Numeric Input

- Any numeric input (virtual or physical) may be read.
- If the input source is any of the following, a Double Register (32 bit) read is required and may be done using either a Modbus Read Input Registers function or a Modbus Read Holding Registers Function.
  - Analog input
  - Pulse input
  - Virtual numeric input
  - 32 bit Modbus holding or input register
  - 16 bit Modbus holding or input register: Each 16 bit Modbus holding or input register will be mapped to a 32 bit Numeric Input.
- Multiple 32 bit register reads are supported.
- If a numeric input is configured with a fractional scale set to 0, a 32 bit integer value will be returned.
- If a numeric input is configured with a fractional scale other than 0, a 32 bit floating point value will be returned.
- 16 Bit Option: A single register (16 bit) read may be performed on a numeric input using the Modbus Read Input Registers function or a Modbus Read Holding Registers function to perform a single 16 bit integer read. Multiple register reads are not supported in 16 bit mode.

Writing a Numeric Input:

- Only virtual numeric inputs may be written. Physical inputs cannot be written.
- A value may be written to a virtual numeric input using a Double Register (32 bits) write. The Modbus Write Multiple Holding Register function may be used to write the 32 bit value to the selected Virtual Input.
- Multiple 32 bit register writes are supported.
- If the virtual numeric input being written is configured with a fractional scale set to 0, the two words will be interpreted as an integer value.
- If the virtual numeric input being written is configured with a fractional scale other than 0, the two words will be interpreted as a floating point value.
- 16 Bit Option: A single register (16 bit) Modbus Write Single Holding Register function may be used to write an integer value to a single Virtual Numeric Input.

Reading a Numeric Output

- Any numeric input (virtual or physical) may be read.
- If the output destination is any of the following, a Double Register (32 bit) read is required and may be done using a Modbus Read Input Registers function or a Modbus Read Holding Registers Function:
  - Virtual output
  - 32 bit Modbus holding register
  - 16 bit Modbus holding register: Each 16 bit Modbus holding register will be mapped to a 32 bit Numeric Output.
- Multiple register reads are supported in 32 bit mode.
- If a numeric output is configured with a fractional scale set to 0, a 32 bit integer value will be returned.
- If a numeric output is configured with a fractional scale other than 0, a 32 bit floating point value will be returned.
- 16 Bit Option: A single register (16 bit) read may be performed on a Numeric Output using the Modbus Read Input Registers function or a Modbus Read Holding Registers function to perform a single

Writing a Numeric Output

- Any numeric input (virtual or physical) may be written.
- If the output destination is any of the following a Double Register (32 bit) write is required and may be done using a Modbus Write Multiple Holding Register Function:
  - Virtual output
  - 32 bit Modbus holding register
  - 16 bit Modbus holding register: Each 16 bit Modbus holding register will be mapped to a 32 bit Numeric Output.
- Multiple register writes are supported in 32 bit mode.
- If the fractional scale of the numeric output is 0, a 2 word (32 bit) Modbus Write Multiple Holding Registers function will be interpreted as a 32 bit integer write to the selected output.

- If the fractional scale of the numeric output is not 0, a 2 word (32 bit) Modbus Write Multiple Holding Registers function will be interpreted as a floating point write to the selected output.
- 16 Bit Option: A single register (16 bit) Modbus Write Single Holding Register function may be used to write an integer value to a single Numeric Output.

Reading a Hex Input

- Any hex input (virtual or physical) may be read.
- If the input source is any of the following, a Double Register (32 bit) read is required and may be done using a Modbus Read Input Registers function or a Modbus Read Holding Registers Function.
  - Virtual hex input
  - 32 bit Modbus holding or input register
  - 16 bit Modbus holding or input register: Each 16 bit Modbus holding or input register will be mapped to a 32 bit Hex Input.
- A 32 bit integer value will be returned.
- 16 Bit Option: A single register (16 bit) read may be performed on a hex input using the Modbus Read Input Registers function or a Modbus Read Holding Registers function to perform a single 16 bit integer read. Multiple register reads are not supported in 16 bit mode.

Writing a Hex Input:

- Only virtual hex inputs may be written. Physical inputs cannot be written.
- A value may be written to a virtual hex input using a Double Register (32 bits) write. The Modbus Write Multiple Holding Register function may be used to write the 32 bit value to the selected Virtual Input.
- Multiple 32 bit register writes are supported.
- The 32 bit value will be interpreted as an integer.
- 16 Bit Option: A single register (16 bit) Modbus Write Single Holding Register function may be used to write an integer value to a single Virtual Hex Input.

Reading Hex Output

- Any hex output (virtual or physical) may be read.
- If the output destination is any of the following, a Double Register (32 bit) read is required and may be done using a Modbus Read Input Registers function or a Modbus Read Holding Registers Function.
  - Virtual output
  - 32 bit Modbus holding register
  - 16 bit Modbus holding register - Each 16 bit Modbus holding register will be mapped to a C32 bit Hex Output.
- Multiple register reads are supported in 32 bit mode.
- A 32 bit integer value will be returned.
- 16 Bit Option: A single register (16 bit) read may be performed on a Hex Output using the Modbus Read Input Registers function or a Modbus Read Holding Registers function to perform a single 16 bit integer read. Multiple register reads are not supported in 16 bit mode.

Writing a Hex Output

- Any hex output (virtual or physical) may be written.
- If the output destination is any of the following a Double Register (32 bit) write is required and may be done using a Modbus Write Multiple Holding Register Function:
  - Virtual output
  - 32 bit Modbus holding register
  - 16 bit Modbus holding register - Each 16 bit Modbus holding register will be mapped to a 32 bit Numeric Output.
- Multiple register writes are supported in 32 bit mode.
- The value written will be interpreted as a 32 bit integer write to the selected output.
- 16 Bit Option: A single register (16 bit) Modbus Write Single Holding Register function may be used to write an integer value to a single hex output.

Physical Device to Modbus Mapping Summary

The following table presents a mapping of all physical devices running on Automation Control.

Note **In automation control, floating point values must have a decimal scale defined of "2" or "6". A decimal scale of "0" will result in the numeric value being treated as an integer.

Raw Data Source	Type	Modbus Data Type	Modbus Function
Z45 Controller Digital Input, 1 bit	Digital	Discrete Input	Fn 02 – Read Discrete Inputs
Z45 Controller Digital Output, 1 bit	Digital	Coil	Fn 01 – Read Coils Fn 15 – Write Multiple Coils Fn 05 – Write Single Coil
Z45 Controller Analog Input	Numeric	Input Register Integer or **Input Register Floating point	Fn 04 – Read Input Registers
Z45 Controller Pulse Input	Numeric	Input Register Integer or **Input Register Floating point	Fn 04 – Read Input Registers
Modbus 16 bit Input	Numeric	Input Register Integer (16 bit)	Fn 04 – Read Input Registers
Modbus 16 bit Holding	Numeric	Holding Register Integer (16 bit)	Fn 03 – Read Holding Registers Fn 03 – Read Holding Registers Fn 16 – Write Multiple Registers Fn 06 – Write Single Register

Raw Data Source	Type	Modbus Data Type	Modbus Function
Modbus 32 bit Input	Numeric	Read Input Register Integer (32 bit) **Read Input Register Floating point	Fn 04 – Read Input Registers
Modbus 32 bit Holding	Numeric	Holding Register Integer (32 bit) or Holding Register Floating point	Fn 03 – Read Holding Registers Fn 16 – Write Multiple Registers
Modbus 16 bit Input	Hex	Input Register Integer (16 bit)	Fn 04 – Read Input Registers
Modbus 16 bit Holding	Hex	Holding Register Integer (16 bit)	Fn 03 – Read Holding Registers Fn 16 – Write Multiple Register Fn 06 – Write Single Register
Modbus 32 bit Input	Hex	Input Register Integer (32 bit)	Fn 04 – Read Input Registers
Modbus 32 bit Holding	Hex	Holding Register Integer (32 bit)	Fn 03 – Read Holding Registers Fn 16 – Write Multiple Registers

Virtual Device to Modbus Mapping Summary

Automation Control makes extensive use of Virtual I/O. Virtual I/O can be thought of as variables or computational blocks that can be tied together through simple read or write functions. In some cases, a Modbus host may be writing to or reading from a Virtual I/O that is performing some sort of conversion or processing of data from a physical device. The following table presents a mapping of all Virtual I/O available in Automation Control.

Note In automation control, floating point values must have a decimal scale defined of "2" or "6". A decimal scale of "0" will result in the numeric value being treated as an integer.

Internal Virtual Device	Supported Modbus Data Type	Modbus Function
Virtual Digital Input or Output	Discrete Input	Fn 02 – Read Inputs
	Coil	Fn 01 - Read Coils Fn 05 – Write Single Coil Fn 15 – Write Multiple Coils
Virtual Numeric Input or Output	Input Register Integer (32 bit or 16bit), Floating point	Fn 04 – Read Input Registers
	Holding Register Integer (32 bit or 16bit),	Fn 03 – Read Holding

Internal Virtual Device	Supported Modbus Data Type	Modbus Function
	Floating point	Registers Fn 16 – Write Multiple Holding Fn 06 – Write Single Holding
Virtual Hex Input or Output	Input Register Integer (32 bit or 16 bit)	Fn 04 – Read Input Registers
	Holding Register Integer (32 bit or 16 bit)	Fn 03 – Read Holding Registers Fn 16 – Write Multiple Holding Fn 06 – Write Single Holding

Register Addressing

Within Automation Control, both input addresses and output addresses start at 1. In order to operate within the standard I/O functions provided by Modbus, it is necessary to separate input and outputs into their own address range.

The default configuration of the Z45 Controllers Modbus TCP Client leaves the base address of inputs starting at 1 but moves the base address of outputs to 1000. This parameter may be adjusted if necessary. This parameter and other addressing configuration parameters will be defined in a following section on configuration parameters.

Since Z45 Controller Numeric and Hex data elements are 32 bit, the address must be multiplied by 2 to comply with standard Modbus addressing. Digital data elements will have the same.

- **Input example**: If you wish to address a Numeric or Hex Input configured at Z45 Controller address 2, the Modbus address would be 4 (address * 2). You would use address 4 to retrieve the 32 bit value. You would also use address 4 if you were to do a single register (16 bit) read. In that case you will be retrieving the least significant portion of the 32 bit value.
- **Output example**: If you wish to address a Numeric or Hex Output configured at Z45 Controller address 2, the Modbus address would be 1004 (address * 2 + 1000. You would use address 1004 to retrieve or write the 32 bit value. You would also use address 1004 if you were to do a single register (16 bit) read or write. In that case you will be retrieving or writing the least significant portion of the 32 bit value.

I/O Type	Input Address Range	Output Address Range
Holding Coil	00001 - 00999	01001 - 01999
Discrete Input	10001 - 10999	11001 - 11999
Input Register	30001 - 30999	31001 - 31999
Holding Register	40001 - 40999	41001 - 41999

IP Address and Port

Modbus TCP Client is configured to listen for incoming connections on both the Ethernet LAN and the wireless WWAN. The default listen port is set to 1502 but the port number may be changed if necessary. If Automation Control is acting as both a Modbus TCP Master and Modbus TCP Client, be careful to avoid port conflicts.

Configuration Parameters

There are a number of parameters associated with Modbus TCP Client that may need to be configured for certain applications. These parameters are kept in an internal file that can be modified if necessary. In order to modify them, you will use the TCO editor function.

The configuration file is **/etc/conf.d/opt.rtu_modbus_tcp_client** and contains the following parameters:

Parameter	Description
RESPTOSE **RESPTOUSEC**	These parameters define response timeout second and response timeout microseconds. This defines how long the Modbus Client will wait for a response before timing out.
BYTEOSE **BYTEOUSEC**	These parameters define the maximum time allowed between received characters.
ALWAYSON	These parameters define the maximum time allowed between received characters.
PORT	This parameter sets the TCP listen port for Modbus Client.
DEBUG	If Debug is set to 1 (on), many diagnostic messages will be generated in syslog. The logread command may be used to review them. Debug should always be set to 0 (off) during normal operation.
COFF **BOFF** **HOFF** **IOFF**	Coil offset, Bit offset, Holding offset, and Input offset allow you to assign an offset to each class of Modbus device type when necessary. As an example, if a server requires that holding registers have a base address of 400001 and Z45 Controller Automation has holding registers located at location 1001, you can set HOFF="399000"
WOFF	As mentioned earlier, both input and output addresses start at 1 in Automation Control. WOFF adjusts the offset of outputs based on its value. By default, WOFF is set to 1000 giving the first output an address of 1001.
WSWAP	Defaults to "0" (no swapping). This parameter controls the read order of 32 bit integers. When set to "1" (swap 32 bit read order), the second register is returned as the first. Some configurations may see incorrect values for 32 bit integers. Changing this value to "1" may resolve the issue.

Configuring with other SCADA software

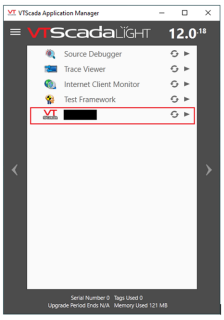
VT SCADA

SCADA software is a common use for the Modbus TCP Client. Instructions for an example application created with VT Scada are provided below. More information for creating VT Scada applications is available at **VTScada.com/help**.

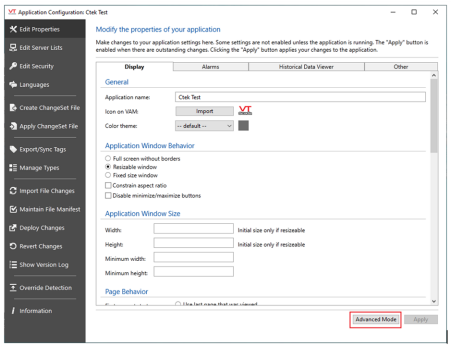
VT Scada reads several addresses at once through a strategy called coalescing. Coalescing may cause issues in situations where a 16 bit integer follows either a floating point value or a 32 bit integer. To solve these issues, several changes must be made to the VT Scada configuration to prevent issues when reading and writing.

Change max block read length

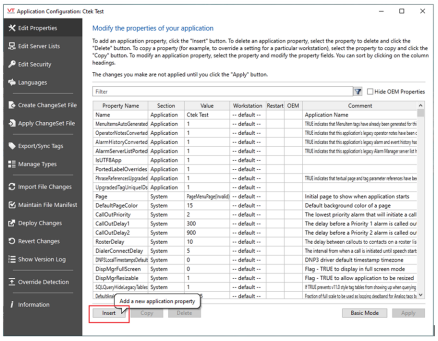
1. Right-click your application in the VT Scada application viewer menu.



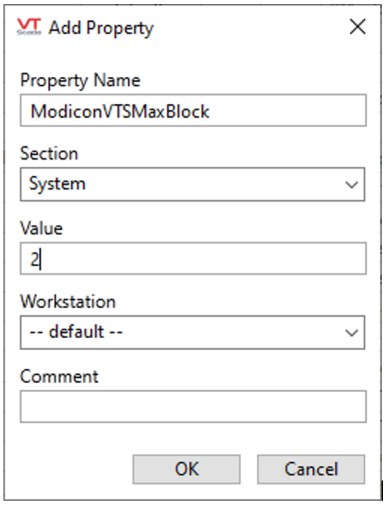
2. Select the edit properties menu. At the bottom right of your screen, click the **Advanced Mode** button.



3. Then, select the insert button at the bottom left.



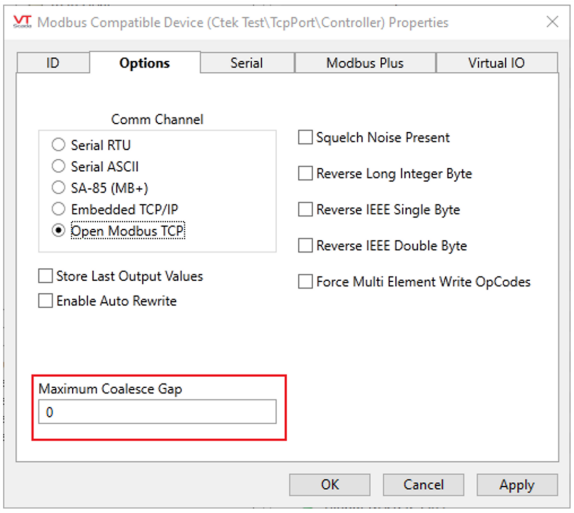
4. In the Add Property dialog, type in the following information:
   - **Property Name**: ModiconVTSMaxBlock
   - **Value**: 2



5. Click **OK** > **Apply** > **OK**. You may now run your application in VT Scada.

Change the Max Coalesce Gap

Z45 Controller do not support reading registers that are not explicitly declared. To fix this, the max coalesce gap must be set to "0". When setting your Modbus Device Z45 Controller Driver, Select the IO tab and change the Max Coalesce Gap to a value of 0.



Make sure all addresses point to the correct register

When adding I/O tags in VT Scada, make sure all read/write addresses are pointing to the earlier of the two defined registers for the pin you are trying to access. The easiest way to calculate the correct register number is by taking the pin number as it appears on your Sky Router, multiply it by 2, and then add 1.

VT Scada Register Address = (Pin Number * 2) + Modbus 5 digit address range + 1

Pin type	Example pin number	Corresponding register address
Digital	001	00003
Numeric	013	40027 (Holding Register)
Hex	007	30015 (Input Register)

Use data suffixes to read internal types

VT Scada uses address suffixes instead of calling Modbus functions directly. The following table will show how to read Z45 Controller internal types using the VT Scada suffixes.

