Phoenix Controls

Room Pressure Indicator (RPI) User Guide

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Section 1. Overview

For anyone other than persons with the requisite administrative rights, the Room Pressure Indicator (RPI) is a visual display of a room's current pressure state in which the only action that can be taken is muting an alarm. Screens are color coded for an easy room pressure status check (Green = Normal, Yellow = Warning, Red = Alarm).

For persons with administrative rights, configuring the RPI settings requires a 4-digit Administrative Code for access to those screens. Only one Administrative Code can be assigned to each RPI regardless of how many staff are authorized to access configuration.

IMPORTANT: *The Room Pressure Indicator (RPI) supports a secure boot feature to ensure that it only runs firmware signed by Phoenix Controls. If the RPI device is not able to boot during the commissioning process, please contact Phoenix controls to get support.*

Section 2. Getting Started

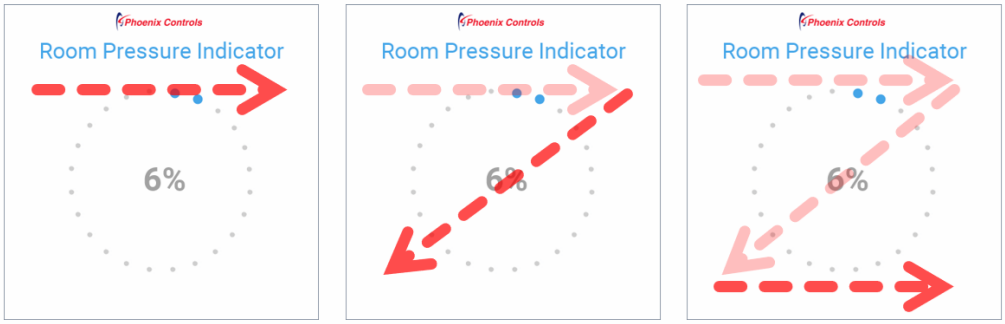
2.1 PIN Access Code

Starting up the RPI for the first time, a 4-digit PIN code to access configuration settings must be created.

1. Once the device boots up, left swipe the screen to access *Administrator Pin Code Setup*. Only one pin code can be set for each RPI, regardless of the number of staff with administrative access. Enter the four digits and press the blue check button.
2. A confirmation screen is displayed for the code. Re-enter your PIN and press the blue check button.
3. When confirmation is completed, a Successful! message is displayed and your PIN is active.

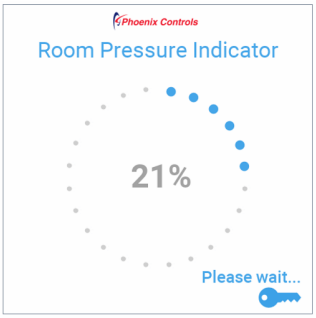
If the pin code is forgotten, log in protection denies access to the PIN Code Setup screen. The only non-network option for reinstating access is to start the forgot pin code process. Reboot the RPI and do the following as it is booting up:

1. Make three separate swipes on the screen in the shape of a Z. Start upper left to upper right, then diagonally from upper right to lower left, then lower left to right. Lift your finger up between each pass - they must be separate actions.



2. Once you begin swiping the screen, you have 3 seconds to complete the Z.
3. If your first attempt fails, you can try again (and again) as long as the firmware is loading.

4. Successfully making the 3 swipes displays a key icon and please wait message.



5. Once the firmware boots up, the Administrator Pin Code Setup screen is displayed. Follow the previous steps for setting up the PIN code. You will get one chance to reset the PIN.
6. If you fail to establish the access PIN, the RPI must be rebooted to try again.

2.2 Auto-Logout/Device Lockout Timers

There are two non-configurable timers in the RPI:

- In all the configuration screens, auto-logout begins after 60 seconds of inactivity and is preceded by a 10 second warning which can be used to cancel the auto-logout.
- Device lockout - set in Security > Attempts Allowed - a configurable number of incorrect login attempts after which the system will lock the user out from retrying. It can be disabled or enabled with a value anywhere from 1 to 10. After the configured number of failed attempts is exceeded, the lockout lasts for 60 seconds.

2.3 Zeroing Out the Pressure Transducer

After the pressure transducer has been powered up for at least 15 minutes, open the door to the space or disconnect the pressure tubes on the pressure transducer to ensure there is zero pressure across the pressure transducer. While the door is open or pressure tubes are disconnected, press and release the *Zero button* on the front of the pressure transducer. This will zero the pressure transducer.

Section 3. Error Handling

When the transducer signal is outside of the configured range, or when there is a general firmware error, the related error screen below is displayed. From either screen it is still possible to navigate to the Configurations screens as long as the underlying firmware is still functioning.

Transducer Out of Range

Firmware Failure

Section 4. Configuring the RPI

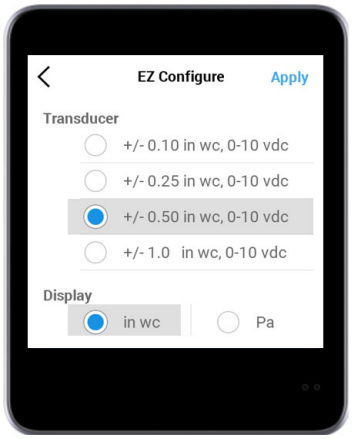
NOTE: The textbox and keyboard used on the Login screen are standard throughout the RPI when text or numeric entries are made.

To access the standby or configuration screens do one of the following:

- Press the Pause icon upper left on the display to put the RPI in Standby Mode. The 4-digit PIN is required to enter Standby. During Standby mode, there is no pressure monitoring and no alarms can occur. To exit Standby and return to operation re-entering the PIN is also required. Note the System Status > Room Status screen reflects this state.
  Or
- Swipe left on the screen to go directly to the login screen for configuration settings. The RPI remains operative and the System Status > Room Status screen reflects the current pressure state (NORMAL, WARNING, ALARM).

Until the RPI Warning and/or Alarm thresholds are configured the device always displays pressure condition Normal. Left swipe the display to enter your Administrative Code and access the Configuration main menu. Use finger pressure on the screen to scroll the main and configuration menus for all available settings. See the following sections for individual configuration screen details.

EZ Configure



This quick start screen contains the most basic settings to make the RPI operational. You must choose a transducer type and displayed pressure units to enable **Apply**. Once you press **Apply**, navigate back to the home screen (active display) to validate the settings are active. You can also see and adjust your transducer pressure and signal range under the I/O menu item on the Transducer Input screen.

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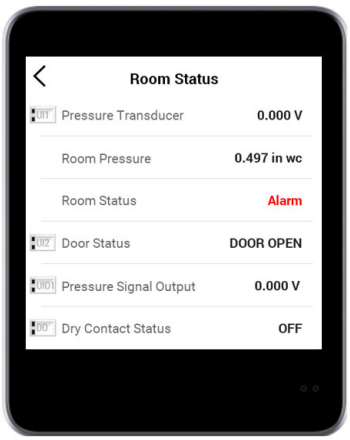
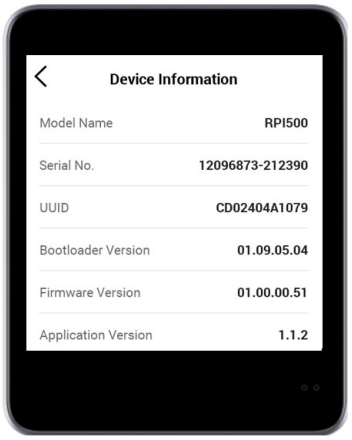
System Status

Sub-menus under System Status provide room/device/network compendiums of Read Only information for at-a-glance review of device-significant information. Dynamic information on a screen, such as Room Pressure or Door Status, continuously update to the current values. See screen captures below.





Communication

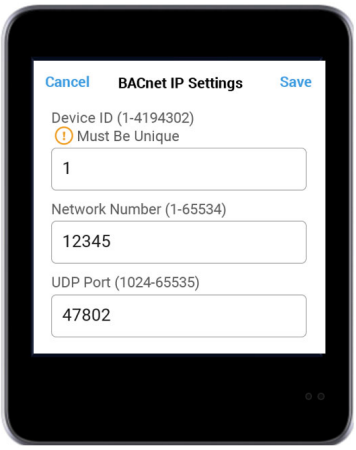
Not Connected

This setting makes the RPI a standalone device. For either BACnet option, once it is selected press Next.

BACnet IP (WiFi)

The BACnet IP (WiFi) screen allows the user to make changes to the current network properties for this device, or to begin connecting to a WiFi Network. Click the appropriate menu button to proceed, refer to the related following section for more information.

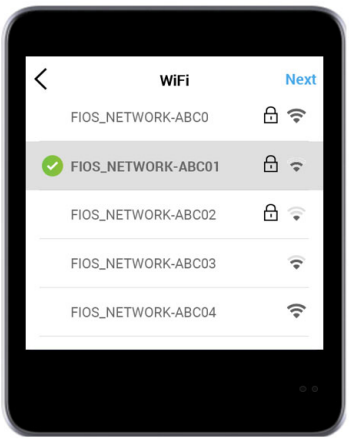
BACnet Network Settings



BACnet properties Device ID, Network Number, and UDP Port can be changed from this screen. Once a value has been edited, the **Save** button is enabled.

- The Device ID parameter is the same value that can also be edited from the BACnet MS/TP screen.
- When finished, return to the main BACnet IP (WiFi) screen by pressing the back arrow (<).

WiFi



Pressing WiFi on the BACnet IP (WiFi) screen initiates a scan for networks, producing a list of those found on this screen. Choose a network and press Next to display the WiFi Password screen and successfully join the network.

IMPORTANT: A laptop->RPI WiFi connection is used for any downloadable updates for the device.

