

Operation Manual

Edge[®] [ii] Controller For Innovation 1600-2000 Water Heaters

Other documents for this product include:

- OMM-0176, Edge [ii] Controller Communication Manual
- OMM-0175, Innovation Installation and Startup Manual



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Heating and Hot Water Solutions

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SECTION 1: GENERAL INFORMATION

1.1 Introduction

This section provides a guide to the operation of Innovation 1600-2000 water heaters using the Edge [ii] Controller, and the numerous types of external sensors and control devices that can interface with the unit using terminals in the unit's Input/Output (I/O) Box. Information regarding the set-up of all Operating Modes, as well as Water Heater Management (WHM) Systems of units, is also included.

1.2 Safety Precautions and Warnings

The initial startup of Innovation units should be performed by factory trained personnel. Operation prior to initial startup by factory trained personnel will void the equipment warranty. In addition, the following **WARNINGS** and **CAUTIONS** must be observed at all times.

CAUTION

All initial installation procedures must be completed before attempting to start the unit.

⚠ WARNING!

Electrical voltages in Innovation 1600-2000 units may include 120, 220, or 460 volts ac. Therefore, these units must be serviced only by factory certified service technicians.

⚠ WARNING!

Do not attempt to dry fire the unit. Starting the unit without a full water level can damage the unit and may result in injury or property damage. This situation will void any warranty.

1.3 Power Up

Upon power-on, the splash screen appears, and then a few seconds later, the Controller's **Main Menu** appears. However, if the **Screensaver Password** feature (see [Screensaver Password](#)) has been enabled, the splash screen remains, with "LOCKED" appearing at the bottom of the screen. Touching the screen, or any button causes the **Enter Password** screen to appear (see Section 1.5 below). You must enter a password to get past the splash screen.

1.4 Download Latest Firmware

AERCO is committed to making the Edge [ii] Controller a reliable and easy to use front-end to your AERCO water heater. AERCO will be continuously monitoring user's experience and implementing improvements to the Controllers firmware.

As a result, it is possible that the Controller firmware on your recently delivered water heater may already be out of date. **You must update the firmware to the latest version before you begin using the Edge [ii] Controller for the first time.** This will eliminate potential problems and allow AERCO Technical Support to better serve you if you need assistance.

The first step is to obtain the latest firmware from AERCO. AERCO certified technicians can download the latest firmware from the AERCO website, or they can contact their local AERCO rep for information on latest firmware.

Once you have either connected the water heater to an Ethernet cable or downloaded the latest firmware to a USB device, you **must** update the firmware. Instructions for both options are in [Section 6.2.7: Firmware Update](#).

1.5 Passwords

The Edge [ii] Controller has multiple levels of password protection.

Level	Password	Description
0	No password	The default. Some parameters are visible but “Read Only”, but the user is excluded from most functionality.
1	159	Allows some basic setting changes. Appropriate for AERCO Trained Technicians.

The level 2 password is reserved for AERCO Trained and AERCO Master Technicians. It is distributed on an individual, as needed, basis. To enter a password:

- Go to the **Main Menu**, press **Advanced Setup**, then press the **Access** button.

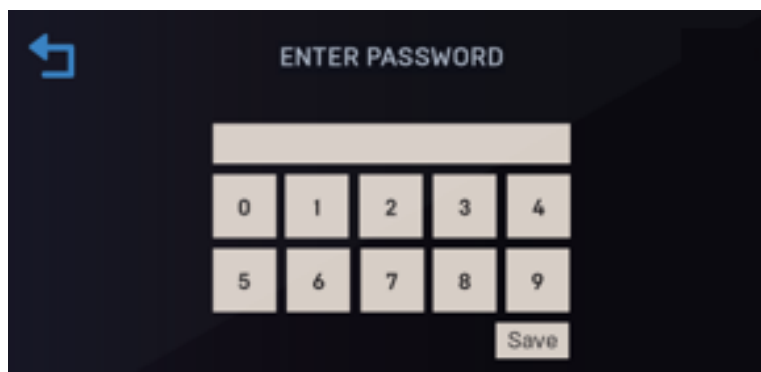


Figure 1-1: Enter Password Screen

- Use the number keypad to enter the password (each number appears as a *), then press **Save**. You’ll have access to the functionality associated with the level of the password.

1.5.1 Screensaver Password

By default, users without a password have Level 0 access to the Controller, which excludes them from most functionality. Access can be restricted to users with an Edge [ii] Controller password, effectively eliminating Level 0 access, by enabling the **Screensaver Password** parameter.

Once enabled, users are presented with the **Enter Password** screen when they attempt to perform *any* function, even accessing the **Main Menu**. To enable the **Screensaver Password** parameter:

- Go to the **Main Menu** and press **Advanced Setup**.
- Press **Access**, then enter your password and press **Save**.
- Press **Unit**, then press **Front Panel Configuration**.

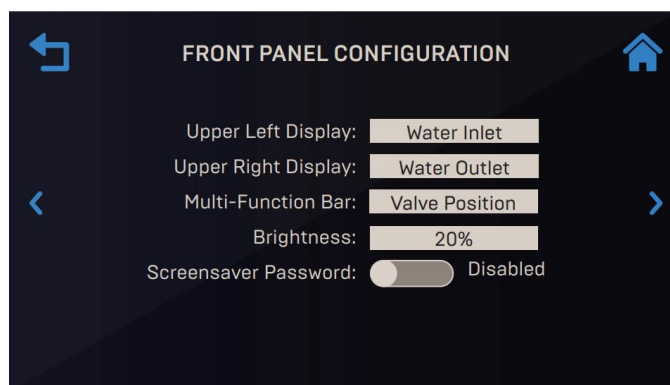


Figure 1-2: Front Panel Configuration Screen

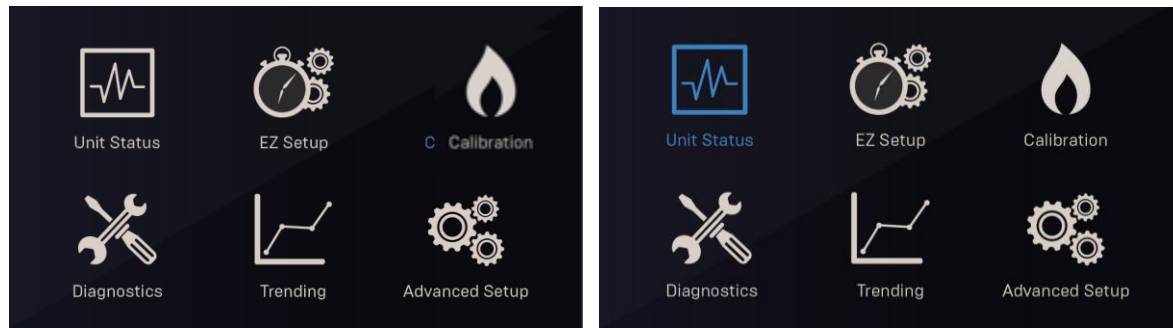
SECTION 1: General Information

4. Scroll down till you see the **Screensaver Password** parameter. It displays the current state of this parameter, either **Enabled** or **Disabled**.
5. If the current state is **Disabled**, press **Disabled**; the state changes to **Enabled**.
6. Press the **Home** button. The change is then saved, and a password is required for all users.

NOTE: Once the Screensaver Password is **Enabled**, after the Controller times out, all users will be prompted to enter a password as soon as they touch any control.

1.6 Main Menu

Once the unit has completed powering up, the touchscreen displays the **Main Menu**. When you press on an item in this screen, it turns blue, as shown on the right below.



NO SELECTION

UNIT STATUS SELECTED

Figure 1-3: Touchscreen Main Menu

All Controller menus and operating parameters are accessed through the six Main Menu options.

1.7 Controller Front Panel Functionality

The Edge [ii] Controller contains a touchscreen, which is a highly sensitive device, and checks for user interaction at a very high frequency. Water heater room environments are sometimes harsh, electromagnetically noisy and dirty, and can experience wide temperature ranges, all of which can be difficult for sensitive electronic components.

AERCO has taken precautions to ensure the proper operation of your unit. We have built the Edge [ii] Controller with a high-quality glass screen for clarity and performance, with an optically bonded overlay covering the front of the enclosure to prevent dirt and liquids from affecting its operation. The Edge [ii] Controller's front panel consists of a touchscreen display along with a variety of indicators and buttons, as shown in the below image.

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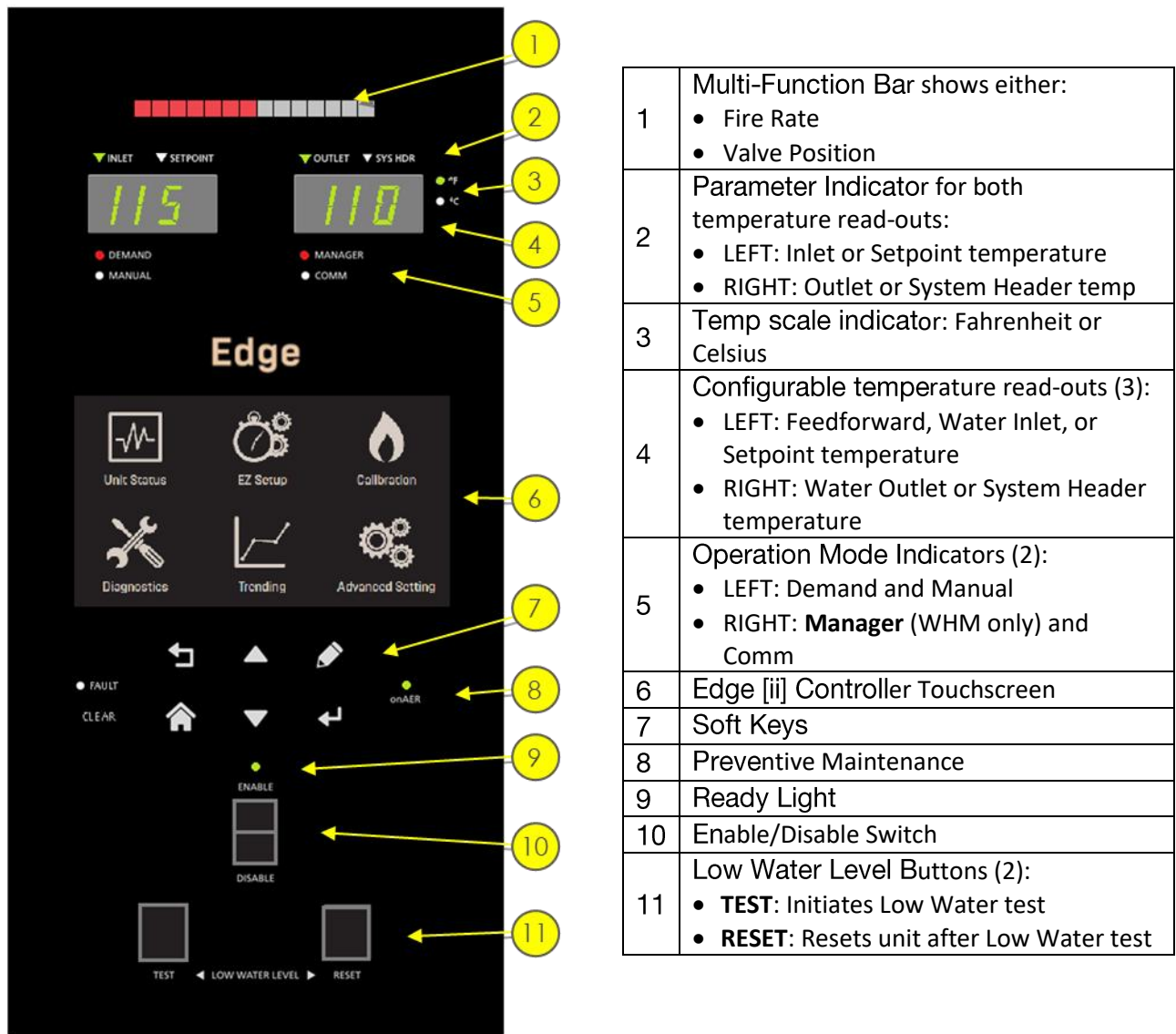


Figure 1-4: Edge [ii] Controller Front Panel Layout

All completed settings and unit Event History are maintained throughout the power cycle.

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The Soft-Keys on the Controller's front face function as follows:

Controller Front Panel Controls		
Icon	Name	Description
	Previous	Takes you to the previous screen.
	Home	Takes you to the touchscreen's Main Menu (see Figure 1.6). If pressed during a procedure, it aborts the procedure.
	Up/Down	These buttons activate a selection box that can then be moved sequentially through the editable/selectable parameters starting from top left (not the title bar with home/previous icons) and moving right and then down as in reading a book.
	Edit	This button allows the editing of the parameter that is currently selected through use of up/down arrows.
	Enter	This button allows you to finalize a selection (for instance, a selected from a menu or from a pop-up (for example, password entry input completion). Note, all alphanumeric data entry is entered in the touchscreen.
CLEAR	Clear	Clears a fault – the red Fault light goes out.

The Controller includes touchscreen reset functionality on the front panel. If the touchscreen becomes non-responsive at any time, press the **FAULT CLEAR** button to reset the touchscreen.

1.8 Touchscreen Button Functionality

Touchscreen Controls		
Icon	Name	Description
	Previous	Takes you to the previous screen.
	Home	Takes you to the touchscreen's Main Menu (see Figure 1.6). If pressed during a procedure, it aborts the procedure.
	Left Right	The LEFT arrow moves to previous point in the array or list and RIGHT arrow moves to next point in the array or list.
	Up/Down	The UP arrow increases a value, DOWN decreases value.
	Page Left Page Right	The arrows on left and right edges of the touchscreen scroll Page Left or Page Right in a round-robin sequence.
	Page Up Page Down	On screens with multiple pages, the Page Up and Page Down buttons moves up and down the pages.
	Abort	The Abort button appears when a process may need to be exited prior to completion.
	Next	Pressing Next takes you to the next screen in a multi-step procedure. Some procedures have a Proceed button instead.
	Save	1. Pressing SAVE on a pop-up screen saves the entered data and returns you to the previous screen. 2. Pressing SAVE on a non-popup screen saves the entered data and takes you to the next screen.
	Retry	Pressing Retry takes you to the previous screen and re-attempts the process step that caused the notification message to appear.
	Help	Takes you to a Help screen specific to the subject.

SECTION 1: General Information

1.9 Selections

When you press a menu item it turns blue; pressing the button a second time de-selects that option. On some screens, this opens the screen you chose. On other screens, the screen remains until you press **Next** or **Proceed**.

Some controls that have only two options have a sliding “toggle” control that indicates the current selection. In the example below on the left, **Manual Mode** is Disabled. To enable it, simply press on the control, which then switches to the opposite option, the background color changes, and the label indicates the current state, as shown on the right-hand image.



Manual Mode Disabled



Manual Mode Enabled

Figure 1-5: Toggle Controls

Some screens include a combination of “read only” and “user-selectable” parameters. Read-Only parameters appear as plain text on a back background.

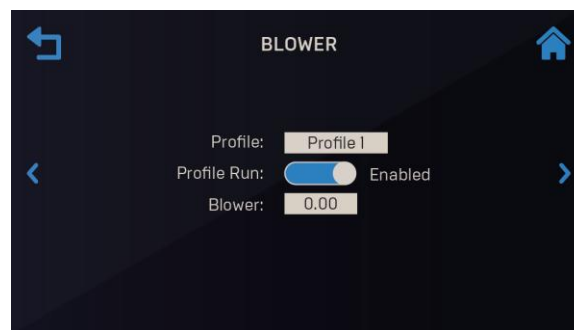


Figure 1-6: List Controls

To make a selection in a user-selectable parameter, press on the field you want to change (the word **Select** in the figure below); a list of options appears. When you select an option, the original screen reappears with your selection displayed in the field.

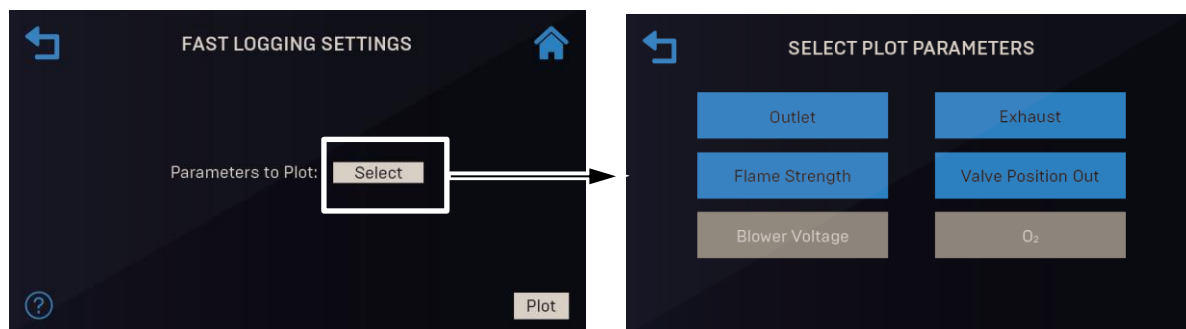


Figure 1-7: List Controls

SECTION 1: General Information

1.10 Aborting An Action

The abort action option is available when a process has begun but may need to be terminated prior to completion. This is initiated by pressing the **Abort** button, if available, or pressing the **Home** button in the touchscreen's upper-right corner.

The following occurs when a process is aborted:

1. A confirmation screen appears. Select **Yes** to abort the process. If no action is taken within 15 seconds, or if you select **No**, the abort is cancelled, and the process continues.

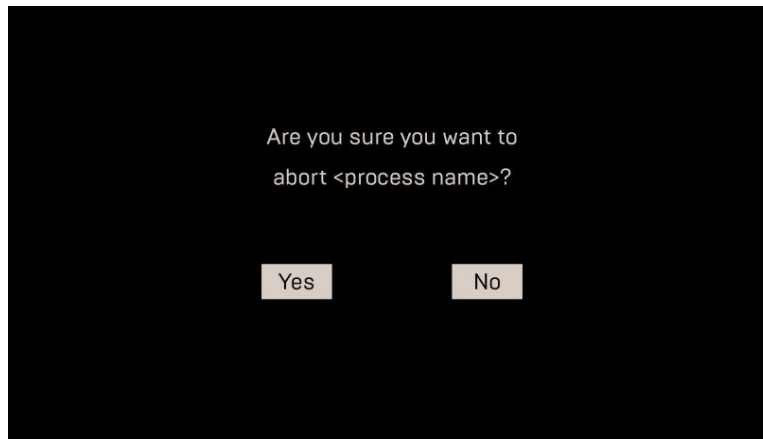


Figure 1-8: Abort Confirmation Screen

2. When an abort is successful, the process terminates, and you are returned to the original screen. When an abort is performed on a screen that has multiple items, items that were entered up to that point are saved.
3. If the process is completed while the Abort confirmation screen is displayed, the Abort action is cancelled.

1.11 Timeout

There is one timeout for both screen sleep mode and password level exit. The timeout is defined as inactivity on the touchscreen and all front panel buttons.

- The default timeout period is 60 minutes.
- The touchscreen goes into sleep mode and resets the access level to the defaults.
- Press the touchscreen to reactivate and display the **Enter Password** screen.

SECTION 1: General Information

1.12 Unit Status & Plant Status Screens

The **Unit Status** screen is the touchscreen's default screen for Innovation water heaters. It is selected by pressing **Unit Status** on the **Main Menu**.

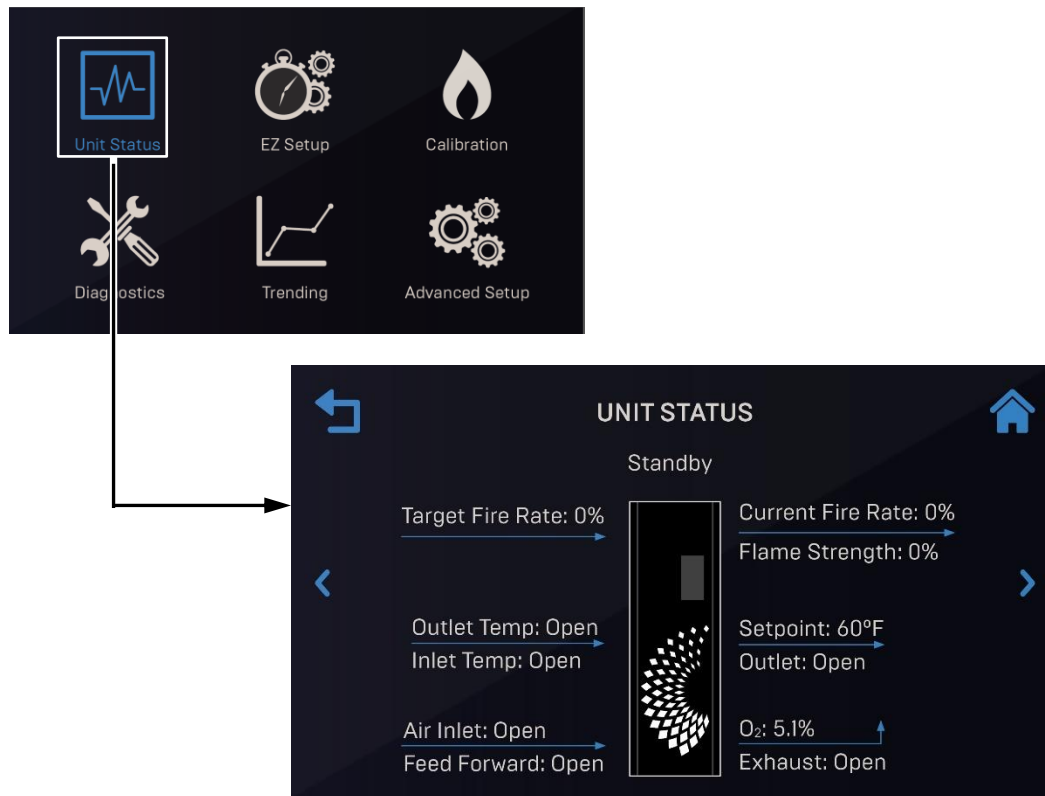


Figure 1-9: Example Unit Status Screen – Status Message Displayed

This screen also appears when the unit powers on (after the splash screen), comes out of sleep mode and has a successful flame ignition. You can manually navigate away from this screen at any time, or the system will automatically transition to the Ignition screen during the Ignition sequence. The following notes apply to this screen:

- In normal operation, the area just below the screen heading displays operating status and fault messages. Status messages have white lettering, Warning messages have yellow lettering and Fault messages have red lettering.
- Setpoint** is not displayed on the unit if WHM mode is enabled.
- The **Max. Fire Rate** parameter is displayed when the max fire rate is set to a quantity other than 100% and the unit Target Fire Rate is -1% or more from the Max Fire Rate.

For a full description of this screen, see *Section 7.2: Unit Status*.

SECTION 1: General Information

1.12.1 Plant Status Screen

If the unit is designated as the “Manager” in a Water Heater Management (WHM) cascade, the Plant Status screen can also be displayed by pressing the **Page Right** arrow. This screen appears only on the WHM Manager.

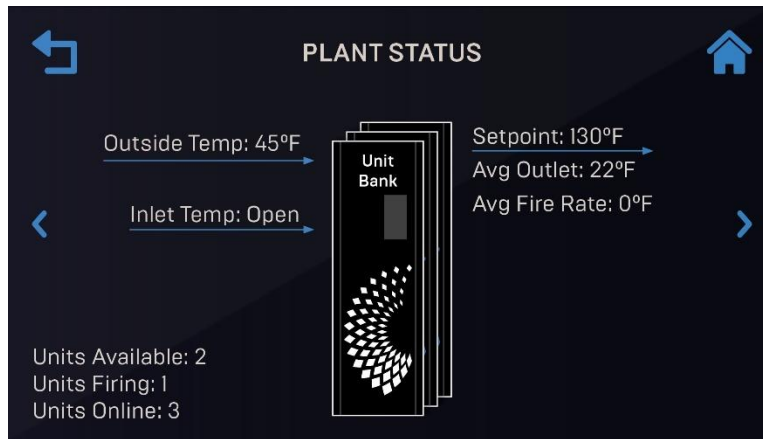


Figure 1-10: Plant Status Screen

From this screen, you can navigate between this and the Unit Status Screen using the **Left Page** and **Right Page** arrows.

For a full description of this screen, see *Section 7.3: Plant Status*.

SECTION 2: EZ SETUP

The EZ Setup function configures the unit as either a Standalone unit or Client or Manager in a Water Heater Management (WHM) Cascade group. If the current unit is the “Manager” of a WHM Cascade group, it sets the operating mode for the “Manager” unit. If it is a “Client” unit in a WHM Cascade group, it sets the operating mode for the “Client” unit.

The EZ Setup screen is accessed by pressing EZ Setup on the Main Menu.

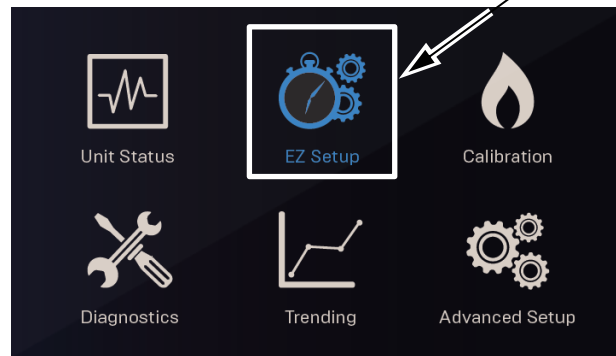


Figure 2-1: Main Menu with EZ Setup Selected

This Section includes the following topics:

[2.1: Backing Up and Restoring Settings](#)

[2.2: EZ Setup - Standalone](#)

[2.3: EZ Setup - Water Heater Management Cascade](#)

[2.4: Completing the Installation](#)

[2.5: EZ Setup - Restoring a Previous Setup](#)

⚠ WARNING!