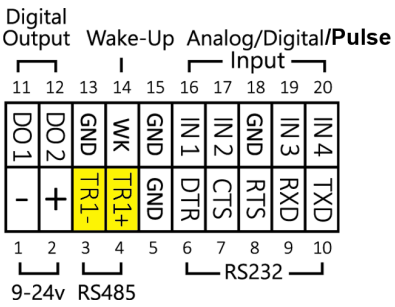
Internal type	Available suffixes
Digital	No suffix is needed for digital pins
Numeric 16 Bit Integer	/UWORD (used for unsigned integers) /SWORD (used for signed integers)
Numeric 32 Bit Integer	/UDWORD (used for unsigned integers) /SDWORD (used for signed integers)
Numeric Floating Point	/Float
Hex	/UDWORD

Local Interfaces

Configure the RS485 port

You can configure the RS485 port to so that the Z45 Controller can communicate with a sensor wired to the port.

The RS485 port consists of the TR1 pins: pin 3 (TR1-) and pin 4 (TR1-2).



Note Digi recommends that you use one of the available ground pins (GND) to minimize signal interference.

Before you begin

- Make sure you have the values from the sensor needed to configure the RS485 port: bit rate, character length, parity, and service.

To configure the RS485 pin for your sensor:

1. Log into the Z45 Controller's web UI.
2. Click **Admin Main**.
3. In the **Interfaces** section, click **RS232/RS485 Ports**. The **RS232/RS485 Port Configuration** page displays.
4. In the **RS485 Configuration (TR1)** section, configure the RS485 (T1) port using the values needed by the sensor wired to the port.
    - **Bit Rate**
    - **Character Length**
    - **Parity**
    - **Service**
5. Click **Update**. The **Parameters Successfully Updated** banner displays in green at the top of the screen.
6. Click **Home** to return to the dashboard page.

Port forwarding

In the gateway mode of operation the Z45 Controller routes data to and from the wireless network IP connection to a class C range of local (private) IP addresses available on the RJ45 Ethernet connector. To accomplish this the Port Forwarding screen allows you to forward WAN side IP traffic arriving on a specific IP Port to a specific Port at a designated LAN side address. In addition, this screen also allows you to make a named (advertised) service available over the WAN interface.

Each forwarding rules consists of the following field:

- **Service Name**: A name that is associated with a service advertised on the Quick Panel of the WAN interface
- **Forwarding From**: The inbound (WAN side) port number managing the traffic
- **Local Port**: The port number on the LAN side that the traffic will be routed to
- **Local IP**: The IP address on the LAN side that the traffic will be routed to. Must be part of the class C range defined in the Ethernet Interface screen.
- **Advertise**: Yes or no
- **Protocol**: TCP, UDP, or both
- **Enable**: Make the rule active (Yes/No)

RS232/RS485 Ports

The RS232/RS485 screen is used to configure the physical (electrical and timing) characteristics of the serial ports. The serial ports can be connected to the TCP/UDP PAD function for WAN transmission or to various protocols used by Automation Control.

RS232/RS485 Options

The screens under this function are used to configure the serial (TCP/UDP/PPP) pad function.

Automation Control

The Automation Control feature provides the logic and control necessary to create automation applications that evaluate analog, digital, and pulse discrete inputs, a full range of Modbus input types, and, based on input values, apply programming logic to control output devices through both discrete and Modbus outputs.

The Automation Manager also provides a simple, GUI based rapid development environment used to create and deploy applications using the Automation Manager.

Access the Automation Control page

You can access the **Automation Control** page from the **Quick Panel** page.

1. Access the device's web UI from the Device Summary page.
2. If you have logged into a Z45 Controller, click **Admin Main**.
3. From the **Options** section, click **Applications**. The **User Applications** page displays.
4. Click **Automation Control**. The **Automation Control** page displays.

Button	Description
Inputs	Configure and manage input pins. ■ Configure input pins on the Connect Sensor XRT-M ■ Configure input pins on the Z45 Controller
Outputs	Configure and manage output pins. ■ Configure output pins on a Connect Sensor XRT-M ■ Configure output pins on a Z45 Controller
Formulas	Create and manage formulas. ■ Formulas: Manage from the web UI.
Programs	Create and manage programs made from an internal function library. ■ Programs
I/O Modules	Introduce data into the system from a MODBUS source, the Z45 Controller, a Multi-Function IO Module, or any third-party supported I/O modules. ■ Set up I/O modules

Button	Description
Force Config Update	A full force configuration update overwrites the entire device configuration based on the Digi Axess configuration. Digi recommends forcing a configuration update only when the sync status shows as **Synced** but the device configuration is not properly synced and you have physical access to the device. ▪ Force a full configuration update on a Connect Sensor
Run Configuration (Z45 Controller only)	Applies the most recent set of administrative changes to the currently running Automation application. You can also use the **Run Configuration** program function to peform this action. See Access the Automation Control page.

View automation data in the Automation Dashboard

The **Automation Dashboard** page graphically represents the information gathered by your devices. Each section in the page represents a control group created in the Automation Control page.

1. Access the device's web UI from the Device Summary page.
2. If you have logged into a Z45 Controller, click **Admin Main**.
3. From the **Options** section, click **Applications**. The **User Applications** page displays.
4. Click **Automation Dashboard**. The **Automation Dashboard** page displays.
   - Connect Sensor+: The last date and time that the device woke and pushed data to Digi Axess displays in the right side of the page. The data displayed on the page reflects the most recently collected data.
   - Z45 Controller: The data displayed on the page reflects the most recently collected data. When the **Refresh** option is selected, the data is automatically updated at the refresh interval defined in the **Auto-Refresh** option in the **Device Profile** page.
5. Determine the data monitoring sections you want to display on the page by selecting an option from the list box. The information in each section is dependent on the device.
   - **Show all**: Show all of the available information. This is the default.
   - **System Status**: Show hardware information.
   - **Network Status**: Show cellular network information.
   - **Device-specific automation groups**: Any automation that has been programmed to collect data from the device displays as an option. This is user-defined.
6. Determine the display style. Options are:
   - **Details**: Show a list of the monitoring data.
   - **Overview**: Show the data as a graphic.
   - **Analysis**: Show a graph of the data over time. This is available only for data that changes over time. Roll the cursor over data to view the date details.
     - Connect Sensor+: The available time range is determined by the data pulled from the device the last time the Connect Sensor+ woke and connected to Digi Axess.
7. Click **Refresh** at the bottom of the page to refresh the data.

Configure input pins on the Connect Sensor XRT-M

You can configure the input pins on the device and use the data collected from the pin in automation control formulas. Each input pin can be configured for one of the following types: **Numeric**, **Digital**, or **Hex**.

Configure a digital input pin on a Connect Sensor XRT-M

You can configure an input pin for digital data.

1. Access the device's web UI from the Device Summary page.
2. Navigate to the **Input Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.
   c. Click **Inputs**. The **Input Configuration** page displays.
3. In the **Input Type** column, click on a **Disabled** button.

   Note An input pin with an input type other than **Disabled** has already been configured and can be updated.

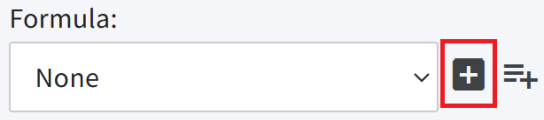
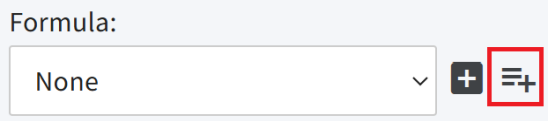
4. At the top of the page, click **Digital**.
5. Configure the settings as described in the tables below.

Digital Input Source

Item	Description
Primary Source	Select an input source option. ■ **Configured Inputs**: Select an input pin. ■ **Configured Outputs:** Select an output pin. ■ **System Variables**: Select a standard data option. ■ **Onboard I/O**
Additional Modifiers	Use the **Additional Modifiers** to take the value you have coming in from the pin and combine it with multiple digital inputs or outputs, outside of a formula. ■ **Operation**: Select **AND** or **OR**. ■ **Source**: Select an input source.

General Pin Options

Item	Description
Polarity	Select the polarity for the input pin to specify which status option signifies "off". ■ **0**: 0 is off. ■ **1**: 1 is off.

Item	Description
Formula	(Optional) Select an existing formula from the **Formula** list box. When data is received from the input source, the formula is run, and the result is the output value for this source. You can create a formula from this page if needed. ■ **Add Device Formula**: Click the plus icon to display the Add Formula page so you can create a formula for this device.  ■ **Add Device Group Formula**: Click the plus with lines icon to the display the Add Device Group Formula page so you can create a formula that can be used by the devices in a specified device group. 

Display Options

Item	Description
Input Name	Enter a descriptive name for in the input source. The name should be unique.
[ON Label]	Enter a label that describes the "on" state of the input pin and displays instead of the "on" **Polarity** option (1 or 0). This label displays on the Digi Axess pages and graphs. This label works with the **[OFF] Label**. For example, the **[ON]** and **[OFF]** labels could say HIGH and LOW, or ON and OFF.
[OFF Label]	Enter a label that describes the "off" state of the input pin and displays instead of the "off" **Polarity** option (1 or 0). This label displays on the Digi Axess pages and graphs. This label works with the **[ON] Label**. For example, the **[ON]** and **[OFF]** labels could say HIGH and LOW, or ON and OFF.
Display Group	Select a display group in which this input source will be included. A display group is used to group similar devices together for easy comparison. The options in the **Display Group** list box are defined in the Dashboard Settings page. If you choose **Disabled**, the input source is not included in a display group.
Display	Select the label(s) for this input source that should display within Digi Axess.

Item	Description
Value	▪ **Input Source**: Display only the **Input Name** label entered in the **Display Options** section. ▪ **Threshold Alert**: Display only the **Threshold Alert** label entered in the **Thresholds** section. The **Threshold Alert** label is available only if a threshold has been configured and then applied to this device. ▪ **Both**: Display both the **Input Name** label and the **Threshold Alert** label.
Indicator Type	Specify whether the status of an alarm should display as a colored dot on the Device Summary page and the Automation Dashboard. ▪ **None**: The colored dot displays in gray. ▪ **LED**: The colored dot displays the color configured in the **Alarm State** list box.

6. You can configure a threshold for the on and off states of the input pin, if needed. When a threshold is enabled and the threshold value is met, an LED button that displays next to the **[ON] Label** or **[OFF] Label** changes to the color selected from the **Alarm State** list box.

Alarms/Programs: OFF State Alarms

Item	Description
Alarm	You can enable a threshold alarm for when the input pin changes to the **[OFF] State** by selecting a notification group from the **Off State Alarm** list box. When a threshold is enabled and the **Off State Threshold Alert** value is met, an LED button that displays next to the **[OFF] Label** changes to the color selected from the **Off State Alarm State** list box.
Threshold Alert	Enter an **Off State Threshold Value** that is compared to the input source value. If the value of the input pin matches the threshold value, a colored alarm dot displays within Digi Axess. The color is determined by the **Off State Alarm State** option.
Alarm State	Select a color for the colored dot that displays next to the **[OFF] Label** in Digi Axess pages when the **Off State Threshold Alert** value is met. ▪ **None**: The dot is gray. ▪ **Green** ▪ **Yellow** ▪ **Red**: The red dot blinks. ▪ **Blue**

Alarms/Programs: ON State Alarms

Item	Description
Alarm	You can enable a threshold alarm for when the input pin changes to the **[ON] State** by selecting a notification group from the **On State Alarm** list box. When a threshold is enabled and the **On State Threshold Alert** value is met, an LED button that displays next to the **[ON] Label** changes to the color selected from the **On State Alarm State** list box.
Threshold Alert	Enter a **Threshold Value** that is compared to the input source value. If the value of the input pin matches the threshold value, a colored alarm dot displays within Digi Axess. The color is determined by the **On State Alarm State** option.
Alarm State	Select a color for the dot button that displays next to the **[ON] Label** in Digi Axess pages when the **On State Threshold Alert** value is met. ▪ **None**: The dot is gray. ▪ **Green** ▪ **Yellow** ▪ **Red**: The red dot blinks. ▪ **Blue**

7. Click **Enable**. A confirmation dialog displays.
8. Click **OK**. Click **Back** to return to the **Input Configuration** page.

Configure a numeric input pin on a Connect Sensor XRT-M

You can configure an input pin for numeric data.

1. Access the device's web UI from the Device Summary page.
2. Navigate to the **Input Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.
   c. Click **Inputs**. The **Input Configuration** page displays.
3. In the **Input Type** column, click on a **Disabled** button.

   Note An input pin with an input type other than **Disabled** has already been configured and can be updated.

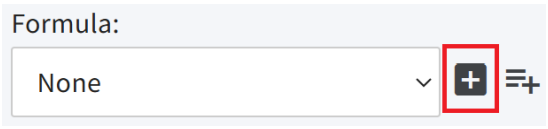
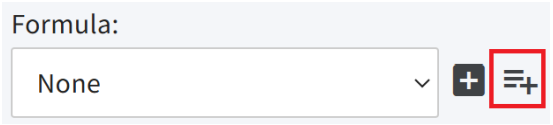
4. At the top of the page, click **Numeric**.
5. Configure the settings as described in the tables below.

   Numeric Input Source

Item	Description
Input Source	Select an input source option. ▪ **Configured Inputs**: Select an input pin.

Item	Description
	■ **Configured Outputs:** Select an output pin. ■ **System Variables**: Select a standard data option.

General Pin Options

Item	Description
Formula	(Optional) Select an existing formula from the **Formula** list box. When data is received from the input source, the formula is run, and the result is the output value for this source. You can create a formula from this page if needed. ■ **Add Device Formula**: Click the plus icon to display the Add Formula page so you can create a formula for this device.  ■ **Add Device Group Formula**: Click the plus with lines icon to the display the Add Device Group Formula page so you can create a formula that can be used by the devices in a specified device group. 
Min Units and **Max Units**	(Optional) Specify the minimum and maximum units range. These unit numbers are only used when you have selected the Standard Conversion formula from the **Formula** list box.

Display Options

Item	Description
Input Name	Enter a descriptive name for in the input source. The name should be unique.
Unit of Measure	Enter the unit of measurement that describes what you are measuring, such as height, volume, or pressure. This is a label that displays in Digi Axess.
Decimal Scale	Select a decimal option from the list box that determines the number of decimal points to display when the numeric output displays in Digi Axess. The number is truncated to the selected decimal option and not rounded. The default is **2 digits**.

Item	Description
Display Group	Select a display group in which this input source will be included. A display group is used to group similar devices together for easy comparison. The options in the **Display Group** list box are defined in the Dashboard Settings page. If you choose **Disabled**, the input source is not included in a display group.
Display Value	Select the label(s) for this input source that should display within Digi Axess. ■ **Input Source**: Display only the **Input Name** label entered in the **Display Options** section. ■ **Threshold Alert**: Display only the **Threshold Alert** label entered in the **Thresholds** section. The **Threshold Alert** label is available only if a threshold has been configured and then applied to this device. ■ **Both**: Display both the **Input Name** label and the **Threshold Alert** label.
Gauge Type	Select how the data from the input source should be graphically displayed within Digi Axess. ■ **None**: Do not graphically display the data. ■ **Linear Gauge**: Display the data in a vertical bar. ■ **Radial Gauge**: Display the data in a curved bar. ■ **Tank Gauge**: Display the data in a wide vertical bar.

6. Specify threshold alarms. When an alarm threshold is met, an alarm notification is sent to the specified notification group. You can create more than one threshold for an input source. A new threshold can be placed before or after an existing one, and the thresholds are numbered sequentially.

   Thresholds section

Item	Description
Threshold xx (where **xx** is the threshold number)	From the **Threshold xx** list box, select a comparison option. This is used to compare a value from the input source data to the defined **Trigger Value** and **Reset Value**. Note If **Disabled** is selected, this threshold alarm is not used.
Trigger Value	Enter a **Trigger Value** that is compared to the input source value. Depending on how the threshold is configured, the following actions may occur. ■ If the comparison condition selected from the **Threshold** list box is met, an alarm notification is logged. ■ **Send Alarm**: If a notification group was selected for **Send Alarm**, an alarm notification is sent to the users in that group. ■ **Alarm State**: If an **Alarm State** other than **None** is selected, a

Item	Description
	colored alarm LED button displays within Digi Axess.
Reset Value	Enter a **Reset Value** that is compared to the input source value. When the reset value is met, the colored dot changes to gray.
Send Alarm	Specify whether you to send an alarm to the users in a notification group when the **Trigger Value** is met. ■ Send an alarm notification: Select a notification group from the list box. ■ Do not send an alarm notification: Select **No Alarms** from the list box.
Threshold Alert	Enter a descriptive name for the alert. This label displays within Digi Axess.
Alarm State	Select a color for the colored dot that displays next to the **Threshold Alert** label. ■ **None**: The dot is gray. ■ **Green** ■ **Yellow** ■ **Red**: The red dot blinks. ■ **Blue**
Options	From the list box, you can choose to add another threshold alarm or delete an existing one. The threshold alarms are renumbered to be consecutive. ■ **Add Below**: Add a threshold alarm after the selected alarm. The threshold alarms are renumbered to be consecutive. ■ **Add Above**: Add a threshold alarm before the selected alarm. ■ **Delete**: Delete the selected threshold alarm.

7. Click **Enable**. A confirmation dialog displays.
8. Click **OK**. Click **Back** to return to the **Input Configuration** page.

Configure a hex input pin on a Connect Sensor XRT-M

You can configure an input source for hex data.

1. Access the device's web UI from the Device Summary page.
2. Navigate to the **Input Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.
   c. Click **Inputs**. The **Input Configuration** page displays.
3. In the **Input Type** column, click on a **Disabled** button.

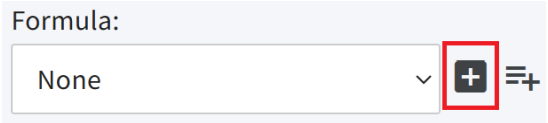
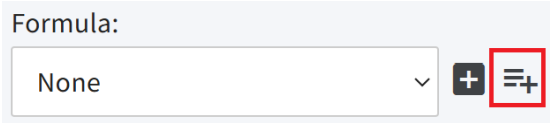
Note An input pin with an input type other than **Disabled** has already been configured and can be updated.