BACnet MS/TP

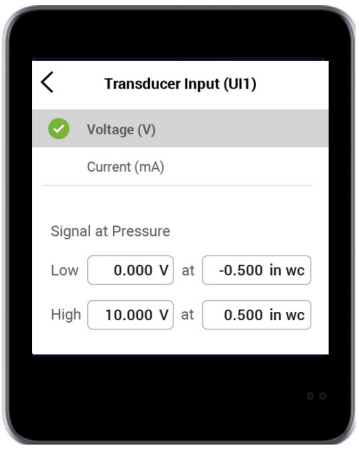
Pressing Next displays the enabling screen. Once enabled the MS/TP device settings are available - scroll the screen to view all settings.

- To change the Auto Mac Address, press Manual to make a keypad entry.
- Click the Baud Rate drop down to select the desired communication speed.

Applying the settings (press Save) requires device restart.

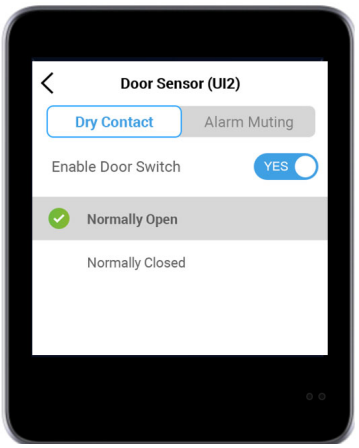
I/O

Transducer Input (UI1)



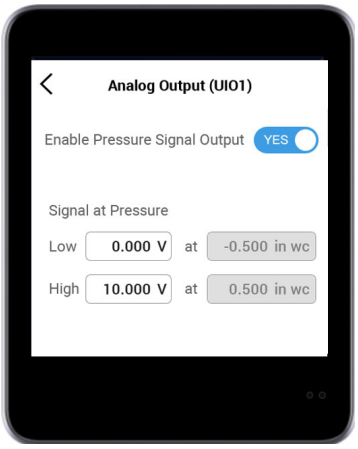
IMPORTANT: The signal and pressure values configured on the screen MUST exactly match the transducer hardware.

Door Sensor (UI2)



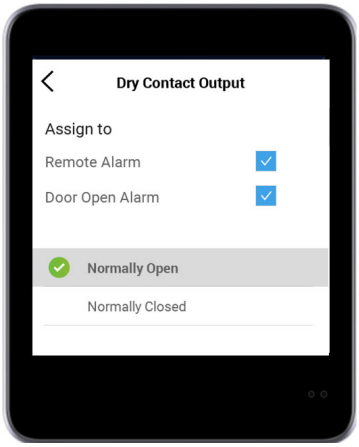
The door open icon on the home screen (active display) is only present when this switch is enabled. Under the Alarm Muting tab, a delay can be set so that, once the door sensor trips, the alarm sound does not occur immediately. Note that if the pressure increases, the screen will indicate an alarm, however the mute will be active for this configured amount of time. It can be set to indefinite, meaning the alarm sound never occurs, or it can be muted for a user-configured number of seconds, from 1 to 99,999.

Analog Output (UI01)



Provides a signal representing the current pressure. In this screen the signal can be scaled as needed for use by another device, always in volts. The pressure range matches the configured transducer range. However the scaled voltage range can be customized as needed, within 0 to 10 Vdc.

Dry Contact Output



Assign to either or both output choices to provide a usable signal to the BMS or somewhere else (e.g.: a nurses station). Note that the Door Open Alarm option is only available if the door switch has been enabled.

Alarms

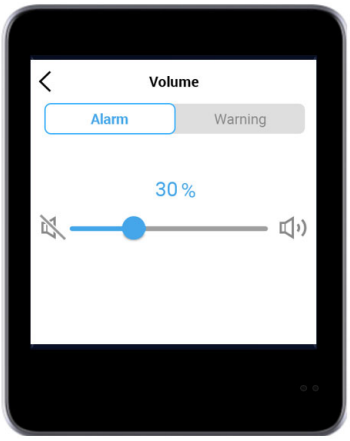
Set Points

IMPORTANT: Any combination of Hi and Lo Warning and Alarm thresholds may be enabled. However, make sure to note the following rules:

1. Values fall within the range configured for your transducer.
2. Hi values must always be greater than Lo values, with a small buffer. For example, if Hi Alarm is set to 0.100 in wc, then Hi Warning must be less than 0.097 in wc.

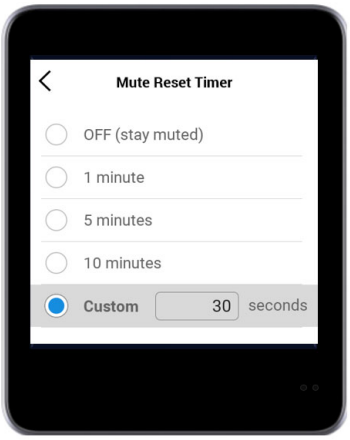
The RPI will automatically make adjustments as needed to keep these rules in place.

Volume



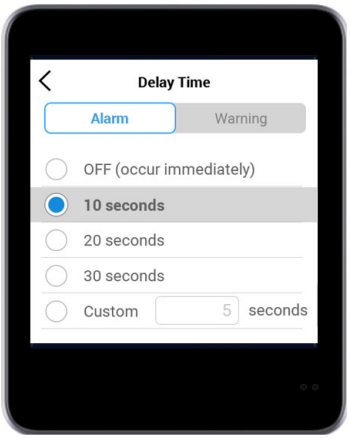
Alarm and Warning loudness are independent of each other and are set separately using the slider. At the maximum (100%) volume setting, the RPI sound will reach 80 dB at a distance of 0 feet away, 75 dB at 1 foot away, and 70 dB at 4 feet away.

Mute Reset Timer



Establishes the duration of any alarm muting, custom set limit is 99999 seconds. Once this timer expires, the mute is removed and the alarm will sound again. Setting this feature to OFF means that once an alarm is muted, it will no longer sound for the duration of the pressure being in this state (WARNING or ALARM).

Delay Time



For both Alarms and Warnings, a delay can be set for an interval between when the threshold value is exceeded and the Alarm or Warning occurs. Custom set limit is 99999 seconds.

Display

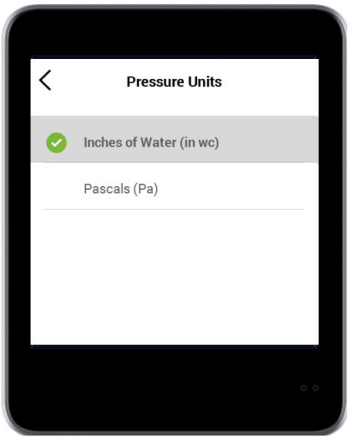
Brightness

This screen's brightness adjusts with the slider to reflect the setting. The brightness ranges from 10% (which matches the dimmed *sleep* state) to 100% which is the maximum brightness level supported.

Language

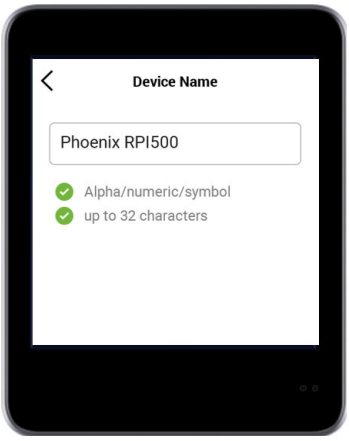
Currently only English is supported.

Pressure Units



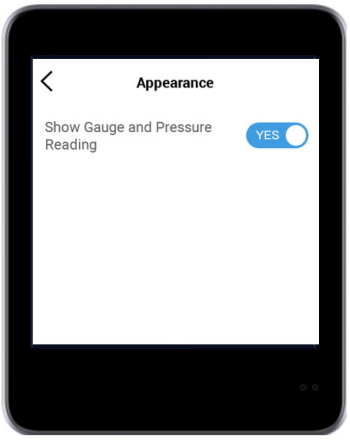
Applied globally to all configuration screens and the display (i.e., will change I/O > Transducer units).

Device Name



Alpha-numeric entry to associate the RPI with the monitored space. This name is displayed in the upper left corner of the home screen (active display). To hide, leave the name blank (empty).

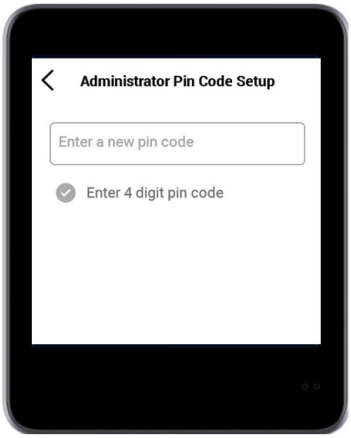
Appearance



Show/hide the on-screen pressure gauge and pressure reading. Hiding the gauge and reading center-aligns the home screen (active display).

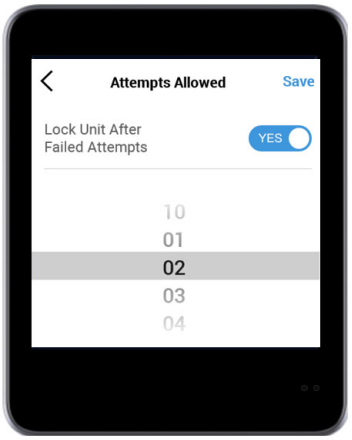
Security

Change Pin Code



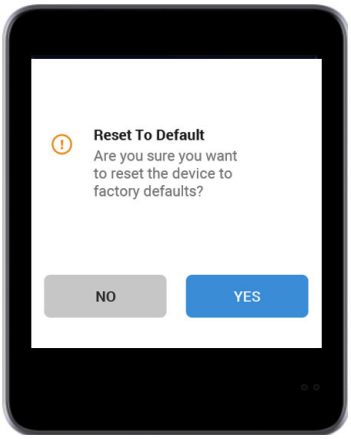
Enter a new Administrative 4-digit access code. This PIN Code input screen behaves the same as those used for the initial 4-digit entry and throughout the RPI.

Attempts Allowed



If you don't elect to lock the unit after a selected number of failed attempts, the number of failed attempts does not apply. Once the designated number of failed logins occur, the RPI will lock out further attempts for 60 seconds.