Before starting these instructions, you must ensure that the unit has the latest Edge [ii] Controller firmware. See [Section 6.2.7: Firmware Update](#) to install the latest firmware.

2.1 Backing Up and Restoring Settings

It is time consuming to set up a unit with correct values for all parameters so it can operate as efficiently as designed. The Edge [ii] Controller provides the option of saving the value of all parameters configured during setup to either the Controller’s internal memory or to an external USB device plugged into the side of the Controller. The saved settings can then be restored at any time, ensuring that the time spent setting up and fine tuning the parameters is not lost.

- This is useful because it provides a copy of the original setup in case it becomes corrupted either through hardware malfunction or operator error. The saved settings can also be exported and then uploaded on other units of the same type in the plant, greatly reducing the time needed to setup other units.
- AERCO recommends using this option to guard against the need to recreate a setup from scratch. Instructions are in Sections [2.5](#) and [6.2.3](#).

SECTION 2: EZ Setup

2.2 EZ Setup: Standalone

Complete the instructions below only if the water heater is a standalone unit.

1. Go to: [Main Menu](#) → [EZ Setup](#).
2. If the unit was previously setup, the **EZ Setup** screen appears showing a summary of the previous setup. Press **Abort** to retain the previous setup or press **Next** to continue.

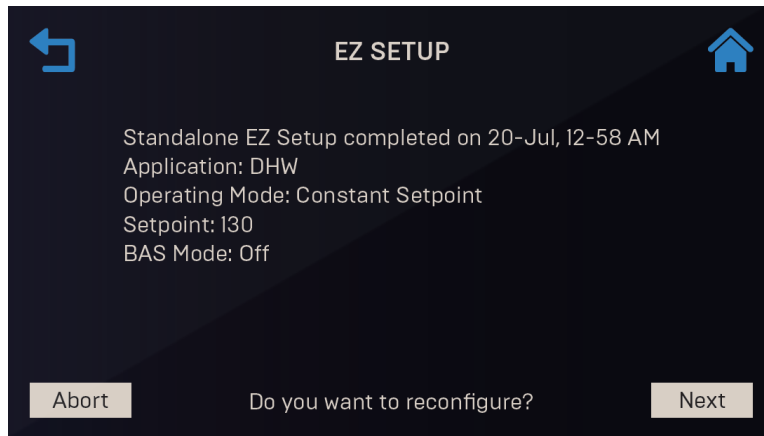


Figure 2-2: Standalone: EZ Setup Screen

3. The **Select Configuration** screen appears. Press **Standalone**. Press **Next** to continue.

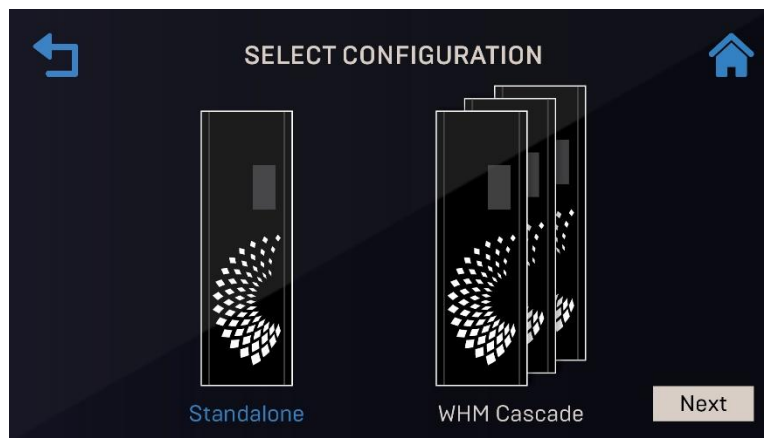


Figure 2-3: Standalone: Select Configuration Screen

SECTION 2: EZ Setup

4. The **Time And Date** screen appears. If both are correct, press **Next**. If not, press either field and enter the correct time (requires 4 digits) or date (requires 8 digits) and then press **Save**.

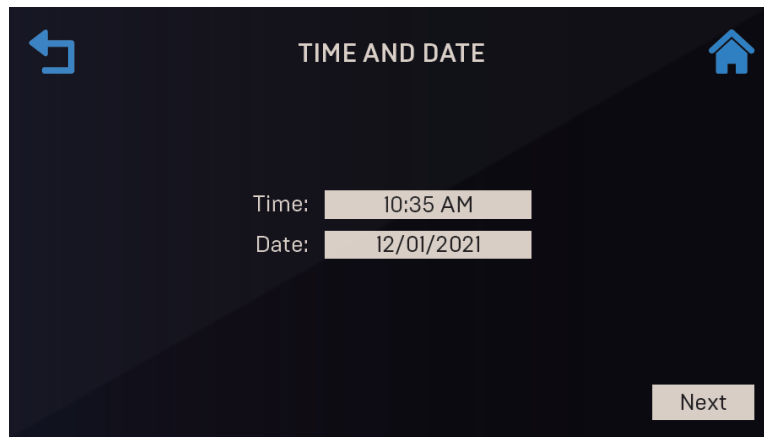


Figure 2-4: Standalone: Enter Date Screen

5. If a previous setup was performed and saved, the **Load Settings** screen appears. To re-load that setup, press **Yes** and see [Section 2.5: Restoring a Previous Setup](#) for instructions. Press **No** to continue to the next step.

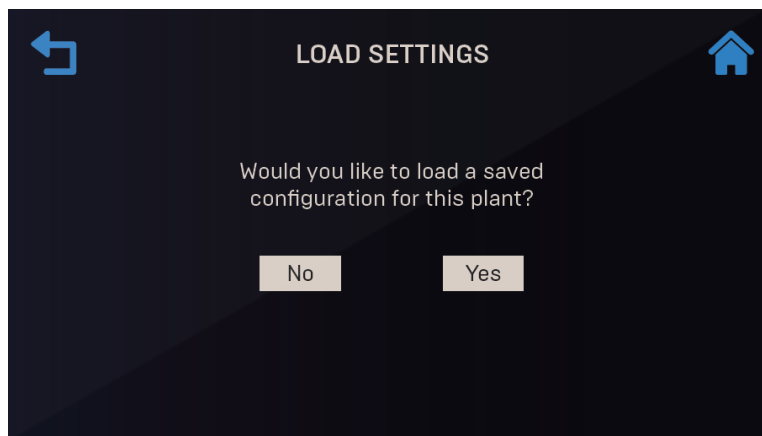


Figure 2-5: Standalone: Load Settings Screen

6. Press **Next** then complete the instructions in the section below that applies to your choice.

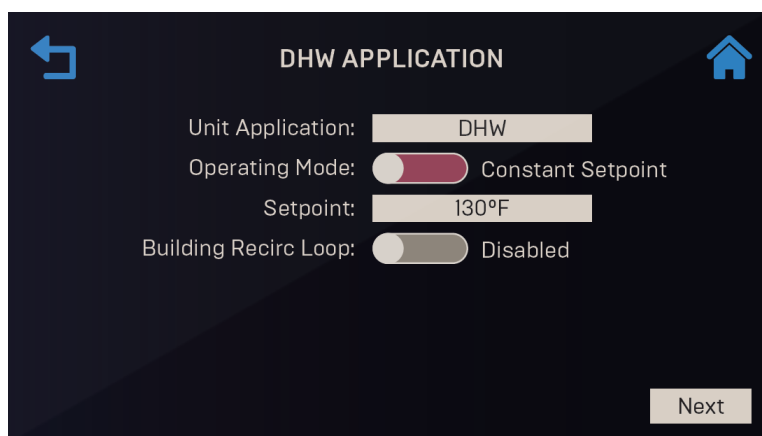


Figure 2-6: Standalone: DHW Application Screen

SECTION 2: EZ Setup

1. If the unit communicates with the site's BAS (Building Automation System), **Select BAS Mode** appears. Select a communication protocol or press **Off**. Press **Next** to continue.

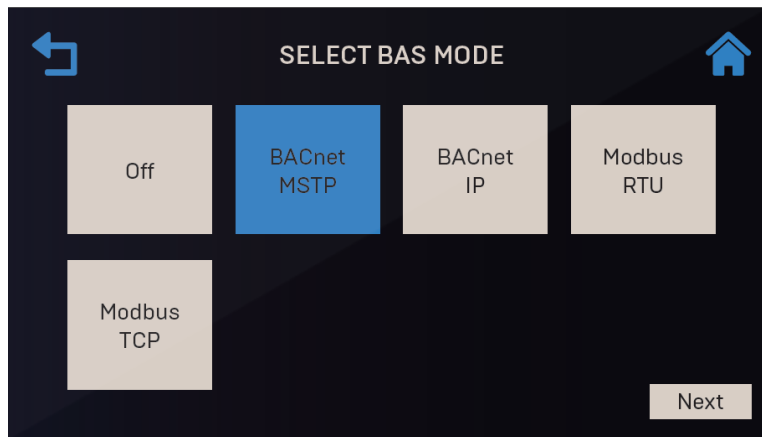


Figure 2-7: Select BAS Mode Screen

2. If you chose **BACnet MSTP**, the **BAS BACnet MSTP Settings** screen appears. Fill in the parameters to establish communications with BAS via BACnet MSTP. Pressing **Next** completes the setup (skip to Step 6).

Figure 2-8: BAS BACnet MSTP Settings Screen

If you choose **BACnet IP**, fill in the parameters on the **BAS BACnet IP Settings** Screen to establish communications with BAS via BACnet IP. Press **Next** to completes setup (skip to Step 7).

Figure 2-9: BAS BACnet IP Settings Screen

SECTION 2: EZ Setup

3. If you chose **Modbus RTU**, the **BAS Modbus RTU Settings** screen appears. Fill in the parameters to establish communications with BAS via Modbus RTU. Pressing **Next** completes the setup (skip to Step 7).

Figure 2-10: BAS Modbus RTU Settings Screen

4. If you choose **Modbus TCP**, the **BAS Modbus TCP Settings** screen appears. Fill in the parameters to establish communications with BAS via Modbus TCP. Pressing **Next** completes the setup (see next step).

Figure 2-11: BAS Modbus TCP Settings Screen

SECTION 2: EZ Setup

- Once the setup has been configured, the **EZ Setup Complete** screen displays a summary of the completed setup as verification that the setup is complete and saved.

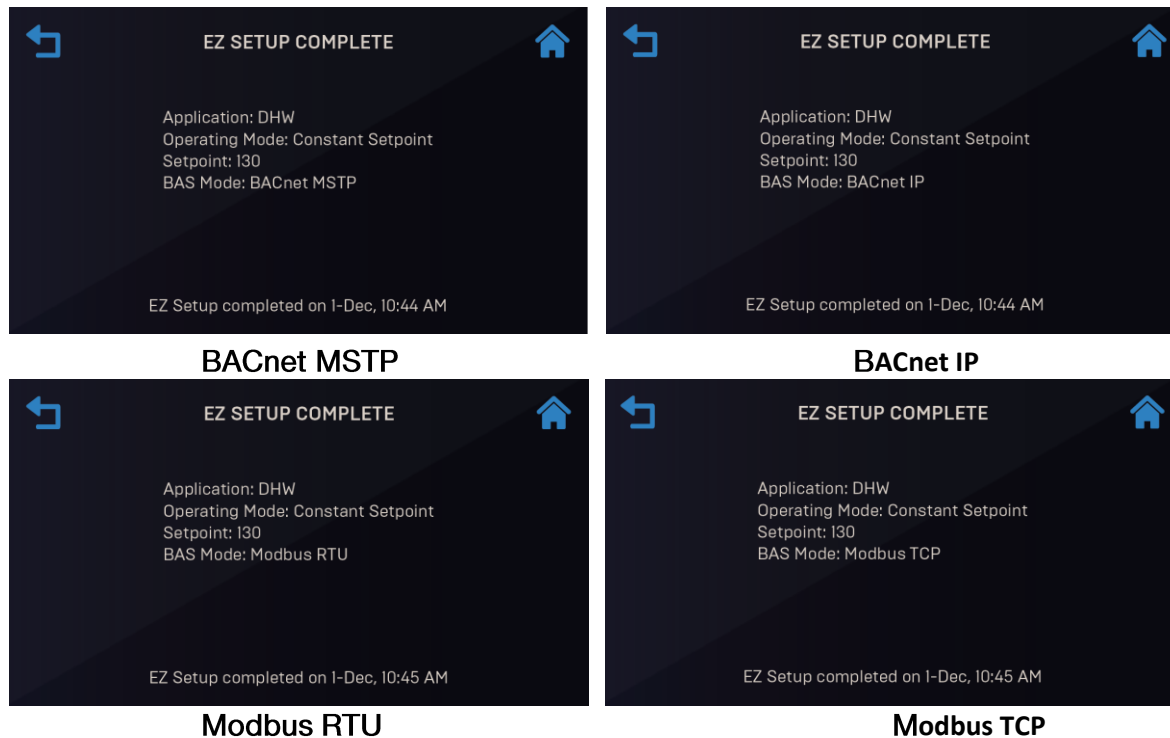


Figure 2-12: EZ Setup Complete Screens

2.3 EZ Setup: Water Heater Management Cascade

If you are implementing AERCO's Water Heater Management (WHM), complete the instructions in the next section to use the EZ Setup function to set up "Client" units. When that is complete, then start the instructions in Section 2.3.2 on the "WHM Manager".

NOTE: All "Client" units are typically setup before starting the WHM-WHM "Manager" setup, so their addresses are available when setting up the "Manager."

Some of the parameters in the screens below are also accessible in Advanced Setup (see Section 6) and so can be changed individually without having to re-run EZ Setup.

2.3.1 EZ Setup: WHM-WHM Client Units

Complete the instructions below on all "client" units in a WHM-WHM cascade. Note, if a WHM-WHM-Client setup was already performed on this or another unit, and you want to load/re-load that setup, see [Section 2.5: EZ Setup – Restoring a Previous Setup](#).

- Go to: **Main Menu** → **EZ Setup**.
- If the unit was previously setup, the **EZ Setup** screen appears showing a summary of the previous setup. You can **Abort** and retain the previous setup or press **Next** to continue.

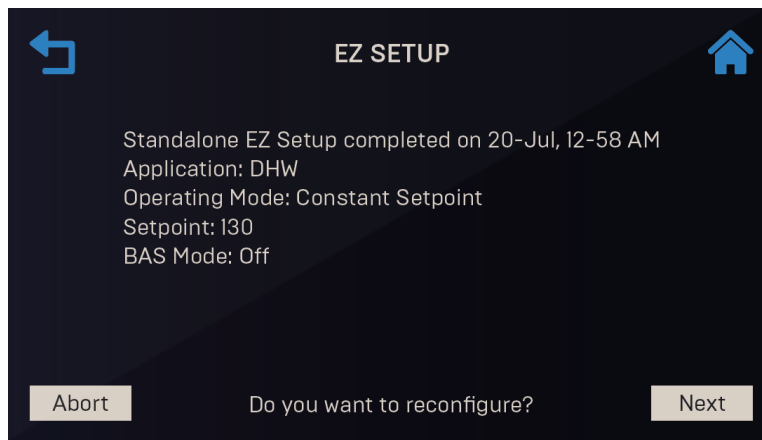


Figure 2-13: WHM Client: EZ Setup Screen

3. On the Select Configuration screen press **WHM Cascade**, then press **Next**.

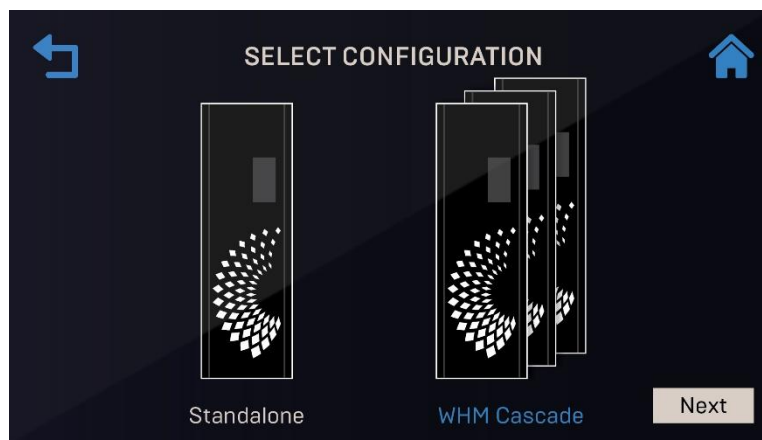


Figure 2-14: WHM Client: Select Configuration Screen

4. The Cascade Role screen appears. Set Unit Mode to **WHM Client**, then press **Next**.

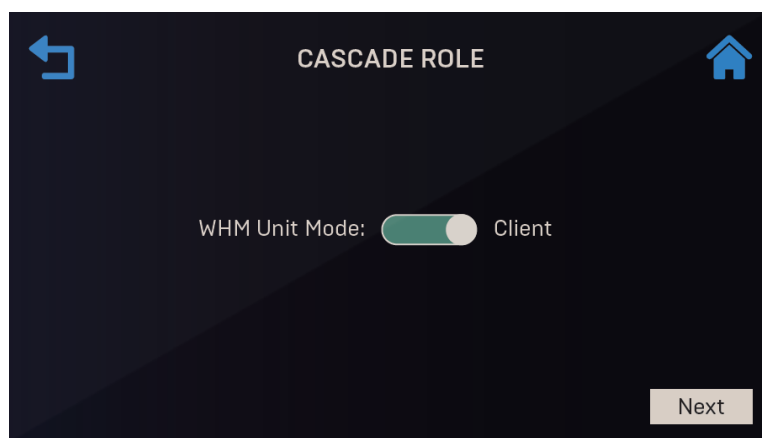


Figure 2-15: WHM Client: Cascade Role Screen

SECTION 2: EZ Setup

5. Configure the following parameters, then press **Next**.
 - **Unit Address:** Enter a unique address for this unit in the WHM Cascade, from 1 to 16 (1 is sometimes reserved for the WHM Manager).
 - **Cascade Baud Rate:** Choose the baud rate for communication with the WHM Manager: 9600, 19200, 38400 or 57600.

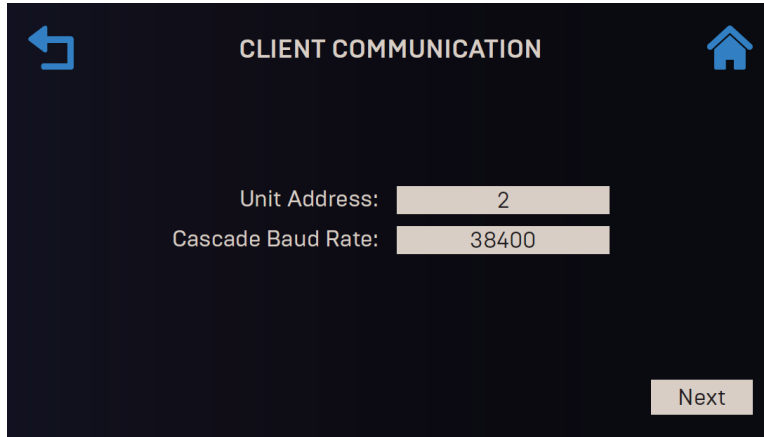


Figure 2-16: WHM Client: Client Communication Screen

6. If a previous setup was created and saved, the **Load Settings** screen appears. If you want to re-load that setup, press **Yes** and see [Section 2.5: EZ Setup – Restoring a Previous Setup](#) for instructions. Press **No** to proceed to the next step.

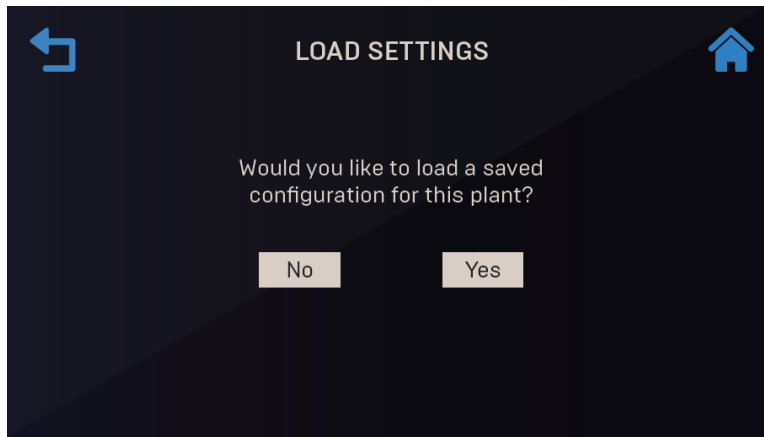


Figure 2-17: WHM Client: Load Settings Screen

SECTION 2: EZ Setup

- When you pressed **No** on the previous screen, the **Client EZ Setup Complete** screen appears indicating completion or failure (if it failed, you can press **Next** to re-run the setup). This screen includes a reminder that WHM Cascade Setup must be run on the WHM Manager.

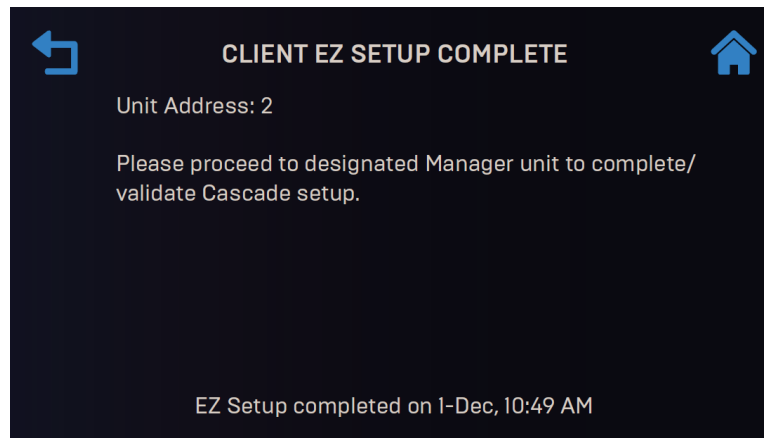


Figure 2-18: WHM Client EZ Setup Complete Screen

2.3.2 EZ Setup: WHM Manager Unit

The Manager unit will sync with all Client water heaters once this process is completed. Note, if a WHM Manager setup was already performed on this or another unit, and you want to load/re-load that setup, see [Section 2.5: EZ Setup – Restoring a Previous Setup](#).

NOTE: All “Client” units are typically setup before starting the WHM Manager setup, so their addresses are available during this process. If they are *not* all setup, you will have to pause and set up all Client units before completing the WHM Manager setup.

- Go to: [Main Menu](#) → [EZ Setup](#).
- If the unit was previously setup, the **EZ Setup** screen appears showing a summary of the previous setup (see Figure 2.3.1-1, above). You can **Abort** and retain the previous setup or press **Next** to continue.
- On the **Select Configuration** screen press **WHM Cascade**, then press **Next**.

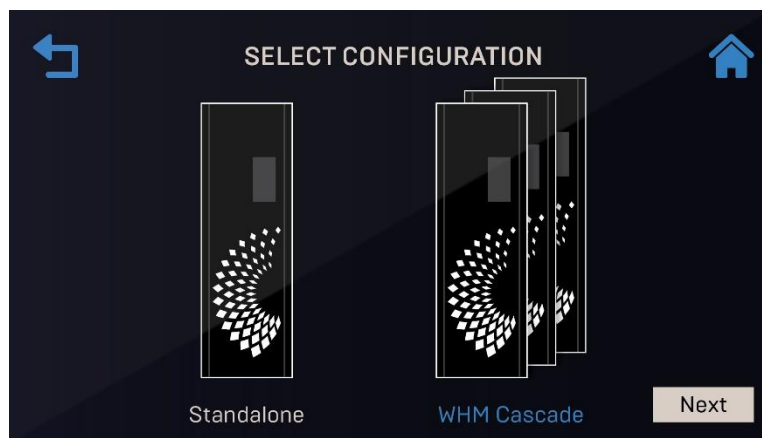


Figure 2-19: WHM Manager: Select Configuration Screen

SECTION 2: EZ Setup

4. On the **Cascade Role** screen select **WHM Manager** and then press **Next**. The Manager LED will light on the front panel signifying the role of the unit.

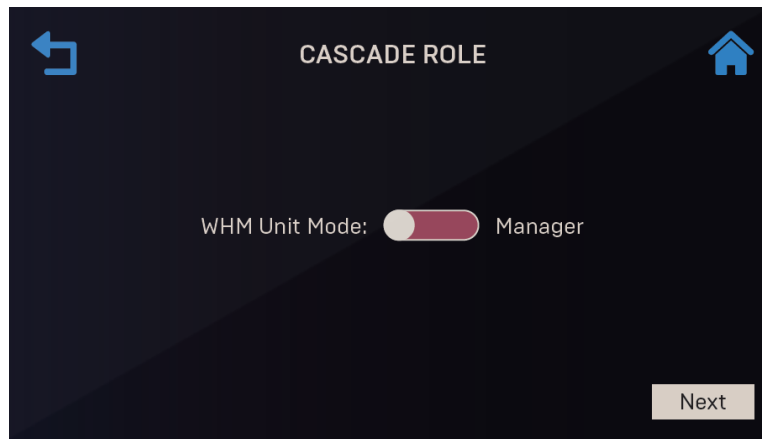


Figure 2-20: WHM Manager: Cascade Role Screen

5. The next screen displays the current time and date. If both are correct, press **Next** to continue. If not, press either field and enter the correct time or date and then press **Save**.