4. At the top of the page, click **Hex**.
5. Configure the settings as described in the tables below.

Hex Input Source

Item	Description
Input Source	Select an input source option. ■ **Configured Inputs**: Select an input pin. ■ **Configured Outputs:** Select an output pin. ■ **System Variables**: Select a standard data option. ■ **Industrial Protocols**

General Pin Options

Item	Description
Formula	(Optional) Select an existing formula from the **Formula** list box. When data is received from the input source, the formula is run, and the result is the output value for this source. You can create a formula from this page if needed. ■ **Add Device Formula**: Click the plus icon to display the Add Formula page so you can create a formula for this device.  ■ **Add Device Group Formula**: Click the plus with lines icon to the display the Add Device Group Formula page so you can create a formula that can be used by the devices in a specified device group. 

Display Options

Item	Description
Input	Enter a descriptive name for in the input source. The name should be unique.

Item	Description
Name	
Unit of Measure	Enter the unit of measurement that describes what you are measuring, such as height, volume, or pressure. This is a label that displays in Digi Axess.
Display Group	Select a display group in which this input source will be included. A display group is used to group similar devices together for easy comparison. The options in the **Display Group** list box are defined in the Dashboard Settings page. If you choose **Disabled**, the input source is not included in a display group.
Display Value	Select the label(s) for this input source that should display within Digi Axess. ▪ **Input Source**: Display only the **Input Name** label entered in the **Display Options** section. ▪ **Threshold Alert**: Display only the **Threshold Alert** label entered in the **Thresholds** section. The **Threshold Alert** label is available only if a threshold has been configured and then applied to this device. ▪ **Both**: Display both the **Input Name** label and the **Threshold Alert** label.
Indicator Type	Specify whether the status of an alarm should display as a colored dot on the Device Summary page and the Automation Dashboard. ▪ **None**: The colored dot displays in gray. ▪ **LED**: The colored dot displays the color configured in the **Alarm State** list box.

6. Specify threshold alarms. When an alarm threshold is met, an alarm notification is sent to the specified notification group. You can create more than one threshold for an input source. A new threshold can be placed before or after an existing one, and the thresholds are numbered sequentially.

   Thresholds section

Item	Description
Threshold xx (where **xx** is the threshold number)	From the **Threshold xx** list box, select a comparison option. This is used to compare a value from the input source data to the defined **Trigger Value** and **Reset Value**. Note If **Disabled** is selected, this threshold alarm is not used.
Trigger Value	Enter a **Trigger Value** that is compared to the input source value. Depending on how the threshold is configured, the following actions may occur. ▪ If the comparison condition selected from the **Threshold** list box is met, an alarm notification is logged.

Item	Description
	■ **Send Alarm**: If a notification group was selected for **Send Alarm**, an alarm notification is sent to the users in that group. ■ **Alarm State**: If an **Alarm State** other than **None** is selected, a colored alarm LED button displays within Digi Axess.
Mask Value	Enter a hexadecimal (hex) mask value that is compared to the input source value. Depending on how the threshold is configured, the following actions may occur. ■ If the comparison condition selected from the **Threshold** list box is met, an alarm notification is logged. ■ **Send Alarm**: If a notification group was selected for **Send Alarm**, an alarm notification is sent to the users in that group. ■ **Alarm State**: If an **Alarm State** other than **None** is selected, a colored alarm LED button displays within Digi Axess.
Send Alarm	Specify whether you to send an alarm to the users in a notification group when the **Trigger Value** is met. ■ Send an alarm notification: Select a notification group from the list box. ■ Do not send an alarm notification: Select **No Alarms** from the list box.
Threshold Alert	Enter a descriptive name for the alert. This label displays within Digi Axess.
Alarm State	Select a color for the colored dot that displays next to the **Threshold Alert** label. ■ **None**: The dot is gray. ■ **Green** ■ **Yellow** ■ **Red**: The red dot blinks. ■ **Blue**
Options	From the list box, you can choose to add another threshold alarm or delete an existing one. The threshold alarms are renumbered to be consecutive. ■ **Add Below**: Add a threshold alarm after the selected alarm. The threshold alarms are renumbered to be consecutive. ■ **Add Above**: Add a threshold alarm before the selected alarm. ■ **Delete**: Delete the selected threshold alarm.

7. Click **Enable**. A confirmation dialog displays.
8. Click **OK**. Click **Back** to return to the **Input Configuration** page.

Update a configured input pin on a Connect Sensor XRT-M

You can change an input pin that has been configured.

1. Access the device's web UI from the Device Summary page.
2. Navigate to the **Input Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.
   c. Click **Inputs**. The **Input Configuration** page displays.
3. In the **Input Type** column, click on the type for pin that has been configured: **Numeric**, **Digital**, or **Hex**. The **Input Pin X Configuration** page displays, where **X** is the input pin number.

   Note An input pin with the **Disabled** input type has not been configured and can be configured. See Configure input pins on the Connect Sensor XRT-M.

4. Configure the input pin, as desired, for the selected input type. For detailed information about each input type, see:
   - Configure a numeric input pin on a Connect Sensor XRT-M
   - Configure a digital input pin on a Connect Sensor XRT-M
   - Configure a hex input pin on a Connect Sensor XRT-M
5. When changes are complete, click **Update**. A confirmation dialog displays.
6. Click **OK** to save your changes.

Configure output pins on a Connect Sensor XRT-M

You can configure the output pins on the device and use the data collected from the pin in automation control formulas. Each output pin can be configured for one of the following types: **Numeric**, **Digital**, or **Hex**.

Configure a digital output pin on a Connect Sensor XRT-M

You can configure an output pin for digital data.

1. Access the device's web UI from the Device Summary page.
2. Navigate to the **Output Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.
   c. Click **Outputs**. The **Output Configuration** page displays.
3. In the **Output Type** column, click on a **Disabled** button.

   Note An output pin with an output type other than **Disabled** has already been configured and can be updated.

4. At the top of the page, click **Digital**.
5. From the **Destination** list box, select the output pin.
6. Configure the settings as described in the tables below.

General Pin Options

Item	Description
State	Select the status for the output pin. The selected status displays until the output value has been calculated. ■ **On**: Set the output pin status on. ■ **Off**: Set the output pin status off. This is the default.
On Program	When the output pin is in the **On** state, the selected program runs. Click the **Add Program** icon next to the field to add a program.
Off Program	When the output pin is in the **Off** state, the selected program runs. Click the **Add Program** icon next to the field to add a program.

Display Options

Item	Description
Output Name	Enter a descriptive name for the output source. The name should be unique.
Display Group	Select a display group in which this output source will be included. A display group is used to group similar devices together for easy comparison. The options in the **Display Group** list box are defined in the Dashboard Settings page. If you choose **Disabled**, the output source is not included in a display group.
[ON Label]	Enter a label that describes the "on" state of the output pin. This label displays on the Digi Axess pages and graphs. This label works with the **[OFF] Label**. For example, the **[ON]** and **[OFF]** labels could say HIGH and LOW, or ON and OFF.
[OFF Label]	Enter a label that describes the "off" state of the output pin. This label displays on the Digi Axess pages and graphs. This label works with the **[ON] Label**. For example, the **[ON]** and **[OFF]** labels could say HIGH and LOW, or ON and OFF.
[ON] Indicator	Specify whether an indicator for the **[ON]** status of the output should display. The status displays as a colored dot on the Device Summary page and the Automation Dashboard. ■ **No color**: A colored indicator does not display. ■ **Red**, **Green**, **Yellow**, or **Blue**: Choose a color that is meaningful to your organization to represent the [ON] status.
[OFF] Indicator	Specify whether an indicator for the **[OFF]** status of the output should display. The status displays as a colored dot on the Device Summary page and the Automation Dashboard.

7. Click **Enable**. A confirmation dialog displays.

8. Click **OK**. Click **Back** to return to the **Output Configuration** page.

Configure a numeric output pin on a Connect Sensor XRT-M

You can configure an output source for numeric data.

1. Access the device's web UI from the Device Summary page.
2. Navigate to the **Output Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.
   c. Click **Outputs**. The **Output Configuration** page displays.
3. In the **Output Type** column, click on a **Disabled** button.

   Note An output pin with an output type other than **Disabled** has already been configured and can be updated.

4. At the top of the page, click **Numeric**.
5. From the **Destination** list box, select the output pin.
6. Configure the settings as described in the tables below.

   General Pin Options

Item	Description
Current Value	Set a value for a variable that can be used in a formula. For example, if your formula needs the value of the height of a tank, and the default height is 5 feet, then enter 5.
Min Value **Max Value**	(Optional) Specify the acceptable minimum and maximum value range for the **Current Value**. This ensures that the output is inside an acceptable range.
Program	Run the selected program. Click the **Add Program** icon next to the field to add a program.

   Display Options

Item	Description
Output Name	Enter a descriptive name for the output source. The name should be unique.
Display Group	Select a display group in which this output source will be included. A display group is used to group similar devices together for easy comparison. The options in the **Display Group** list box are defined in the Dashboard Settings page. If you choose **Disabled**, the output source is not included in a display group.
Unit of	Enter the unit of measurement that describes what you are measuring, such as

Item	Description
Measure	height, volume, or pressure. This is a label that displays in Digi Axess.
Decimal Scale	Select a decimal option from the list box that determines the number of decimal points to display when the numeric output displays in Digi Axess. The number is truncated to the selected decimal option and is not rounded. The default is **2 digits**.
Gauge Type	Select how the data from the input source should be graphically displayed within Digi Axess. ■ **None**: Do not graphically display the data. ■ **Linear Gauge**: Display the data in a vertical bar. ■ **Radial Gauge**: Display the data in a curved bar. ■ **Tank Gauge**: Display the data in a wide vertical bar.

7. Click **Enable**. A confirmation dialog displays.
8. Click **OK**. Click **Back** to return to the **Output Configuration** page.

Configure a hex output pin on a Connect Sensor XRT-M

You can configure an output source for hex data.

1. Access the device's web UI from the Device Summary page.
2. Navigate to the **Output Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.
   c. Click **Outputs**. The **Output Configuration** page displays.
3. In the **Output Type** column, click on a **Disabled** button.

   Note An output pin with an output type other than **Disabled** has already been configured and can be updated.

4. At the top of the page, click **Hex**.
5. From the **Destination** list box, select the output pin.
6. Configure the settings as described in the tables below.

   General Pin Options

Item	Description
Current Value	Set a value for a variable that can be used in a formula. For example, if your formula needs the value of the height of a tank, and the default height is 5 feet, then enter 5.
Program	Run the selected program. Click the **Add Program** icon next to the field to add a program.

   Display Options

Item	Description
Output Name	Enter a descriptive name for the output source. The name should be unique.
Display Group	Select a display group in which this output source will be included. A display group is used to group similar devices together for easy comparison. The options in the **Display Group** list box are defined in the Dashboard Settings page. If you choose **Disabled**, the output source is not included in a display group.
Unit of Measure	Enter the unit of measurement that describes what you are measuring, such as height, volume, or pressure. This is a label that displays in Digi Axess.

7. Click **Enable**. A confirmation dialog displays.
8. Click **OK**. Click **Back** to return to the **Output Configuration** page.

Update a configured output pin on a Connect Sensor XRT-M

You can change an output pin that has been configured.

1. Access the device's web UI from the Device Summary page.
2. Navigate to the **Output Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.
   c. Click **Outputs**. The **Output Configuration** page displays.
3. In the **Output Type** column, click on the type for pin that has been configured: **Numeric**, **Digital**, or **Hex**. The **Output Pin X Configuration** page displays, where **X** is the input pin number.

   Note An output pin with the **Disabled** output type has not been configured and can be configured. See Configure output pins on a Connect Sensor XRT-M.

4. Configure the output pin, as desired, for the selected output type. For detailed information about each input type, see:
   - Configure a digital output pin on a Connect Sensor XRT-M
   - Configure a numeric output pin on a Connect Sensor XRT-M
   - Configure a hex output pin on a Connect Sensor XRT-M
5. When changes are complete, click **Update**. A confirmation dialog displays.
6. Click **OK** to save your changes.

Configure input pins on the Z45 Controller

You can configure the input pins on the device and use the data collected from the pin in automation control formulas. Each input pin can be configured for one of the following types: **Numeric**, **Digital**, or **Hex**.

Configure a digital input pin on a Z45 Controller

You can configure an input pin for digital data.

1. Log into the Z45 Controller's web UI.
2. Navigate to the **Input Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.
   c. Click **Inputs**. The **Input Configuration** page displays.
3. In the **Input Type** column, click on a **Disabled** button.

   Note An input pin with an input type other than **Disabled** has already been configured and can be updated.

4. At the top of the page, click **Digital**.
5. Configure the settings as described in the tables below.

   Digital Input Source

Item	Description
Primary Source	Select an input source option. ■ **Configured Inputs**: Select an input pin. ■ **Configured Outputs:** Select an output pin. ■ **System Variables**: Select a standard data option. ■ **Onboard I/O**
Additional Modifiers	Use the **Additional Modifiers** to take the value you have coming in from the pin and combine it with multiple digital inputs or outputs, outside of a formula. ■ **Operation**: Select **AND** or **OR**. ■ **Source**: Select an input source.

   General Pin Options

Item	Description
Initial Value	Enter an initial value for the input pin. This value is used in formulas after you change the input pin configuration but before the Z45 Controller does a reading.
Polarity	Select the polarity for the input pin to specify which status option signifies "off". ■ **0**: 0 is off. ■ **1**: 1 is off.
Formula	(Optional) Select an existing formula from the **Formula** list box.

Item	Description
	When data is received from the input source, the formula is run, and the result is the output value for this source.

Logging Options

Item	Description
Log Rate (sec)	Specify how often the Z45 Controller should log a change to the value of the calculated formula. The log rate is measure in seconds. ■ **0**: Do not log any changes. ■ **1**: Signifies that every change is logged when it occurs, and is not dependent on a time interval. ■ **2**, **3**, ...: The time interval at which the value is logged.
MQTT Publish	Determine whether you want to publish the messages when the device connects to the broker. ■ **Off**: The current input does not publish an MQTT message. ■ **Auto**: The MQTT message is delivered using the topic structure defined by the device. For example, the device may use the MAC address to define the device: *<MAC Address>/input/1* where *<MAC Address>* is the MAC address for the device ■ **Defined Topic**: The MQTT message is delivered with a user-defined topic. When you choose this option, the **Topic** field displays, in which you can enter a topic name. The topic **Off** is entered by default.
MQTT Subscribe	Determine whether you want to subscribe to MQTT messages. ■ **Off**: The current input does not subscribe to an MQTT message. ■ **Auto**: The MQTT message is delivered using the topic structure defined by the device. This uses MAC address to define the device. For example, the device may use the MAC address to define the device: *<MAC Address>/input/1* where *<MAC Address>* is the MAC address for the device ■ **Defined Topic**: The MQTT message is delivered with a user-defined topic. When you choose this option, the **Topic** field displays, in which you can enter a topic name. The topic **Off** is entered by default.

Display Options

Item	Description
Input Name	Enter a descriptive name for in the input source. The name should be unique.
[ON Label]	Enter a label that describes the "on" state of the input pin and displays instead of the "on" **Polarity** option (1 or 0). This label displays on the Digi Axess pages and graphs. This label works with the **[OFF] Label**. For example, the **[ON]** and **[OFF]** labels could say HIGH and LOW, or ON and OFF.
[OFF Label]	Enter a label that describes the "off" state of the input pin and displays instead of the "off" **Polarity** option (1 or 0). This label displays on the Digi Axess pages and graphs. This label works with the **[ON] Label**. For example, the **[ON]** and **[OFF]** labels could say HIGH and LOW, or ON and OFF.
Display Value	Select the label(s) for this input source that should display within Digi Axess. ■ **Input Source**: Display only the **Input Name** label entered in the **Display Options** section. ■ **Threshold Alert**: Display only the **Threshold Alert** label entered in the **Thresholds** section. The **Threshold Alert** label is available only if a threshold has been configured and then applied to this device. ■ **Both**: Display both the **Input Name** label and the **Threshold Alert** label.
Indicator Type	Specify whether the status of an alarm should display as a colored dot on the Device Summary page and the Automation Dashboard. ■ **None**: The colored dot displays in gray. ■ **LED**: The colored dot displays the color configured in the **Alarm State** list box.
Local Display Group	From the **Local Display Group** list box, select a local display group in which the data from this output pin should be included. The group displays on the Automation Dashboard. The group displays locally and is in addition to what displays from the web UI. Options: ■ **00 - Off**: No local display group is selected to display. ■ **01 - {name}** to **24 - {name}**: Select a local display group in which the data from this pin should be displayed. See Configure the local and remote dashboard groups for information about naming and displaying the local display groups.

Remote Access Options

Item	Description
Remote	Select the name of the group that displays the result of a calculated formula on

Item	Description
Display Group	the Automation Dashboard. ■ **00 - Disabled**: A remote display group does not display. ■ **01 - {name}** through **24 - {name}**: Select a remote display group in which the data from this pin should be displayed. See Configure the local and remote dashboard groups for information about naming and displaying the remote display groups.
Remote Display Sources	Specify the platform(s) on which the user can view the group on the Automation Dashboard. ■ **Cloud Only**: The Z45 Controller web UI or Digi Axess. This is the default. ■ **Phone Only**: The Digi Axess Mobile app. ■ **Cloud/Phone**: The Z45 Controller web UI, Digi Axess, or the Digi Mobile application.
Remote Control	Specify whether users can change the value of an output from Digi Axess or the Digi Mobile app. ■ **Disabled**: Do not allow changes. This is the default. ■ **Enabled**: Changes are allowed.

6. You can configure a threshold for the on and off states of the input pin, if needed. When a threshold is enabled and the threshold value is met, an LED button that displays next to the **[ON] Label** or **[OFF] Label** changes to the color selected from the **Alarm State** list box.