Reset to Default



Globally changes any RPI configuration settings to factory default. You will need to set up the Administrator pin code when logging in.

- Pressing Yes restarts the RPI.
- Pressing No returns to the main menu.

Section 5. RPI FAQs

Login

I forgot my PIN code, what do I do?

Refer to the section *Getting Started - PIN Access Code* for instructions on resetting the pin code.

How do I configure multiple log-in levels/Users?

The RPI has only one log-in level: Administrator. This pin code is set up the first time the user navigates to the Standby Mode or the Settings screens.

Pressure

I just see a black Pressure Out of Range screen. How do I fix it?

This indicates that the pressure reading is outside of the range you have configured.

1. Make sure the transducer is properly plugged into Input #1.
2. Check that the values configured for min signal and max signal are equal or greater than the actual transducer's limits. You will find this setting by swiping left, logging in then under I/O > Transducer Input.
3. Verify that the actual transducer signal on the screen System Status > Room Status matches the expected value.

How do I change pressure units to pascals or inches of water?

Display units are configured by swiping left, logging in, and going to Display > Pressure Units.

How do I hide the gauge and pressure reading on the home screen?

Swipe left, log in, then go to Display -> Appearance.

Door Switch

Why doesn't the door switch status show on the home screen?

Door status will only appear if the door switch is enabled. Door status is indicated by a large door icon when the door is open; door closed has no indicator - the RPI just shows the standard icon for that pressure state.

1. Swipe left, log in and make sure the switch is configured properly under I/O > Door Sensor.
2. Verify that the sensor has been properly plugged in to Input #2.
3. Verify the expected door sensor value is shown in System Status > Room Status.

Why is there no sound when the door is opened; how do I turn off the sound when the door is opened?	The Door sensor has its own muting capability so that, even though a warning or alarm occurs, no sound will be heard. This can be configured to last indefinitely, or for a specific number of seconds. The Muting screen is found by swiping left, logging in, and going to I/O > Door Sensor > Alarm Muting.

Alarms

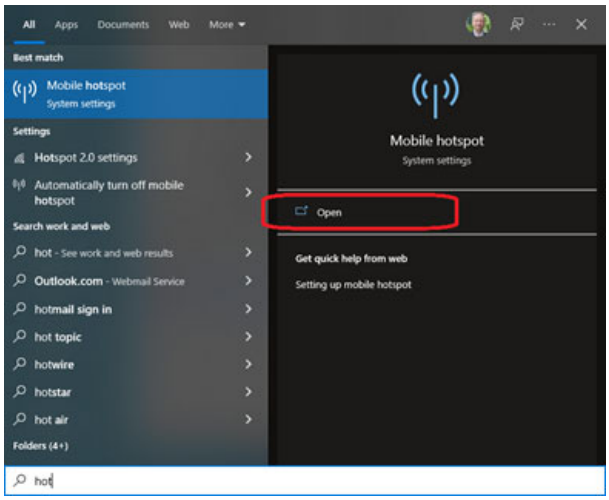
After I mute an alarm, why does the alarm start sounding again?	An alarm mute lasts until the pressure has left the current state (Warning or Alarm), OR when the configured Mute Reset time has expired. This property can be changed by swiping left, logging in, and going to the screen Alarms > Mute Reset Timer.
Can I give the pressure extra time to recover before the RPI goes into Warning or Alarm?	If you do not want to increase the thresholds for warning or alarm, yet wish to give the room some additional time to recover before posting an alarm or warning, the alarm delay time can be used. *This is not the same as the door sensor sound delay, which has its own configurable delay.* To set a warning or alarm delay time, swipe left, log-in and go to Alarms > Delay Time. Alarm and Warning can be separately configured with custom delays.
Why is the RPI showing the green NORMAL screen even though the pressure on the screen is way out of normal?	Warning and Alarm thresholds must be configured. The RPI by default has no alarms and no warnings enabled. To set up the threshold(s), swipe left, log in and go to Alarms > Set Points. Refer to this User Guide's Alarms Set Points section, located under Configuring the RPI for details.

Section 6. RPI500 and Niagara Workbench

This following sections describe the entire setup process for integrating a Phoenix Controls RPI500 with either the Niagara or Phoenix Workbench. By connecting the RPI500 device to a laptop hotspot, the device can be discovered as part of the BACnet network within a Niagara or Phoenix station. Once added to a station, updated firmware can be downloaded to the device through the Phoenix Device Manager. RPI500 devices can be configured through BACnet by using the RPI500 Commissioning Tool (RPI-CT), also available in the workbench. Real time data points are polled with the RPI-CT to assist in troubleshooting.

6.1 Laptop Communication Setup

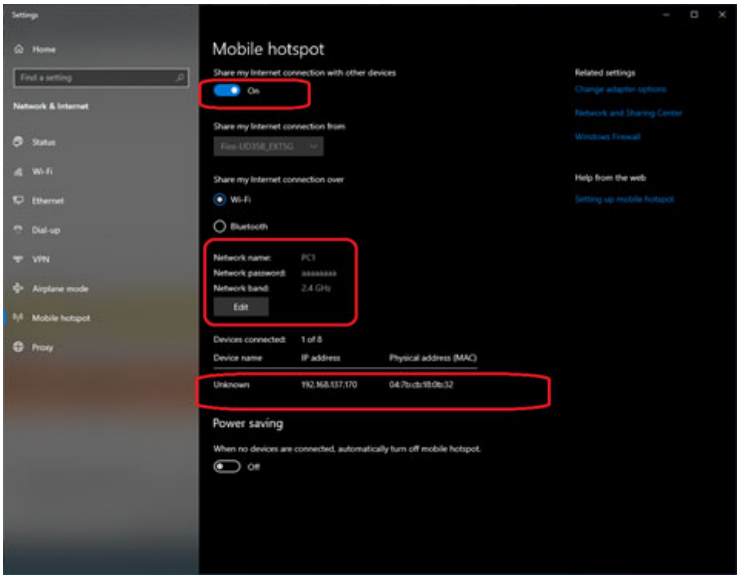
The RPI500 communicates though your laptop's mobile hotspot. To launch the mobile hotspot setup page, click the Windows Start menu icon and type mobile hotspot or hotspot, then click Open.



Once the Mobile hotspot window is displayed, edit the network.

1. The name you choose will appear on the RPI network screen when looking for networks.
2. Choose a password which will be entered on the RPI to join this network.
3. Click the On button.

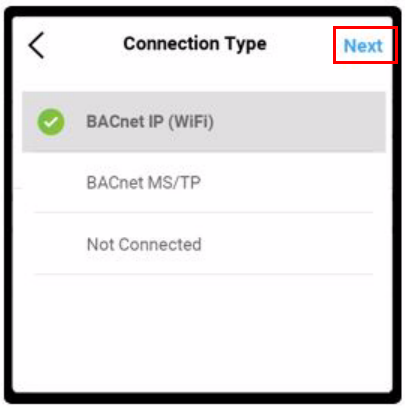
At this time, no devices will appear connected. Once the RPI has connected, it will be listed as shown in the device table in the following screenshot.



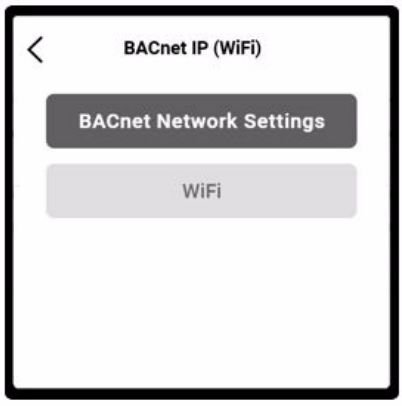
6.2 Connecting the RPI500

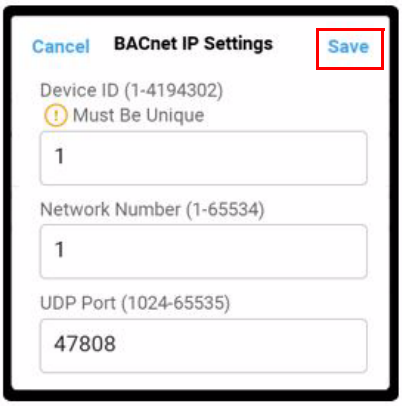
1. Once the mobile hotspot above has been turned on, swipe left on your RPI500 screen to login to the configuration pages.

2. In the Configuration menu, tap *Communication*. On the *Connection Type* screen tap *BACnet IP (WiFi)* then tap *Next*.

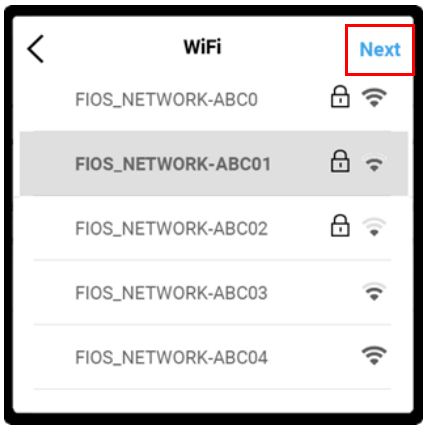


3. On BACnet IP (WiFi) screen tap *BACnet Network Settings*. On the BACnet IP Settings screen, *ensure the UDP Port is set to 47808*. If not, edit to the correct value then tap *Save*.

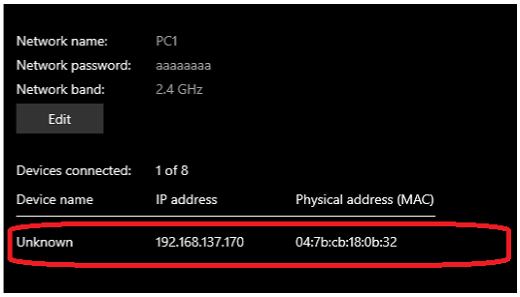




4. You'll be returned to the BACnet IP (WiFi) screen. Tap *WIFI*, which begins a scan of the available networks. When the scan is complete (example below), find your laptop's network in the list. Tap that network, then tap *Next*. You will be prompted for a network password.