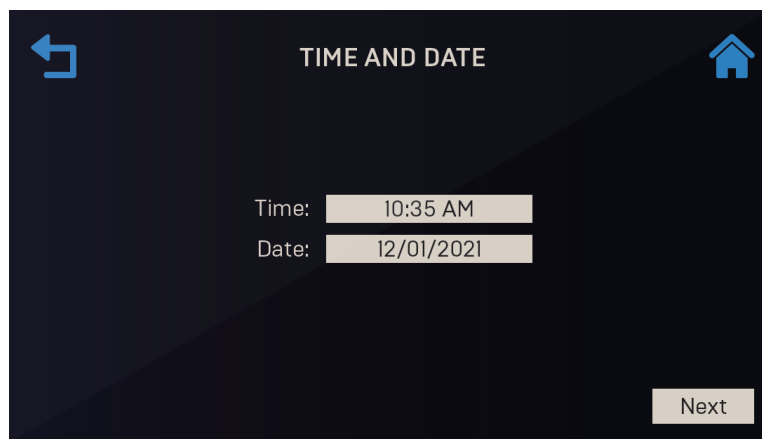


Figure 2-21: WHM Manager: Time and Date Screen

6. Fill in the settings on the **Cascade Communication** screen, described below. When done, press **Next** to continue.

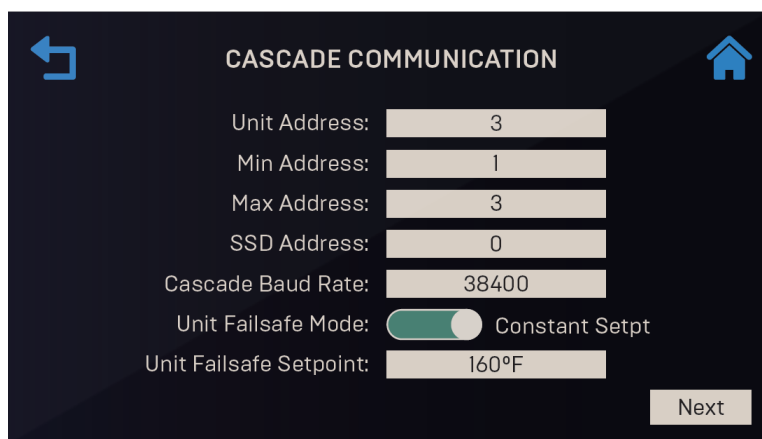


Figure 2-22: WHM Manager: Manager Communication Screen

SECTION 2: EZ Setup

NOTE: Many of these parameters also appear in [Section 6.3.2: Cascade Communication](#), where individual settings can be easily changed at a later time.

- **Unit Address:** The unique communication address of the current (Manager) unit.
(Range: 1 to 127)
- **Min & Max Address:** The address range in the WHM cascade, 1 up to the total number of units in the cascade; for example, 1 and 10 (**Max Address** maximum = 16).

SSD Address: The Client/Client Device address. This parameter is necessary for communication with the Protonode gateway.

- **Cascade Baud Rate:** Select the rate at which information is transferred in a communication channel: 9600, 19200, 38400, 115200 bits per second.
- **Plant Failsafe Mode:** The Manager's operating mode if there is a loss of communication between the Manager and Client units, or to the BAS or external signal/sensor, such as an outdoor sensor (default = **Constant Setpoint**).
- **Plant Failsafe Setpoint:** (only if **Plant Failsafe Mode** = **Constant Setpoint**) Specify the Setpoint for all units in the cascade.

- The **Client Address** screen appears as a reminder to set up all Client units in the WHM Cascade before continuing. Once all Client units are set up, press **Next** to continue.

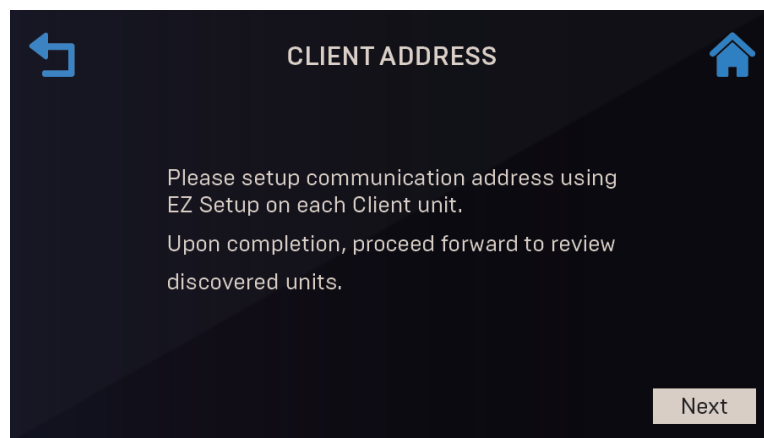
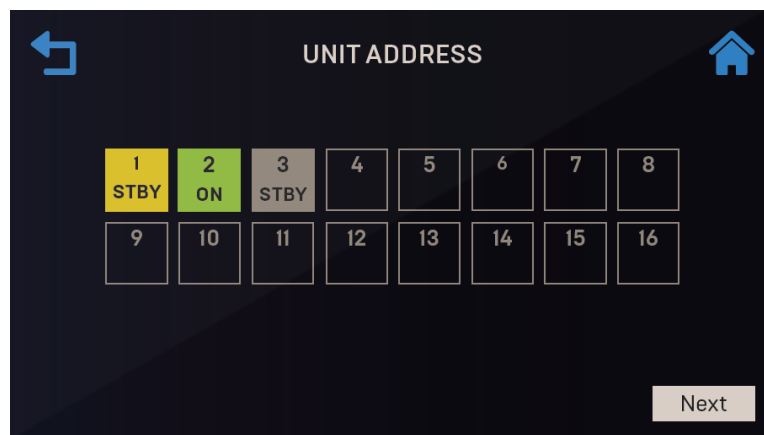


Figure 2-23: WHM Manager: Client Address Screen

- The **Unit Address** screen shows a color-coded square of each unit in the cascade, along with a code indicating its current status. Before continuing you should verify that this screen confirms your understanding of all units in the cascade. Press **Next** to continue.



STATUS CODES

ON	On
STBY	Standby
FLT	Fault
MAN	Manual
SLIM	Setpoint Limiting
IGN	Ignition

Figure 2-24: WHM Manager: Unit Address Screen

SECTION 2: EZ Setup

IMPORTANT!

Do not continue past this screen unless it accurately represents the cascade you are creating.

9. If a previous setup was performed and saved on this unit, and you want to re-load that setup, press **Yes** and see [Section 2.5: EZ Setup – Restoring a Previous Setup](#) for instructions. To create a new setup, press **No** to continue.

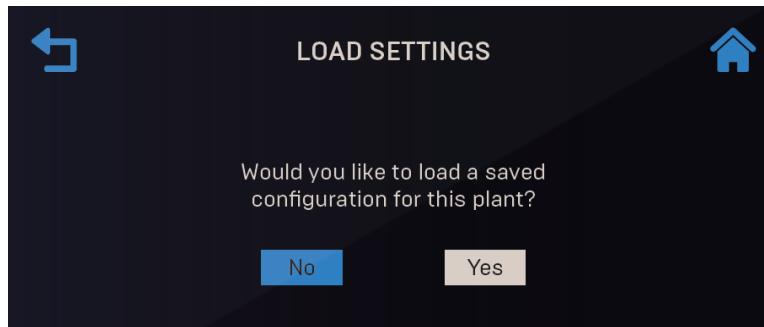


Figure 2-25: WHM Manager: Load Settings Screen

10. Press **Next** and then complete the instructions in the section below that apply to your choice.

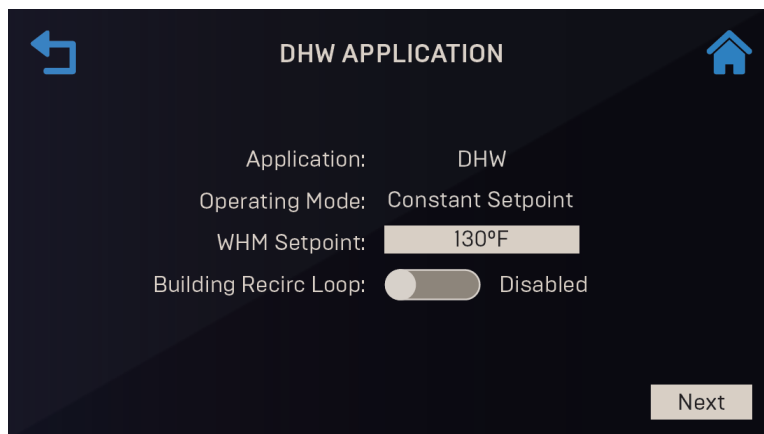


Figure 2-26: WHM Manager: DHW Application Screen

11. Press **Next** and then complete the instructions in the section below that apply to your choice.

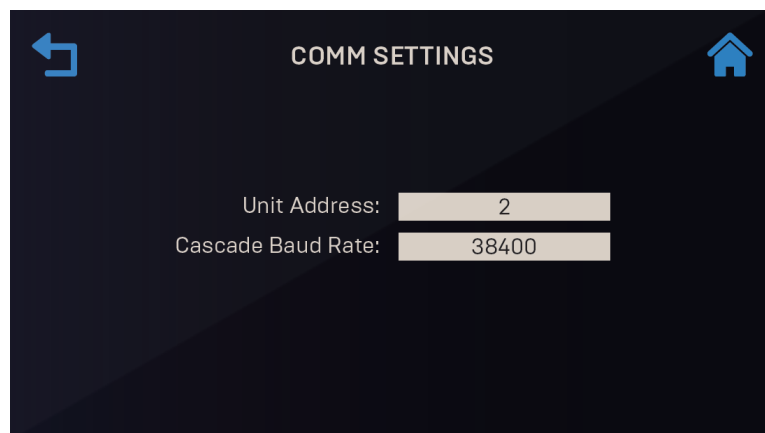


Figure 2-27: WHM Manager: Communication Settings Screen

SECTION 2: EZ Setup

2.4 Completing the Installation

Complete the instructions below to complete the installation. If the unit communicates with a BAS, you will select and configure the communication protocol as well.

12. If the **EZ Setup Complete** screen appears, skip to Step 7.
13. If the unit communicates with the site's BAS (Building Automation System), **Select BAS Mode** appears. Select a communication protocol or else press **Off**. Press **Next** to continue.

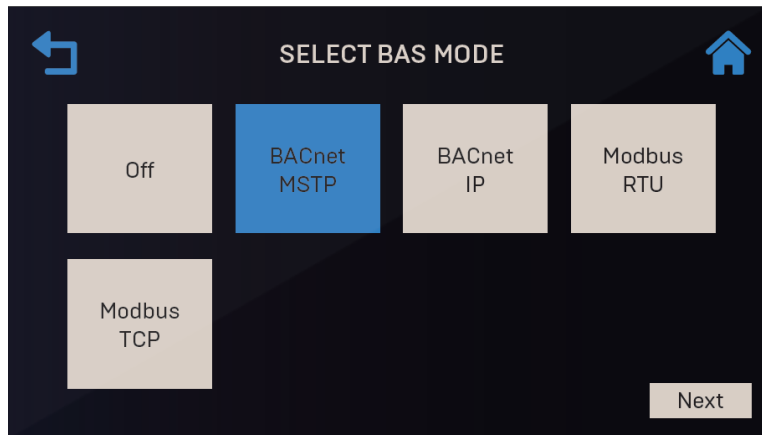


Figure 2-28: Select BAS Mode Screen

14. If you chose **BACnet MSTP**, the **BAS BACnet MSTP Settings** screen appears. Fill in the parameters to establish communications with BAS via BACnet MSTP. Press **Next** to completes setup (skip to Step 7).

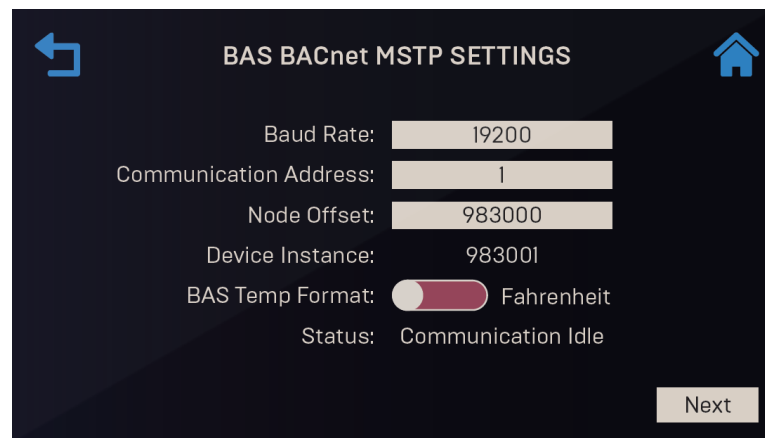
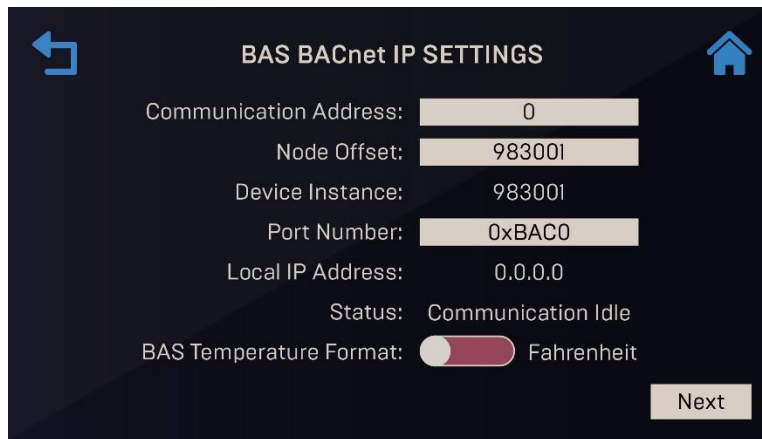


Figure 2-29: BAS BACnet MSTP Settings Screen

SECTION 2: EZ Setup

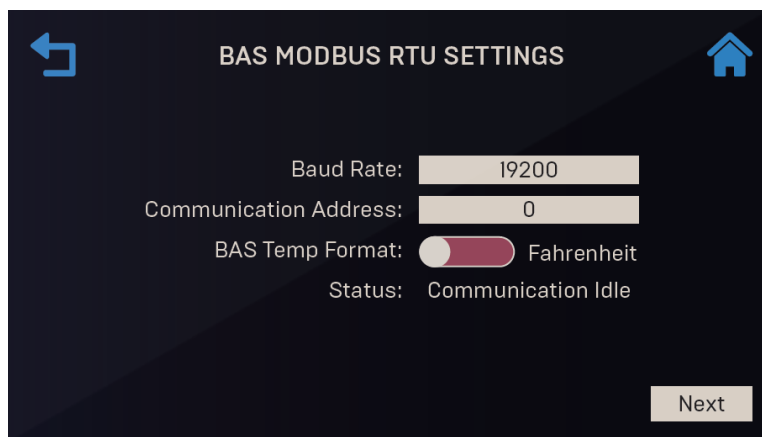
15. If you choose **BACnet IP**, enter the **BAS BACnet IP Settings** parameters to establish communications via BACnet IP. Press **Next** to complete setup (skip to Step 7).



The screenshot shows the 'BAS BACnet IP SETTINGS' screen. It features a dark blue background with white text. At the top, there is a title bar with a back arrow on the left and a home icon on the right. Below the title, the following settings are displayed: 'Communication Address' with a value of '0', 'Node Offset' with '983001', 'Device Instance' with '983001', 'Port Number' with '0xBAC0', 'Local IP Address' with '0.0.0.0', 'Status' showing 'Communication Idle', and 'BAS Temperature Format' with a toggle switch set to 'Fahrenheit'. A 'Next' button is located at the bottom right.

Figure 2-30: BAS BACnet IP Settings Screen

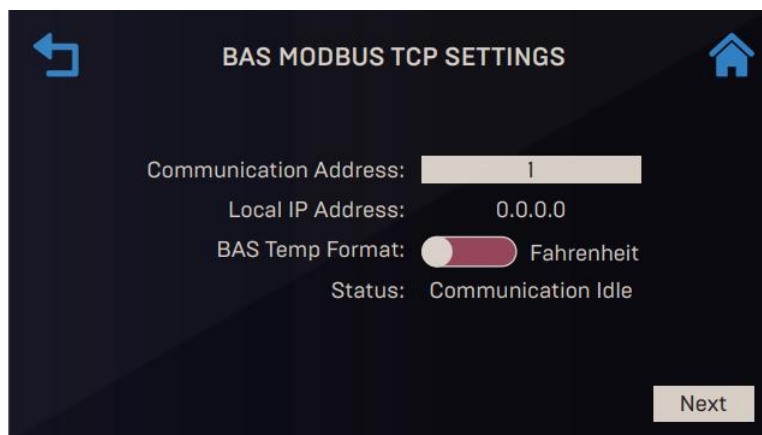
16. If you chose **Modbus RTU**, enter the **BAS Modbus RTU Settings** parameters to establish communications with BAS via Modbus RTU. Press **Next** to complete setup (skip to Step 7).



The screenshot shows the 'BAS MODBUS RTU SETTINGS' screen. It has a dark blue background with white text. The title bar at the top includes a back arrow and a home icon. The settings listed are: 'Baud Rate' with '19200', 'Communication Address' with '0', 'BAS Temp Format' with a toggle switch set to 'Fahrenheit', and 'Status' showing 'Communication Idle'. A 'Next' button is positioned at the bottom right.

Figure 2-31: BAS Modbus RTU Settings Screen

17. If you choose **Modbus TCP**, enter the **BAS Modbus TCP Settings** parameters to establish communications with BAS via Modbus TCP. Press **Next** to complete setup.



The screenshot shows the 'BAS MODBUS TCP SETTINGS' screen. It features a dark blue background with white text. The title bar at the top has a back arrow and a home icon. The settings displayed are: 'Communication Address' with '1', 'Local IP Address' with '0.0.0.0', 'BAS Temp Format' with a toggle switch set to 'Fahrenheit', and 'Status' showing 'Communication Idle'. A 'Next' button is located at the bottom right.

Figure 2-32: BAS Modbus TCP Settings Screen

SECTION 2: EZ Setup

- Once the setup has been configured, the **EZ Setup Complete** screen displays a summary of the completed setup as verification that the setup is complete and saved.

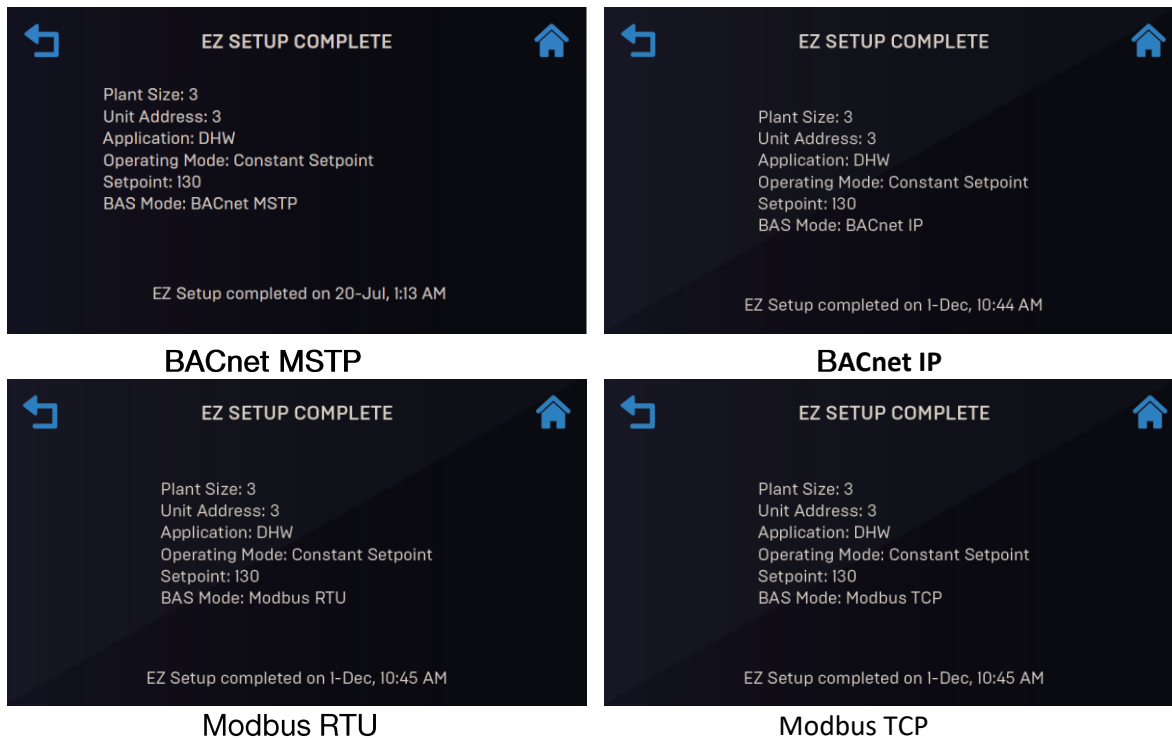


Figure 2-33: Example EZ Setup Complete Screens

2.5 EZ Setup: Restoring a Previous Setup

Complete the instructions below if a setup has already been run on the current unit, or on a different unit and saved to a USB device, and you wish to load that setup on the current unit.

For instructions on saving a setup, see [Section 6.1.3: Save and Transfer Settings](#).

NOTE: If you are transferring to/from Client or Manager units in a WHM Cascade:

- Client and Manager units use separate setup files; Client units require a Client setup file, and Manager units require a Manager setup file.
- If loading the setup from a USB device, the device can have only Client or Manager setup files but cannot have both on the same device.
- If loading the setup from a USB device, the device can have multiple Client files or multiple Manager (but not both, as started above). The system will automatically load the file with the latest date for the particular model (you will not have a choice).

- Go to: **Main Menu → EZ Setup** and start any of the EZ Setup configuration routines described above.

2. After the first few steps, when the **Load Settings** screen appears, press **Yes**.

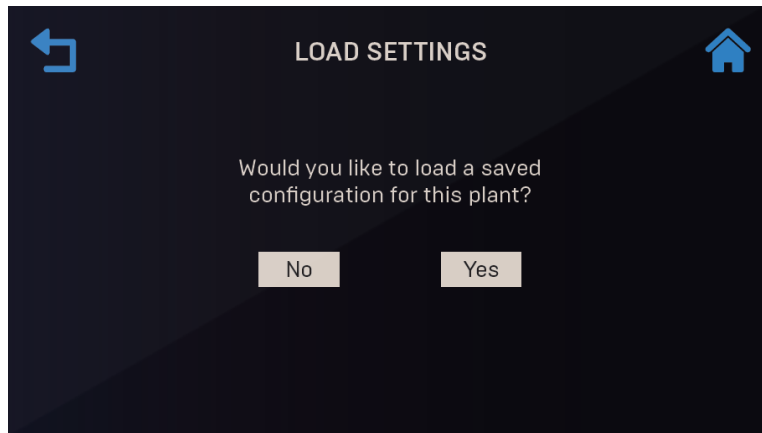


Figure 2-34: EZ Setup: Load Settings Screen

3. The **Settings File Select** screen appears. Choose the location of the setup file:
 - If the settings are on a **USB** device, choose **USB**.
 - If the settings are in the Controller's on-board memory, choose **Onboard**.
 - If you want to restore the original factory settings, choose **Factory Settings**.

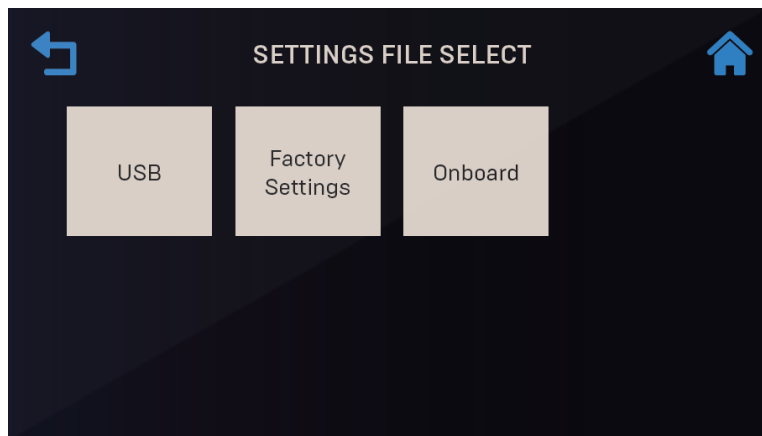


Figure 2-35: EZ Setup: Settings Source Select Screen

4. The **Overwrite Calibration** screen appears. Press **Yes** to overwrite the unit's existing combustion calibration setting, press **No** to retain settings.

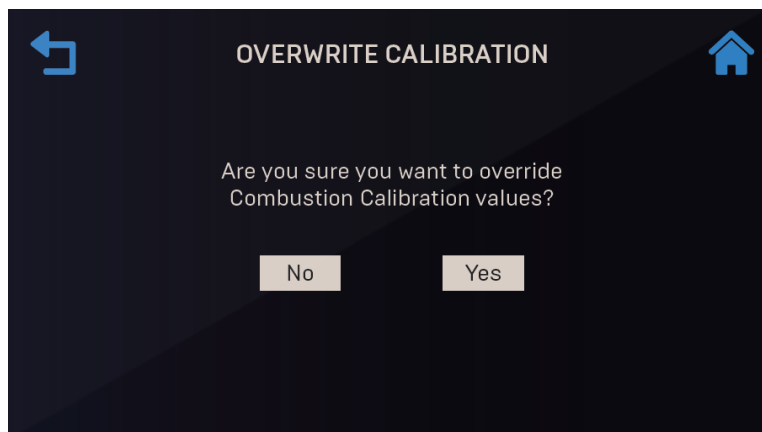
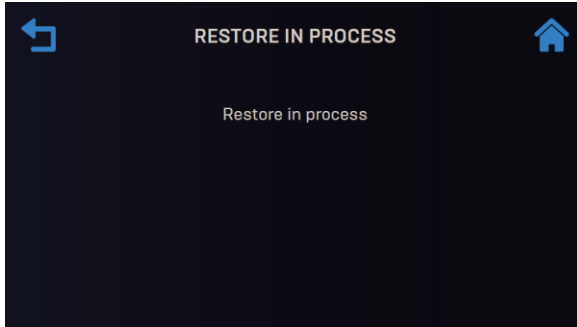
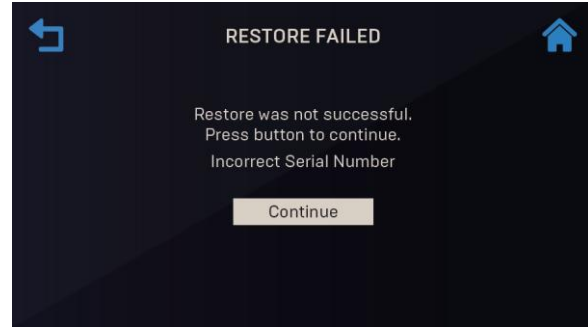


Figure 2-36: EZ Setup: Settings Upload Complete Screen

5. Pressing **Yes** will lead to the **Restore in Process** screen. The unit automatically reboots after about 5 seconds. If the upload failed, the **Restore Settings Complete** screen displays the error that occurred, and gives you the option to **Retry** the upload.