   Alarms/Programs: OFF State Alarms

Item	Description
Alarm	You can enable a threshold alarm for when the input pin changes to the **[OFF] State** by selecting a notification group from the **Off State Alarm** list box. When a threshold is enabled and the **Off State Threshold Alert** value is met, an LED button that displays next to the **[OFF] Label** changes to the color selected from the **Off State Alarm State** list box.
Repeat	The number of times the alarm should be sent after the initial alarm is sent.
Interval (sec)	The time interval between the repeated alarms. The time is measured in seconds.
Threshold Alert	Enter an **Off State Threshold Value** that is compared to the input source value. If the value of the input pin matches the threshold value, a colored alarm dot displays within Digi Axess. The color is determined by the **Off State Alarm State** option.
Alarm State	Select a color for the colored dot that displays next to the **[OFF] Label** in Digi Axess pages when the **Off State Threshold Alert** value is met. ■ **None**: The dot is gray.

Item	Description
	■ **Green** ■ **Yellow** ■ **Red**: The red dot blinks. ■ **Blue**
Program	Select a program to run when the alarm threshold is met and an alarm is sent. ■ **00-Off**: No program is run. This is the default. ■ **Program list**: The program selected from the list of options runs when the alarm is sent.
Repeat	The number of times the alarm should be sent after the initial alarm is sent.
Interval (sec)	The time interval between the repeated alarms. The time is measured in seconds.

Alarms/Programs: ON State Alarms

Item	Description
Alarm	You can enable a threshold alarm for when the input pin changes to the **[ON] State** by selecting a notification group from the **On State Alarm** list box. When a threshold is enabled and the **On State Threshold Alert** value is met, an LED button that displays next to the **[ON] Label** changes to the color selected from the **On State Alarm State** list box.
Repeat	The number of times the alarm should be sent after the initial alarm is sent.
Interval (sec)	The time interval between the repeated alarms. The time is measured in seconds.
Threshold Alert	Enter a **Threshold Value** that is compared to the input source value. If the value of the input pin matches the threshold value, a colored alarm dot displays within Digi Axess. The color is determined by the **On State Alarm State** option.
Alarm State	Select a color for the dot button that displays next to the **[ON] Label** in Digi Axess pages when the **On State Threshold Alert** value is met. ■ **None**: The dot is gray. ■ **Green** ■ **Yellow** ■ **Red**: The red dot blinks. ■ **Blue**
Program	Select a program to run when the alarm threshold is met and an alarm is sent.

Item	Description
	■ **00-Off**: No program is run. This is the default. ■ **Program list**: The program selected from the list of options runs when the alarm is sent.
Repeat	The number of times the alarm should be sent after the initial alarm is sent.
Interval (sec)	The time interval between the repeated alarms. The time is measured in seconds.

7. Click **Enable**. A confirmation dialog displays.
8. Click **OK**. Click **Back** to return to the **Input Configuration** page.

Configure a numeric input pin on a Z45 Controller

You can configure an input pin for numeric data.

1. Log into the Z45 Controller's web UI.
2. Navigate to the **Input Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.
   c. Click **Inputs**. The **Input Configuration** page displays.
3. In the **Input Type** column, click on a **Disabled** button.

   Note An input pin with an input type other than **Disabled** has already been configured and can be updated.

4. At the top of the page, click **Numeric**.
5. Configure the settings as described in the tables below.

   Numeric Input Source

Item	Description
Input Source	Select an input source option. ■ **Configured Inputs**: Select an input pin. ■ **Configured Outputs:** Select an output pin. ■ **System Variables**: Select a standard data option.

   General Pin Options

Item	Description
Initial Value	Enter an initial value for the input pin. This value is used in formulas after you change the input pin configuration but before the Z45 Controller does a reading.

Item	Description
Initial Reference	Enter an initial reference value for the input pin. This value is used in formulas as a base value.
Formula	(Optional) Select an existing formula from the **Formula** list box. When data is received from the input source, the formula is run, and the result is the output value for this source.
Min Units and **Max Units**	(Optional) Specify the minimum and maximum units range. These unit numbers are only used when you have selected the Standard Conversion formula from the **Formula** list box.

Logging Options

Item	Description
Log Rate (sec)	Specify how often the Z45 Controller should log a change to the value of the calculated formula. The log rate is measure in seconds. ■ **0**: Do not log any changes. ■ **1**: Signifies that every change is logged when it occurs, and is not dependent on a time interval. ■ **2**, **3**, ...: The time interval at which the value is logged.
MQTT Publish	Determine whether you want to publish the messages when the device connects to the broker. ■ **Off**: The current input does not publish an MQTT message. ■ **Auto**: The MQTT message is delivered using the topic structure defined by the device. For example, the device may use the MAC address to define the device: *<MAC Address>/input/1* where *<MAC Address>* is the MAC address for the device ■ **Defined Topic**: The MQTT message is delivered with a user-defined topic. When you choose this option, the **Topic** field displays, in which you can enter a topic name. The topic **Off** is entered by default.
MQTT Subscribe	Determine whether you want to subscribe to MQTT messages. ■ **Off**: The current input does not subscribe to an MQTT message. ■ **Auto**: The MQTT message is delivered using the topic structure defined by the device. This uses MAC address to define the device. For example, the device may use the MAC address to define the device: *<MAC Address>/input/1* where *<MAC Address>* is the MAC address for the device ■ **Defined Topic**: The MQTT message is delivered with a user-

Item	Description
	defined topic. When you choose this option, the **Topic** field displays, in which you can enter a topic name. The topic **Off** is entered by default.

Display Options

Item	Description
Input Name	Enter a descriptive name for in the input source. The name should be unique.
Unit of Measure	Enter the unit of measurement that describes what you are measuring, such as height, volume, or pressure. This is a label that displays in Digi Axess.
Decimal Scale	Select a decimal option from the list box that determines the number of decimal points to display when the numeric output displays in Digi Axess. The number is truncated to the selected decimal option and not rounded. The default is **2 digits**.
Display Value	Select the label(s) for this input source that should display within Digi Axess. ■ **Input Source**: Display only the **Input Name** label entered in the **Display Options** section. ■ **Threshold Alert**: Display only the **Threshold Alert** label entered in the **Thresholds** section. The **Threshold Alert** label is available only if a threshold has been configured and then applied to this device. ■ **Both**: Display both the **Input Name** label and the **Threshold Alert** label.
Gauge Type	Select how the data from the input source should be graphically displayed within Digi Axess. ■ **None**: Do not graphically display the data. ■ **Linear Gauge**: Display the data in a vertical bar. ■ **Radial Gauge**: Display the data in a curved bar. ■ **Tank Gauge**: Display the data in a wide vertical bar.
Local Display Group	From the **Local Display Group** list box, select a local display group in which the data from this output pin should be included. The group displays on the Automation Dashboard. The group displays locally and is in addition to what displays from the web UI. Options: ■ **00 - Off**: No local display group is selected to display. ■ **01 - {name}** to **24 - {name}**: Select a local display group in which the data from this pin should be displayed. See Configure the local and remote dashboard groups for information about naming and displaying the local display groups.

Remote Access Options

Item	Description
Remote Display Group	Select the name of the group that displays the result of a calculated formula on the Automation Dashboard. ■ **00 - Disabled**: A remote display group does not display. ■ **01 - {name}** through **24 - {name}**: Select a remote display group in which the data from this pin should be displayed. See Configure the local and remote dashboard groups for information about naming and displaying the remote display groups.
Remote Display Sources	Specify the platform(s) on which the user can view the group on the Automation Dashboard. ■ **Cloud Only**: The Z45 Controller web UI or Digi Axess. This is the default. ■ **Phone Only**: The Digi Axess Mobile app. ■ **Cloud/Phone**: The Z45 Controller web UI, Digi Axess, or the Digi Mobile application.
Remote Control	Specify whether users can change the value of an output from Digi Axess or the Digi Mobile app. ■ **Disabled**: Do not allow changes. This is the default. ■ **Enabled**: Changes are allowed.

6. Specify threshold alarms. When an alarm threshold is met, an alarm notification is sent to the specified notification group. You can create more than one threshold for an input source. A new threshold can be placed before or after an existing one, and the thresholds are numbered sequentially.

   Thresholds section

Item	Description
Threshold xx (where **xx** is the threshold number)	From the **Threshold xx** list box, select a comparison option. This is used to compare a value from the input source data to the defined **Trigger Value** and **Reset Value**. Note If **Disabled** is selected, this threshold alarm is not used.
Trigger Value	Enter a **Trigger Value** that is compared to the input source value. Depending on how the threshold is configured, the following actions may occur. ■ If the comparison condition selected from the **Threshold** list box is met, an alarm notification is logged. ■ **Send Alarm**: If a notification group was selected for **Send Alarm**, an alarm notification is sent to the users in that group. ■ **Alarm State**: If an **Alarm State** other than **None** is selected, a colored alarm LED button displays within Digi Axess.

Item	Description
Reset Value	Enter a **Reset Value** that is compared to the input source value. When the reset value is met, the colored dot changes to gray.
Send Alarm	Specify whether you to send an alarm to the users in a notification group when the **Trigger Value** is met. ■ Send an alarm notification: Select a notification group from the list box. ■ Do not send an alarm notification: Select **No Alarms** from the list box.
Repeat	The number of times the alarm should be sent after the initial alarm is sent.
Interval (sec)	The time interval between the repeated alarms. The time is measured in seconds.
Threshold Alert	Enter a descriptive name for the alert. This label displays within Digi Axess.
Alarm State	Select a color for the colored dot that displays next to the **Threshold Alert** label. ■ **None**: The dot is gray. ■ **Green** ■ **Yellow** ■ **Red**: The red dot blinks. ■ **Blue**
Run Program	Select a program to run when the alarm threshold is met and an alarm is sent. ■ **00-Off**: No program is run. This is the default. ■ **Program list**: The program selected from the list of options runs when the alarm is sent.
Repeat	The number of times the alarm should be sent after the alarm threshold is met.
Interval (sec)	The time interval between the repeated alarms. The time is measured in seconds.
Options	From the list box, you can choose to add another threshold alarm or delete an existing one. The threshold alarms are renumbered to be consecutive. ■ **Add Below**: Add a threshold alarm after the selected alarm. The threshold alarms are renumbered to be consecutive. ■ **Add Above**: Add a threshold alarm before the selected alarm. ■ **Delete**: Delete the selected threshold alarm.

7. Click **Enable**. A confirmation dialog displays.

8. Click **OK**. Click **Back** to return to the **Input Configuration** page.

Configure a hex input pin on a Z45 Controller

You can configure an input source for hex data.

1. Log into the Z45 Controller's web UI.
2. Navigate to the **Input Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.
   c. Click **Inputs**. The **Input Configuration** page displays.
3. In the **Input Type** column, click on a **Disabled** button.

   Note An input pin with an input type other than **Disabled** has already been configured and can be updated.

4. At the top of the page, click **Hex**.
5. Configure the settings as described in the tables below.

Hex Input Source

Item	Description
Input Source	Select an input source option. ■ **Configured Inputs**: Select an input pin. ■ **Configured Outputs:** Select an output pin. ■ **System Variables**: Select a standard data option.

General Pin Options

Item	Description
Initial Value	Enter an initial value for the input pin. This value is used in formulas after you change the input pin configuration but before the Z45 Controller does a reading.
Initial Reference	Enter an initial reference value for the input pin. This value is used in formulas as a base value.
Formula	(Optional) Select an existing formula from the **Formula** list box. When data is received from the input source, the formula is run, and the result is the output value for this source.

Logging Options

Item	Description
Log Rate (sec)	Specify how often the Z45 Controller should log a change to the value of the calculated formula. The log rate is measure in seconds. ■ **0**: Do not log any changes. ■ **1**: Signifies that every change is logged when it occurs, and is not dependent on a time interval. ■ **2**, **3**, ...: The time interval at which the value is logged.
MQTT Publish	Determine whether you want to publish the messages when the device connects to the broker. ■ **Off**: The current input does not publish an MQTT message. ■ **Auto**: The MQTT message is delivered using the topic structure defined by the device. For example, the device may use the MAC address to define the device: *<MAC Address>/input/1* where *<MAC Address>* is the MAC address for the device ■ **Defined Topic**: The MQTT message is delivered with a user-defined topic. When you choose this option, the **Topic** field displays, in which you can enter a topic name. The topic **Off** is entered by default.
MQTT Subscribe	Determine whether you want to subscribe to MQTT messages. ■ **Off**: The current input does not subscribe to an MQTT message. ■ **Auto**: The MQTT message is delivered using the topic structure defined by the device. This uses MAC address to define the device. For example, the device may use the MAC address to define the device: *<MAC Address>/input/1* where *<MAC Address>* is the MAC address for the device ■ **Defined Topic**: The MQTT message is delivered with a user-defined topic. When you choose this option, the **Topic** field displays, in which you can enter a topic name. The topic **Off** is entered by default.

Display Options

Item	Description
Input Name	Enter a descriptive name for in the input source. The name should be unique.
Unit of Measure	Enter the unit of measurement that describes what you are measuring, such as height, volume, or pressure. This is a label that displays in Digi Axess.
Display	Select the label(s) for this input source that should display within Digi Axess.

Item	Description
Value	▪ **Input Source**: Display only the **Input Name** label entered in the **Display Options** section. ▪ **Threshold Alert**: Display only the **Threshold Alert** label entered in the **Thresholds** section. The **Threshold Alert** label is available only if a threshold has been configured and then applied to this device. ▪ **Both**: Display both the **Input Name** label and the **Threshold Alert** label.
Indicator Type	Specify whether the status of an alarm should display as a colored dot on the Device Summary page and the Automation Dashboard. ▪ **None**: The colored dot displays in gray. ▪ **LED**: The colored dot displays the color configured in the **Alarm State** list box.
Local Display Group	From the **Local Display Group** list box, select a local display group in which the data from this output pin should be included. The group displays on the Automation Dashboard. The group displays locally and is in addition to what displays from the web UI. Options: ▪ **00 - Off**: No local display group is selected to display. ▪ **01 - {name}** to **24 - {name}**: Select a local display group in which the data from this pin should be displayed. See Configure the local and remote dashboard groups for information about naming and displaying the local display groups.

Remote Access Options

Item	Description
Remote Display Group	Select the name of the group that displays the result of a calculated formula on the Automation Dashboard. ▪ **00 - Disabled**: A remote display group does not display. ▪ **01 - {name}** through **24 - {name}**: Select a remote display group in which the data from this pin should be displayed. See Configure the local and remote dashboard groups for information about naming and displaying the remote display groups.
Remote Display Sources	Specify the platform(s) on which the user can view the group on the Automation Dashboard. ▪ **Cloud Only**: The Z45 Controller web UI or Digi Axess. This is the default. ▪ **Phone Only**: The Digi Axess Mobile app. ▪ **Cloud/Phone**: The Z45 Controller web UI, Digi Axess, or the Digi Mobile application.
Remote	Specify whether users can change the value of an output from Digi Axess or the

Item	Description
Control	Digi Mobile app. ■ **Disabled**: Do not allow changes. This is the default. ■ **Enabled**: Changes are allowed.

6. Specify threshold alarms. When an alarm threshold is met, an alarm notification is sent to the specified notification group. You can create more than one threshold for an input source. A new threshold can be placed before or after an existing one, and the thresholds are numbered sequentially.

Thresholds section

Item	Description
Threshold xx (where **xx** is the threshold number)	From the **Threshold xx** list box, select a comparison option. This is used to compare a value from the input source data to the defined **Trigger Value** and **Reset Value**. Note If **Disabled** is selected, this threshold alarm is not used.
Trigger Value	Enter a **Trigger Value** that is compared to the input source value. Depending on how the threshold is configured, the following actions may occur. ■ If the comparison condition selected from the **Threshold** list box is met, an alarm notification is logged. ■ **Send Alarm**: If a notification group was selected for **Send Alarm**, an alarm notification is sent to the users in that group. ■ **Alarm State**: If an **Alarm State** other than **None** is selected, a colored alarm LED button displays within Digi Axess.
Mask Value	Enter a hexadecimal (hex) mask value that is compared to the input source value. Depending on how the threshold is configured, the following actions may occur. ■ If the comparison condition selected from the **Threshold** list box is met, an alarm notification is logged. ■ **Send Alarm**: If a notification group was selected for **Send Alarm**, an alarm notification is sent to the users in that group. ■ **Alarm State**: If an **Alarm State** other than **None** is selected, a colored alarm LED button displays within Digi Axess.
Send Alarm	Specify whether you to send an alarm to the users in a notification group when the **Trigger Value** is met. ■ Send an alarm notification: Select a notification group from the list box. ■ Do not send an alarm notification: Select **No Alarms** from the list

Item	Description
	box.
Repeat	The number of times the alarm should be sent after the initial alarm is sent.
Interval (sec)	The time interval between the repeated alarms. The time is measured in seconds.
Threshold Alert	Enter a descriptive name for the alert. This label displays within Digi Axess.
Alarm State	Select a color for the colored dot that displays next to the **Threshold Alert** label. ■ **None**: The dot is gray. ■ **Green** ■ **Yellow** ■ **Red**: The red dot blinks. ■ **Blue**
Run Program	Select a program to run when the alarm threshold is met and an alarm is sent. ■ **00-Off**: No program is run. This is the default. ■ **Program list**: The program selected from the list of options runs when the alarm is sent.
Repeat	The number of times the alarm should be sent after the alarm threshold is met.
Interval (sec)	The time interval between the repeated alarms. The time is measured in seconds.
Options	From the list box, you can choose to add another threshold alarm or delete an existing one. The threshold alarms are renumbered to be consecutive. ■ **Add Below**: Add a threshold alarm after the selected alarm. The threshold alarms are renumbered to be consecutive. ■ **Add Above**: Add a threshold alarm before the selected alarm. ■ **Delete**: Delete the selected threshold alarm.

7. Click **Enable**. A confirmation dialog displays.
8. Click **OK**. Click **Back** to return to the **Input Configuration** page.

Update a configured input pin on a Z45 Controller

You can change an input pin that has been configured.

1. Log into the Z45 Controller's web UI.
2. Navigate to the **Input Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.

c. Click **Inputs**. The **Input Configuration** page displays.