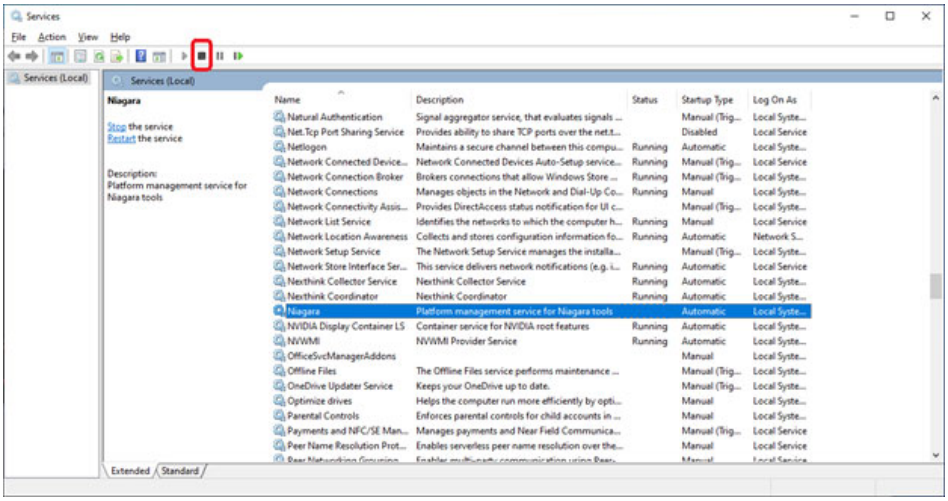


5. Enter the password which you created on your laptop when creating the mobile hotspot. The RPI500 will attempt to log-in to your mobile hotspot. If successful, the following success message is displayed on the RPI500, and the device is listed in your laptop hotspot screen's device table.

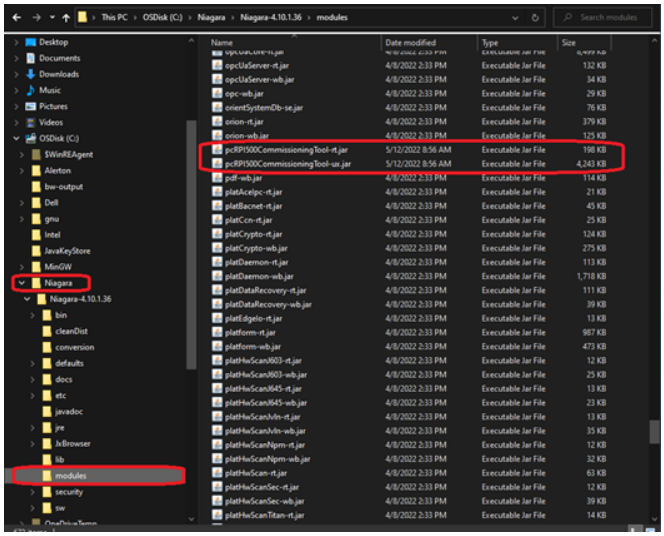


6.3 Setting Up a Niagara Station for the RPI500

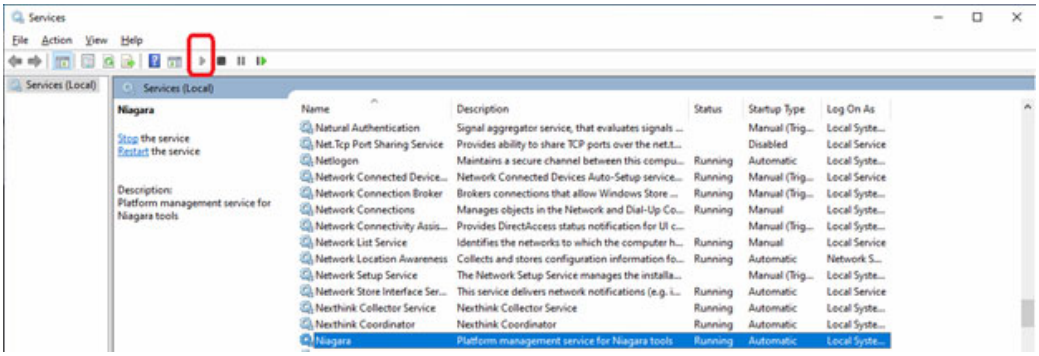
IMPORTANT: *Before starting your workbench setup, first make sure Niagara is not running and the Niagara service has been stopped using the interface button provided.*



1. From the files provided by Phoenix Controls, copy the two jar files *pcRPI500CommissioningTool-rt.jar* and *pcRPI500CommissioningTool-ux.jar* and paste them into your Niagara Modules folder. This may require administrative permissions.

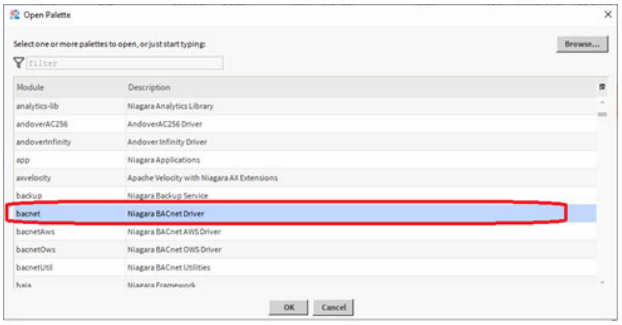


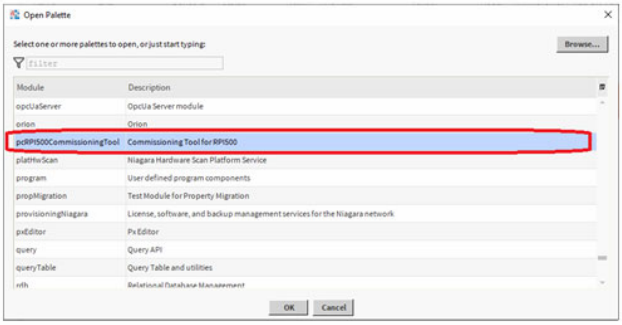
2. Once the file copy/paste is completed, restart the Niagara service using the interface button.



3. Launch workbench and create a new station. Two palettes are used in setting up a station for use with the RPI500. It is recommended that they be opened in workbench. If the palette is not visible, in the workbench top menu select Window > Side Bar > Palette. Then click the open icon. The Open Palette screen is displayed.

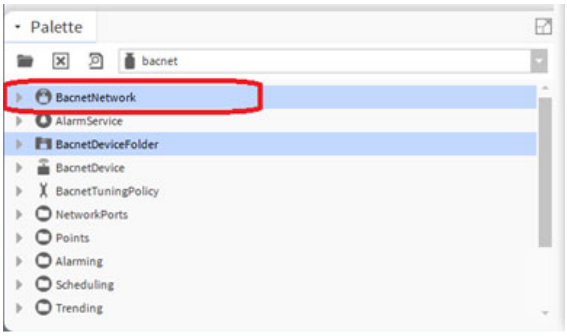
4. Find and open the *bacnet* and the *pcRPI500CommissioningTool* palettes.



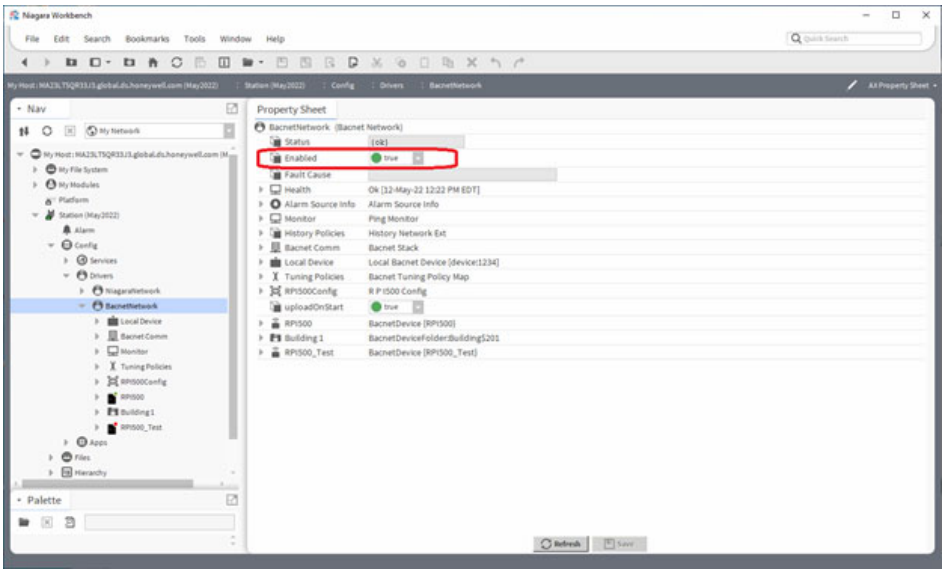


6.4 Seting Up the BACnet Network

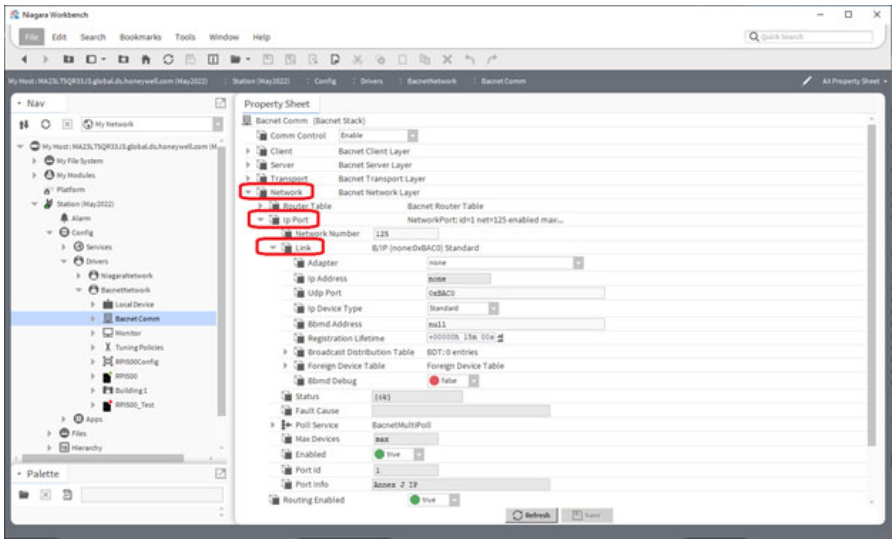
1. If the station does not yet contain a BACnet network, drag a BacnetNetwork from the bacnet palette to the Drivers folder of your station.