Restore Successful



Restore Failed

Figure 2-37: EZ Setup: Settings Upload Complete Screen – Success

SECTION 3: CALIBRATION

The Calibration screen provides a number of tools to calibrate various of the unit's components. It is accessed by pressing **Calibration** on the **Main Menu**.

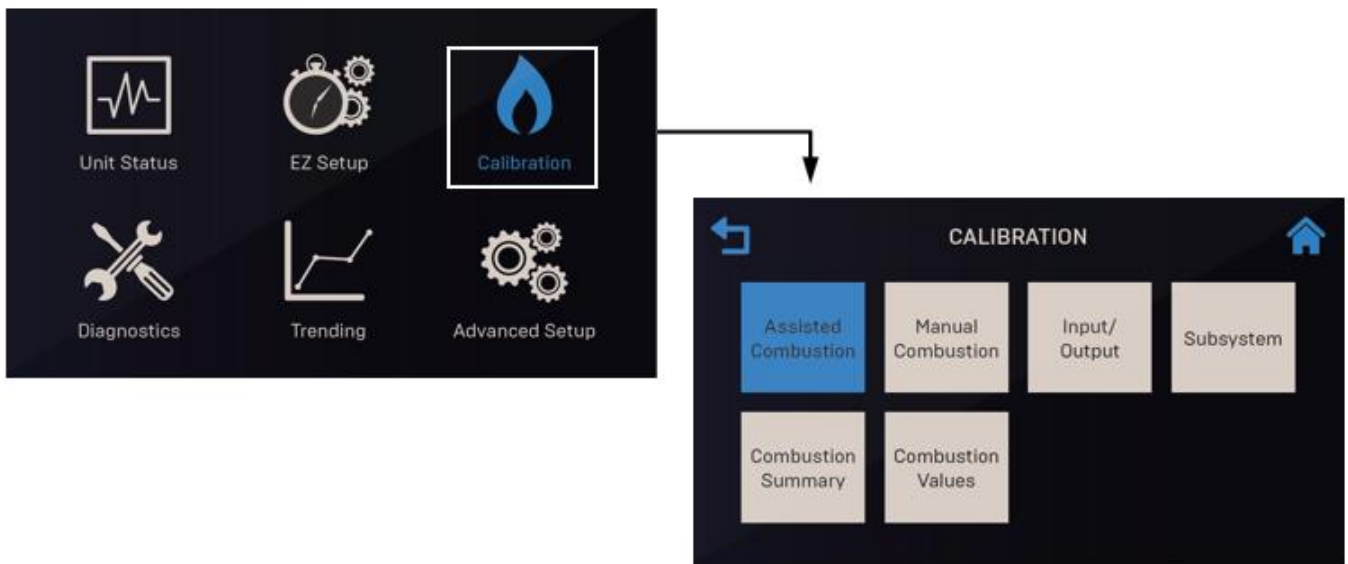


Figure 3-1: Calibration Screen

This Section includes the following topics:

- [3.1: Assisted Combustion Calibration](#)
- [3.2: Manual Combustion Calibration Overview](#)
- [3.3: Input/Output:](#)
- [3.4: Subsystem](#)
- [3.5: Combustion Summary](#)

IMPORTANT

Before starting these instructions, you must ensure that the unit has the latest Edge Controller firmware. See Section 6.2.7: Firmware Update to install the latest firmware.

3.1 Assisted Combustion Calibration

Complete the instructions below to perform **Assisted Combustion Calibration** on the current unit. If you press the **Back** or **Home** buttons at any time before completion, the calibration operation is disabled and normal operation resumes. Assisted Combustion Calibration uses the same calibration steps as Manual Combustion Calibration.

1. Ensure the Enable/Disable switch on the unit's front face is in the **Enable** position.
2. Go to: **Main Menu → Calibration → Assisted Combustion**.
3. If the O₂ sensor is not connected, a message appears saying that combustion calibration cannot be performed; this function must abort. In that case, connect the O₂ sensor and repeat Step 2.

SECTION 3: Calibration

4. The **Assisted Combustion Calibration** screen appears listing 3 conditions that must be met or performed before continuing:
 - Verify that the upstream gas supply pressures to unit is between 4.0" and 14" W.C.
 - Install the following devices on the unit, per the Innovation 1600-2000 Operation Manual:
 - A manometer on the high gas pressure switch
 - A combustion analyzer probe in the exhaust manifold
 - A multimeter to read flame strength and combustion analysis
 - Ensure the facility can dissipate the heat generated at full fire, to avoid over temperature conditions. If current heat demand is low (e.g., outside temperature is relatively high), consider performing the entire combustion calibration process as quickly as possible to reduce the amount of heat generated by the test.

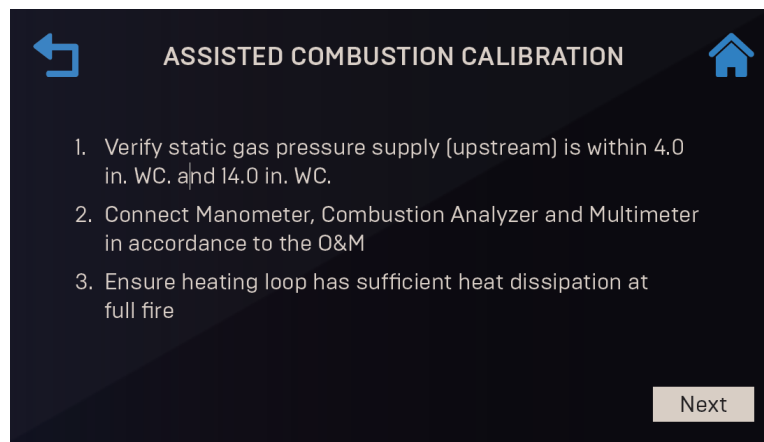


Figure 3-2: Assisted Combustion: Assisted Combustion Calibration Screen

5. Once all three conditions have been verified/met. Press **Next** to continue.
6. The **NOx Requirements** screen appears. Choose the NOx target: **9 ppm**, **20 ppm** or **None**. The combustion calibration target table for the CEN model and the selected NOx requirement is loaded into the Controller.

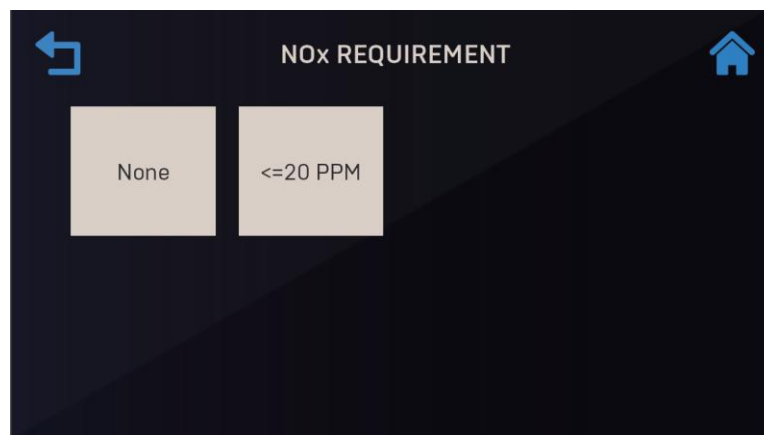


Figure 3-3: Assisted Combustion: NOx Requirement Screen

7. The unit is put in **Manual** mode (but is not yet firing) and a message appears saying **O2 Sensor Calibration in Progress**. Wait 1 to 2 minutes for this step to complete.

SECTION 3: Calibration

8. The unit now begins the ignition sequence (see Section 7.1 for details) and continues until the unit is firing at full valve position (max fire rate). This step may take a minute or more.
9. When the ignition sequence is complete, the **Downstream Gas Pressure** screen appears. Enter the manometer's gas pressure reading. The allowable gas pressure range varies by model. See the *Innovation 1600-2000 Pre-Installation Gas Supply Guide*, TAG-0113.

DOWNSTREAM GAS PRESSURE

Downstream Gas Pressure: in. WC

Figure 3-4: Assisted Combustion: Downstream Gas Pressure Screen

10. The system now starts combustion calibration, starting at the 100% valve position.

COMBUSTION CALIBRATION IN PROGRESS

Valve Position	Target O ₂	O ₂ Reading	Blower
100%	5.0%	6.2%	7.30 V

Figure 3-5: Assisted Combustion: Combustion Calibration In Progress Screen

11. Once the O₂ level has been finalized the **Calibration Data Recording** screen appears. Enter values in the **NOx**, **CO** and **Flame Strength** fields from the multimeter. Press **Next**.

Figure 3-6: Assisted Combustion: Calibration Data Recording Screen

Note the following:

- Valid NOx range is defined by the NOx requirement chosen in Step 6.
 - Valid CO range is between 1 and 300 ppm
 - Valid Flame Strength is $\geq 2 \mu\text{A}$
 - You can move to the next valve position if the NOx and/or Flame Strength values entered are out of range, however a message will appear alerting you to that condition, such as **Flame Strength too low**.
 - You **cannot** proceed if the CO value is out of range. A message will appear saying **Invalid CO value. Abort and manually calibrate to reduce CO**.
 - When transitioning from one valve position to the next, the In-Progress screen (Figure 3.1-4) is displayed showing the O₂ levels and blower voltage for all previously completed valve positions.
 - If there are any problems during the assisted calibration, a screen may appear requesting user action.
12. After pressing **Next**, the system begins calibrating the next valve position. Repeat the **previous** step at the new Valve Position for this and all other Valve Positions.
13. After completing the last Valve Position, the **Combustion Calibration Complete** screen appears. See Section 3.5 for instructions on accessing this screen.

SECTION 3: Calibration

3.2 Manual Combustion Calibration Overview

The Edge [ii] Controller has functionality to perform the full combustion calibration process on all Innovation 1600-2000 water heaters.

NOTE: The following is a general overview of the combustion calibration process. Combustion calibration instructions vary from model to model, and some may require specific additional steps not included below. For full combustion calibration instructions specific to your unit, consult the OMM manual that shipped with your unit.

1. Go to: **Main Menu → Calibration → Combustion Calibration**. If the O₂ sensor is not connected, a message appears saying that combustion calibration cannot be performed and this function aborts. If that occurs, connect the O₂ sensor and then repeat Step 1.
2. The **Combustion Calibration** screen appears listing 3 conditions that must be met or performed before continuing. Once all three conditions have been met, press **Next**.

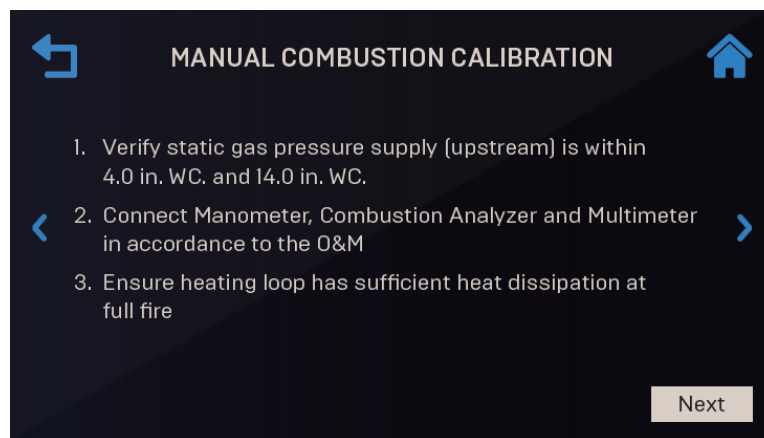


Figure 3-7: Manual Combustion: Manual Combustion Calibration Screen

3. On the **NOx Requirements** screen, select the NOx (Nitrogen Oxide) target to use during combustion calibration.

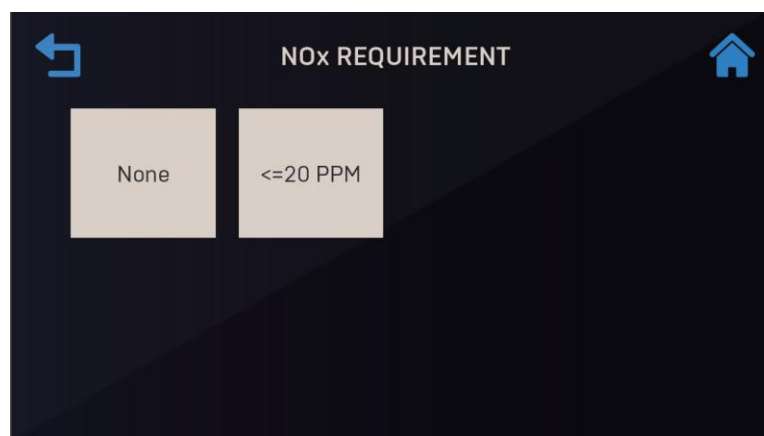


Figure 3-8: Manual Combustion: NOx Requirement Screen

SECTION 3: Calibration

- The unit is put in **Manual** mode and the **Combustion Calibration** screen now appears. It provides two methods to ramp the unit's valve position up or down:
 - Method 1:** Toggle through the pre-set calibration points till you reach the desired valve position, then press **Go** to go to that point (left image below).
 - Method 2:** Enable **Fine VP Step**, then manually press the + or – buttons once per 1% to bring the unit to the desired valve position (right image below).

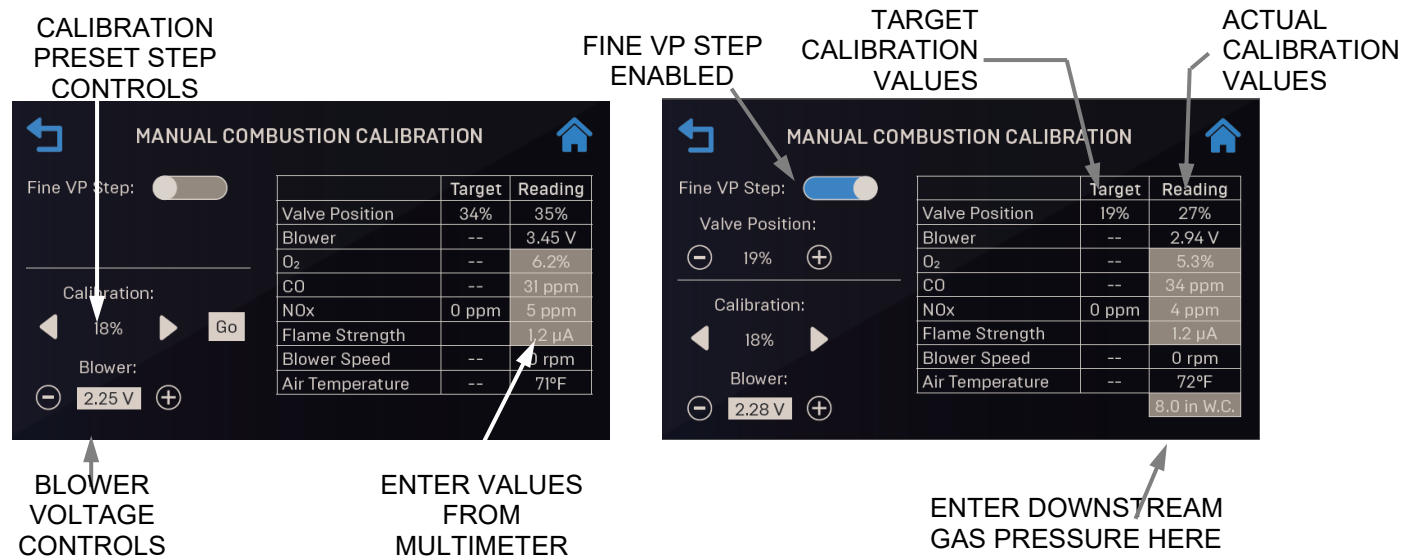


Figure 3-9: Manual Combustion: Manual Combustion Calibration Screen

- First change the valve position to 30%, press the **Go** button, verify that the unit has ignited and is operating as expected, then use ► (Right) arrow key to change the valve position to 100% and press **Go**.
- Record the downstream manometer's gas pressure reading in the **Downstream Gas Pressure** field, which appears only when **Valve Position** = 100%.
- Enter O₂, NO_x, CO and flame strength values from the combustion analyzer and multi-meter at the 100% fire rate in the Reading cells.
- If the O₂% Reading value doesn't match the Target value, use the Blower voltage control to adjust the combustion process, then repeat this step as needed until the Reading and Target values are a close match.
- After completing the steps above at 100%, use either method (see Step 4) to reduce the valve position to the next step.
- Repeat Steps 7 – 9 until you reach the last (lowest) calibration point. At the lowest valve positions, small changes to blower voltage have a large effect.
- You can press **Back** and re-calibrate one or more points or view the **Combustion Calibration Complete** screen by going to **Main Menu → Calibration → Combustion Summary**. See Section 3.5 for instructions on accessing this screen.

SECTION 3: Calibration

3.3 Input/Output

Complete the instructions below to view the current reading of the system's sensors, and either calibrate the sensor or enter offset values. Note, this does not apply to the two Over-Temperature Limit Switches mounted on the front of the unit just under the I/O board; instructions for checking and configuring those switches are in the *Innovation 1600-2000 Operation-Service Manual* (OMM-0175).

1. Go to: **Main Menu → Calibration → Input/Output.**
2. The Input/Output screen appears showing the sensors that are available. If a sensor is unavailable or disabled, its button is not displayed.

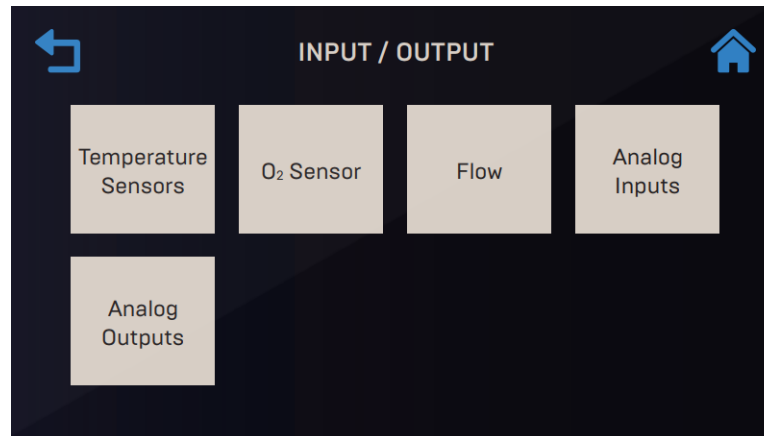


Figure 3-10: Calibration: Input/Output Screen

NOTE: You can navigate from one **Input/Output** screen to the next in round-robin fashion using the **Page Left** and **Page Right** icons on each screen.

3.3.1 Temperature Sensors

This screen allows you to see the current value of all temperature sensors. If reliable feedback or external instrumentation indicates the reading is inaccurate, you can adjust its reading via the **Offset** parameter. This process can be repeated for all available analog inputs.

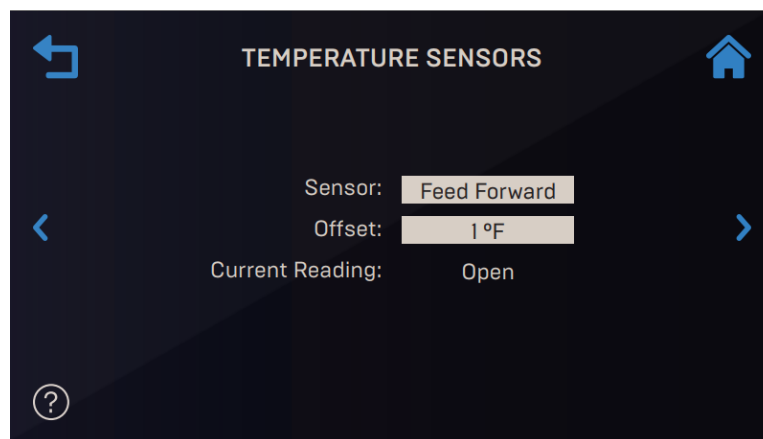


Figure 3-11: Input/Output: Temperature Sensors Screen

1. Go to: **Main Menu → Calibration → Input/Output → Temperature Sensors.**

SECTION 3: Calibration

2. Press the **Sensor** parameter and select the temperature sensor you want to view:
 - Exhaust
 - Air Inlet
 - Outlet
 - Supply Header
 - Return Header
 - Return Loop 2
 - RTD Spare 2
 - Outdoor Temp
 - Lower Inlet
 - DHW Temp
 - Upper Inlet
 - Supply Loop 2
 - RTD Spare 1
3. If necessary, you can adjust the **Offset** parameter to match a reliable reading or instrument by entering a value in this parameter. (Range: -10.0 to 10.0°F, default = 0.0°F)
4. Repeat Steps 2 and 3 to add offsets to other temperature sensors, as needed.

3.3.2 O2 Sensor

The **O2 Sensor** screen displays the current oxygen (O₂) reading, and also allows you to enter an offset, and/or enable Auto Calibration of the O₂ sensor. This sensor is an important part of O2 Trim functionality; the **O2 Sensor** screen is not visible on units that don't have an O₂ sensor.

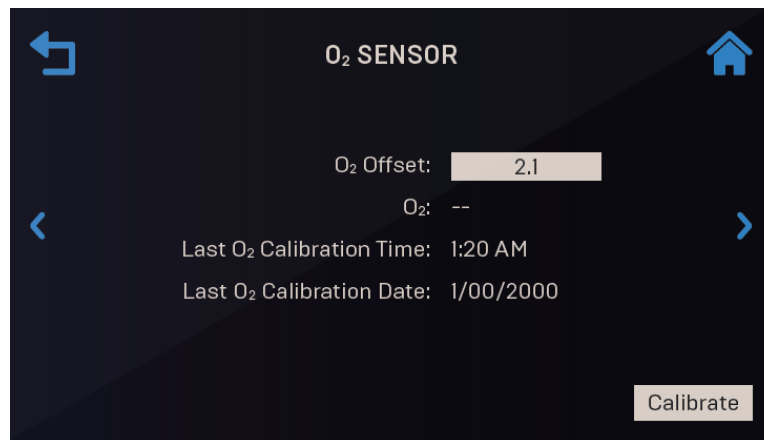


Figure 3-12: Input/Output: O2 Sensor Screen

1. Go to: **Main Menu → Calibration → Input/Output → O2 Sensor**.
2. If needed, enter an **O2 Offset** value to make the reading match an external meter. The unit must be operating with sufficient blower speed to measure O₂. The current reading appears before and after entry. (Range: -3.0% to 3.0%, default = 1.0%)
3. To initiate, press **Auto Calibrate Now** and choose **Yes**.

3.3.3 Analog Inputs

The **Analog Inputs** screen allows you to calibrate all analog inputs such as a sensor, remote signal, or feedback from a valve. If reliable feedback or external instrumentation indicates the reading is inaccurate, you can adjust its reading via the **Offset** parameter.

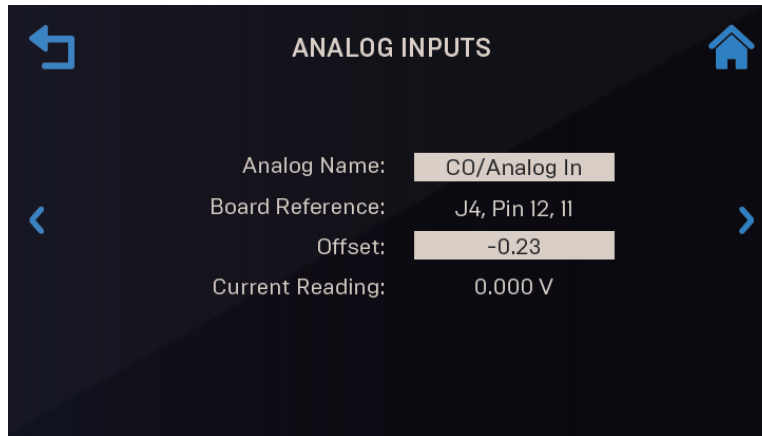


Figure 3-13: Input/Output: Analog Inputs Screen

1. Go to: **Main Menu → Calibration → Input/Output → Analog Inputs.**
2. Press the **Analog Name** field and choose the sensor you want to view. The selected input is displayed along with its current reading. The available Analog Inputs are:
 - CO/Analog In
 - Air Pump
 - Spare Analog In 3
 - Spare Analog In 2
 - Flow
 - Remote Analog In
 - Spare Analog In 1
 - Cas Vlv Fdbk (Cascade Valve Feedback)
3. If you chose **Remote Analog In** or **Spare Analog In 1, 2 or 3** in step 2, the **Function** parameter appears with a read-only display of the function to which the input is currently assigned (assignments are made in [Section 6.5.4: Analog Inputs](#)):
 - DHW Setpoint
 - DHW VSP Fdbk
 - SmartPlate VP
 - NOx
 - Other Setpoint
4. This screen includes the following additional parameters:
 - **Board Reference:** Displays how the input connects to the Edge [ii] Controller, either through the unit's wiring harness or to specific pins on the unit's I/O Board (see the I/O board map in Section 2.10 of the *Innovation 1600-2000 Operation Manual*, OMM-0175).
 - **Offset:** If necessary, you can adjust the **Current Reading** to match a reliable reading or instrument by entering a value in this parameter. (Range: -2.0 to +2.0, default = 0.0)
 - **Current Reading:** A read-only display of the current value. If no input is sensed, it displays either **INVALID** or --- (blank).
5. You can repeat Steps 2 through 4 with the other Analog Inputs, as needed.