3. In the **Input Type** column, click on the type for pin that has been configured: **Numeric**, **Digital**, or **Hex**. The **Input Pin X Configuration** page displays, where **X** is the input pin number.

> **Note** An input pin with the **Disabled** input type has not been configured and can be configured.

4. Configure the input pin, as desired, for the selected input type. For detailed information about each input type, see:
   - Configure a numeric input pin on a Z45 Controller
   - Configure a digital input pin on a Z45 Controller
   - Configure a hex input pin on a Z45 Controller
5. When changes are complete, click **Update**. A confirmation dialog displays.
6. Click **OK** to save your changes.

Configure output pins on a Z45 Controller

You can configure the output pins on the device and use the data collected from the pin in automation control formulas. Each output pin can be configured for one of the following types: **Numeric**, **Digital**, or **Hex**.

Configure a digital output pin on a Z45 Controller

You can configure an output pin for digital data.

1. Log into the Z45 Controller's web UI.
2. Navigate to the **Output Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.
   c. Click **Outputs**. The **Output Configuration** page displays.
3. In the **Output Type** column, click on a **Disabled** button.

> **Note** An output pin with an output type other than **Disabled** has already been configured and can be updated.

4. At the top of the page, click **Digital**.
5. Configure the settings as described in the tables below.

Digital Output Destination

Item	Description
Destination	Select a destination option for the calculated output value. ■ **Digital Output x**: Virtual output pin. The number in the option corresponds to the output pin number. this is the default.

Item	Description
	■ **Onboard Digital 1**: Physical output pin. ■ **Onboard Digital 2**: Physical output pin ■ **Set Low Power**: Sets the Z45 Controller in low power mode. ■ **TWIG Protocol**: Select if you are using this protocol.

General Pin Options

Item	Description
Initial Value	Select an initial value for the output pin. This value is used until an output value has been calculated. ■ **Last**: The last calculated output value. ■ **Off**: Set the initial value to **0** (**Off**). ■ **On**: Set the initial value to **1** (**On**). ■ **Actual Value**: Recalculate the output value given the updated settings.
State	Select the status for the output pin. The selected status displays until the output value has been calculated. ■ **On**: Set the output pin status on. ■ **Off**: Set the output pin status off. This is the default.
Shutoff Timer	This is used in conjunction with the **State** list box if the **On** option is selected. Enter a time interval in the **Shutoff Timer** field that determines when the option in the **State** list box changes from **On** to **Off**. Options: ■ **0**: No change occurs. ■ **Number greater than 0**: Enter a time interval greater than 0. When the time interval is met the **State** list box changes from **On** to **Off**. The time is measured in seconds.
On Program	When the output pin is in the **On** state, the selected program runs. Click the **Add Program** icon next to the field to add a program.
Off Program	When the output pin is in the **Off** state, the selected program runs. Click the **Add Program** icon next to the field to add a program.

Logging Options

Item	Description
Log	Determine whether you want to log change events the occurred on the output pin. The changes are logged to the device.

Item	Description
	■ **Disable**: Changes are not logged. This is the default. ■ **Enable**: Changes are logged.
MQTT Publish	Determine whether you want to publish the messages when the device connects to the broker. ■ **Off**: The current input does not publish an MQTT message. ■ **Auto**: The MQTT message is delivered using the topic structure defined by the device. For example, the device may use the MAC address to define the device: *<MAC Address>/input/1* where *<MAC Address>* is the MAC address for the device ■ **Defined Topic**: The MQTT message is delivered with a user-defined topic. When you choose this option, the **Topic** field displays, in which you can enter a topic name. The topic **Off** is entered by default.
MQTT Subscribe	Determine whether you want to subscribe to MQTT messages. ■ **Off**: The current input does not subscribe to an MQTT message. ■ **Auto**: The MQTT message is delivered using the topic structure defined by the device. This uses MAC address to define the device. For example, the device may use the MAC address to define the device: *<MAC Address>/input/1* where *<MAC Address>* is the MAC address for the device ■ **Defined Topic**: The MQTT message is delivered with a user-defined topic. When you choose this option, the **Topic** field displays, in which you can enter a topic name. The topic **Off** is entered by default.

Display Options

Item	Description
Output Name	Enter a descriptive name for the output source. The name should be unique.
[ON Label]	Enter a label that describes the "on" state of the output pin. This label displays on the Digi Axess pages and graphs. This label works with the **[OFF] Label**. For example, the **[ON]** and **[OFF]** labels could say HIGH and LOW, or ON and OFF.
[OFF Label]	Enter a label that describes the "off" state of the output pin. This label displays on the Digi Axess pages and graphs. This label works with the **[ON] Label**.

Item	Description
	For example, the **[ON]** and **[OFF]** labels could say HIGH and LOW, or ON and OFF.
[ON] Indicator	Specify whether an indicator for the **[ON]** status of the output should display. The status displays as a colored dot on the Device Summary page and the Automation Dashboard. ■ **No color**: A colored indicator does not display. ■ **Red**, **Green**, **Yellow**, or **Blue**: Choose a color that is meaningful to your organization to represent the [ON] status.
[OFF] Indicator	Specify whether an indicator for the **[OFF]** status of the output should display. The status displays as a colored dot on the Device Summary page and the Automation Dashboard. ■ **No color**: A colored indicator does not display. ■ **Red**, **Green**, **Yellow**, or **Blue**: Choose a color that is meaningful to your organization to represent the **[OFF]** status.
Scheduler	Determines the status of the **Scheduler**. ■ **Disabled**: The scheduler is disabled. This is the default. ■ **Enabled**: The scheduler is enabled.
Local Display Group	From the **Local Display Group** list box, select a local display group in which the data from this output pin should be included. The group displays on the Automation Dashboard. The group displays locally and is in addition to what displays from the web UI. Options: ■ **00 - Off**: No local display group is selected to display. ■ **01 - {name}** to **24 - {name}**: Select a local display group in which the data from this pin should be displayed. See Configure the local and remote dashboard groups for information about naming and displaying the local display groups.

Remote Access Options

Item	Description
Remote Display Group	Select the name of the group that displays the result of a calculated formula on the Automation Dashboard. ■ **00 - Disabled**: A remote display group does not display. ■ **01 - {name}** through **24 - {name}**: Select a remote display group in which the data from this pin should be displayed. See Configure the local and remote dashboard groups for information about naming and displaying the remote display groups.

Item	Description
Remote Display Sources	Specify the platform(s) on which the user can view the group on the Automation Dashboard. ■ **Cloud Only**: The Z45 Controller web UI or Digi Axess. This is the default. ■ **Phone Only**: The Digi Axess Mobile app. ■ **Cloud/Phone**: The Z45 Controller web UI, Digi Axess, or the Digi Mobile application.
Remote Control	Specify whether users can change the value of an output from Digi Axess or the Digi Mobile app. ■ **Disabled**: Do not allow changes. This is the default. ■ **Enabled**: Changes are allowed.

6. Click **Enable**. A confirmation dialog displays.
7. Click **OK**. Click **Back** to return to the **Output Configuration** page.

Configure a numeric output pin on a Z45 Controller

You can configure an output source for numeric data.

1. Log into the Z45 Controller's web UI.
2. Navigate to the **Output Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.
   c. Click **Outputs**. The **Output Configuration** page displays.
3. In the **Output Type** column, click on a **Disabled** button.

   Note An output pin with an output type other than **Disabled** has already been configured and can be updated.

4. At the top of the page, click **Numeric**.
5. Configure the settings as described in the tables below.

   Digital Output Destination

Item	Description
Destination	Select a destination option for the calculated output value. ■ **Numeric Output x**: Virtual output pin. The number in the option corresponds to the output pin number. this is the default. ■ **SDI-12 Protocol**: Select if you are using this protocol.

   General Pin Options

Item	Description
Initial Value	Select an initial value for the output pin. This value is used until an output value has been calculated. ■ **Last**: The last calculated output value. ■ **Off**: Set the initial value to **0** (**Off**). ■ **On**: Set the initial value to **1** (**On**). ■ **Actual Value**: Recalculate the output value given the updated settings.
Current Value	Set a value for a variable that can be used in a formula. For example, if your formula needs the value of the height of a tank, and the default height is 5 feet, then enter 5.
Min Value **Max Value**	(Optional) Specify the acceptable minimum and maximum value range for the **Current Value**. This ensures that the output is inside an acceptable range.
Program	Run the selected program. Click the **Add Program** icon next to the field to add a program.

Logging Options

Item	Description
Log	Determine whether you want to log change events the occurred on the output pin. The changes are logged to the device. ■ **Disable**: Changes are not logged. This is the default. ■ **Enable**: Changes are logged.
MQTT Publish	Determine whether you want to publish the messages when the device connects to the broker. ■ **Off**: The current input does not publish an MQTT message. ■ **Auto**: The MQTT message is delivered using the topic structure defined by the device. For example, the device may use the MAC address to define the device: *<MAC Address>/input/1* where *<MAC Address>* is the MAC address for the device ■ **Defined Topic**: The MQTT message is delivered with a user-defined topic. When you choose this option, the **Topic** field displays, in which you can enter a topic name. The topic **Off** is entered by default.
MQTT Subscribe	Determine whether you want to subscribe to MQTT messages. ■ **Off**: The current input does not subscribe to an MQTT message. ■ **Auto**: The MQTT message is delivered using the topic structure defined by the device. This uses MAC address to define the

Item	Description
	device. For example, the device may use the MAC address to define the device: *<MAC Address>/input/1* where *<MAC Address>* is the MAC address for the device ■ **Defined Topic**: The MQTT message is delivered with a user-defined topic. When you choose this option, the **Topic** field displays, in which you can enter a topic name. The topic **Off** is entered by default.

Display Options

Item	Description
Output Name	Enter a descriptive name for the output source. The name should be unique.
Unit of Measure	Enter the unit of measurement that describes what you are measuring, such as height, volume, or pressure. This is a label that displays in Digi Axess.
Decimal Scale	Select a decimal option from the list box that determines the number of decimal points to display when the numeric output displays in Digi Axess. The number is truncated to the selected decimal option and is not rounded. The default is **2 digits**.
Gauge Type	Select how the data from the input source should be graphically displayed within Digi Axess. ■ **None**: Do not graphically display the data. ■ **Linear Gauge**: Display the data in a vertical bar. ■ **Radial Gauge**: Display the data in a curved bar. ■ **Tank Gauge**: Display the data in a wide vertical bar.
Local Display Group	From the **Local Display Group** list box, select a local display group in which the data from this output pin should be included. The group displays on the Automation Dashboard. The group displays locally and is in addition to what displays from the web UI. Options: ■ **00 - Off**: No local display group is selected to display. ■ **01 - {name}** to **24 - {name}**: Select a local display group in which the data from this pin should be displayed. See Configure the local and remote dashboard groups for information about naming and displaying the local display groups.

Remote Access Options

Item	Description
Remote Display Group	Select the name of the group that displays the result of a calculated formula on the Automation Dashboard. ■ **00 - Disabled**: A remote display group does not display. ■ **01 - {name}** through **24 - {name}**: Select a remote display group in which the data from this pin should be displayed. See Configure the local and remote dashboard groups for information about naming and displaying the remote display groups.
Remote Display Sources	Specify the platform(s) on which the user can view the group on the Automation Dashboard. ■ **Cloud Only**: The Z45 Controller web UI or Digi Axess. This is the default. ■ **Phone Only**: The Digi Axess Mobile app. ■ **Cloud/Phone**: The Z45 Controller web UI, Digi Axess, or the Digi Mobile application.
Remote Control	Specify whether users can change the value of an output from Digi Axess or the Digi Mobile app. ■ **Disabled**: Do not allow changes. This is the default. ■ **Enabled**: Changes are allowed.

6. Click **Enable**. A confirmation dialog displays.
7. Click **OK**. Click **Back** to return to the **Output Configuration** page.

Configure a hex output pin on a Z45 Controller

You can configure an output source for hex data.

1. Log into the Z45 Controller's web UI.
2. Navigate to the **Output Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.
   c. Click **Outputs**. The **Output Configuration** page displays.
3. In the **Output Type** column, click on a **Disabled** button.

   Note An output pin with an output type other than **Disabled** has already been configured and can be updated.

4. At the top of the page, click **Hex**.
5. Configure the settings as described in the tables below.

   Digital Output Destination

Item	Description
Destination	Select a destination option for the calculated output value.

Item	Description
	▪ **Hex Output x**: Virtual output pin. The number in the option corresponds to the output pin number. this is the default.

General Pin Options

Item	Description
Initial Value	Select an initial value for the output pin. This value is used until an output value has been calculated. ▪ **Last**: The last calculated output value. ▪ **Off**: Set the initial value to **0** (**Off**). ▪ **On**: Set the initial value to **1** (**On**). ▪ **Actual Value**: Recalculate the output value given the updated settings.
Current Value	Set a value for a variable that can be used in a formula. For example, if your formula needs the value of the height of a tank, and the default height is 5 feet, then enter 5.
Program	Run the selected program. Click the **Add Program** icon next to the field to add a program.

Logging Options

Item	Description
Log	Determine whether you want to log change events the occurred on the output pin. The changes are logged to the device. ▪ **Disable**: Changes are not logged. This is the default. ▪ **Enable**: Changes are logged.
MQTT Publish	Determine whether you want to publish the messages when the device connects to the broker. ▪ **Off**: The current input does not publish an MQTT message. ▪ **Auto**: The MQTT message is delivered using the topic structure defined by the device. For example, the device may use the MAC address to define the device: *<MAC Address>/input/1* where *<MAC Address>* is the MAC address for the device ▪ **Defined Topic**: The MQTT message is delivered with a user-defined topic. When you choose this option, the **Topic** field displays, in which you can enter a topic name. The topic **Off** is entered by default.

Item	Description
MQTT Subscribe	Determine whether you want to subscribe to MQTT messages. ■ **Off**: The current input does not subscribe to an MQTT message. ■ **Auto**: The MQTT message is delivered using the topic structure defined by the device. This uses MAC address to define the device. For example, the device may use the MAC address to define the device: *<MAC Address>/input/1* where *<MAC Address>* is the MAC address for the device ■ **Defined Topic**: The MQTT message is delivered with a user-defined topic. When you choose this option, the **Topic** field displays, in which you can enter a topic name. The topic **Off** is entered by default.

Display Options

Item	Description
Output Name	Enter a descriptive name for the output source. The name should be unique.
Unit of Measure	Enter the unit of measurement that describes what you are measuring, such as height, volume, or pressure. This is a label that displays in Digi Axess.
Local Display Group	From the **Local Display Group** list box, select a local display group in which the data from this output pin should be included. The group displays on the Automation Dashboard. The group displays locally and is in addition to what displays from the web UI. Options: ■ **00 - Off**: No local display group is selected to display. ■ **01 - {name}** to **24 - {name}**: Select a local display group in which the data from this pin should be displayed. See Configure the local and remote dashboard groups for information about naming and displaying the local display groups.

Remote Access Options

Item	Description
Remote Display Group	Select the name of the group that displays the result of a calculated formula on the Automation Dashboard. ■ **00 - Disabled**: A remote display group does not display. ■ **01 - {name}** through **24 - {name}**: Select a remote display group in which the data from this pin should be displayed. See Configure the local and

Item	Description
	remote dashboard groups for information about naming and displaying the remote display groups.
Remote Display Sources	Specify the platform(s) on which the user can view the group on the Automation Dashboard. ■ **Cloud Only**: The Z45 Controller web UI or Digi Axess. This is the default. ■ **Phone Only**: The Digi Axess Mobile app. ■ **Cloud/Phone**: The Z45 Controller web UI, Digi Axess, or the Digi Mobile application.
Remote Control	Specify whether users can change the value of an output from Digi Axess or the Digi Mobile app. ■ **Disabled**: Do not allow changes. This is the default. ■ **Enabled**: Changes are allowed.

6. Click **Enable**. A confirmation dialog displays.
7. Click **OK**. Click **Back** to return to the **Output Configuration** page.

Update a configured output pin on a Z45 Controller

You can change an output pin that has been configured.

1. Log into the Z45 Controller's web UI.
2. Navigate to the **Output Configuration** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Administration** page displays.
   c. Click **Outputs**. The **Output Configuration** page displays.
3. In the **Output Type** column, click on the type for pin that has been configured: **Numeric**, **Digital**, or **Hex**. The **Output Pin X Configuration** page displays, where **X** is the input pin number.

   Note An output pin with the **Disabled** output type has not been configured.

4. Configure the output pin, as desired, for the selected output type. For detailed information about each input type, see:
   ■ Configure a digital output pin on a Z45 Controller
   ■ Configure a numeric output pin on a Z45 Controller
   ■ Configure a hex output pin on a Z45 Controller
5. When changes are complete, click **Update**. A confirmation dialog displays.
6. Click **OK** to save your changes.

Formulas: Manage from the web UI

Formulas use the input data collected from a device and apply calculations to provide a meaningful output. A formula is connected to an input on a device, and the formula runs every time data is

collected on the device for that input.

Formulas are built as a set of sequential steps. For each step, you choose a formula option and a formula operator to create an output which can be reviewed in Digi Axess.

Where are formulas used?

After a formula has been created, you can connect the formula to an input configuration on an input pin, and then enable the configuration. If you want the data from the input configuration to be included in the Device Summary page, you can select a display group.

Stop a formula from running

When you no longer want the formula to run, you can remove it from the input.

Device-defined and device group formulas

You can create a formula that is used for one specific device, or for the devices in a device group. A set of standard formulas provided by Digi Axess is also available.

- Device formula: Create and manage formulas for a specific device. You can add and manage device-defined formulas only on the device's web UI.
- Device group formula: Create and manage device group formulas. A device group formula is available to the devices in the device group selected for the formula.

  Note Device group formulas can also be created and managed from the Digi Axess Administration dashboard. See Formulas: Manage in Digi Axess Admin (Connect Sensor only).

  Note This feature is for Connect Sensor only.

- Digi Axess formulas: A set of standard formulas created by Digi are available for all devices.