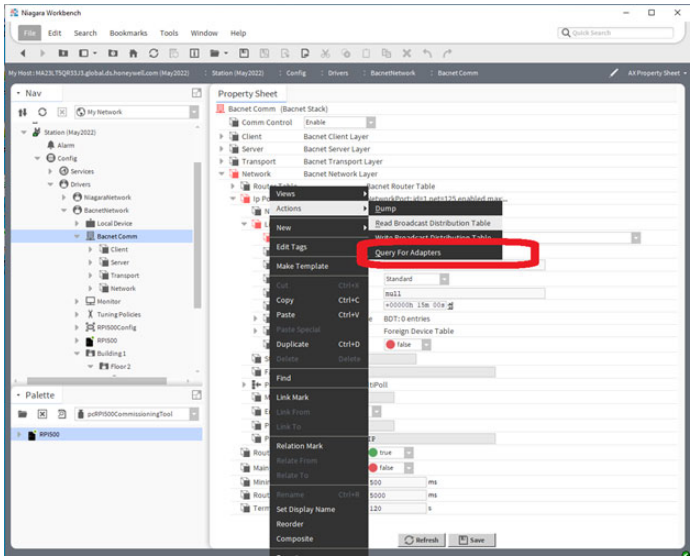
2. Right-click the BacnetNetwork in your station's navigation tree, and select *AX Property Sheet*. Make sure the network is enabled as shown here.



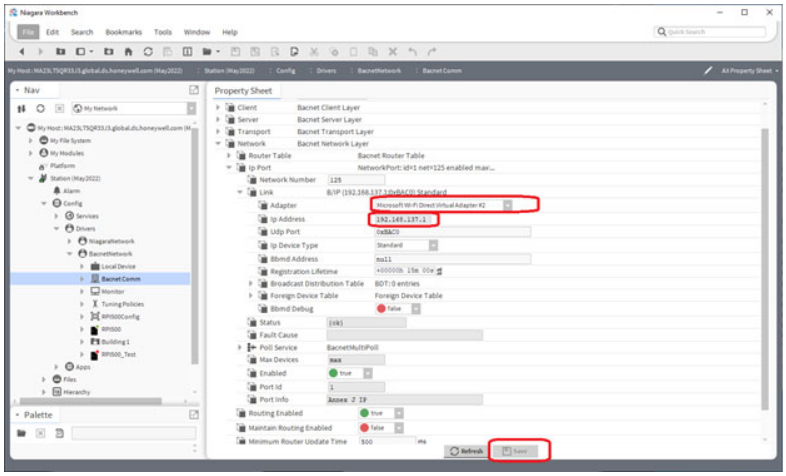
3. Double-click the BACnet Comm in the property sheet to open that property sheet. Open the Network, then opent the IP Port and Link objects underneath:



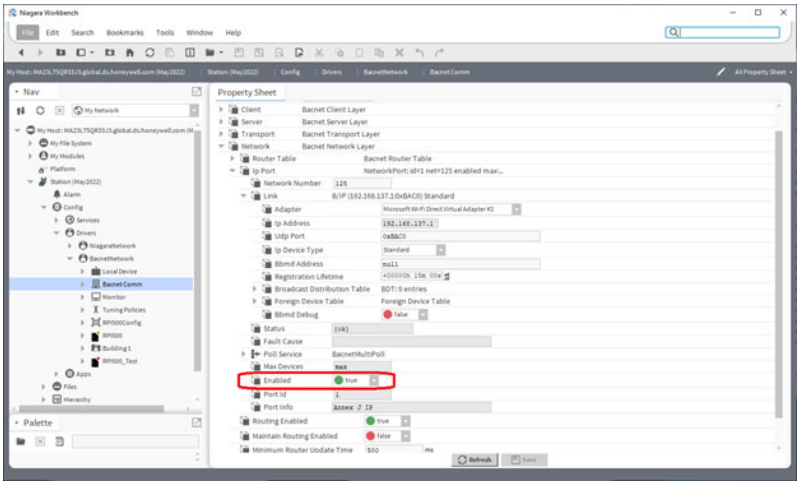
4. Right-click the *Link* object and from the menu choose Actions-> Query For Adapters.



5. In the Adapter dropdown list, choose the *Microsoft Wi-Fi Direct Virtual Adapter*. Click the **Save** button, which will fill in the IP Address field.



6. Make sure Ip Port is enabled.

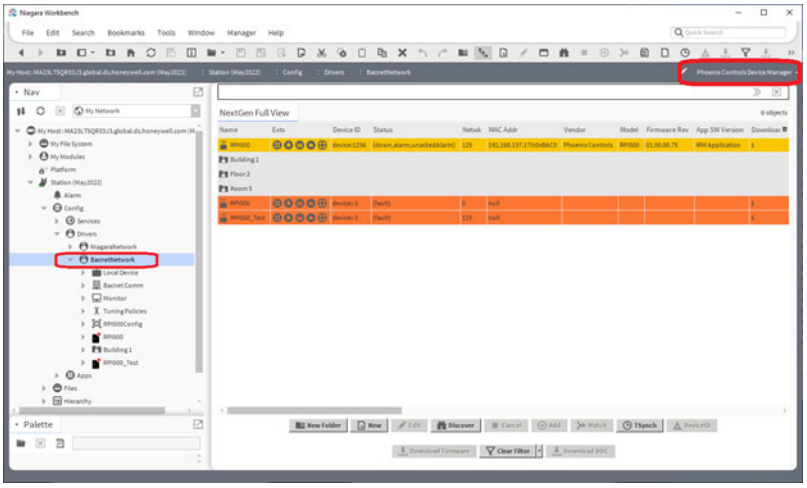


7. The Ip Port *Status* should now read {ok}. If the BACnet set up has been done properly, the Phoenix Device Manager's Discovery button in the next section will be enabled. If not, re-check the previous steps in this section.

Section 7. Working in Phoenix Controls Device Manager

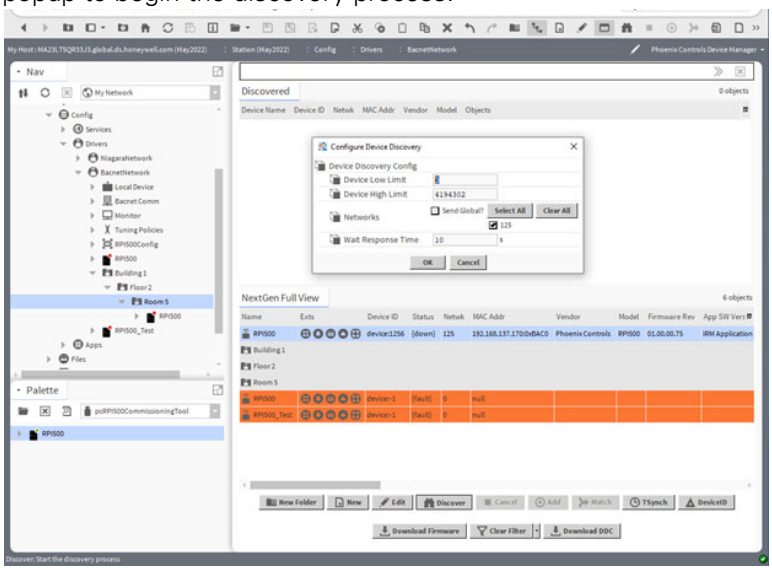
The Phoenix Device Manager is a BACnet device viewer with additional features for Phoenix BACnet devices. It allows BACnet devices to be discovered and added to a station; provides a way to download firmware to one or more devices with a single command; and allows for customized views, filtering by device types with columns that can be shown or hidden. The depth of devices seen can be controlled by selecting either the current bacnet folder or the folder with all of its child folders (the full navigation hierarchy).

To launch the Phoenix Controls Device Manager, double-click on the BacnetNetwork object in the station's navigation tree, or on any bacnet device folder. The Phoenix Device Manager is the default view shown. The action buttons in the button of the window will become enabled depending on which devices are selected. For example, the Add button is only enabled if a newly discovered device has been selected.