3.3.4 Analog Outputs

This screen allows you to calibrate all available analog outputs, such as a valve or pump. You can also view feedback (if available). If reliable feedback or external instrumentation indicates the reading is inaccurate, you can adjust its reading via the **Offset** parameter. This process can be repeated for all available analog outputs.

1. Go to: Main Menu → Calibration → Input/Output → Analog Outputs.

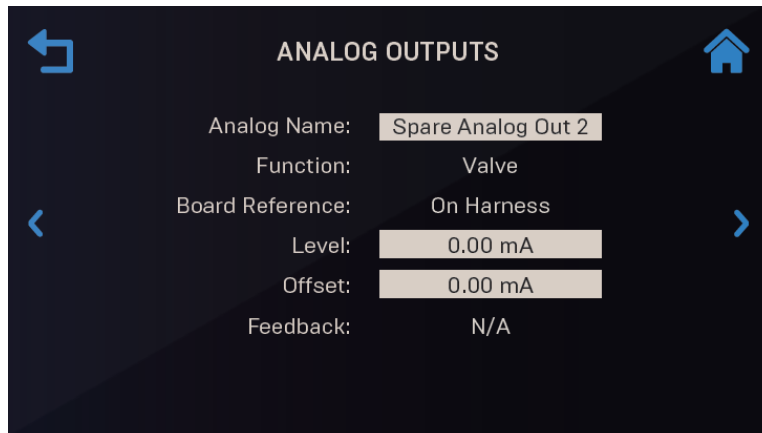


Figure 3-14: Input/Output: Analog Outputs Screen

2. Press the **Analog Name** field and choose the analog output you want to view. The chosen output is displayed along with its current reading.
 - Spare Analog Out 2
 - Spare Analog Out 1
 - DHW V.S. Pump
 - Cascade Valve
 - Spare Analog Out 3
3. If you chose **Spare Analog Out 1** or **2** in step 2, the **Function** parameter provides a read-only display of the function the output has been assigned, either **Valve** or **Other**.
4. The **Board Reference** shows I/O Board pins to which the output selected in Step 2 is connected or shows “On Harness”. For more information, see the I/O board diagram in Section 2.10 of the *Innovation 1600-2000 Operation-Service Manual* (OMM-0175).
5. Set the **Level** parameter to the reading from a reliable external instrument. For example, set the Level to 5 V or 10 mA and observe that it matches the external instrumentation or feedback, if available. If not, enter an appropriate value in the **Offset** parameter. (Range: 0.00 to 10.00V or 0.00 to 20.00 mA)
6. If necessary, you can adjust the **Offset** to match a reliable reading or instrument by entering a value in this parameter. (Range: -1.0 to +1.0 or -2.0 to +2.0 mA, default = 0.0).
7. If the output selected in Step 2, includes feedback, it is displayed in the **Feedback** parameter (see the Name parameter in [Section 6.5.4: Analog Inputs](#)). If no feedback is sensed, the reading is ‘---’(blank). The feedback signal mapping is:

Analog Output	Analog Input (Feedback)	Display Tag
Cascade Valve	Cas Vlv Fdbk	Valve Feedback
BLR VS (Variable Speed) Pump	BLR VSP Fdbk	Pump Feedback
DHW VS (Variable Speed) Pump	DHW VSP Fdbk	Pump Feedback

8. Repeat Steps 2 through 7 with the other Analog Outputs in use in the system.

SECTION 3: Calibration

3.4 Subsystem

This screen accesses two system components: the Air/Fuel Valve and the Spark Monitor

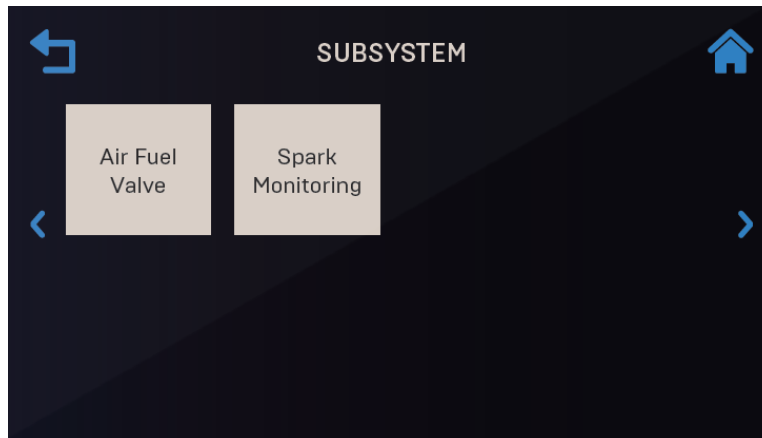


Figure 3-15: Calibration: Subsystem Calibration Menu

1. Go to: **Main Menu → Calibration → Subsystem**.
2. Press either **Air Fuel Valve** or **Spark Monitoring**.

NOTE: To navigate between the Air Fuel Valve and Spark Monitor screens in round-robin fashion, use the **Page Left** and **Page Right** icons on both screens.

3.4.1 Air Fuel Valve Calibration

Complete the instructions below to calibrate the Air/Fuel Valve.

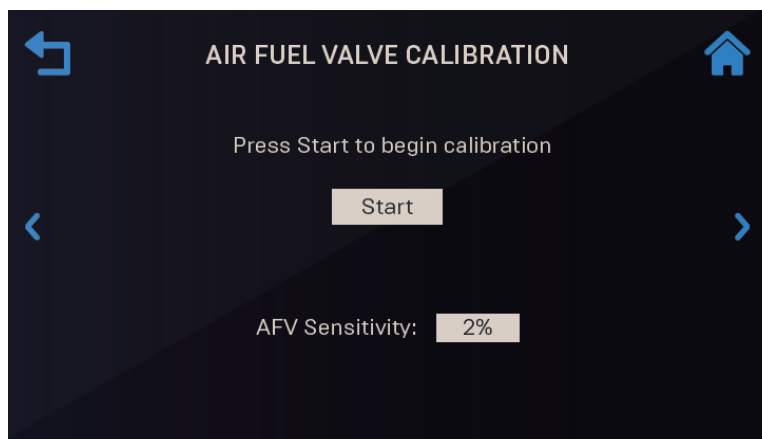
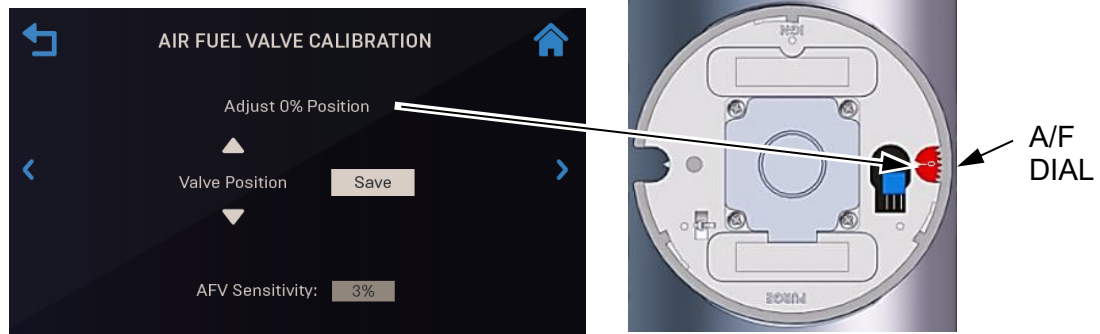


Figure 3-16: Subsystem: Air/Fuel Valve Calibration Screen

1. Go to: **Main Menu → Calibration → Subsystem → Air Fuel Valve**.
2. Before calibrating you have the option of adjusting the **A/F Sensitivity** (1% to 5%).
3. To start the calibration, press the **Start** button. The valve position (shown on the Air/Fuel dial) automatically moves to 0%. If it settled at something other than 0%, you could manually move the valve position using the **Up** or **Down** arrows until the Air/Fuel dial reaches 0%.



AIR FUEL VALVE CALIBRATION SCREEN

AIR/FUEL VALVE

Figure 3-17: Air/Fuel Valve Calibration Screen – After Completion

4. When the Air/Fuel dial has settled at the 0%, the **Save** button appears. Press **Save** when done to save the 0% calibration.
5. The valve now moves to the 100% position and the same options are available. Press **Save** when done to save the 100% calibration.
6. The valve position now automatically moves to the 50% position. The **Save** button is replaced with the **Done** button to signify completion, and a status message is displayed above the valve position adjustment.

NOTE: If the valve does not read 50%, press **Done** but then repeat the process to ensure calibration.

3.4.2 Spark Monitor Calibration

The **Spark Monitoring** screen gives you the option of bounding the Spark Monitor's measurement range by specifying the minimum and maximum spark current.



Figure 3-18: Subsystem: Spark Monitor Screen – Spark Monitor Enabled

1. Go to: **Main Menu → Calibration → Subsystem → Spark Monitoring.**
2. To set a spark range, specify values in the following fields:
 - **Min Spark:** Range: 0.00 to 0.29 A
 - **Max Spark:** Range: 0.30 to 2.50 A

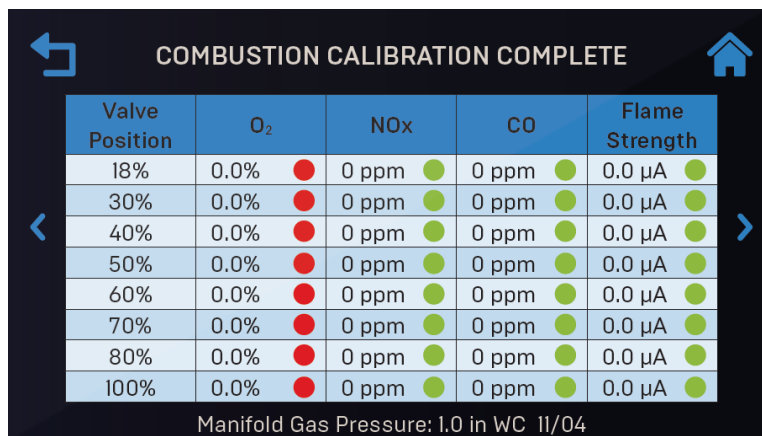
SECTION 3: Calibration

3.5 Combustion Summary

The **Combustion Calibration Complete** screen displays a summary of the results of the most recent combustion calibration. It remains in effect until the next combustion calibration.

This screen also appears at the end of the Assisted Combustion Calibration (see Section 3.1: *Assisted Combustion Calibration*) and Manual Combustion Calibration (see Section 3.2: *Manual Combustion Calibration*).

To view the summary, go to: **Main Menu → Calibration → Combustion Summary**. Each cell is color coded with a green or red icon to indicate if each level is acceptable.



Valve Position	O ₂	NO _x	CO	Flame Strength
18%	0.0% ●	0 ppm ●	0 ppm ●	0.0 μA ●
30%	0.0% ●	0 ppm ●	0 ppm ●	0.0 μA ●
40%	0.0% ●	0 ppm ●	0 ppm ●	0.0 μA ●
50%	0.0% ●	0 ppm ●	0 ppm ●	0.0 μA ●
60%	0.0% ●	0 ppm ●	0 ppm ●	0.0 μA ●
70%	0.0% ●	0 ppm ●	0 ppm ●	0.0 μA ●
80%	0.0% ●	0 ppm ●	0 ppm ●	0.0 μA ●
100%	0.0% ●	0 ppm ●	0 ppm ●	0.0 μA ●

Manifold Gas Pressure: 1.0 in WC 11/04

Figure 3-19: Combustion Calibration Complete Screens

SECTION 4: DIAGNOSTICS

The Diagnostics menu provides access to a number of tools you can use to diagnose a suspected or observed fault. It is accessed by pressing **Diagnostics** on the **Main Menu**

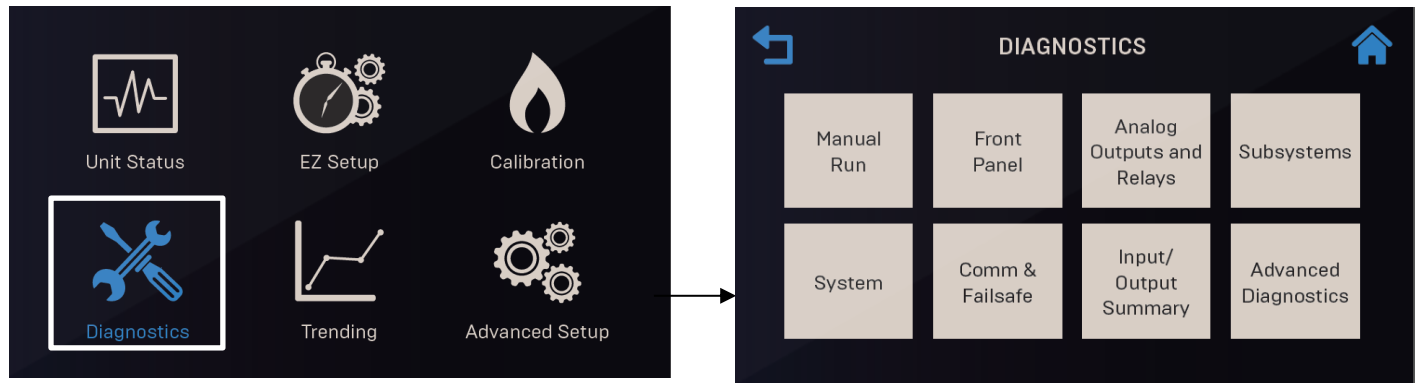


Figure 4-1: Diagnostics Menu

This Section includes the following topics:

[4.1: Manual Run](#)

[4.2: Front Panel](#)

[4.2.1: Front Panel Diagnostics](#)

[4.3: Analog Outputs and Relays](#)

[4.3.1: Relays](#)

[4.3.2: Analog Outputs](#)

[4.4: Subsystems](#)

[4.4.1: Air Fuel Valve Stepper Motor](#)

[4.4.2: Blower](#)

[4.4.3: Ignition](#)

[4.5: System](#)

[4.5.1: Pre-Start Up](#)

[4.5.2: Versions](#)

[4.6: Comm & Failsafe](#)

[4.6.1: IP Network](#)

[4.6.2: BAS](#)

[4.6.3: USB Storage](#)

[4.7: Input/Output Summary](#)

⚠ WARNING!

Before starting these instructions, you must ensure that the unit has the latest Edge [ii] Controller firmware. See [Section 6.2.7: Firmware Update](#) to install the latest firmware.

4.1 Manual

Most diagnostic test procedures require the unit to be in **Manual Mode**. Manual Mode:

- Initially reduces the unit's Fire Rate to zero.
- Allows the system to display certain diagnostic options that are otherwise unavailable.
- Suppresses event transmissions to external systems.
- Lights the red **Manual** LED on the Controller's front face.
- Flags all events in the internal log as related to Manual Mode.

SECTION 4: Diagnostics

To put the unit in Manual Mode:

- Go to: **Main Menu → Diagnostics → Manual Run.**

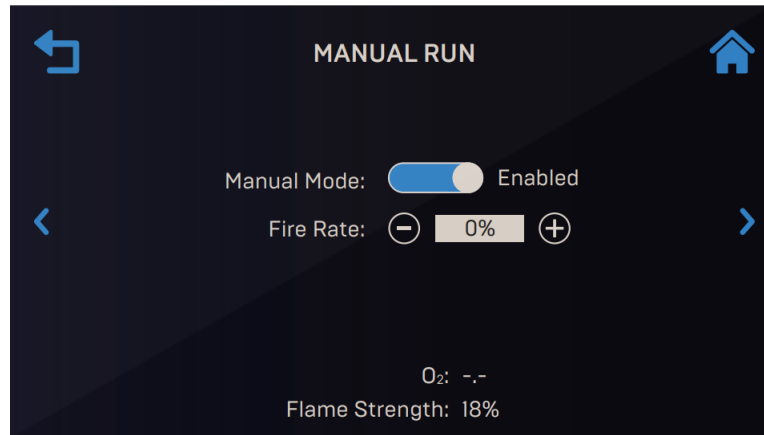


Figure 4-2: Diagnostics: Manual Run Screen – Manual Mode Enabled

- Enable the **Manual Mode** toggle. The red Manual LED lights on the Controller’s front face turns on, the unit shuts down (if not already) and stays in **Manual Mode** until it is disabled from this screen, or until the session times-out.
- When Manual Mode is enabled, the Fire Rate control appears. You can use these controls to manually fire the unit in 1% increments using the + and – controls or press on the field and manually enter a specific fire rate.
- When you are done operating in **Manual Mode**, use the **Manual Mode** toggle to disable it. All initiated/active diagnostic routines/processes will terminate, the **Manual LED** on the Controller’s front face will go off, and the unit will resume normal operation.

4.2 Front Panel

This screen accesses several tests of the Controller’s touchscreen, LEDs, keypad and buttons.

4.2.1 Front Panel diagnostics:

- Go to: **Main Menu → Diagnostics → Front Panel.**

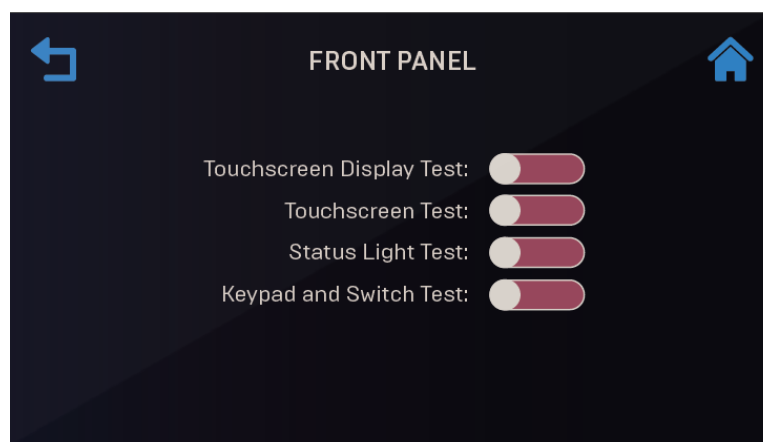


Figure 4-3: Diagnostics: Front Panel Screen

SECTION 4: Diagnostics

2. Select a diagnostic test, to perform:

- **Touchscreen Display Test:** Sequentially displays five colors, full-screen, for 5 seconds each. Determine if any pixels fail to show any color.



Figure 4-4: Diagnostics: Touchscreen Display Test

- **Touchscreen Test:** When you enable this test, move your finger around the screen to all four corners. Verify X and Y coordinates change as you move your finger.

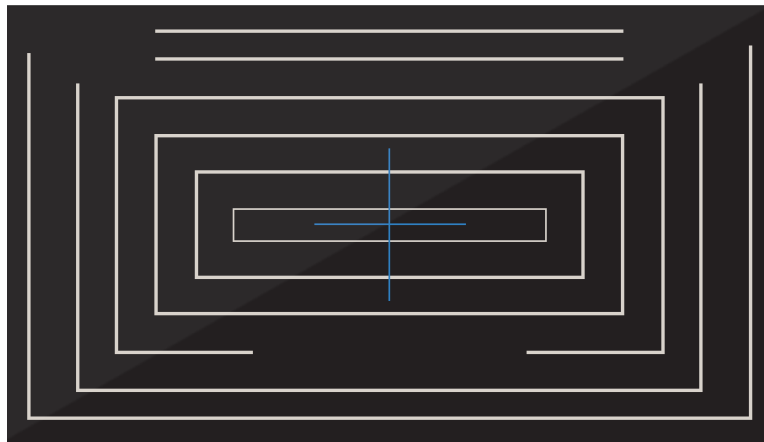


Figure 4-5: Diagnostics: Touchscreen Display Test

- **Status Light Test:** Walks through each of the LED lights Individually.
- **Keypad and Switch Test:** Allows you to verify the buttons on the Controller's face, below the touchscreen; this test does not include the Low Water Level Test & Reset buttons.

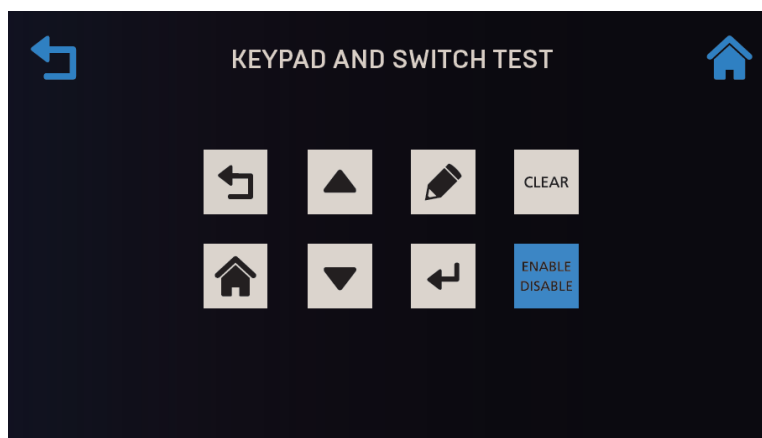


Figure 4-6: Diagnostics: Keypad and Switch Test Screen

SECTION 4: Diagnostics

4.3 Analog Outputs and Relays

The **Analog Outputs and Relays** screen allows you to test the unit's relays and analog outputs. This screen is accessible only in **Manual Mode**.

1. Go to: **Main Menu → Diagnostics → Analog Outputs and Relays**.

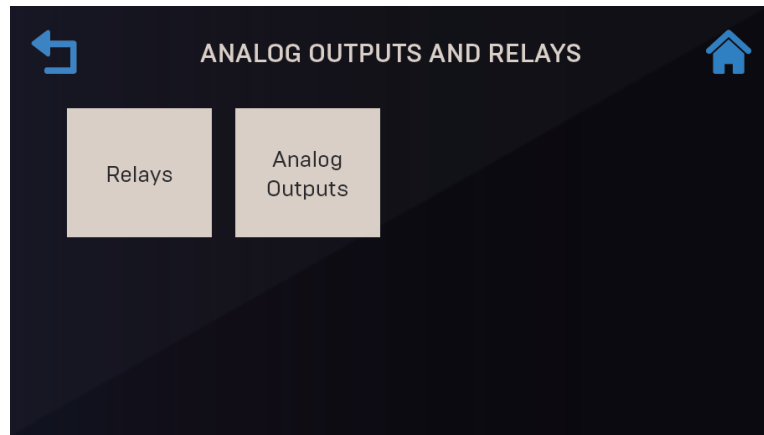


Figure 4-7: Diagnostics: Analog Outputs and Relays Screen

2. Press either **Relays** or **Analog Outputs**.

NOTE: To navigate between the **Analog Output** and **Relays** screens in round-robin fashion, use the **Page Left** and **Page Right** icons on both screens.

4.3.1 Relays

The **Relays** screen displays a list of all relays in the system and allows you to manually test each one to confirm they are functioning. Complete the instructions below to test the unit's relays.

1. Go to: **Main Menu → Diagnostics → Analog Outputs and Relays → Relays**.

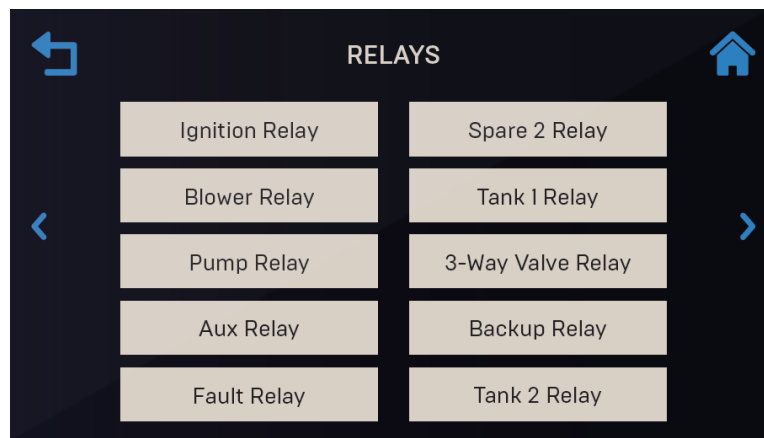


Figure 4-8: Analog Outputs and Relays: Relays Screens

2. Press the relay you want to test; it turns blue, enabling it for 1 minute, after which it is automatically disabled. You can select multiple relays to test at one time.
3. During test, verify the function associated with the selected relay(s) occurred as expected.
4. The Relay test will disable automatically after 1 minute.

SECTION 4: Diagnostics

4.3.2 Analog Outputs

The **Analog Outputs** screen displays the current values of the various analog outputs and allows you to manually adjust their values.