  Note This feature is for Connect Sensor only.

Add a device-defined formula in the web UI

You can create a formula for one specific device.

1. Access the device's web UI from the Device Summary page.

   If you have logged into a Z45 Controller, click **Admin Main**.
2. Navigate to the **Manage Formulas** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Configuration** page displays.
   c. Click **Formulas**. The **Manage Formulas** page displays.
3. In the **Device Defined Formulas** section, click **Add Device Formula**. The **Formula Definition** page displays.
4. In the **Formula Definition** section, enter a descriptive name in the **Formula Name** field.
5. Create a formula by adding steps.
   a. Select a formula option from the step list box. Information about the option displays in the screen.
   b. Depending on the calculation option, a parameter field may display. Enter an appropriate value for the selected formula in the parameter field.
   c. From the **Add** list box, select a formula operator.

d. Determine the next action for the formula.
   - **Add below**: Add a step to the formula below the current step.
   - **Add above**: Add a step to the formula above the current step.
   - **Delete**: Delete the current step.
   - **Don't choose an option**: Do not choose an option if the formula is complete.

e. Repeat the process to add more items to the formula.

6. Click **Save** to save the formula. A confirmation dialog displays.
7. Click **OK** to confirm the change.
8. Click **Back** to return to the **Manage Formulas** page. The formula you created displays in the **Device Defined Formulas** list on the page.

Edit a formula for a device in the web UI

You can edit a device formula if needed.

1. Access the device's web UI from the Device Summary page.

   If you have logged into a Z45 Controller, click **Admin Main**.
2. Navigate to the **Manage Formulas** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Configuration** page displays.
   c. Click **Formulas**. The **Manage Formulas** page displays.
3. In the **Device Defined Formulas** section, click the name of the formula that you want to change. The **Formula Definition** page displays.
4. If desired, update the name in the **Formula Name** field.
5. Edit the formula as needed. For information about the fields, see Add a device-defined formula in the web UI.
6. Click **Save** to save the formula. A confirmation dialog displays.
7. Click **OK** to confirm the change. A green banner with the message "Formula Successfully Updated" displays at the top of the page.
8. Click **Back** to return to the **Manage Formulas** page.

Copy a device formula in the web UI

You can copy a formula that has been created for a device to create a new device formula. You can rename and edit the copied formula as needed.

1. Access the device's web UI from the Device Summary page.

   If you have logged into a Z45 Controller, click **Admin Main**.
2. Navigate to the **Manage Formulas** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Configuration** page displays.
   c. Click **Formulas**. The **Manage Formulas** page displays.
3. In the **Device Defined Formulas** section, find the formula that you want to copy.

4. Click the **Copy Formula** icon next to the formula name. The copied formula is added to the end of the list of formulas. A sequential number is appended to the formula name.

   The message "Formula Has Been Copied" displays in a green banner at the top of the page.
5. Edit the formula as needed.
   a. Click the name of the copied formula to open it in the **Formula Definition** screen.
   b. Change the name of the formula in the **Formula Name** field.
   c. Edit the formula as needed. For information about the fields, see Add a device-defined formula in the web UI.
   d. Click **Save** to save your changes. A confirmation dialog displays.
   e. Click **OK**. A green banner with the message "Formula Successfully Updated" displays at the top of the page

Delete a device formula from the web UI

You can delete a formula that has been created for a device.

If you try to delete a formula that is connected to a input pin, an error message displays and you are not allowed to delete the formula. You should edit the input configurations that use the formula you want to delete, and then delete the formula.

1. Access the device's web UI from the Device Summary page.

   If you have logged into a Z45 Controller, click **Admin Main**.
2. Navigate to the **Manage Formulas** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Configuration** page displays.
   c. Click **Formulas**. The **Manage Formulas** page displays.
3. In the **Device Defined Formulas** section, find the formula that you want to delete.
4. Click the **Delete Formula** icon next to the formula name. A confirmation dialog displays.
5. Click **OK** to confirm the deletion. The message "Formula Successfully Deleted" displays in a green banner at the top of the page.

   If the formula is used in an input pin configuration, the message "ERROR: "*Pin name*" uses formula "*Formula name*" " displays. The formula is not deleted.

Save a device formula as a device group formula

Note This feature is for Connect Sensor family variants only.

A formula created for a device can be saved as a device group formula for a selected device group. The device group formula will be available to all devices in the selected device group and to the devices in any child groups.

1. Access the device's web UI from the Device Summary page.

   If you have logged into a Z45 Controller, click **Admin Main**.
2. Navigate to the **Manage Formulas** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Configuration** page displays.

   c. Click **Formulas**. The **Manage Formulas** page displays.
3. In the **Device Defined Formulas** section, find the formula that you want to save as a device group formula.
4. Click the **Save to Device Group** icon next to the formula name. The **Save Formula to Device Group** page displays.
   a. In the **Name** field, enter a descriptive name for the device group formula.
   b. From the **Device Group** list box, select a device group. The device group formula will be available to any device in this device group and to the devices in any child groups.
5. Click **Save** to save the device group formula. A confirmation dialog displays.
6. Click **OK**. The **Formula Definition** page displays.
7. Edit the formula as needed.
   a. Change the name of the formula in the **Formula Name** field.
   b. Edit the formula. For information about the fields, see Add a device-defined formula in the web UI.
   c. Click **Save** to save your changes. A confirmation dialog displays.
   d. Click **OK**. A green banner with the message "Formula Successfully Updated" displays at the top of the page.

Add a device group formula in the web UI

Note This feature is for Connect Sensor family variants only.

You can create a device group formula that will be available to all devices in the selected device group and to the devices in any child groups.

Note A device group formula added from the device's web UI is also available in the Digi Axess Administration dashboard. See Add a formula from the Administration dashboard.

1. Access the device's web UI from the Device Summary page.
2. Navigate to the **Manage Formulas** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Configuration** page displays.
   c. Click **Formulas**. The **Manage Formulas** page displays.
3. In the **Device Group Formulas** section, click **Add Device Group Formula**. The **Create Formula** page displays.
   a. In the **Name** field, enter a descriptive name for the device group formula. The name must be unique within the selected device group.
   b. From the **Device group** list box, select a device group. The formula you are creating will be available to all devices in the selected device group and to the devices in any child groups.
   c. If you are adding an input pin or an output pin to the formula, you can use the **Reference Device** field. From the **Reference Device** field, select a device that has a similar configuration to the devices that will be in the new formula you are creating. The configured pins from the reference device are available when adding an input pin or an output pin to the formula. The input pin and output pin options that you can select from

the list box are limited to those that are configured for the reference device.

This feature allows you to easily reuse a pin configuration and eliminates the need to manually enter the number of a configured input pin or output pin.

d. Click **Save** to save the formula. A confirmation dialog displays.

e. Click **OK** to confirm the change. The **Formula Definition** page displays.

4. Enter a descriptive name in the **Formula Name** field.

5. Create a formula by adding steps.

   a. Select a formula option from the first list box in the step. Information about the option displays in the screen.

   b. If a parameter field displays, enter an appropriate value for the selected formula.

      - **Input Pin**: You are required enter the number of the input pin or, if a list box is available, to select the name of a configured and enabled input pin for a Connect Sensor XRT-M or a Z45 Controller.

        Using the Reference Device field

        This field is used only if the following conditions are met:

        - You are maintaining a formula in the Administration dashboard or a device group formula from the web UI.
        - You have added an input pin to the formula. You are required to enter a pin number or select an option from the parameter list box.

        If you selected a device from the **Reference Device** field, the parameter field is a list box with options are limited to the input pins configured for the selected reference device. You can select an appropriate input pin that works for your formula.

        If you didn't select a device from the **Reference Device** field, you must manually enter the an input pin number.

      - **Output Pin**: You are required enter the number of the output pin or, if a list box is available, to select the name of a configured and enabled output pin for a Connect Sensor XRT-M or a Z45 Controller.

        Using the Reference Device field

        This field is used only if the following conditions are met:

        - You are maintaining a formula in the Administration dashboard or a device group formula from the web UI.
        - You have added an output pin to the formula. You are required to enter a pin number or select an option from the parameter list box.

        If you selected a device from the **Reference Device** field, the parameter field is a list box with options are limited to the output pins configured for the selected reference device. You can select an appropriate output pin that works for your formula.

        If you didn't select a device from the **Reference Device** field, you must manually enter the an output pin number.

   c. From the **Add** list box, select a formula operator.

   d. Determine the next action for the formula.

- **Add below**: Add a step to the formula below the current step.
- **Add above**: Add a step to the formula above the current step.
- **Delete**: Delete the current step.
- **Don't choose an option**: Do not choose an option if the formula is complete.

e. Repeat the process to add more items to the formula.

6. Click **Save** to save the formula. A confirmation dialog displays.
7. Click **OK** to confirm the change.
8. Click **Back** to return to the **Manage Formulas** page. The formula you created displays in the **Device Group Formulas** list on the page.

Edit a device group formula from the web UI

Note This feature is for Connect Sensor family variants only.

You can edit the formula name and the steps in the formula for a device group formula.

Be aware

- You cannot change the device group selected for the formula.
- You cannot delete a device group formula from the web UI. However, you can delete it from the Administration dashboard in Digi Axess. See Delete a formula using the Go button from the Administration dashboard and Delete a formula from the review page in the Administration Dashboard.

To edit a device group formula:

1. Access the device's web UI from the Device Summary page.
2. Navigate to the **Manage Formulas** page.
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Configuration** page displays.
   c. Click **Formulas**. The **Manage Formulas** page displays.
3. In the **Device Group Formulas** section, click the name of the device group formula that you want to change. The **Formula Definition** page displays.
4. If desired, update the name in the **Formula Name** field. The name must be unique within the selected device group.
5. If you are adding an input pin or an output pin to the formula, you can use the **Reference Device** field. From the **Reference Device** field, select a device that has a similar configuration to the devices that will be in the new formula you are creating. The configured pins from the reference device are available when adding an input pin or an output pin to the formula. The input pin and output pin options that you can select from the list box are limited to those that are configured for the reference device.

   This feature allows you to easily reuse a pin configuration and eliminates the need to manually enter the number of a configured input pin or output pin.
6. Edit the formula as needed. For information about the fields, see Add a device group formula in the web UI.
7. Click **Save** to save the changes. A confirmation dialog displays.

8. Click **OK** to confirm the change. A green banner with the message "Formula Successfully Updated" displays at the top of the page.
9. Click **Back** to return to the **Device Group Formula** page.

Review the Digi Axess formulas

Note This feature is for Connect Sensor family variants only.

A set of basic formulas created by Digi are available. The formulas can't be changed, copied, or deleted, but can be connected to an input. These are available for all devices.

To review a Digi Axess formula:

1. Access the device's web UI from the Device Summary page.
2. Navigate to the **Manage Formulas** page
   a. From the **Options** section, click **Applications**. The **Available Applications** page displays.
   b. Click **Automation Control**. The **Management & Configuration** page displays.
   c. Click **Formulas**. The **Manage Formulas** page displays.
3. In the **Digi Axess Formulas** section, click on the name of the formula you want to review. The **Formula Definition** page for the formula displays.
   - **IEEE 754 Float - BADC**
   - **IEEE 754 Float - DCBA**
   - **Integer - BADC**
   - **Standard Conversion**
4. Click **Back** to return to the **Manage Formulas** page.

Formula options

Formulas allow mathematical pre-processing on all numeric, analog, and hex inputs, and post-processing on numeric and hex outputs on Modbus type I/O modules.

The tables below describe the options that are available to create a formula.

- Constants
- Calculated Values
- Hex Functions
- Command Functions
- Trigonometric Functions
- Mathematical Functions

Formula reference

Formulas are developed using a stack calculator. The calculator mechanism uses postfix notation, a mathematical notation in which every operator follows all of its operands.

For example, to find the sum of 2 plus 2:

Infix Notation: 2 [+] 2 result 4

Postfix Notation: 2 [Ent] 2 [+] result 4

Controller Formula Screen: [constant value=] 2 [Ent] [constant value=] 2 [Add] result 4

Unless otherwise directed, the result of a formula calculation will be placed on the input or output pin invoking the formula.

Constants formulas

Formula	Description
Current Pin	Allows the use of the current value of the input invoking the formula.
Input Pin	Allows the use of the current value of an input pin other than the one invoking the formula. You are required enter the number of the input pin or, if a list box is available, to select the name of a configured and enabled input pin on a Connect Sensor XRT-M or on a Z45 Controller. **In-line Parameters** ▪ **Input pin**: Integer or a currently configured input from the list box. **Using the Reference Device field** This field is used only if the following conditions are met: ▪ You are maintaining a formula in the Administration dashboard or a device group formula from the web UI. ▪ You have added an input pin to the formula. You are required to enter a pin number or select an option from the parameter list box. If you selected a device from the **Reference Device** field, the parameter field is a list box with options are limited to the input pins configured for the selected reference device. You can select an appropriate input pin that works for your formula. If you didn't select a device from the **Reference Device** field, you must manually enter the an input pin number.
Output Pin	Allows the use of the current value of the output pin invoking the formula. You are required enter the number of the output pin or, if a list box is available, to select the name of a configured and enabled output pin on a Connect Sensor XRT-M or a Z45 Controller. **In-line Parameters** ▪ **Output Pin**: Integer or a currently configured input from the list box. **Using the Reference Device field** This field is used only if the following conditions are met: ▪ You are maintaining a formula in the Administration dashboard or a device group formula from the web UI. ▪ You have added an output pin to the formula. You are required to enter a pin number or select an option from the parameter list box. If you selected a device from the **Reference Device** field, the parameter field is a list box with options are limited to the output pins configured for the selected reference device. You can select an appropriate output pin that works for your formula. If you didn't select a device from the **Reference Device** field, you must manually enter the an output pin number.

Formula	Description
Constant Value	Allows a user defined numeric value to be used in the formula. You are required to enter a numeric value. **In-line Parameters** ▪ **Numeric Value**: Integer/Decimal When a constant value has more than 9 decimal value precision, the full value is stored, but only a maximum of 9 places will be displayed back on return. After a constant value is defined within a formula, it is not updated unless the **Update** option is checked before clicking **Save**.
PI	The constant pi.
Constant Hex Value	Allows a user defined hex value to be used in the formula. You are required to enter the hex value. **In-line Parameters** ▪ **Hex Value**: 0 - FFFF
Correction	Allows the use of the correction value that is defined for the input or output pin invoking the formula.
Min Range	Allows the use of the minimum range value of the analog input invoking the formula.
Max Range	Allows the use of the maximum range value of the analog input pin invoking the formula.
Min Units	Allows the use of the minumum units value of the input or output pin invoking the formula.
Max Units	Allows the use of the maximum units value of the input or output pin invoking the formula.

Calculate Values formulas

Formula	Description
[Max-Min] Range	Allows the use of the value of the difference between the **Max Range** and **Min Range** of the analog input pin invoking the formula.
[Max-Min] Units	Allows the use of the value of the difference between the **Max Units** and **Min Units** of the input or output pin invoking the formula.
Fn Voltage to NTC10K Temperature	An NTC10K sensor must be configured with an appropriate pull-up resistor to create a 0-5V DC input and temperature in degrees Celcius will be calculated. Suggested pull-up resistor values are 370K for 24VDC power and 140K for 12VDC. Three values must be pushed on the stack. **Stack Parameters** ▪ Incoming Voltage (across NTC): Numeric ▪ NTC Type: Integer [0 = Type II/TR91, 1 = Type III, 2 = Carel/Eliwell] ▪ Actual Supply Voltage (to pull-up): Numeric

Formula	Description
	In-line Parameters ▪ **Resistor Value** (ohms): Integer
Fn Samples Sum	Performs a summation on the data coming into the pin and performs a reset to 0 at a set minute of the hour. Before calling this function, the data source and a constant defining a minute value must be specified. The minute value will trigger a change event every hour at the defined minute value and restart the summation from zero. **Valid values** ▪ 0 - 60; where 0 triggers a change on every reading without a reset.
Fn Samples Difference Sum	Performs a summation on the difference between the previous sample and the current sample. A maximum expected value for the sample must be specified to account for the rollover of the value. Additionally, before calling this function, the data source and a constant defining a minute value must be specified. The minute value will trigger a change event every hour at the defined minute value and restart the summation from zero. **Valid values** ▪ 0 - 60; where 0 triggers a change on every sample without a reset. **In-line Parameters** ▪ **Rollover Value**: Integer
Fn Samples Sum [No Reset]	Performs exactly as **Fn Samples Sum** with the exception that the summation will not be reset to 0 at the specified time.
Fn Samples Difference Sum [No Reset]	Performs exactly as **Fn Samples Difference Sum** with the exception that the summation will not be reset to 0 at the specified time. **In-line Parameters** ▪ **Rollover Value**: Integer
Fn Average Mem 1	Performs averaging on the invoking pin. The function parameter defines the sample size up to a maximum of 2500 samples. Allows for this functionality to be applied to 1 pin only. **In-line Parameters** ▪ **Sample Size**: Integer (1-2500)
Fn Average Mem 2	Performs averaging on the invoking pin. The function parameter defines the sample size up to a maximum of 2500 samples. Allows for this functionality to be applied to 1 pin only. **In-line Parameters** ▪ **Sample Size**: Integer (1-2500)
Fn Average Mem 3	Performs averaging on the invoking pin. The function parameter defines the sample size up to a maximum of 2500 samples. Allows for this functionality to be applied to 1 pin only.