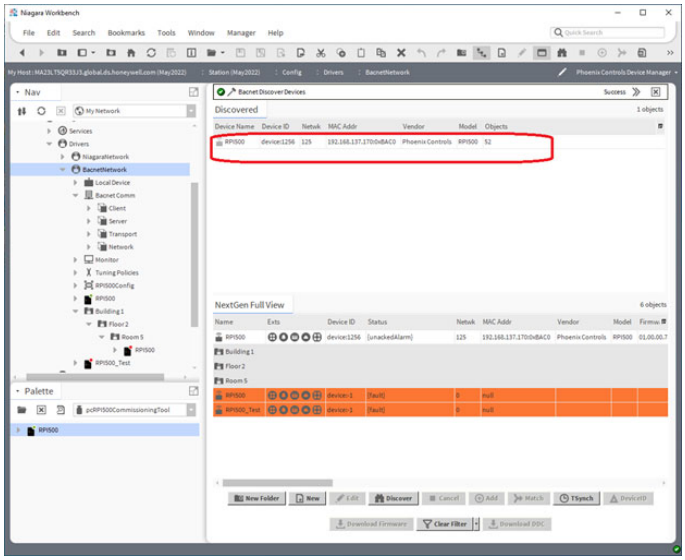


7.1 Discovering RPI500s

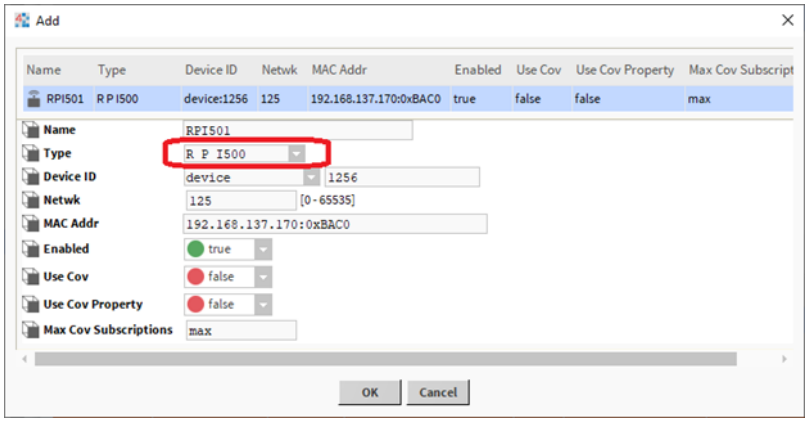
1. The *Discover* button at the bottom section of the screen should be enabled. If not, check the settings of the BacnetNetwork as described in the previous section. Click the *Discover* button then click *OK* in the Device Discovery popup to begin the discovery process.



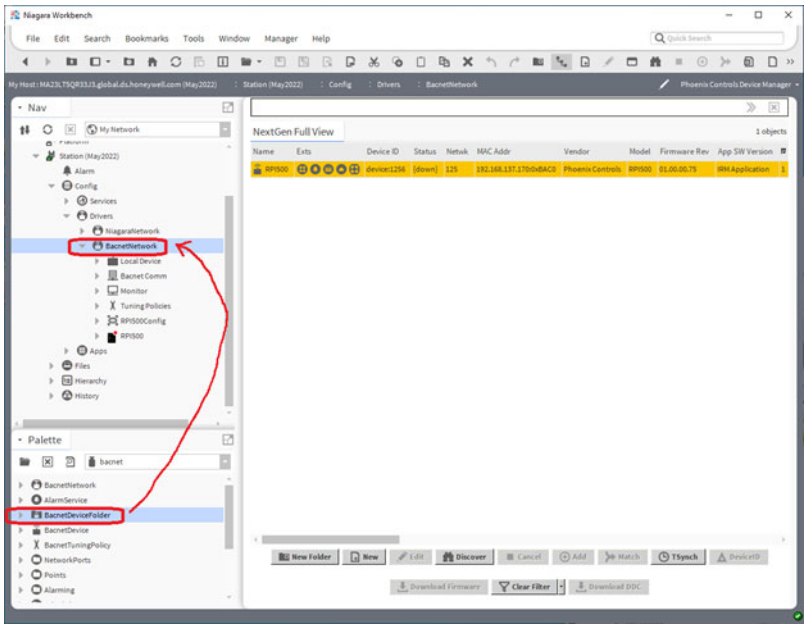
2. Discovered devices are listed in the upper panel of the window. If no devices are discovered, try rebooting the RPI500 device and reconnecting it to the laptop's mobile hotspot.



3. Selecting one or more discovered devices enables the Add and Match buttons, allowing the device(s) to either be added to the station as new devices or matched to a existing RPI500 devices. Clicking Add displays a pop-up screen - *make sure the Type selected from the drop-down list is RPI500 and not a generic Bacnet device.*



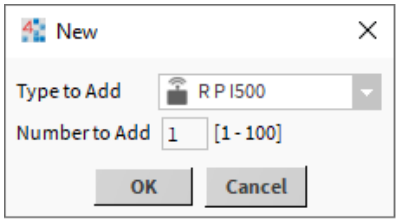
4. An added device appears to the left in the station navigation window. Devices can be located either directly under the BacnetNetwork, or, to add hierarchy (such as Buildings, Floors, Rooms, etc.), use BacnetDeviceFolders to create the desired structure. BacnetDeviceFolders can be dragged from the bacnet palette to the BacnetNetwork.



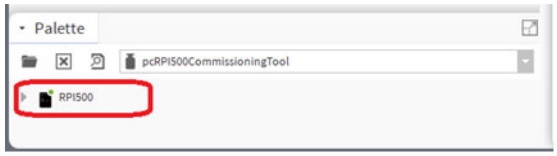
Add a New (undiscovered) RPI500 Device

New RPI500 devices can be created in one of two ways:

1. Click the New button from the Phoenix Controls Device Manager and select the type as RPI500.

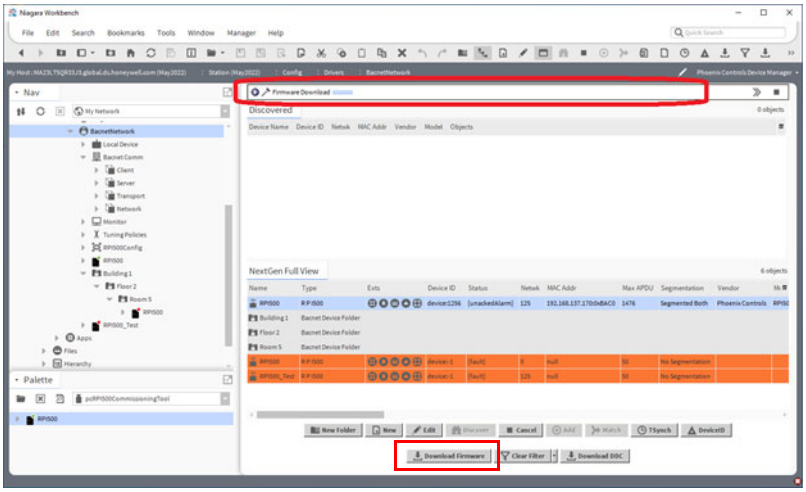


2. Drag an RPI500 from the pcRPI500CommissioningTool palette to either the BacnetNetwork or any Bacnet device folder under the BacnetNetwork.

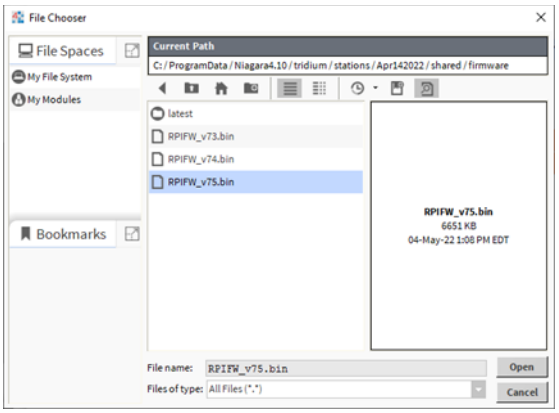


7.2 Downloading Firmware (Device Manager)

1. To Download firmware to the RPI500, it must be discovered from the *Phoenix Device Manager* (see section on Device Discovery). Select the device (or multiselect using the Shift or Ctrl keys), then click the Download Firmware button at the bottom of the Phoenix Device Manager screen.



2. In the popup that displays, browse to the firmware file, choose it and click *Open*.



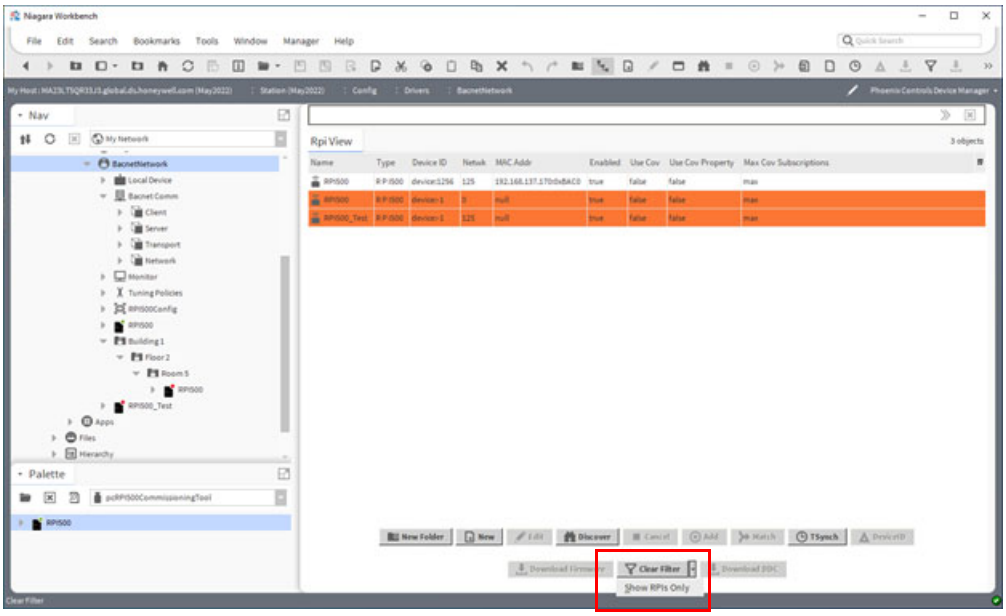
Wait for the firmware download to complete, which may take as much as 5 - 10 minutes.

3. The RPI device shows no change on its screen during the download. When the download is complete, the RPI reboots automatically. The new firmware version can be seen in the RPI splash screen during device startup, or by navigating to the System Status -> Device Information screen on the RPI.