1. Go to: **Main Menu → Diagnostics → Analog Outputs and Relays → Analog Outputs.**

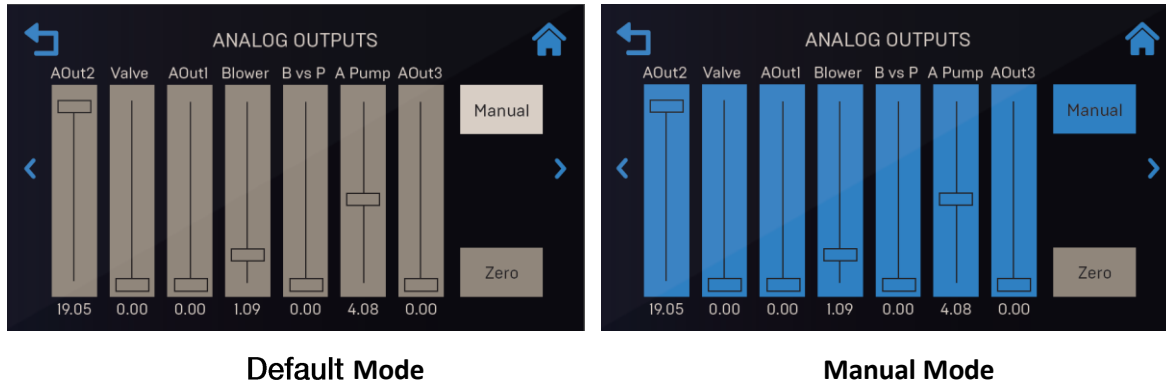


Figure 4-9: Analog Outputs and Relays: Analog Outputs Screen

2. In Default mode, this screen is grey and displays the current value of all analog outputs.
3. Pressing the **Manual** button reduces the fire rate to zero and the sliders turn blue. You can now manually adjust the position of one or more of the outputs and verify the behavior of the selected output(s). You can return all sliders to 0.00 by pressing the **Zero** button.
4. To put this screen back in Default mode, press the **Manual** button again.

4.4 Subsystems

The **Subsystems** screens allow you to test the units Air/Fuel Valve, Blower and Ignition.

NOTE: You can navigate from one **Subsystem** screen to the next in round-robin fashion using the **Page Left** and **Page Right** icons on each screen.

1. Go to: **Main Menu → Diagnostics → Subsystems.**

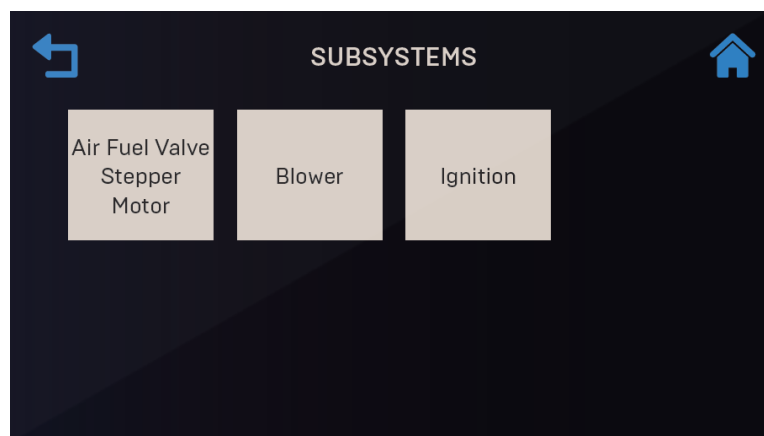


Figure 4-10: Diagnostics: Subsystems Screen

2. Press on the component you want to test.

SECTION 4: Diagnostics

4.4.1 Testing the Air Fuel Valve Stepper Motor

1. Go to: Main Menu → Diagnostics → Subsystems → Air Fuel Valve Stepper Motor.

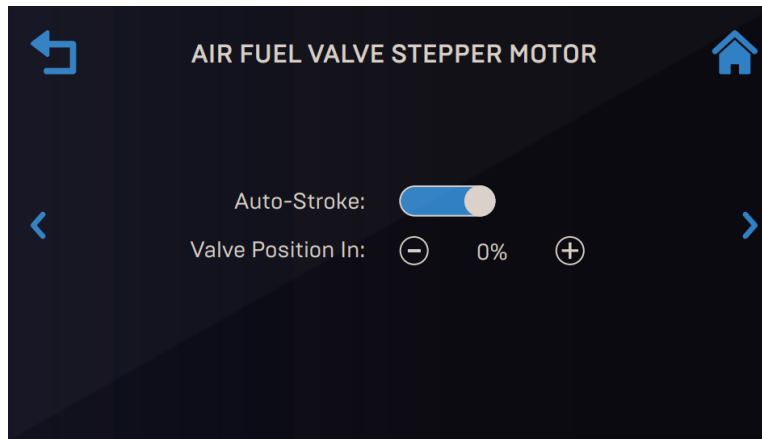


Figure 4-11: Subsystems: Air Fuel Valve Stepper Motor Test Screen

2. Press the **Auto-Stroke** control to initiate the test. This will start one full cycle of the Air Fuel Valve, from fully closed to fully open then back to closed. During the test, the valve position is displayed from 0% to 100%.
3. Alternatively, manually adjust the Air Fuel Valve position in 1% increments using the **Plus** and **Minus** buttons and compare stepper motor's physical position to value on the screen.

4.4.2 Testing the Blower Motor

1. Go to: Main Menu → Diagnostics → Subsystems → Blower.

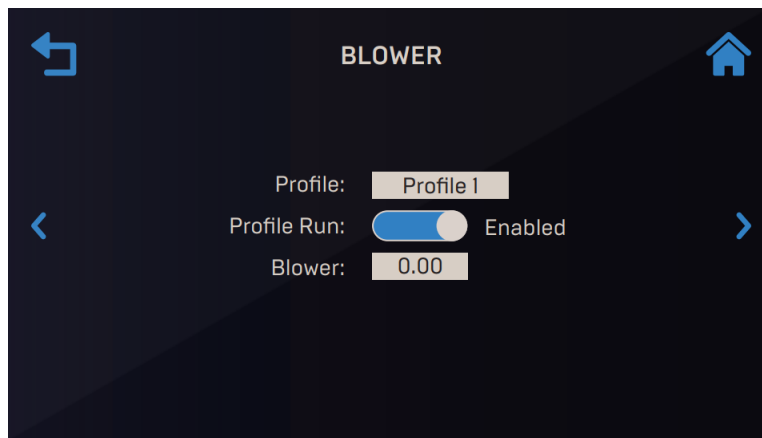


Figure 4-12: Subsystems: Blower Screen

2. The **Blower** screen allows you manually drive the blower to a desired output using the **Plus** or **Minus** buttons on the **Blower** (voltage) control, or to run a pre-defined sequence.
3. To run the blower manually, use the **Plus** or **Minus** buttons or press the numeric field and input a blower voltage, then verify by observing the blower speed.
4. To run a pre-defined sequence, press the **Profile** parameter and select **Profile 1**, then enable **Profile Run**. This exercises the Blower in increments from 0-10 volts then back to 0.
5. Using either method, **Blower** (voltage) and **Blower** (rpm) are displayed continuously.

SECTION 4: Diagnostics

4.4.3 Testing the Ignition System

Complete the instructions below to test the ignition system. Note, the Safety Shutoff Valve does not open during this test.

1. Go to: **Main Menu → Diagnostics → Subsystems → Ignition.**

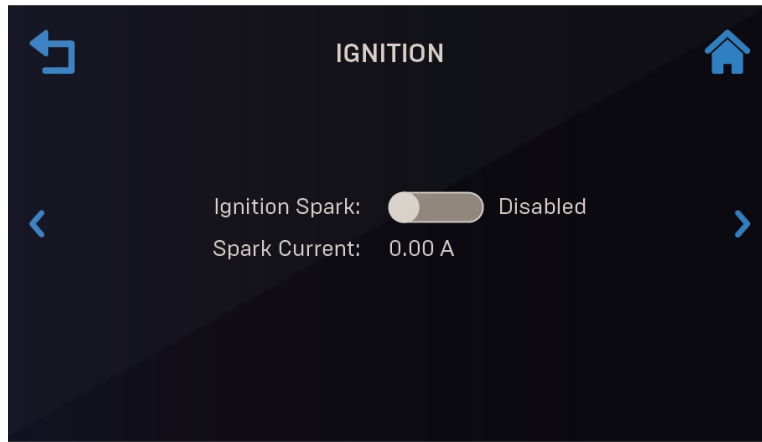


Figure 4-13: Subsystems: Ignition Screen

2. Start the **Ignition Spark** test or **Flame Scanner Relay** test (available only on some models) by enabling its control.
3. The Igniter Solenoid opens the gas assist line solenoid and generates sparking of the igniter until the **Ignition Spark** control is disabled.
4. Enabling the **Flame Scanner Relay** enables the relay.
5. In both tests, the **Spark Current** is displayed continuously during the test.

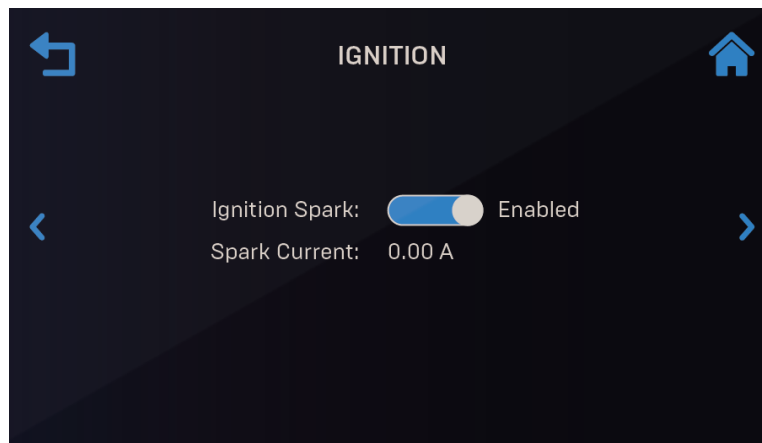


Figure 4-14: Subsystems: Ignition Screen

SECTION 4: Diagnostics

4.5 System

From the **System** screen you can run a programmable profile, manually ramp the fire rate up or down, perform a pre-startup diagnostic or view a software version summary.

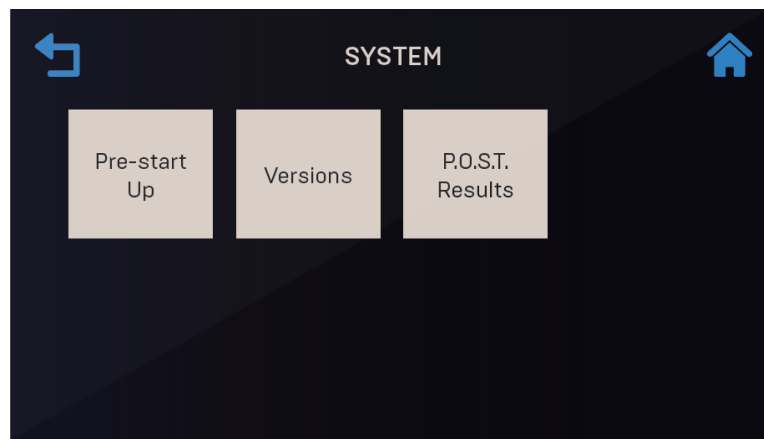


Figure 4-15: Diagnostics: System Screen

NOTE: To navigate from the **Pre-Start Up** screen to **Versions** in round-robin fashion, use the **Page Left** and **Page Right** icons on each screen.

4.5.1 Pre-Start Up Diagnostic Test

The **Pre-Start Up** screen allows you to verify system components and assemblies without opening the SSOV. This is useful when the building's gas supply has not yet been turned on.

1. Go to: **Main Menu → Diagnostics → System → Pre-Start Up.**

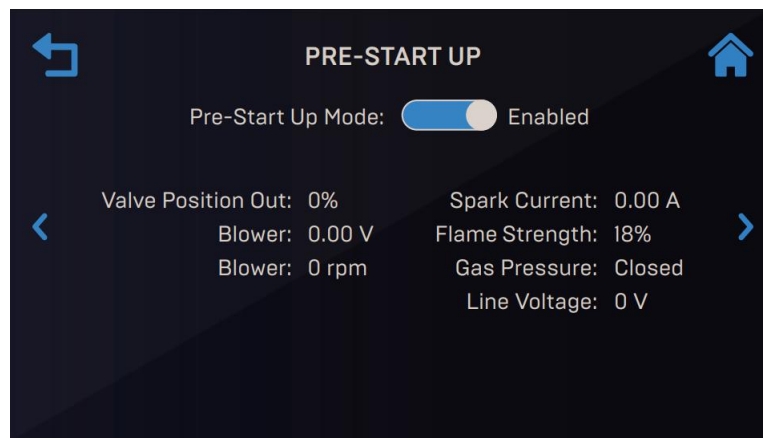


Figure 4-16: System: Pre-Start Up Screen – Shown Disabled

2. To run the Pre-Startup test, enable the **Pre-Start Up Mode** control. The following occurs:
 - The valve position moves to ignition position.
 - The Blower is turned on at ignition point voltage.
 - The gas assist solenoid opens.
 - The igniter is sparked.
3. Monitor the valve position out, blower voltage and speed, spark current, flame strength, gas pressure and line voltage.
4. When observations have completed, disable the **Pre-Start Up Mode** control.

SECTION 4: Diagnostics

4.5.2 Version Information

The screen screens display the current version of the various firmware components. Go to: **Main Menu → Diagnostics → System → Versions.**

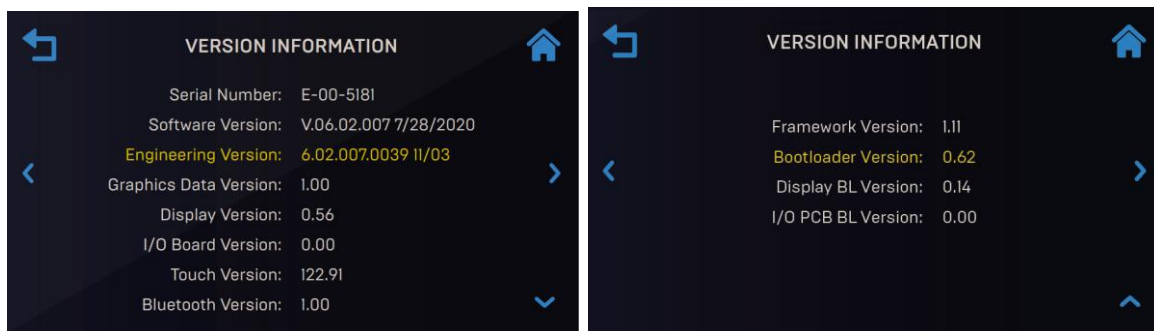


Figure 4-17: System: Versions Information Screen

4.6 Comm & Failsafe

The **Comm & FAILSAFE** screen provides access to screens that can be used to verify IP, Predictive Maintenance, and BAS communication, and check the status of communication with smart devices and available space on a USB device plugged into the side of the Controller.

Go to: **Main Menu → Diagnostics → Comm & Failsafe.**

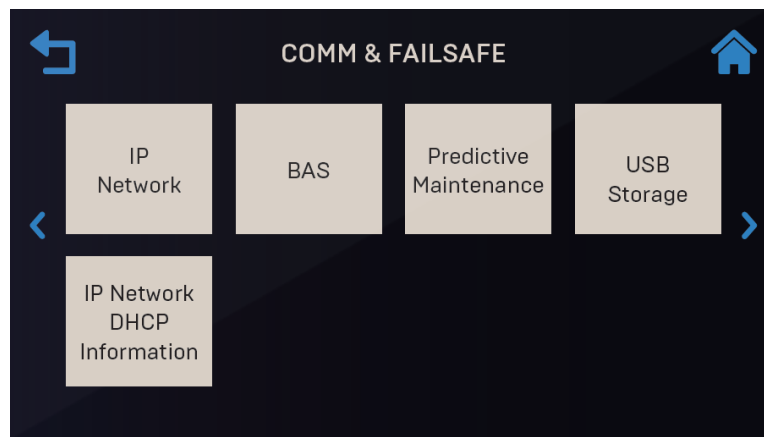


Figure 4-18: Diagnostics: Communications Screen

SECTION 4: Diagnostics

4.6.1 IP Network

The IP Network option is used to check the IP interface used by BAS. Go to: **Main Menu** → **Diagnostics** → **Comm & Failsafe** → **IP Network** to view the available parameters.

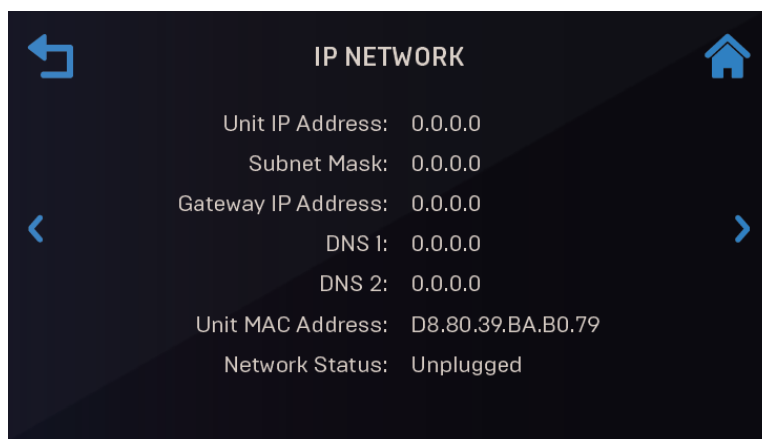
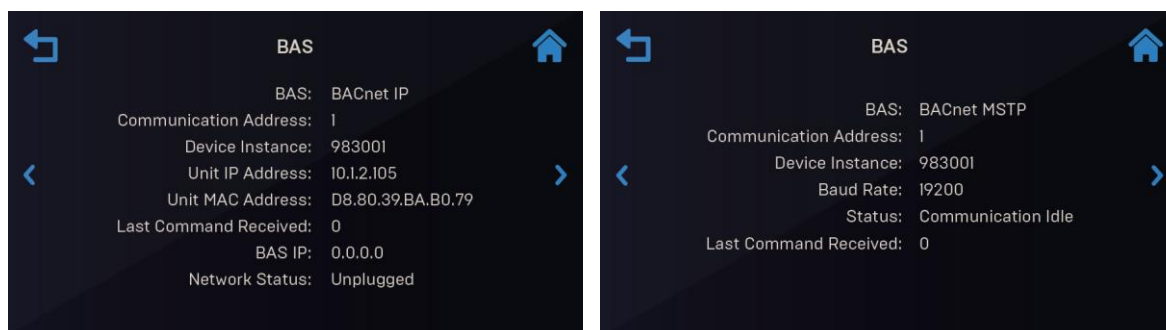


Figure 4-19: Comm & Failsafe: IP Network Screen

4.6.2 BAS

If the unit is part of a Building Automation System (BAS), the BAS screen provides a read-only display of various communication parameters. The screen that appears depends on the communication protocol specified in the **BAS** parameter (see [Section 6.4.1](#)). Go to: **Main Menu** → **Diagnostics** → **Comm & Failsafe** → **BAS** to view the available parameters.



BAS = BACnet IP

BAS = BACnet MSTP

Figure 4-20: Comm & Failsafe: BAS Screen

SECTION 4: Diagnostics

4.6.3 USB Storage

If a USB device is plugged into the USB port on the Controller's left side, the **USB Storage** screen displays various parameters about that device (if no devices is plugged in, the screen just displays the **Status** parameter).

1. Plug a USB device into the USB port on the Controller's left side.
2. Go to: **Main Menu → Diagnostics → Comm & Failsafe → USB Storage**.

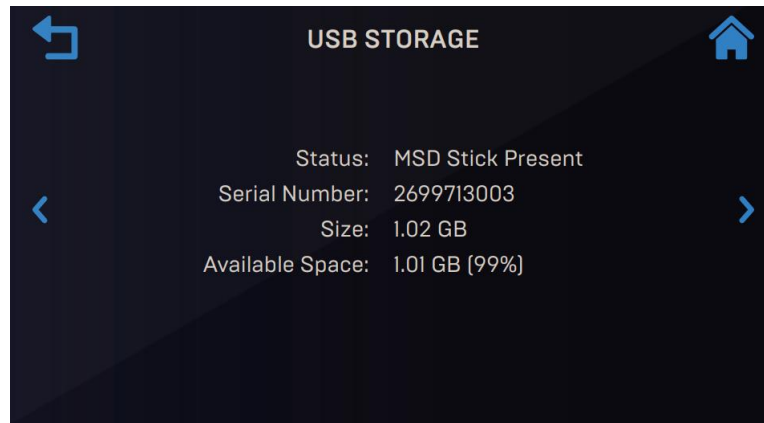


Figure 4-21: Comm & Failsafe: USB Storage Screen

3. View the status of the available parameters.

4.7 Input/Output Summary

The **Input/Output Summary** screen is a read-only, multi-page screen that displays the current status of all Inputs and Outputs, such as temperature sensors, pressure sensors, flow sensor, O₂ sensor, Analog Inputs and Analog Outputs. Items that are not part of the configuration (for example, Feed Forward), are displayed as --- (blank).

1. Go to: **Main Menu → Diagnostics → Input/Output Summary**.

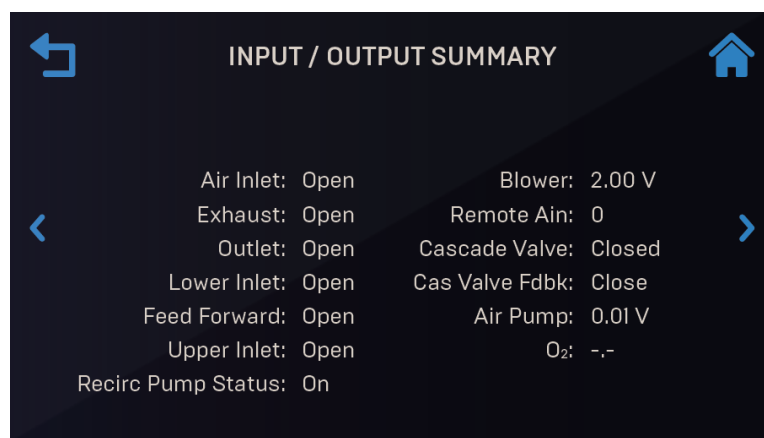


Figure 4-22: Input/Output: Input/Output Summary Screen (First of 3)

SECTION 5: TRENDING

The Controller provides two “Trending” graphs, which each display up to four selectable parameters. It is accessed by pressing **Trending** on the **Main Menu**.

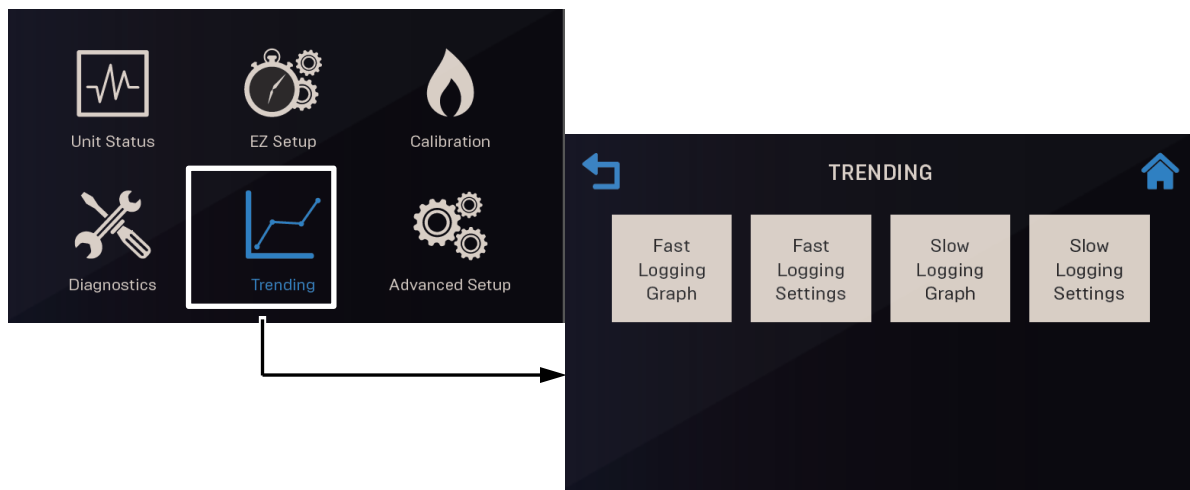


Figure 5-1: Trending Screen

This Section includes the following topics:

[5.1: Fast Logging Settings and Graph](#)

[5.2: Slow Logging Settings and Graph](#)

The Edge [ii] Controller provides two Trending graphs:

- **Fast Speed:** Data is saved 2x per second. Total historical data is 3 minutes (old data is dumped). It is saved for up to 30 seconds after a fault. Fault data is erased once the fault is cleared.
- **Slow Speed:** Data is saved on a user-selected time frame, ranging from every second to once every 2 minutes.

Both graphs have their own list of user-selectable parameters.

IMPORTANT!

Before starting these instructions, you must ensure that the unit has the latest Edge Controller firmware. See *Section 6.2.7: Firmware Update* to install the latest firmware.

5.1 Fast Logging Settings and Graph

1. Go to: Main Menu → Trending → Fast Logging Settings.

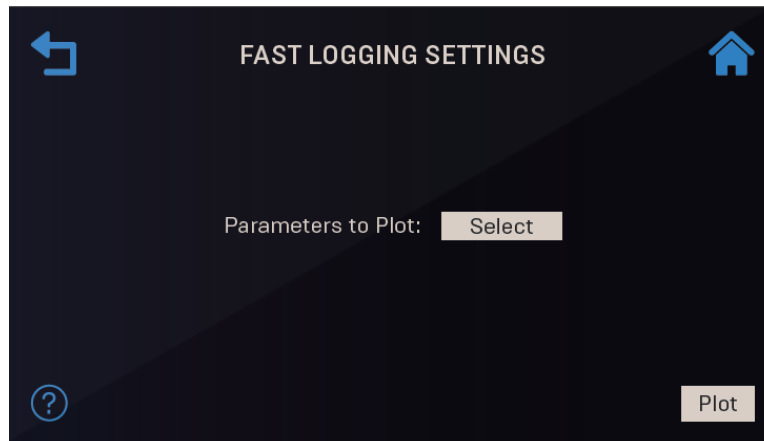


Figure 5-2: Trending: Fast Logging Settings Screen

2. Press **Parameters to Plot**. The **Select Plot Parameters** screen displays the available parameters. Any new selection will create a new plot; the previous selection will be deleted.