Formula	Description
	In-line Parameters ▪ **Sample Size**: Integer (1-2500)
Fn Average Mem 4	Performs averaging on the invoking pin. The function parameter defines the sample size up to a maximum of 2500 samples. Allows for this functionality to be applied to 1 pin only. **In-line Parameters** ▪ **Sample Size**: Integer (1-2500)
Fn Trim Below	Returns the **Trim Below Value** when the sample is below that value. You are required to enter a numeric value. **In-line Parameters** ▪ **Trim Below Value**: Numeric
Fn Trim Over	Return the **Trim Above Value** when the sample is above that value. You are required to enter a numeric value. **In-line Parameters** ▪ **Trim Above Value**: Numeric
Fn Totalize	Performs totalizing function over a defined period of time on a numeric input defining a rate. **In-line Parameters** ▪ **Totalizing Period**: Numeric (seconds)
Fn Volumize	Takes a pulse input and calculates a rate per defined time interval. **In-line Parameters** ▪ **Trigger Period**: Numeric (seconds) or ▪ **Input/Output Source**: Ixx or Oxx

Hex Functions

Formula	Description
Fn Swap Words	Performs a 16 bit swap on 32-bit MODBUS register reads when necessary. **Example**: ABCD1234 becomes 1234ABCD. [Current Input] [Ent] [Fn Swap Words]
Fn Swap Bytes	Performs 8 bit swap on 16 or 32-bit MODBUS register reads when necessary. **Example**: ABCD1234 becomes CDAB3412. [Current Input] [Ent] [Fn Swap Bytes]
Fn Signed to REG16	Performs the conversion of a signed integer value to a 16 bit hex value. The value to be converted is taken from the last value in the calculator's stack.

Formula	Description
Fn Signed to REG32	Performs the conversion of a signed integer value to a 32 bit hex value. The value to be converted is taken from the last value in the calculator's stack.
Fn Float to REG32	Performs the conversion of a float value to a 32 bit hex value. The value to be converted is taken from the last value in the calculator's stack.
Fn Reg16 to Signed	Performs the conversion of a 16 bit hex value to a signed integer value. The value to be converted is taken from the last value in the calculator's stack. **Example**: Assume the invoking pin is an input of a MODBUS module configured as hex and the source is a 16-bit Holding register. Use the register value as a signed integer. [Current Input] [Ent] [Fn Reg16 to Signed]
Fn Reg32 to Signed	Performs the conversion of a 32 bit hex value to a signed integer value. The value to be converted is taken from the last value in the calculator's stack. **Example**: Assume the invoking pin is the input of a MODBUS module configured as hex and the source is a 32-bit Holding register. Use the register value as a signed integer. [Current Input] [Ent] [Fn Reg32 to Signed]
Fn Reg32 to Float	Performs the conversion of a 32 bit hex value to a float value. The value to be converted is taken from the last value in the calculator's stack. **Example 1**: Assume the invoking pin is an input of a MODBUS module configured as hex and the source is a 32-bit Holding register. Use the register value as a float. [Current Input] [Ent] [Fn Reg32 to Float]
Fn REG32 M10K to Unsigned	Performs the conversion of a 32 bit hex value in Modulo 10000 to an unsigned integer value. The value to be converted is taken from the last value in the calculator's stack.
Fn REG32 M10K to Signed	Performs the conversion of a 32 bit hex value in Modulo 10000 to a signed integer value. The value to be converted is taken from the last value in the calculator's stack.
Fn Hex Bit State - Position	Takes a hex value and returns the bit value at the indicated position. **In-line Parameters** ▪ **Bit Position**: Integer (1-32)
Fn Hex Non-Zero State	Takes a hex value and returns 1 if any bit is set. Returns 0 if no value is set.

Command Functions

Formula	Description
Fn Save Value	Takes the value in the stack and stores it into memory at a specified interval. This function requires one parameter that defines an interval time value in seconds at which the value will be saved. A value of zero will save at every change. **In-line Parameters**

Formula	Description
	▪ **Rate(Second)**: Integer
Fn Set Input Pin	Takes the value in the stack and pushes it to the designated input pin at every interval from the top of the hour. This function requires a constant value preceding it that defines an interval time value in minutes. The function call then requires a parameter that defines the number of the input pin to push the value into. **In-line Parameters** ▪ **Pin Number**: Integer
Fn Reset Pin Formula	Allow the invoking pin to trigger a reset event on another pin. Doing it from the formula rather than as a program function call will keep the even synchronous across multiple, dependent pins. The function takes the pin number that will be reset as the parameter. **In-line Parameters** ▪ **Pin Number**: Integer
Fn [If Not] Reset Event Goto	Allows the formula to perform certain operations only in the case that a formula reset is triggered from a **Reset Pin Formula** program function call. The formula function take 1 parameter which tells the formula to skip to the specified line and continue execution in the case or normal operation (not a reset event). **In-line Parameters** ▪ **Line Number**: Integer
Fn Debounce Low	When the signal goes low, waits for a period of time before passing the most current value to the system for processing. The time period can be defined in minutes or come from another Input/Ouput in the system. **In-line Parameters** ▪ **Debounce Period**: Numeric (minutes) Or ▪ **Input/Output Source**: Ixx or Oxx
Fn Debounce High	When the signal goes high, waits for a period of time before passing the most current value to the system for processing. The time period can be defined in minutes or come from another Input/Ouput in the system. **In-line Parameters** ▪ **Debounce Period**: Numeric (minutes) Or ▪ **Input/Output Source**: Ixx or Oxx
Fn Trigger Low	Passes the low signal to the system and waits a period of time before sending the next signal. The time period can be defined in minutes or come from another Input/Ouput in the system. **In-line Parameters** ▪ **Trigger Period**: Numeric (minutes)

Formula	Description
	Or ▪ **Input/Output Source**: Ixx or Oxx
Fn Trigger High	Passes the high signal to the system and waits a period of time before sending the next signal. The time period can be defined in minutes or come from another Input/Ouput in the system. **In-line Parameters** ▪ **Trigger Period**: Numeric (minutes) Or ▪ **Input/Output Source**: Ixx or Oxx
Fn Sample Rate	Specify a time interval between processing of samples. **In-line Parameters** ▪ **Trigger Period**: Numeric (seconds) Or ▪ **Input/Output Source**: Ixx or Oxx

Trigonometric Functions

Formula	Description
Radians to Degrees	Performs the conversion of a numeric value in radians to degrees.
Degrees to Radians	Performs the conversion of a numeric value in degrees to radians.
Sin - Radians	Performs sin function on numeric value in radians.
Cos - Radians	Performs cosine function on numeric value in radians.
Tan - Radians	Performs tangent function on numeric value in radians.
Asin - Radians	Performs arc sin function on numeric value and returns radians
Acos - Radians	Performs arc cosine function on numeric value and returns radians
Atan - Radians	Performs arc tangent function on numeric value and returns radians.

Mathematical Functions

Formula	Description
Square Root	Performs square root function on numeric value.

Formula operators

You can use the formula operators to complete a formula.

Formula	Description
Sub	Subtract
Add	Add
Mul	Multiply
Div	Divide
Xch	Exchange the position of the last two values in the stack.
And	Bitwise And
Or	Bitwise Or
Ent	Enter a value into the stack.
Pop	Pop: Bring a value out of the stack.
Xor	Bitwise XOR (Exclusive Or) function to the previous value on the stack. Note For Connect Sensor devices, **Xor** allows only Digital and Hex input pins.
Y^X	Exponential calculation where Y is the current value on the stack and X is the value being added to the stack. The Y value must be sequentially before the X value in the stack.

Programs

Programs are named groups of functions that can be applied to a specific input or output as the result of a threshold event on an input or output. For instance, a program called "Power Indicator OFF" could be used to turn off an indicator whenever charging power is removed from a battery powered system. The same program could also set the application status to yellow on the Digi Axess map.

You can use the programs you create in the **Program Definition** page in other pages, such as the **Input Configuration** and **Output Configuration** pages.

Some of the types of functions that can be performed include the following:

- Set and clear inputs and output pins
- Perform arithmetic operations
- Set and clear input and output pins on remote Z45 Controllers
- Execute a variety of timing and timer functions
- Managing motors and wear leveling
- Application status and reporting to Digi Axess
- Manage threshold configurations
- Manage application Geo-Fences

List of functions

Instructions on how to create a program and a list of functions is available.

Add an Automation Control program

Programs are entered in the **Manage Programs** page. A pull down provides a list of available functions that can be applied and screen hints describe the function's parameter or argument list. Parameters are entered with a space separator.

1. Access the Automation Control page.
2. Click **Programs**. The **Manage Programs** page displays.
3. Click **Add New**.
4. In the **Program Definition** section, enter a descriptive name in the **Program Name** field.
5. Enter a step in the **Insert Step** section.
   a. Select a step number from the first list box.
   b. Select a function from the second list box. Information about the function displays in the screen. For more information, see List of Automation Control program functions.
   c. Enter the parameters for the selected function in the parameter field.

   d. Click **Update**.
   e. Repeat the process for each step in the program.
6. Click **Back** to return to the **Manage Programs** page. The program you created displays in the page.

Set and clear input/output pins functions

In the following descriptions, P1, P2, P3, etc. are used to indicate positional parameters or arguments that must be specified when using a function. Each parameter or argument given to a function must be separated by a single space.

Digital I/O - Set

P1	Destination pin type	Digital [**i**]nput or [**o**]utput
P2	Destination Digital pin number	Digital <**pin number**>
P3	Source type	Digital [**i**]nput or [**o**]utput or [**u**]ser defined
P4	Source Digital pin number or user defined value	Digital <**pin number**> or <**value**>

Example: Set digital output pin 6 to ON (1)

- Function: Digital I/O - Set
- Parameters: o 6 u 1

Numeric I/O - Set

P1	Destination pin type	Numeric [**i**]nput or [**o**]utput
P2	Destination Numeric pin number	Numeric <**pin number**>
P3	Source type	Numeric [**i**]nput or [**o**]utput or [**u**]ser defined
P4	Source Numeric pin number or user defined value	Numeric <**pin number**> or <**value**>

Example: Set numeric input pin 12 to value of numeric output pin 9

- Function: Numeric I/O - Set
- Parameters: i 12 o 9

Hex I/O - Set

P1	Destination pin type	Hex [**i**]nput or [**o**]utput
P2	Destination Hex pin number	Hex <**pin number**>
P3	Source type	Hex [**i**]nput or [**o**]utput or [**u**]ser defined
P4	Source Numeric pin number or user defined value	Hex <**pin number**> or <**value**>

Example: Set hex output pin 3 to hex value FFF

- Function: Hex I/O - Set
- Parameters: o 3 u FFF

Hex I/O - Set Bits

Set Bits performs a Boolean OR of the absolute value specified in the source definition with the destination pin.

P1	Destination pin type	Hex [**i**]nput or [**o**]utput
P2	Destination Hex pin number	Hex <**pin number**>
P3	Source type	Hex [**i**]nput or [**o**]utput or [**u**]ser defined
P4	Source Numeric pin number or user defined value	Hex <**pin number**> or <**value**>

Example: Input 7 has a value of A6; set it to E7

- Function: Hex I/O - Set Bits
- Parameters: i 7 u 41

Hex I/O - Clear Bits

Clear Bits performs a Boolean AND of the 1's compliment of the absolute value specified in the source definition with the destination pin.

P1	Destination pin type	Hex [**i**]nput or [**o**]utput
P2	Destination Hex pin number	Hex <**pin number**>
P3	Source type	Hex [**i**]nput or [**o**]utput or [**u**]ser defined
P4	Source Numeric pin number or user defined value	Hex <**pin number**> or <**value**>

Example: Output 1 has a value of E1; set it to 81

- Function: Hex I/O - Clear Bits
- Parameters: o 1 u 81

Performing Arithmetic functions

In the following descriptions, P1, P2, P3, etc. are used to indicate positional parameters or arguments that must be specified when using a function. Each parameter or argument given to a function must be separated by a single space.

Numeric I/O - Add

Numeric I/O - Subtract

Numeric I/O - Multiply

Numeric I/O - Divide

P1	Destination pin type	Numeric [**i**]nput or [**o**]utput
P2	Destination Numeric pin number	Numeric <**pin number**>
P3	Source type	Numeric [**i**]nput or [**o**]utput or [**u**]ser defined
P4	Source Digital pin number or user defined value	Numeric <**pin number**> or <**value**>

Example: Add 1200.77 to input pin 17 and place the result on output pin 17

- Function: Numeric I/O – Add
- Parameters: o 17 u 1200.77

Example: Multiple input pin 14 by input pin 15 and place the result on input pin 14

- Function: Numeric I/O – Multiply
- Parameters: o 14 u 15

Set I/O on remote Z45 Controllers functions

Remote operations are those decisions and resulting actions that are distributed between two or more Z45 Controllers in different physical locations connected over the cellular network. All remote operations are a single function providing the ability to remotely set the values of remote virtual input pins and all types of output pins, both physical and virtual. This approach allows decisions to be made at the site where the actually machinery will be turned on and off and therefore provides a high degree of reliability.

In the following descriptions, P1, P2, P3, etc. are used to indicate positional parameters or arguments that must be specified when using a function. Each parameter or argument given to a function must be separated by a single space.

Remote Digital I/O - Set

P1	Remote IP address of Destination	<**IP address**>
P2	Destination pin type	Digital [**i**]nput or [**o**]utput
P3	Destination Digital pin number	Digital <**pin number**>
P4	Source type	Digital [**i**]nput or [**o**]utput or [**u**]ser defined
P5	Source Digital pin number or user defined value	Digital <**pin number**> or <**value**>
P6	Network Wait Time	[**0**]: Do not wait for network: Aassume that the network is available and initiate the remote operation. which will succeed if an address is available or fail if it is not. [**1**]: Wait for a certain period of time for the Z45 Controller to get an IP address from the network.

Example: Set input pin 24 of IP address 166.155.12.12 to 1 after waiting for the network to respond

This means that the value of input pin 24 on the remote unit using IP 166.155.12.12 is changed to the user-defined value of 1, after checking that the network is connected.

- Function: Remote Digital I/O – Set
- Parameters: 166.155.12.12 i 24 u 1 1

Example: Set output pin 18 at IP address 173.101.15.44 to the value of local input pin 4 without waiting for the network

This means that the value of output pin 18 on the remote unit using IP 173.101.15.44 is changed to the value defined by the local routers input pin 4, without checking if the network is connected.

- Function: Remote Digital I/O – Set
- Parameters: 173.101.15.44 o 18 i 4 0

Remote Numeric I/O - Set

P1	Remote IP address of Destination	<**IP address**>
P2	Destination pin type	Numeric [**i**]nput or [**o**]utput
P3	Destination Numeric pin number	Numeric <**pin number**>
P4	Source type	Numeric [**i**]nput or [**o**]utput or [**u**]ser defined
P5	Source Numeric pin number or user defined value	Numeric <**pin number**> or <**value**>
P6	Network Wait Time	[**0**]: Do not wait for network: Aassume that the network is available and initiate the remote operation. which will succeed if an address is available or fail if it is not. [**1**]: Wait for a certain period of time for the Z45 Controller to get an IP address from the network.

Example: Set input pin 5 of IP address 166.155.12.12 to 3.145 after waiting for the network to respond

- Function: Remote Numeric I/O – Set
- Parameters: 166.155.12.12 i 5 u 3.145 1

Remote Hex I/O - Set

P1	Remote IP address of Destination	<**IP address**>
P2	Destination pin type	Hex [**i**]nput or [**o**]utput
P3	Destination Hex pin number	Hex <**pin number**>
P4	Source type	Hex [**i**]nput or [**o**]utput or [**u**]ser defined
P5	Source Hex pin number or user defined value	Hex <**pin number**> or <**value**>
P6	Network Wait Time	[**0**]: Do not wait for network: Assume that the network is available and initiate the remote operation. which will succeed if an address is available or fail if it is not. [**1**]: Wait for a certain period of time for the Z45 Controller to get an IP address from the network.

Example: Set input pin 24 of IP address 166.155.12.12 to AF without waiting for the network to respond

- Function: Remote Hex I/O – Set
- Parameters: 166.155.12.12 i 24 u AF 0

Timers and counters functions

In the following descriptions, P1, P2, P3, etc. are used to indicate positional parameters or arguments that must be specified when using a function. Each parameter or argument given to a function must be separated by a single space.

Timer/Counter - Start

Timer/Counter is a value incrementing or decrementing at one second intervals. It is housed on a numeric input or numeric output. If it is in an output it is non-volatile and if it is in an input it is volatile. If it is in an output, the output can still be linked to an input. In either case the thresholds of an input can then be used to make decisions based on the counter value or the value can just be used to accumulate things like engine hours.

P1	Destination pin type	Numeric [**i**]nput or [**o**]utput
P2	Destination Numeric pin number: location where the timer resides	Numeric <**pin number**>
P3	Counter type	[**0**]: Count up from current value [**1**]: Count up from user/pin defined value [**2**]: Count down from current value [**3**]: Count down from user/pin defined value
P4	Start value source type	[**i**]nput or [**o**]utput or [**u**]ser defined
P5	Start value source pin number or user defined value	<**pin number**> or <**value**>
P6	Limit type	[**0**]: No limit value [**1**]: stop at user-defined limit value [**2**]: Roll over to start value at user-defined value and continue counting
P7	Limit value	[**0**]: No limit value <**user-defined value**>
P8	Update value: the amount to add/subtract each second.	<**user-defined value**>
P9	Write rate in 1 second increments; update frequency of timer value to P2.	<**user-defined value**>

Example: Create a counter on output pin 14 that counts up from 0 in seconds with no limit and updates the display every 15 seconds

- Function: Timer/Counter – Start
- Parameters: o 14 0 u 0 0 0 1 15

Timer/Watchdog - Start

A watchdog timer is a value decrementing at a one second rate. The value is NOT directly housed in an input or output pin. When the value decrements to zero the defined digital output or input pin will turn on. If you keep setting the watchdog timer, it will never get to zero.

P1	Destination Digital pin type	Digital [**i**]nput or [**o**]utput
P2	Destination Digital pin number: pin that goes high when the watchdog expires	Digital <**pin number**>
P3	Start value source type	[**i**]nput or [**o**]utput or [**u**]ser defined
P4	Start value source pin number or user defined value	<**pin number**> or <**value**>
P5	Update value: the amount to add/subtract each second.	<**user-defined value**>

Example: Set output pin 4 when a 60 second timer reaches 0

- Function: Timer/Watchdog – Start
- Parameters: o 4 u 60 1

Timer/Clock - Start

A clock is a square wave signal generated on an input or output. It can be continuous or of a pre-defined pulse length. The clock frequency is generated by a decrementing counter. Each time the counter decrements to zero, the defined digital input or output will toggle state.