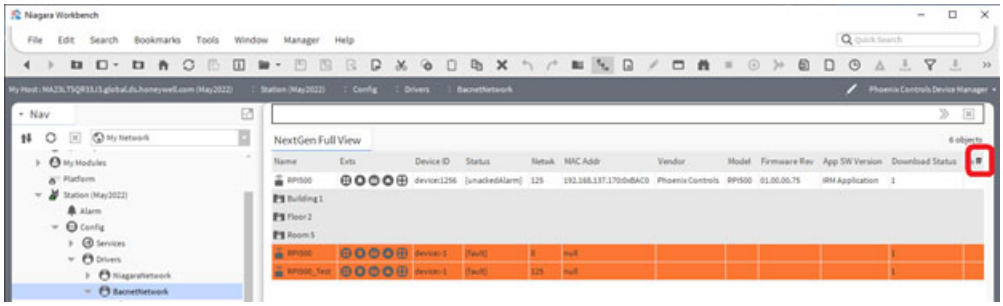
Customize Your View

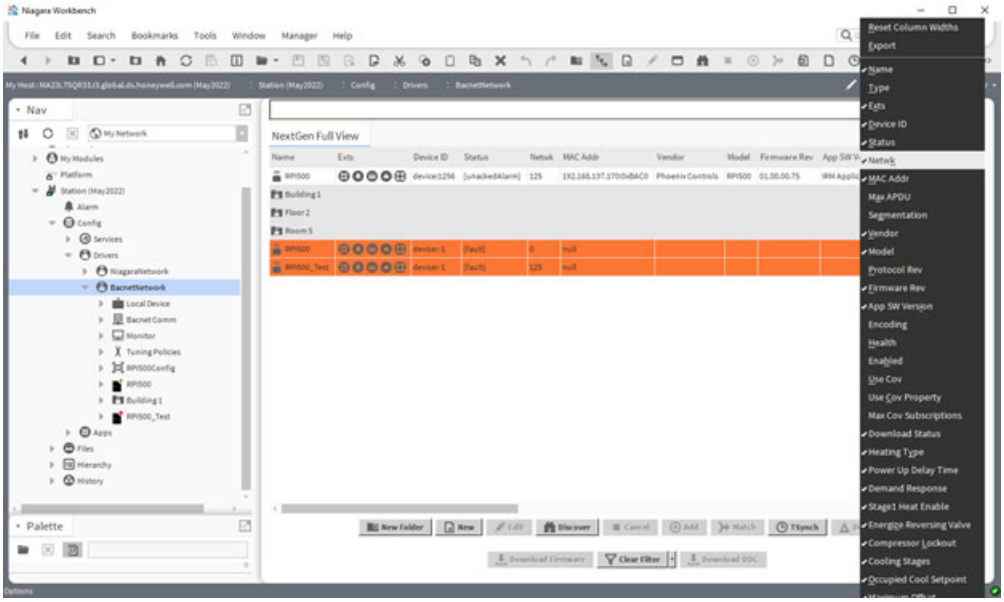
The Phoenix Device Manager default view displays all Bacnet Devices and Bacnet Device Folders based on the navigation tree location it was launched from.

- To filter the default view so that only RPI devices are shown, click the dropdown button next to the Clear Filter button and select Show RPIs Only.
- To reset the view back to the default, click the Clear Filter button.

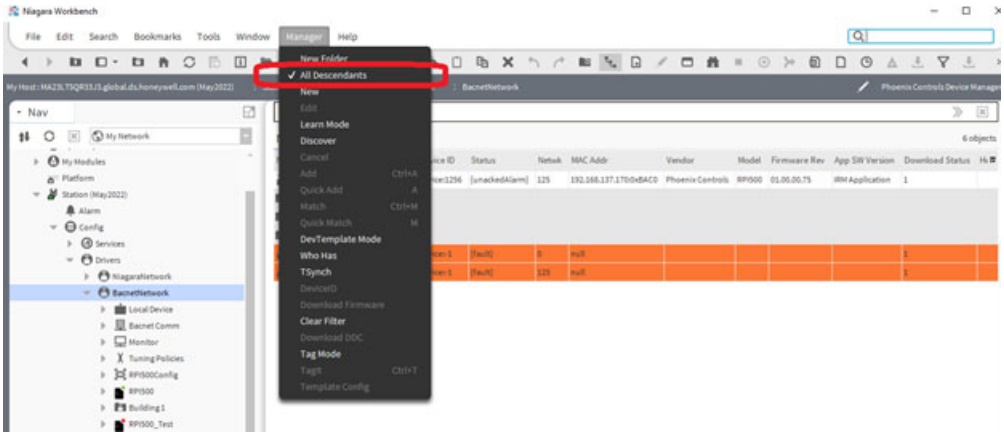


Depending on the filter chosen and the devices present, the default columns for that choice are shown. To hide any of those columns or to choose from the full list of available columns to show, click the Table icon in the upper right corner and select or unselect the desired column names.





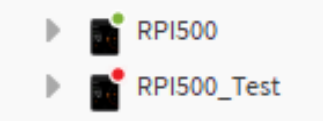
By default, the full hierarchy below the object selected in the navigation tree is displayed. If you only want to see objects in the current level of the navigation tree, click *Manager* in the top menu bar and uncheck *All Descendants*.



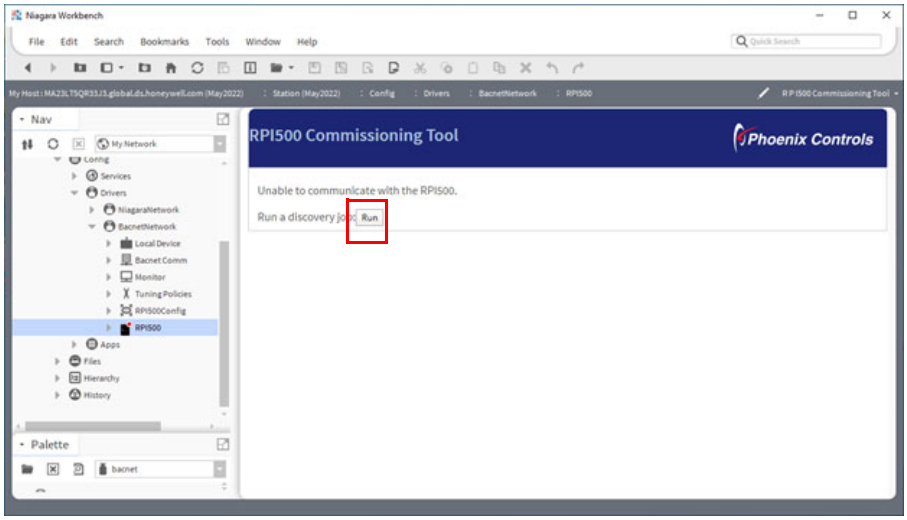
Section 8. Using the RPI Commissioning Tool

The RPI500 Commissioning Tool views the current configuration and present data from a single RPI device in the station.

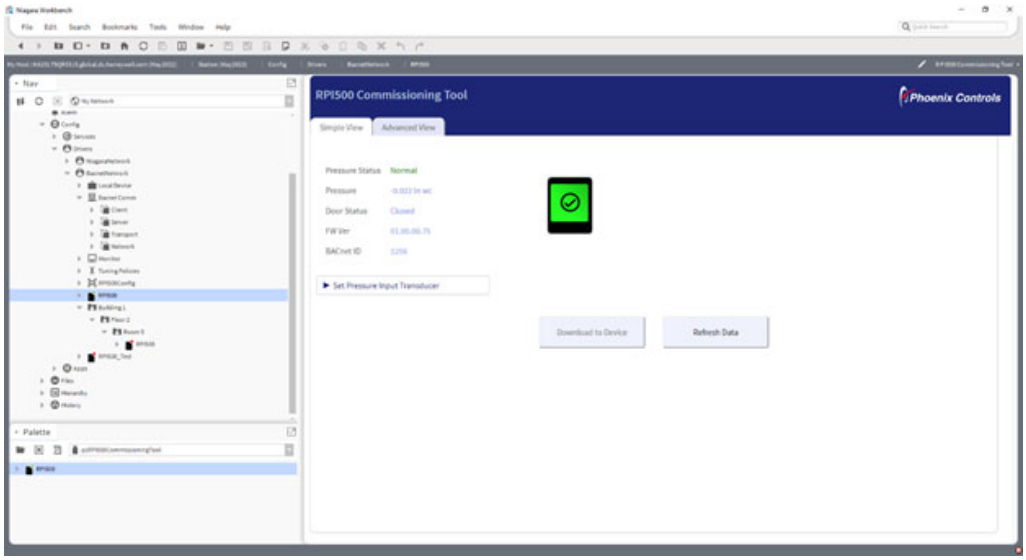
1. Launch the RPI500 Commissioning Tool by double-clicking an RPI500 device in the station's navigation tree. If the RPI500 icon in the navigation tree is red, then it must be rediscovered in order to properly communicate.



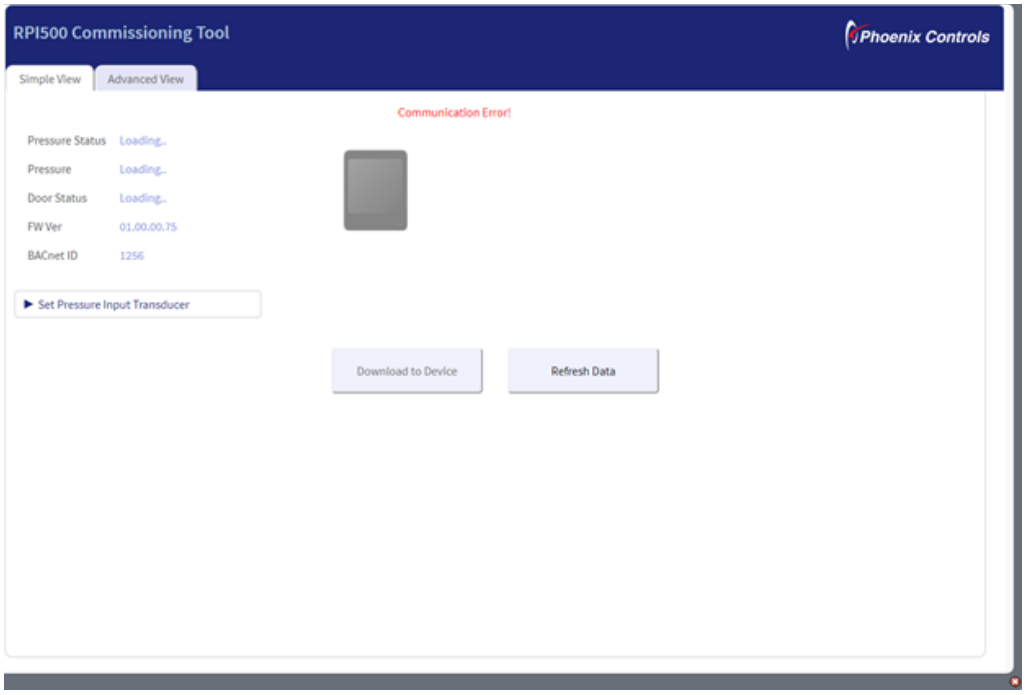
2. Rediscovery can be done through the Phoenix Controls Device Manager, or by launching the RPI500 Commissioning Tool. If the Commissioning Tool is launched and discovery is needed, the screen below is displayed. Proceed by clicking the *Run* button.