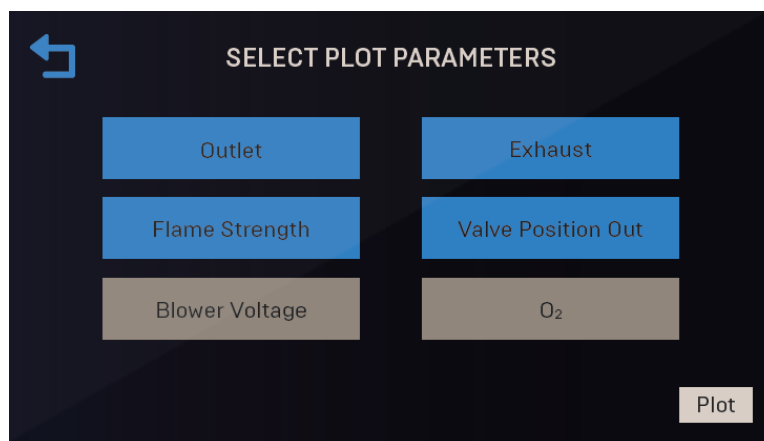


Figure 5-3: Trending: Select Plot Parameters Screen – Fast Logging

3. Press the **Back** button to return to the Fast Logging Settings screen.
4. Press the **Plot** button to create the new graph.

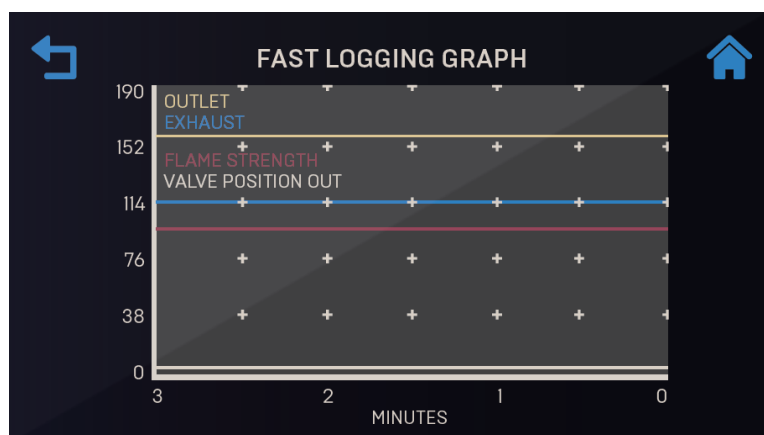


Figure 5-4: Trending: Graph Screen

SECTION 5: Trending

5.2 Slow Logging Settings and Graph

Complete the instructions below to select the parameters for the Slow Logging graph.

1. Go to: Main Menu → Trending → Slow Logging Settings.

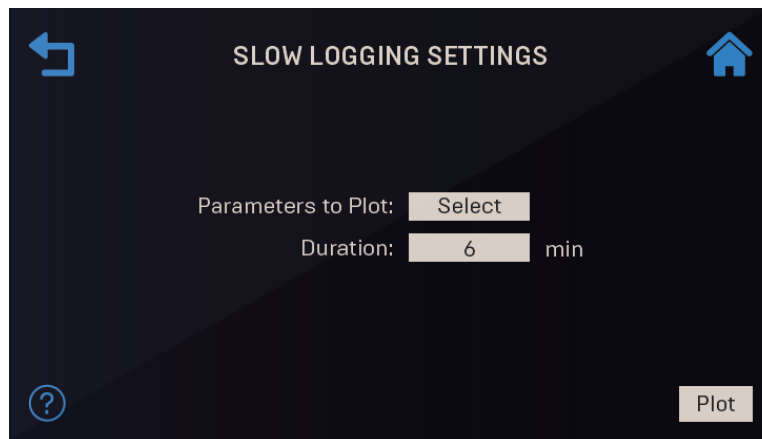


Figure 5-5: Trending: Slow Logging Settings Screen

2. Press Parameters to Plot to display Select Plot Parameters. Select up to 4 parameters.

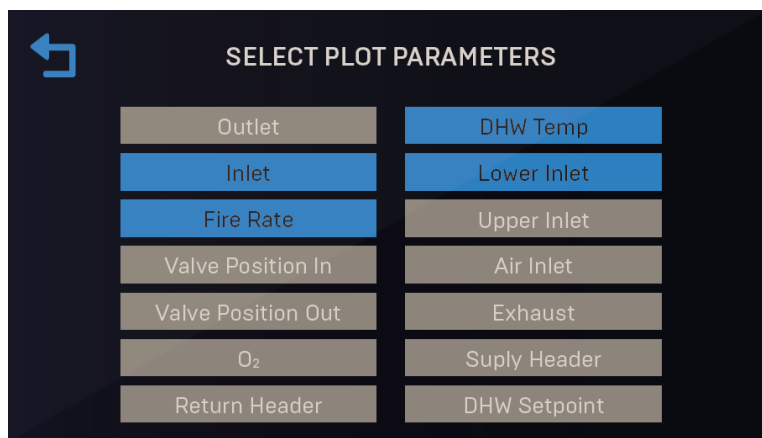


Figure 5-6: Trending: Select Plot Parameters Screen – Slow Logging

3. To set the logging duration (X-Axis), press the Duration field on the Slow Logging Settings screen (Figure 5.2-1, above) and then choose the duration.

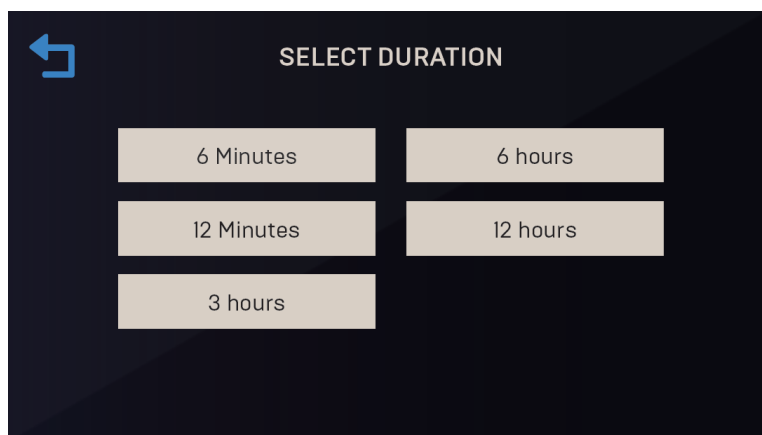


Figure 5-7: Trending: Select Logging Duration Screen – Slow Logging

SECTION 5: Trending

4. Press **Back** to return to the **Slow Logging Settings** screen. Any new selection will create a new plot; the previous selection will be deleted.
5. Press the **Back** button to return to the Slow Logging parameters screen.
6. Press the **Plot** button to create the new graph.

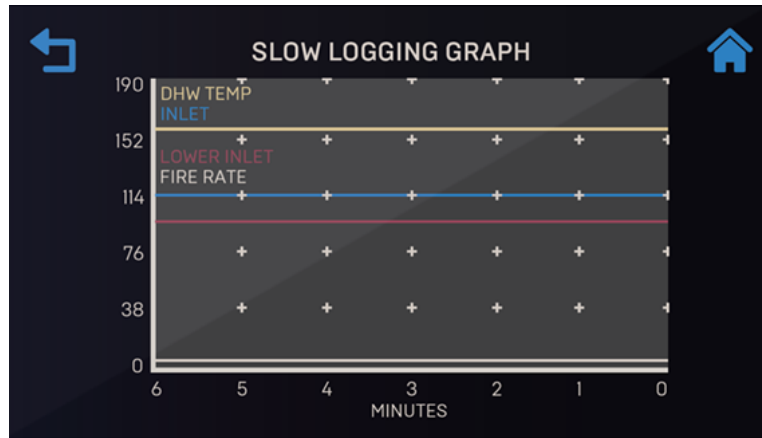


Figure 5-8: Trending: Select Logging Duration Screen – Slow Logging

7. Once the graph has been created, you can return to it any time by going to: **Main Menu → Trending → Slow Logging Graph.**

SECTION 6: ADVANCED SETUP

The **Advanced Setup** screen provides access to specific parameters. It is accessed by pressing **Advanced Setting** on the **Main Menu**.

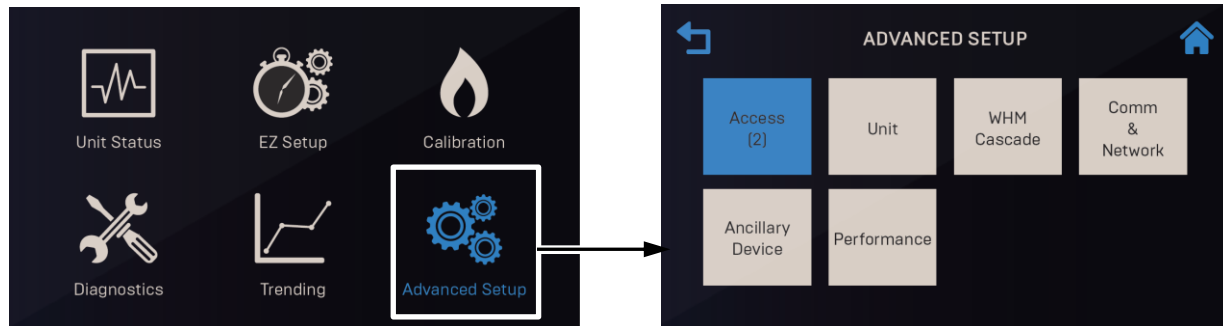


Figure 6-1: Advanced Setup Screen

This Section includes the following topics:

[6.1: Access](#)

[6.2: Unit](#)

[6.2.3: Save and Transfer Settings](#)

[6.2.4: Fault Management](#)

[6.2.5: Freeze Protection](#)

[6.3: WHM Cascade](#)

[6.3.1: Cascade Configuration](#)

[6.3.2: Cascade Communication](#)

[6.3.3: WHM Application Configuration](#)

[6.3.4: Operating Controls](#)

[6.3.4.1: Sequencing Controls](#)

[6.3.4.2: Anti-Cycling Control](#)

[6.3.4.3: Valve Configuration](#)

[6.3.4.4: Lead/Lag](#)

[6.3.5: Sanitation Settings](#)

[6.4: Comm & Failsafe](#)

[6.4.1: BAS \(Building Automation System\)](#)

[6.4.2: Ethernet](#)

[6.4.3: Communication Failsafe](#)

[6.5: Ancillary Devices](#)

[6.5.1: Interlocks](#)

[6.6: Performance](#)

[6.6.1: O2 Trim](#)

[6.6.1.1: O2 Trim Settings](#)

[6.6.1.2: O2 Trim Parameters](#)

[6.6.1.3: O2 Trim Status](#)

[6.6.2: Temperature Controls](#)

[6.6.2.1: PID Setting](#)

[6.6.2.2: Temperature Conformance](#)

[6.6.2.3: Setpoint Range](#)

[6.6.2.4: Feedforward Settings](#)

[6.6.3 Fire Control](#)

IMPORTANT!

Before starting these instructions, you must ensure that the unit has the latest Edge Controller firmware. See *Section 6.2.7: Firmware Update* to install the latest firmware.

6.1 Access

The Enter Password screen allows you to log in to the system. As mentioned in Section 1.6, there are multiple passwords, each granting a specific level of access.

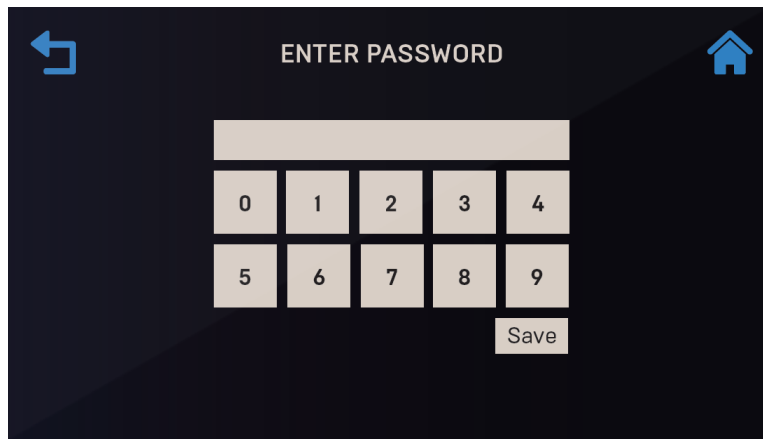


Figure 6-2: Advanced Setup: Enter Password Screen

1. Go to: **Main Menu → Advanced Setup → Access**. The Enter Password screen appears.
2. The password for AERCO Trained Technicians is **159**. Enter **159** or the password you have been given, then press **Save**.

6.2 Unit

The Unit screen provides access to parameters specific to the single unit. Note, some parameters were set at the factory prior to shipping and cannot be changed.

NOTE: To navigate from one Unit screen to the next in round-robin fashion use the **Page Left** and **Page Right** icons on each screen.

1. Go to: **Main Menu → Advanced Setup → Unit**.

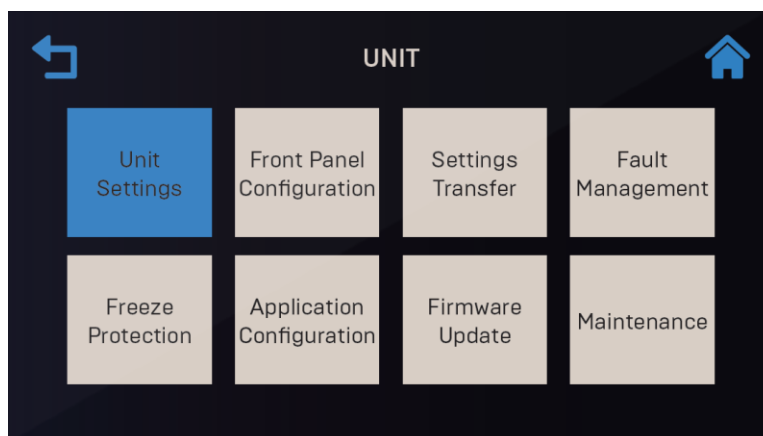


Figure 6-3: Advanced Setup: Unit Screen

NOTE: The Application Configuration button is enabled only if Unit Mode (in the **Advanced Setup → WHM Cascade → Cascade Configuration**) = Off.

SECTION 6: Advanced SetUP

6.2.1 Unit Settings

The Unit Settings screens display a list of parameters and controls across several pages. Many of these parameters were set at the factory before shipping and should not be changed.

- Go to: Main Menu → Advanced Setup → Unit → Unit Settings.

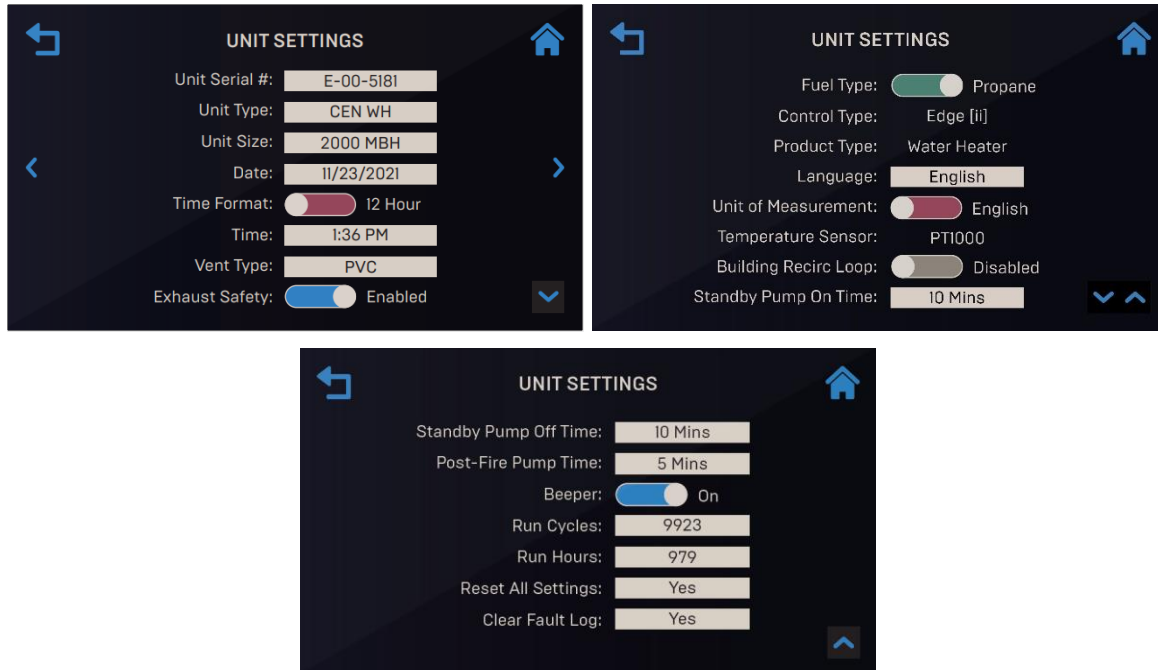


Figure 6-4: Unit: Unit Settings Screens

- The following fields are available:

- Unit Serial #:** Displays the unit's factory-set serial number in a unique format of G-YY-ZZZZ or N-YY-ZZZZ. Do **NOT** change unless replacing Edge [ii] Controller. Format is:
 - G & N:** Letters specific to AERCO Innovation water heaters. The letters E, H, R, and A are available for future use.
 - YY:** The two-digit year
 - ZZZZ:** A sequential 4-digit serial number.
- Unit Type:** The AERCO product/model – CEN WH. **Unit Size:** Displays available sizes for the given Unit Type. Do **NOT** change unless replacing the Edge [ii] Controller.
- Date & Time:** Allows you to set the date and time. The Time Format control allows you to select 12- or 24-hour format.

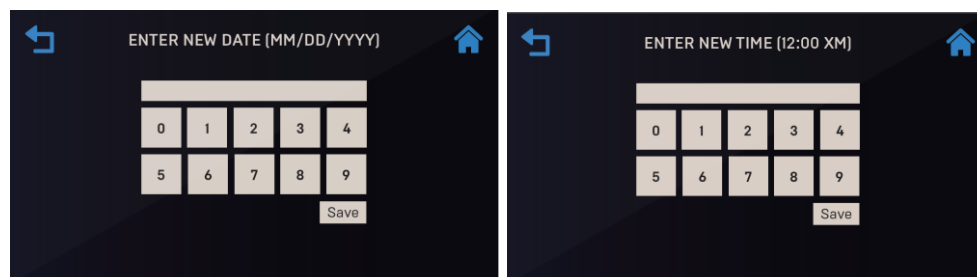


Figure 6-5: Unit: Enter Date & Time Screens

SECTION 6: Advanced SetUP

- **Time Format:** Choose the **12 Hour** or **24-Hour** format.
- **Vent Type:** Select from unit-type-specific venting options: **PVC**, **CPVC**, **Polypro** or **Stainless Steel**.
- **Exhaust Safety:** If Enabled, this parameter protects the unit and exhaust vent from excessively high exhaust temperatures. When exhaust temperature exceeds any of three limits, an action is taken, as shown in the table below. The limits depend on the vent material specified in **Vent Type** (Stainless Steel has no limit).

TABLE 6.2.1: Exhaust Safety Temperature Limits				
Limit Type	Result Action	Vent Material		
		PVC	CPVC	Polypro
Caution Limit	Display Warning	158°F	210°F	215°F
High Temp Limit	Reduce Fire Rate	170°F	220°F	220°F
Fault Limit	Unit Shut Down	180°F	230°F	230°F

- **Fuel Type:** Choose either **Natural Gas** or **Propane**. This option is not available for all unit types.
- **Control Type:** Specifies the controller: **Edge [ii]** (the default for all Platinum units) or **Edge [i]**. Do **NOT** change unless replacing the Edge [ii] Controller with an Edge [i] Controller.
- **Language:** Choose from available language options: **English**, **Spanish**, **French**.
- **Unit of Measurement:** Choose the unit of measure the Controller will use, either **Metric** (°C, lps, Pa) or **English** (°F, gpm, in. W.C., psi). The corresponding LED indicator on the Controller's front face, °F or °C, lights (see Figure 6.2.2-1, below).
- **Temperature Sensor:** Specifies the sensor type: **PT1000** (the default on all current units) or **Balco**. DO NOT CHANGE.
- **Building Recirc Loop:** Set to **ENABLED** when sending building return water to the upper inlet. This automatically shows the Upper Inlet temperature on the STATUS screen.
- **Standby Pump On Time:** The time duration that the recirc pump will run if there is no demand to fire, after being off the "Standby Pump Off Time".
- **Standby Pump Off Time:** The time duration that the recirc pump will remain off after it shuts down when the unit is not in demand.
- **Post-Fire Pump Time:** The time duration that the recirc pump will run after shutting down the first time that demand goes away.
- **Beeper:** Enables/disables the audible fault alarm.
- **Run Cycles/Run Hours:** Displays the number of run hours/run cycles since the last system reset. Both can be reset to 0 (or any other number).
- **Reset All Settings:** To reset all settings and restore default values, press **Yes**, then press **Yes** again when asked to confirm.
- **Clear Fault Log:** To clear the Unit Event History (see [Section 7.7 Unit Event History](#)), press **Yes**, then press **Yes** again when asked to confirm.

6.2.2 Front Panel Configuration

The Front Panel Configuration screen allows you to modify the Controller's front panel and the touchscreen timeout setting.

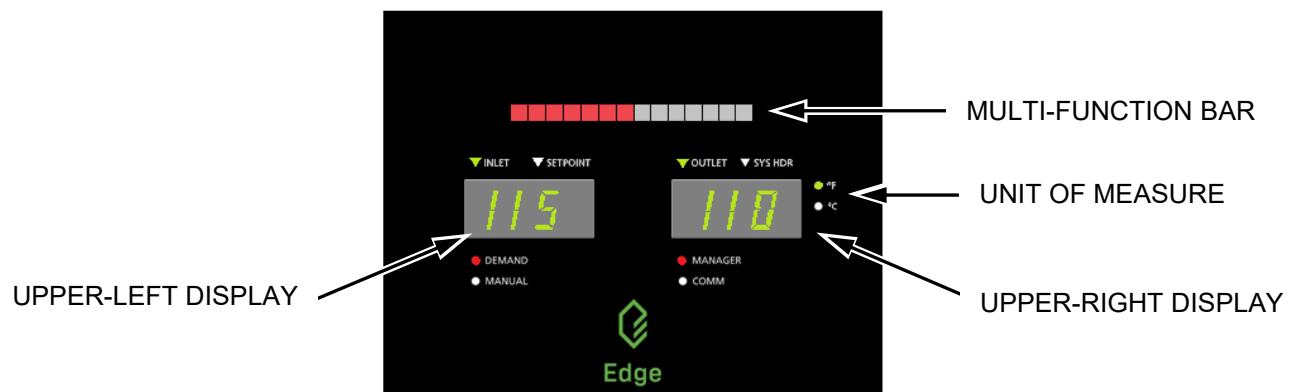


Figure 6-6: Unit: Controller Front Panel – Upper Portion

1. Go to: Main Menu → Advanced Setup → Unit → Front Panel Configuration.

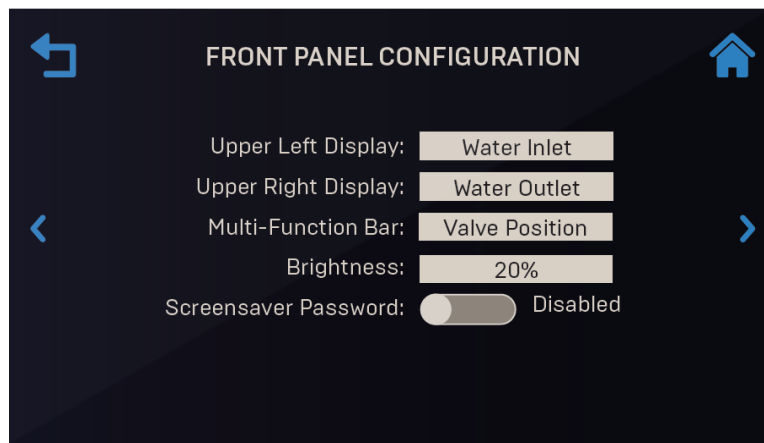


Figure 6-7: Unit: Front Panel Configuration Screen

2. The following fields are available:
 - **Upper Left Display:** Choose between: Feedforward, Water Inlet, and Setpoint; a blue ▼ icon appears on the Controller's front face next to your choice.
 - **Upper Right Display:** Choose between: Water Outlet and System Header; a green ▼ icon appears on the Controller's front face next to your choice.
 - **Multi-Function Bar:** Displays Valve Position
 - **Brightness:** Touchscreen brightness. Even when set to 10, the touchscreen is never completely dark. (Range: 10 to 100%)
 - **Screensaver Password:** Determines whether *all* users are required to enter a password to access Controller functionality, even Password Level 0 items, such as viewing Unit Status. See [Section 1.5 Passwords](#).
 - **Screen Timeout:** Specifies touchscreen timeout in minutes. (Range: 3 to 90 min.)
 - **Screen Timeout Now:** Setting to Yes puts the screen into sleep mode immediately. The Enter Password screen immediately appears.

6.2.3 Save and Transfer Settings

The Edge [ii] Controller includes functionality for saving a unit's current setup, which creates a backup of the state of all user-configurable parameters. It can be saved to either:

- The Controller's internal memory
- To a USB device plugged into the USB port on the side of the Controller.

Once saved, the complete setup can be restored on the same unit or transferred to one or more other units. This second option is particularly useful when setting up a WHM cascade; the first "client" unit is setup, configured and fully tested, then its setup is transferred to all the other "client" units **of the same unit type**. It can also be used to recover if a setup becomes corrupted, either through hardware malfunction or operator error.

⚠ WARNING!

Client and Manager units use separate setup files; Client units require a Client setup file, and Manager units require a Manager setup file.

If loading the setup from a USB device, the device can have only **Client or Manager** setup files on it but **cannot** have both files on the same device.