P1	Destination Digital pin type	Digital [**i**]nput or [**o**]utput
P2	Destination Digital pin number: location where the clock is generated	Digital <**pin number**>
P3	Clock rate source type	[**i**]nput or [**o**]utput or [**u**]ser defined
P4	Clock rate value source pin number or user defined value	<**pin number**> or <**value**>
P5	Update rate: decrement frequency in [Update rate] * 0.1 sec. increments	<**Update rate**>
P6	Update value: amount to subtract from P4 each update period	<**user-defined value**>
P7	Stop pulse value: Stop at defined number of pulses	[0]: Continuous <**user-defined value**>

Example: Clock output pin 1 at a rate of once every 1 second (1 second ON followed by 1 second OFF) for 400 iterations

- Function: Timer/Clock – Start
- Parameters: o 1 u 5 10 1 400

Timer/Counter/Ext/Clk - Start

Note Use of this function is tied to the Z45 Controller's Discrete or Relay Input (pin 17).

Timer/Counter/Ext/Clk is a value incrementing or decrementing at the rate of the Discrete Input (DI) pin on the Z45 Controller, also known as the relay input (pin 17). The Timer/Counter is assigned to a numeric input or numeric output. If it is in an output it is non-volatile and if it is in an input it is volatile. If it is in an output, the output can still be connected to an input. In either case the thresholds of an input can then be used to make decisions based on the counter value or the value can be used to accumulate things like engine hours.

P1	Destination Numeric pin type	Numeric [**i**]nput or [**o**]utput
P2	Destination Numeric pin number: location where the timer resides	Numeric <**pin number**>
P3	Counter type	[**0**]: Count up from current value [**1**]: Count up from user/pin defined value [**2**]: Count down from current value [**3**]: Count down from user/pin defined value
P4	Start value source type	[**i**]nput or [**o**]utput or [**u**]ser defined
P5	Start value source pin number or user defined value	<**pin number**> or <**value**>
P6	Limit type	[**0**]: No limit value [**1**]: stop at user-defined limit value [**2**]: Roll over to start value at user-defined value and continue counting
P7	Limit value	[**0**]: No limit value <**user-defined value**>
P8	Update value: the amount to add/subtract each second.	<**user-defined value**>
P9	Write rate in 1 second increments; update frequency of timer value to P2.	<**user-defined value**>
P10	Sample type	[**0**]: Count transitions going negative [**1**]: Count transitions going positive

Example: Count negative going transitions of the Discrete Input and place the count on output pin 17. The counter should count up from zero and has no limits. For each transition of the Discrete Input add 15 to the value of pin 17. Pin 17 will be updated every 30 seconds.

- Function: Timer/Counter/Ext/Clk– Start
- Parameters: o 17 1 u 0 0 0 15 30 0

Timer/Alarm Override - Start

Timer/Alarm Override – Start provides a mechanism to override (disable) all alarms for a specified period of time (in minutes). P1 and P2 define the pin that will represent the state of override, and P3 and P4 define the period of time for which alarms will be disabled. As with all timers Timer/Alarm Override is stopped with Timer/Any – Stop.

P1	Destination Numeric pin type	Numeric [**i**]nput or [**o**]utput
P2	Destination Numeric pin number: pin that goes high when the watchdog expires	Numeric <**pin number**>
P3	Override Duration (min.) source type	[**i**]nput or [**o**]utput or [**u**]ser defined
P4	Override Duration (min.) value source pin number or user defined value	<**pin number**> or <**value**>

Example: Disable alarms for the number of minutes specified by input pin 11 and show override status on output pin 18

- Function: Timer/Alarm Override – Start
- Parameters: o 18 i 11

Timer/Counter/Any - Stop

Timer/Counter/Any – Stop will stop any of the counters/timers defined in this section.

P1	Destination pin type	[**i**]nput or [**o**]utput
P2	Destination pin number: location where timer/counter is defined	<**pin number**>

Example: Stop a time previously started on output pin 5

- Function: Timer/Counter/Any – Stop
- Parameters: o 5

Output Shutoff Timer - Set

Allows the user to change the shutoff timer value for a digital output.

In-line Parameters

- **P1**: Output Pin Number: Digital output pin number.
- **P2**: New Value Source Type: [i]nput or [o]utput or [u]ser defined.
- **P3**: Pin Number/Value: New Value source pin number or user defined value.

Motor Control and Wear Leveling functions

Motor outputs (P3), Override inputs (P4), Hour Meter outputs (P5) require sequential assignment starting at the pin specified for the number of elements in the sequence. For example, a Z45 Controller having 3 pumps might assign output pin 12 to be the starting pin for the first motor. This would automatically require that output pins 13 and 14 be the starting pins for motors 2 and 3 respectively.

Motor outputs (P3) must be configured so that their initial state is set to zero during automation control start up. All Override inputs (P4) must be configured to execute an override state change function when override pins turn on or off. This means that the override state change must be defined as both the "Off Program" and "On Program" on all override pins. All Hour Meter timers (P5) must be housed in outputs. The value of P5 will be interpreted as an output.

In the following descriptions, P1, P2, P3, etc. are used to indicate positional parameters or arguments that must be specified when using a function. Each parameter or argument given to a function must be separated by a single space.

Motor Control Group

P1	Function type	[**1**]: Start primary motor [**2**]: Start secondary motor [**3**]: Start tertiary motor [**4**]: Start quaternary motor [**5**]: Start all motors [**6**]: Stop primary motor [**7**]: Stop secondary motor [**8**]: Stop tertiary motor [**9**]: Stop quaternary motor [**10**]: Stop all motors [**11**]: Override state change
P2	Motor Count: Number of motors in the group	<**value**>

P3	Motor Start output source pin number; others assigned sequentially	<**pin number**>
P4	Override Start input source pin number; others assigned sequentially **Note** Override refers to a switch or signal to place the motor in service or take it out of service. When the motor is in service it operates automatically under the control of the Control_Motor_Group function. When it is out of service it is not available as a part of the group being controlled. A motor that is out of service can still be switched on and off manually but its state will be unknown to the Control_Motor_Group function.	<**pin number**>

Example: Start the primary pump at a pump station with two pumps starting on output pin 2 that are managed by override switches starting at input 4 and whose hours are tracked on outputs starting at output 6.

- Function: Motor Control Group
- Parameters: 1 2 2 4 6

Example: Stop all pumps at a pump station with two pumps starting on output pin 2 that are managed by override switches starting at input 4 and whose hours are tracked on outputs starting at output 6.

- Function: Motor Control Group
- Parameters: 10 2 2 4 6

Application Status and reporting to Digi Axess functions

Application Status - Force

This function triggers all configured pins to report to services such as MQTT and Digi Axess.

Managing Input Thresholds, Initial Values, and Initial Reference functions

In the following descriptions, P1, P2, P3, etc. are used to indicate positional parameters or arguments that must be specified when using a function. Each parameter or argument given to a function must be separated by a single space.

Input Threshold - Set

P1	Input Pin Number: Numeric/Analog/Pulse input pin number	<**pin number**>
P2	Threshold: [1 - 17] Threshold Number	[**1 - 17**]: Threshold Number of Trigger
P3	Threshold Field to modify	[**1**]: Trigger Value and Reset Value = Trigger * Factor [**2**]: Alarm Repeat Count

		[**3**]: Alarm Repeat Interval (s) [**4**]: Program Repeat Count [**5**]: Program Repeat Interval (s) [**6**]: Execute Threshold Changes [**7**]: Trigger Value and Reset Value = Trigger + Factor
P4	New Value Source Type	[**i**]nput or [**o**]utput or [**u**]ser defined
P5	New Value Source: Pin number or user defined value	<**pin number**> or <**value**>
P6	Factor Source Type	[**i**]nput or [**o**]utput or [**u**]ser defined
P7	Factor Source: Pin number or user defined value. This is used as either: ▪ A multiplier on repeat/interval values a factor multiplied. ▪ Added to trigger to create reset value.	<**pin number**> or <**value**>

Managing Geo-Fences functions

In the following descriptions, P1, P2, P3, etc. are used to indicate positional parameters or arguments that must be specified when using a function. Each parameter or argument given to a function must be separated by a single space.

Geo-Fence - Set

The Geo-Fence Set function enables or disables a pre-configured geo-fence on the unit. Geo-fences are configured on the Z45 Controller's Location Source screen and may be either assigned to automation control for use with this function, or operated from the web interface.

P1	Fence to use	[**1**]: Fence configuration 1 [**2**]: Fence configuration 2
P2	Function	[**0**]: Disable [**1**]: Enable

Example: Enable fence configuration 2

- Function: Geo-Fence – Set
- Parameters: 2 1

Restart the application function

Run Configuration

Produces, under program control, the exact same effect as the **Run Configuration** button on the Automation Control page. This function does not require any parameters.

Input configuration function

Allows the user to change a defined threshold, initial value or initial reference on an analog, pulse, or numeric pin under program control. When this function is executed, the permanent stored value for the selected parameter will be updated. If a threshold value is being updated, that value will immediately go into effect and thresholds will be reevaluated using the new value.

In the following descriptions, P1, P2, P3, etc. are used to indicate positional parameters or arguments that must be specified when using a function. Each parameter or argument given to a function must be separated by a single space.

Input Configuration - Set

P1	Input pin number; Numeric/Analog/Pulse input pin number	Numeric/Analog/Pulse <**pin number**>
P2	Parameter to Modify	[**18**]: Initial Value [**19**]: Initial Reference [**20**]: Minimum Value [**21**]: Maximum Value
P3	New Value Source Type	Digital [**i**]nput or [**o**]utput or [**u**]ser defined
P4	Pin Number/Value: New Value source pin number or user defined value	Digital <**pin number**> or <**value**>
P5	Multiplier: Value by which parameter being modified is multiplied	<**value**>

Cycle Control Group function

Allow up to 10 outputs to be cycled base on a defined configuration.

In the following descriptions, P1, P2, P3, etc. are used to indicate positional parameters or arguments that must be specified when using a function. Each parameter or argument given to a function must be separated by a single space.

Cycle Control Group

P1	Function	[**1**]: Start Cycle Group [**2**]: Start Next Cycle [**3**]: Dwell Current Cycle [**4**]: Stop Cycle Group

P2	Cycle Count: Number of cycles in control group	<**value**>
P3	Control Output Location: Output source pin number of 1st motor; others assigned sequentially.	<**pin number**>
P4	Cycle Setup Location: Output source pin number where cycle setup parameters begin	<**pin number**>
P5	System State Parameters Location: Input source pin number of 1st parameter.	<**pin number**>

Output Shutoff Timer function

Allows the user to change the shutoff timer value for a digital output.

In the following descriptions, P1, P2, P3, etc. are used to indicate positional parameters or arguments that must be specified when using a function. Each parameter or argument given to a function must be separated by a single space.

Output Shutoff Timer- Set

P1	Output Pin Number: Digital output pin number	Digital <**pin number**>
P2	New Value Source Type	Digital [**i**]nput or [**o**]utput or [**u**]ser defined
P3	Pin Number/Value: New Value source pin number or user defined value	Digital <**pin number**> or <**value**>

Send Text to Com Port function

In the following descriptions, P1, P2, P3, etc. are used to indicate positional parameters or arguments that must be specified when using a function. Each parameter or argument given to a function must be separated by a single space.

Send Text to Com Port

P1	Com Port	[**1**]: ttyS1 (RS-232) [**2**]: ttyS2 (RS-485)
P2	Message Line Number: The line number of the text from the text file (opt.rtu_send_ text) that should e send to the Com Port	[**0 - 9**]

Reset Pin Formula function

In the following descriptions, P1, P2, P3, etc. are used to indicate positional parameters or arguments that must be specified when using a function. Each parameter or argument given to a function must

be separated by a single space.

Reset Pin Formula

Reset to zero the value for an input pin where the value is calculated/maintained by a formula. Up to 10 pins can be reset.

In-line Parameters

- **Pin Number(s)**: Input Pin Number: Up to 10 characters, separated by a space.

List of Automation Control program functions

This section contains an alphabetical list of the Automation Control program functions.

Set up I/O modules

Through the use of Input/Output modules, sensor data, MODBUS data, and your local Z45 Controller, information can be brought into the application in order to develop monitoring and control solutions.

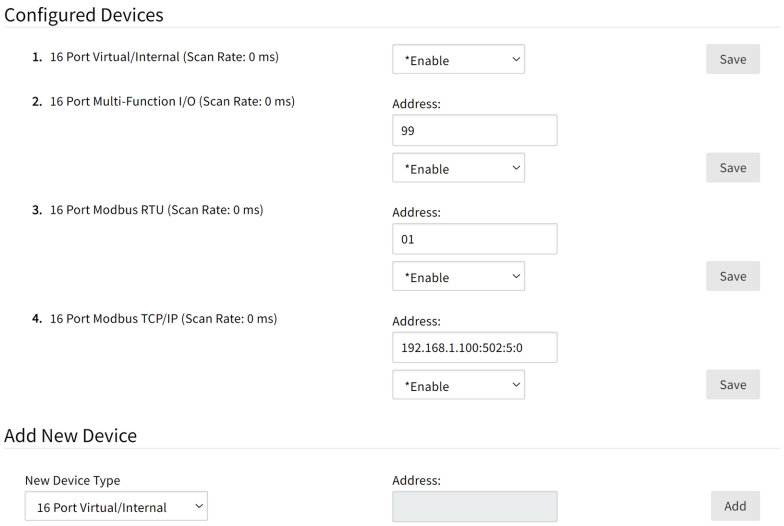
The following I/O module types are available:

- Virtual/Internal module
- Multi-Function I/O module
- MODBUS RTU module
- MODBUS TCP/IP module

All modules enumerate in configurations of 8 inputs and 8 outputs (16 ports). Multiple MODBUS modules can be created for the same address to increase the number of available inputs and outputs.

Add an I/O module

1. Access the Automation Control page.
2. Click **I/O Modules**. The **I/O Module Configuration** page displays.
3. To add a new I/O module, scroll to the **Add New Device** section.
   a. From the **New Device Type** list box, select an I/O module type.
   b. Enter the Z45 Controller's IP address in the **Address** field.
   c. Click **Add**.



16 Port Virtual/Internal module

Characteristics

Consists of 8 virtual inputs and 8 virtual outputs that can be defined as data type digital, numeric, or hex. This module can be used to define the controller I/O (4 inputs/2 outputs) and for utilizing the SDI-12 and TWIG protocol for Nelson Irrigation. Virtual I/O can be used to represent internal values of the

Z45 Controller such as temperature, GPS coordinates, or voltage, for intermediate calculations and for displaying values and results.

Communications

Since Virtual I/O modules are internal to the Z45 Controller, communications is also internal. There are no off-box communications.

Addressing

None

16 Port Multi-Function I/O module

Characteristics

This module type is configured for communication with Digi's 16-Port Multi-Function I/O Modules. They consist of 8 physical inputs and 8 physical outputs. Inputs may be defined as data type digital, analog, or pulse through the Automation Control application. Outputs are of type digital.

Communications

Digi's 16-port multi-function I/O module uses 2-wire RS485 communications with a proprietary protocol. Appropriate settings are all pre-configured on TR2-/TR2+ (pins 15 & 16) of the Z45 Controller.

Addressing

Addresses for 16-port I/O modules are hexadecimal numbers between 1 and FF. Modules are shipped from the factory with a default address of 99.

Resetting an Unknown Address

To address a module with an unknown address perform the following steps

1. Disconnect all I/O modules except for the one having the unknown address.
2. Enter the text “default” for the address of the first physical (16-port) Multi-Function I/O module on the screen.
3. Click **Save**. The connected module is given the address of "99" by default.
4. Change the address of the target module to the desired address.
5. Click **Save**.

Note If multiple modules are connected during the default addressing described above, all will be set to address 99.

Replacing a 16-port Multi-Function I/O module

To replace an I/O module while retaining its current configuration perform the following steps

1. Remove the module to be replaced from the RS485 string.
2. Remove any module on the RS485 string having the address of 99.
3. Connect the new (replacement) module to the string.
4. Assign an address of 99 to that module.

5. Click **Save**.
6. Assign the desired address to that module.
7. Click **Save**.
8. Reconnect previously disconnected modules.

16 Port Modbus RTU module

Characteristics

A Modbus I/O module consists of 8 inputs and 8 outputs which can be mapped onto Modbus registers, holding registers, or coils through the Automation Control Application. Inputs and outputs may be defined as data type digital, numeric, or hex.

Communications

A 16-Port MODBUS module supports 2-wire RS485 communications with a MODBUS RTU protocol.

Addressing

Addresses for 16-port Modbus I/O RTU modules (RS485) are hexadecimal numbers between 01 and EF. You must use caps for Hex. This address must match the I/O modules address assignment.

16 Port Modbus TCP/IP module

Characteristics

A Modbus I/O module consists of 8 inputs and 8 outputs which can be mapped onto Modbus registers, holding registers, or coils through the Automation Control Application. Inputs and outputs may be defined as data type digital, numeric, or hex.

Communications

A 16-Port MODBUS module supports TCP/IP communications with a MODBUS TCP protocol.

Addressing

Addresses for 16-port Modbus TCP/IP modules are in the following format:

<IP Address>:<Port>:<Poll Rate>:<Client ID>

Where:

- **IP Address**: 4-ocet V4 IP address of the Modbus device
- **Port**: Modbus port number (0 – 65535)
- **Poll Rate**: Polling time value for TCP communications with the Modbus device (1 – 9999 sec.). The recommended poll rate is 5 seconds.
- **Client ID**: Optional device ID which may be required depending on vendor. Defaults to zero if not specified.

Examples:

- 192.168.1.200:565:20
- 10.10.30.44:1017:20