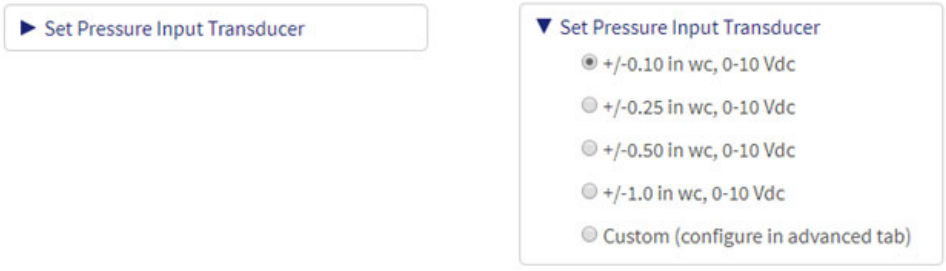
3. Once the discovery is completed, the Commissioning Tool shows the Simple View tab by default.



4. Simple View provides basic information about the operation of the RPI500. It also shows a picture view indicating whether the pressure is Normal, Warning, Alarm, and if the door sensor has been tripped. If communication fails, which can happen when the WiFi signal is weak, the RPI picture shows a disabled device.



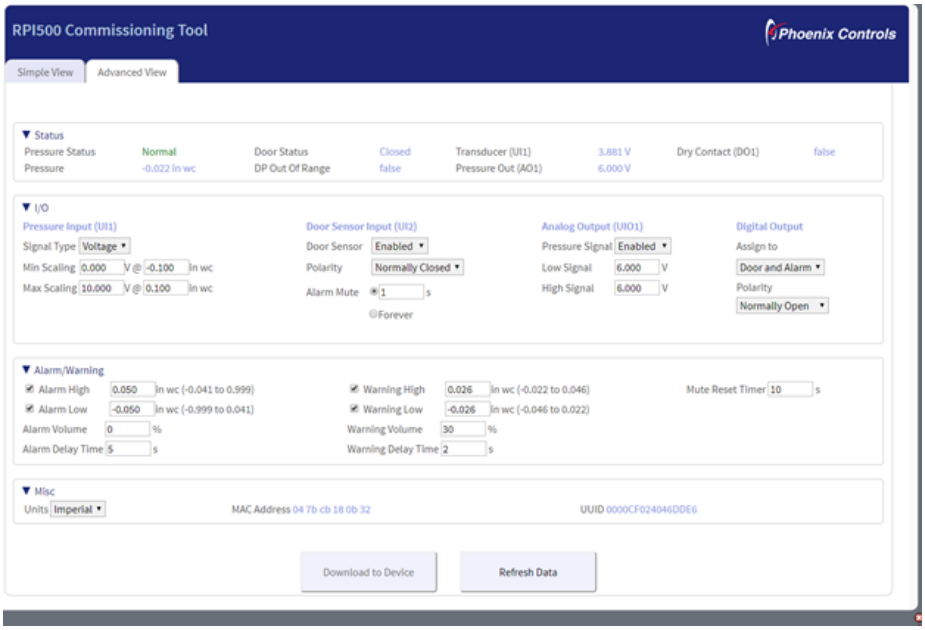
5. Read Only status data is shown on the left side of the tab. This data is polled every few seconds. By clicking on the side arrow, the section opens downward and the pressure transducer can be configured. To close the section again, click the arrow a second time.



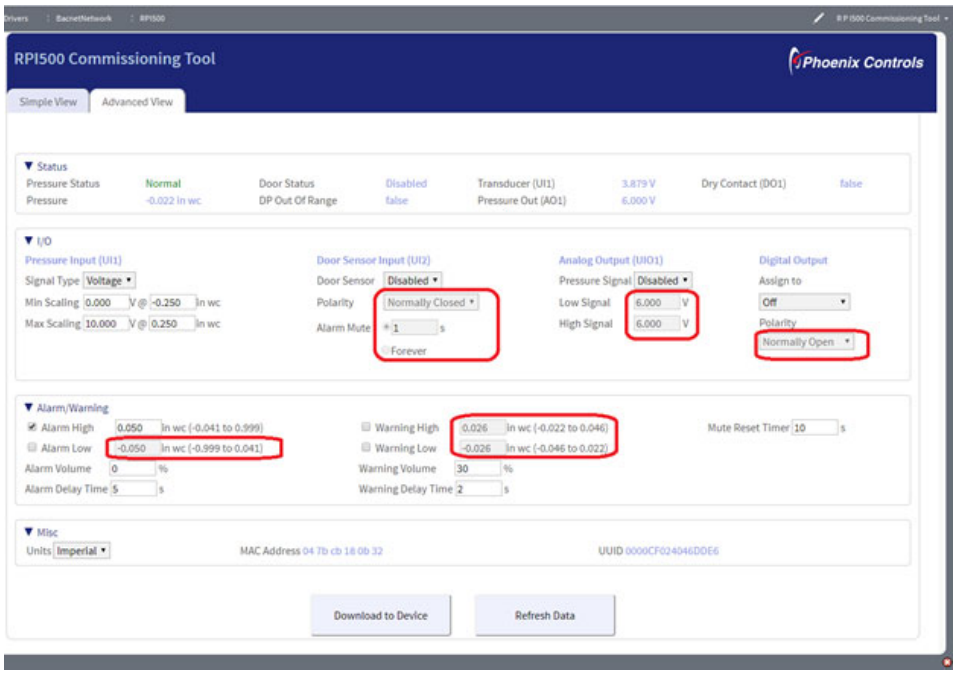
For more customized configuration of the transducer, or more RPI configuration settings, use the Advanced View tab.

Advanced View

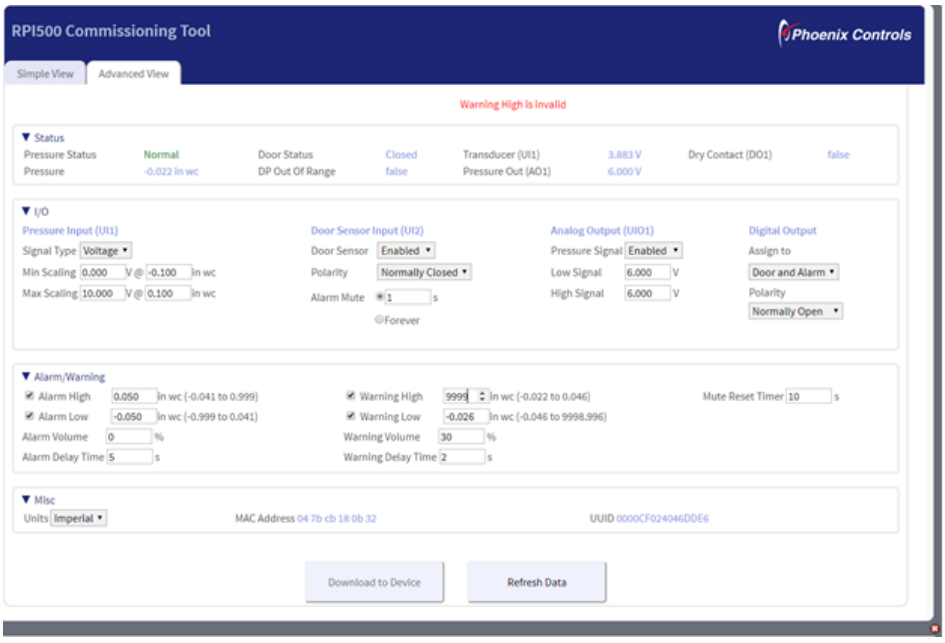
The Advanced View provides a larger selection of configurable parameters, as well as Read Only real-time data to help with debugging. As with the simple view, click each triangle to open that section of parameters. Click the triangle again to close the section.



Some parameters which are represented by checkboxes and drop-downs result in enabling or disabling features. For those parameters, other controls may become disabled indicating that they are controlled by the dropdown or checkbox. As an example, the disabled controls are shown on the following screen.



Configurations cannot be downloaded if values are invalid. In the following example, the Warning High is out of range, thereby disabling the download button.

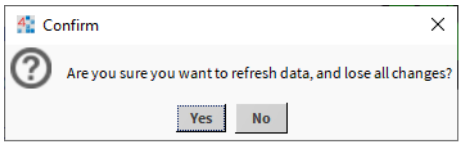


Note that there are configurations not available from the commissioning tool which are set in the RPI itself, such as network communication (IP and MS/TP settings), screen brightness, display language, passcode, etc.

Download and Refresh Buttons

Download to Device downloads the configuration data from the tool into the device. When this download occurs, the old values in the RPI500 are overwritten with the new values and cannot be recovered. Note that this button is only enabled (button text is not grayed out as above) if there are changes to be downloaded and the current edited values are within their allowable range. In this way, the tool keeps invalid data from reaching the RPI500 device.

Refresh Data uploads the latest configuration data from the device into the commissioning tool, effectively clearing any changes made since the last download. Configuration data is read once when launching the tool. It is not read again unless the user uses this button to refresh the data. The popup confirmation shown here occurs to warn the user that any unsaved (un-downloaded) changes will be lost.



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