When saving a setup file, each unit produces a file with a unique name based on unit serial number that never changes. A USB device can have multiple Client or Manager files (but not both) for multiple units, but only one for each unit. Creating a new setup file on the Controller or a USB device will overwrite the existing copy.

1. Go to: **Main Menu → Advanced Setup → Unit → Settings Transfer**. If necessary, enter password 159 or your password.

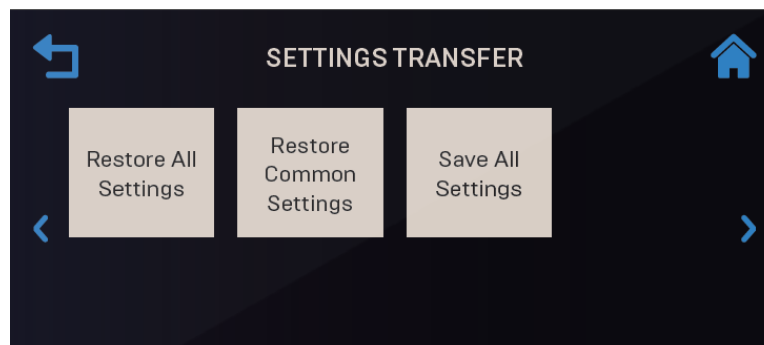


Figure 6-8: Unit: Settings Transfer Screen

2. Choose one of the following:
 - To **save** the current settings, press **Save All Settings** and then complete the instructions in [Section 6.2.3.1: Save Settings](#). AERCO strongly recommends using this option periodically to guard against the need to perform a time-consuming recreation of the original setup.
 - To **restore** settings, choose one of the **Restore** options and then complete the instructions in [Section 6.2.3.2: Restore Settings](#).
 - **Restore All Settings:** This is appropriate when restoring settings that were saved on a unit and are only appropriate for that unit.
 - **Restore Common Settings:** Restores the settings that are common to all units of the same type. This is appropriate when one unit has already been setup and you want to copy all its settings and parameters to additional units of the same type in a WHM cascade.

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6.2.3.1 Save Settings

If you chose **Save All Settings** in the previous section, complete the following steps to save the unit's current setup, which includes the current state of all settings/parameters.

1. The **Save Destination** screen appears. This option saves all of the unit's settings and configurable parameters.

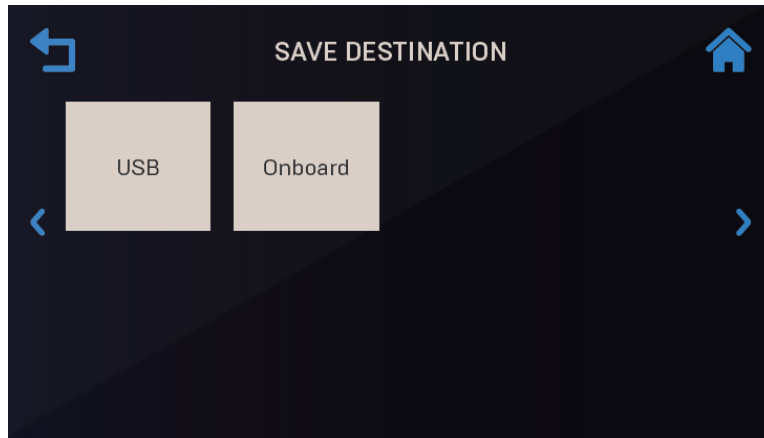


Figure 6-9: Unit: Save Source Selection

2. Chose where you want to save the current settings:
 - **Onboard:** Saves the current setup file to the Controller's onboard memory.
 - **USB:** This option is available only if an unencrypted USB device is plugged into the Controller's USB port; if no USB device is plugged in, it is greyed-out, as shown above. You can use the same USB device used in Section 6.2.7.1 to obtain the latest firmware.

NOTE: Each unit produces a setup file with a unique name based on its serial number. If that setup file has already been saved to the Controller's memory or a USB device, **this step will overwrite it!**

3. If the setup was successfully saved, the **Save Succeeded** screen appears; press **Continue** to proceed. If it failed, a **Save Unsuccessful** screen appears. If successful, press **Continue** to proceed.

6.2.3.2 Restore Settings

If you chose **Restore All Settings** or **Restore Common Settings** in Section 6.2.3, one of the following screens appears:



Restore ALL Settings Option Restore COMMON Settings Option

Figure 6-10: Unit: Restore Source/Common Screens

SECTION 6: Advanced SetUP

- Choose where the setup was saved (see [Section 6.2.3.1: Save Settings](#)):
 - USB:** If the setup was saved to a USB device plugged into the Controller's USB port.
 - Onboard:** If the setup was saved to the Controller's onboard memory.
 - Factory Settings:** Restores the original setup performed at the factory, overwriting parameters that were manually configured after the unit was installed.

⚠ WARNING!
THIS STEP WILL OVERWRITE THE PREVIOUS SETUP!

- The **Overwrite Calibration** screen now appears. Press **Yes** to overwrite the existing combustion calibration. If you press **No**, the existing combustion calibration data is retained.
- The settings on the USB device are uploaded to the unit, overwriting the existing settings. The **Restore Succeeded** screen appears if the restore was successfully, and the unit then reboots in about 5 seconds. If there was a problem, the **Restore Failed** screen appears.

6.2.4 Fault Management

The **Fault Management** screen controls whether the reset mode for three fault conditions is automatic or manual.

- Go to: **Main Menu → Advanced Setup → Unit → Fault Management**.
- Choose the desired reset mode, **Manual** or **Automatic**, for all three fault conditions.
 - Water Temp Reset:** Supply water temperature exceeds specified tolerance. This applies only to the internal settings of the Controller, not to the Manual High Temp Safely Limit switch.
 - Gas Pressure Reset:** Gas pressure exceeds or drops below specified tolerance (model specific).

6.2.5 Freeze Protection

Freeze Protection contains parameters that can prevent damage due to freezing conditions.

- Go to: **Main Menu → Advanced Setup → Unit → Freeze Protection**.

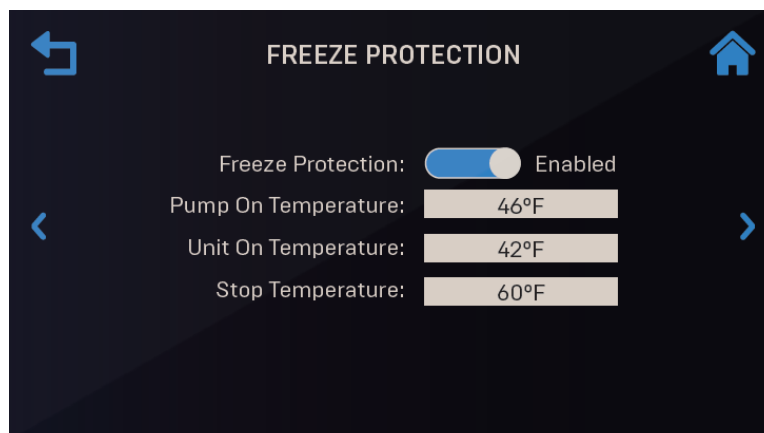


Figure 6-11: Freeze Protection Screen (Enabled)

SECTION 6: Advanced SetUP

2. If desired, set **Freeze Protection** to **Enabled**.
3. Once **Enabled**, the following additional parameters appear, which determine when the unit will shut off and restart:
 - **Pump On Temperature:** Ambient temperature below this value triggers system pump to start. (Range: 20 to 245°F)
 - **Unit On Temperature:** Ambient temperature below this value triggers the unit to fire. (Range: 20 to 245°F)
 - **Stop Temperature:** Ambient temperature above this value returns the system to normal operation. (Range: 20 to 245°F)

6.2.6 Unit Application Configuration

The unit's **Application Configuration** screen contains operating mode, temperature and setpoint parameters for Standalone units.

- This option is disabled (greyed out) if **Unit Mode** = **WHM Client** or **WHM Manager** in [Section 6.3.1: Cascade Configuration](#), below (it appears only if **Unit Mode** = **Off**).
- Some parameters below appear in EZ Setup (see Section 2). EZ Setup walks you through a full configuration while this screen allows you modify individual parameters.

1. Go to: **Advanced Setup** → **Unit** → **Application Configuration**. Either the Constant Setpoint or Remote Setpoint mode appears. Choose the **Operating Mode** appropriate for the unit:

TABLE 6.1: Operating Modes	
Available Operating Modes	Application
1 Constant Setpoint	DHW
2 Remote Setpoint	DHW

2. The following parameters apply only if the unit communicates with an ACS or BMS system; they appear for all Applications and Operating Mode selections:
 - **Unit Address (1-127):** Number the unit will be known as by the ACS or BMS system
 - **Unit Baud Rate:** Choose the communication rate: **9600**, **19200**, **38400** or **57600**.
3. If **Unit Application** = **DHW**, choose the **Unit DHW Operating Mode** for the unit, either **Constant Setpoint** or **Remote Setpoint**.
 - If **Unit DHW Operating Mode** = **Constant Setpoint**, the following parameters appear:
 - Setpoint
 - **Setpoint Low Limit:** This is the lowest temperature value allowed to be selected for the setpoint. Range 40 to 190, def=60.
 - **Setpoint High Limit:** This is the highest temperature value allowed to be selected for the setpoint. Range 40 to 190, def=170.
 - **Building Recirc Loop:** Enable if the building return is connected to the upper inlet of the heater. Default is "Disabled".
 - If **Unit DHW Operating Mode** = **Remote Setpoint**, the following parameters appear:
 - **Building Recirc Loop:** Enable if the building return is connected to the upper inlet of the heater. Default is "Disabled".
 - **Network Timeout:** The timeout value before a Modbus Fault is declared due to no response from the **WHM Manager** unit or (if a Manager) from the BAS.
 - **Remote Signal:** Choose the signal type for the selected device.

6.2.7 Firmware Update

When AERCO releases a new Controller firmware version, there are two options for obtaining it; both require the firmware to first be downloaded to a USB device:

Option 1: Download to an external computer and then save it on a USB device.

Option 2: Download via an Ethernet cable to a USB device plugged into the Controller.

NOTE: Detailed information and steps for downloading updated firmware are available in [Appendix B: Edge \[ii\] Controller Firmware Update](#).

6.2.8 Maintenance

Water heaters require routine maintenance to ensure reliability and efficiency. There are two maintenance cycles: 12 months and 24 months. The Controller keeps track of both cycles and displays a warning when either cycle is ending, prompting the maintenance technician to perform the required maintenance.

The maintenance technician must confirm that maintenance has been fully or partially completed by using the 12- and 24-Month **Maintenance** screens.

1. Go to: **Main Menu → Advanced Setup → Unit → Maintenance**.

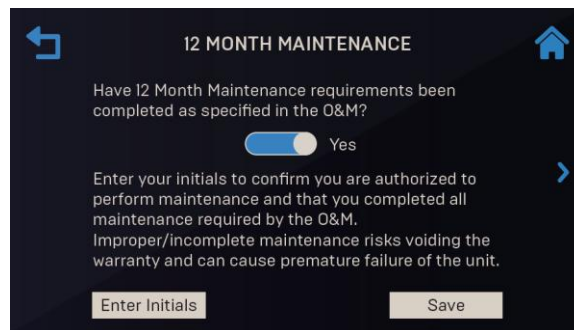


Figure 6-12: Unit: 12 Month Maintenance Screen

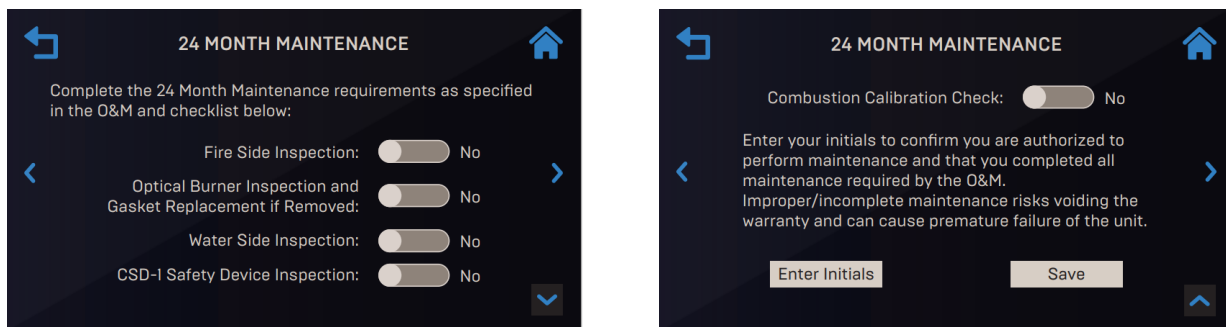


Figure 6-13: Unit: 24 Month Maintenance Screen

2. Either the 12 Month Maintenance or 24 Month Maintenance screen appears, depending on which cycle is coming up next. On a new unit, the 12 Month screen appears first.
3. In the 12 Month Maintenance screen, once all 12-month maintenance tasks have been completed set the toggle to **Yes**, enter your initials in the lower-left field, then press **Save**. The Controller will reset the 12 Month Maintenance cycle.
4. In the 24 Month Maintenance screen, set each of the 24-month maintenance tasks that have been completed to **Yes**, then enter your initials in the lower-left field.

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- When all tasks have been completed, press **Complete** (the **Complete** button doesn't appear until all tasks have been completed). However, if any task is still set to **No**, you can press **Save** to close this screen; the 24 Month calendar is not reset.
- Return to this screen once all tasks have been completed.
- Once all 24-month maintenance tasks have been completed, set all toggles to **Yes**, then press **Complete**. The 24 Month Maintenance cycle is reset.

6.3 WHM Cascade

The WHM Cascade screen provides options to alter WHM Cascade system settings.

- Go to: **Main Menu → Advanced Setup → WHM Cascade**.

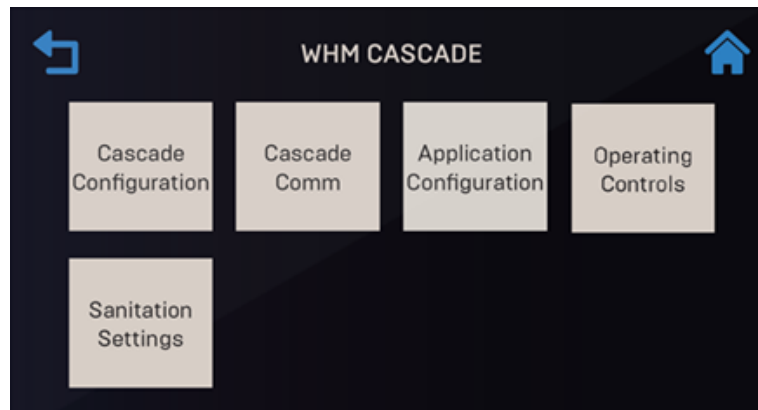


Figure 6-14: Advanced Setting: WHM Cascade Screen

- All the options on this screen are greyed out (disabled) except **Cascade Configuration** until WHM Cascade functionality has been enabled (see Step 2 in the next Section).

NOTE: Once WHM Cascade functionality is enabled, you can navigate from one WHM Cascade screen to the next in round-robin fashion using the Page Left and Page Right icons.

6.3.1 Cascade Configuration

Water Heater Management (WHM) functionality is enabled from this screen by setting **Unit Mode** to either **WHM Manager** or **WHM Client** (default = **Off**).

Once either **WHM Manager** or **WHM Client** is enabled, the following occurs:

- If the unit is configured as a **WHM Manager**, all parameters below (and all other WHM Cascade sections) apply to all units in the WHM cascade, and will take precedence over the same parameters on units configured as a **WHM Client**.
- The unit **Application Configuration** screen for standalone units (in [Section 6.2.6: Unit Application Configuration](#)) is disabled.
- Additional WHM parameters appear on the screen. The specific parameters depend on whether **WHM Manager** or **WHM Client** was selected, and on the current value of various parameter in [Section 6.3.3: WHM Application Configuration](#); the available parameters are shown in the table in Step 3, below:

SECTION 6: Advanced SetUP

1. Go to: Main Menu → Advanced Setup → WHM Cascade → Cascade Configuration.

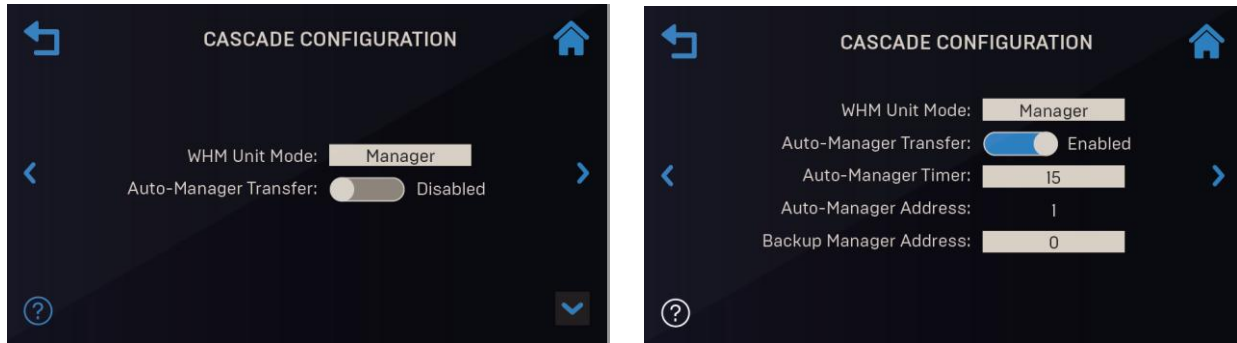
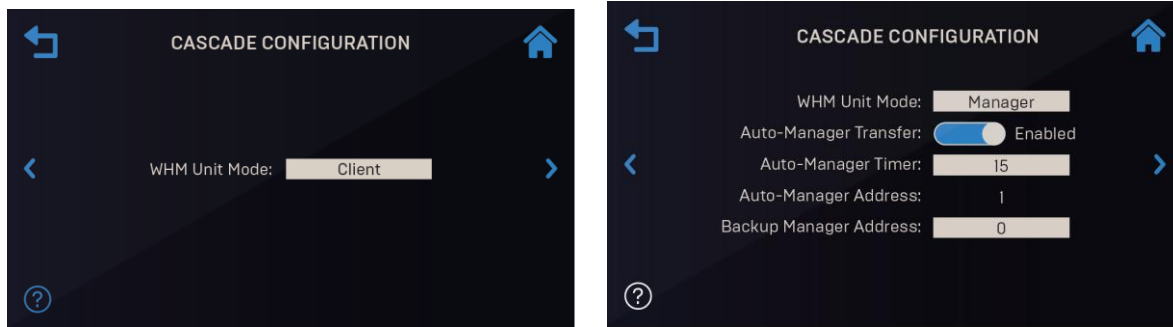


Figure 6-15: WHM Cascade: Cascade Configuration Screen

2. To designate the current unit as a WHM Client or WHM Manager, press **WHM Unit Mode** and choose **WHM Client** or **WHM Manager**.



Unit Mode = WHM Client

Unit Mode = WHM Manager

Figure 6-16: WHM Cascade: Cascade Configuration Screen

Item 1: Auto-Manager Transfer: If enabled, WHM Manager functionality can be transferred to a designated Backup Manager. The Backup Manager must be connected to all system level sensors, either via dual lead sensors or via Modbus wiring. When enabled, the following additional parameters appear:

- **Item 1a: Auto-Manager Timer:** Specifies the time before switching over Manager functionality. (Range: 10 to 120 seconds, Default = 30)
- **Item 1b: Auto-Manager Addr:** A read-only display of the address of the current WHM Manager.
- **Item 1c: Backup Manager Addr:** Enter the address of the unit designated as the Backup Manager. It can be any address above 0 except the value of Auto-Manager Addr. (Range: 0 to 16)

6.3.2 Cascade Communication

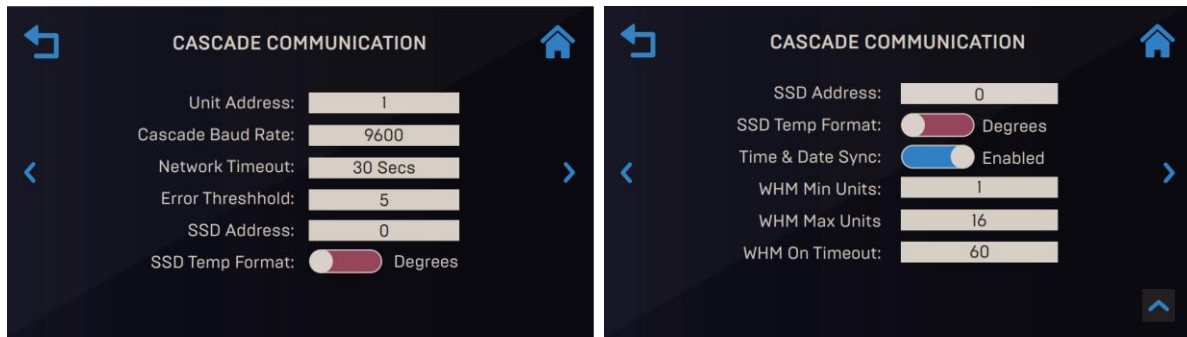
This screen allows you to modify individual communication parameters.

NOTES:

- This screen is available only after WHM functionality has been enabled (see the **Unit Mode** parameter in [Section 6.3.1: Cascade Configuration](#)). If the unit is configured as a **WHM Manager**, its parameters apply to this unit and all **WHM Client** units.
- Some parameters also appear in **EZ Setup** (Section 2). While EZ Setup is designed to walk you through the full configuring of a unit, this screen allows you to modify individual parameters.

SECTION 6: Advanced SetUP

1. Go to: **Main Menu → Advanced Setup → WHM Cascade → Cascade Comm.** Two parameters appear only if **Unit Mode = WHM Manager** in [Section 6.3.1](#) (see Step 3).



WHM CLIENT SCREEN

WHM MANAGER SCREEN

Figure 6-17: WHM Cascade: Cascade Communication Screens

2. Configure the following parameters on both **WHM Client** and **WHM Manager** screens:
 - **Unit Address:** The unit's address in the WHM Cascade network. (Range: 1 to 16)
 - **Cascade Baud Rate:** Select the rate at which information is transferred in a communication channel: 9600, 19200, 38400, 57600 bits per second.
 - **Network Timeout:** The time before a Modbus Fault is declared due to no response from the WHM Manager unit or (if a Manager) from the BAS. (Range: 5 - 999)
 - **Error Threshold:** The number of Modbus Comm errors allowed before invoking a Modbus Comm Fault. (Range: 1 to 9)
 - **SSD Address:** Client/Client Device address (for backwards compatibility). This must be set to 247 for the manager to communicate with a Protonode gateway.
3. If the unit is configured as a **WHM Manager**, the following additional parameters appear:
 - **Min & Max Addresses:** Address range of units in WHM cascade (1 to 16).
 - **SSD Temp Format:** Either **Points** or **Degrees**. Choose "Points" when the manager is communicating to a Protonode gateway.
 - **Time&Date Sync over WHM:** If enabled, the WHM Manager's time and date are sent to all WHM Clients units. All units in the cascade will then be synchronized.
 - **Comm Error String:** Displays the number of Comm errors on each Comm port (client unit). If no valid address is entered for a client unit, it displays "-" for that address. The maximum number of error counts is 9.
 - **WHM Min Units:** The minimum number of units to leave active or minimum number of isolation valves to leave open at all times.
 - **WHM Max Units:** The maximum number of heaters needed to handle the heating load. If there are more heaters, the other will come into the lead-lag rotation, or, become active if a unit faults or is disabled.
 - **WHM On Timeout:** Minimum time before heater is allowed to fire again.

SECTION 6: Advanced SetUP

6.3.3 WHM Application Configuration

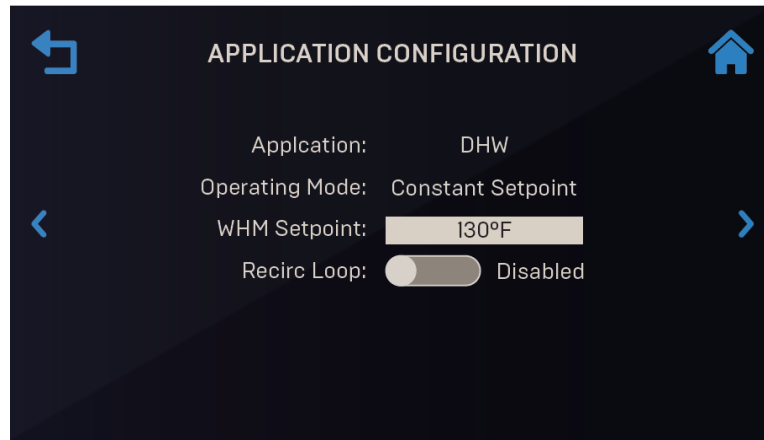
The WHM Cascade's Application Configuration screen allows you to configure individual operating parameters that will be transmitted to all WHM Client units.

Some parameters below appear in **EZ Setup** (see Section 2). This screen allows you to modify individual parameters, as needed.

NOTES:

- This screen is available only after WHM Cascade functionality has been enabled (see the **Unit Mode** parameter in [Section 6.3.1: Cascade Configuration](#)).
- If the unit is configured as a **WHM Manager**, the parameters apply to this unit and will be transmitted to all WHM Client units. If the unit is configured as a **WHM Client**, the parameters configured on the **WHM Manager** will take precedence.
- If WHM Cascade functionality is enabled on a unit, the [Unit → Application Configuration screen in Section 6.2.6](#) (above) is disabled.

1. Go to: **Main Menu → Advanced Setup → WHM Cascade → Application Configuration.**



APPLICATION = DHW

Figure 6-18: WHM Cascade: Application Configuration – Example 1st Screens

2. Configure the following parameters:
 - **Application:** DHW
 - **Operating Mode:** Constant Setpoint
 - **WHM Setpoint:** Select the plant/heater setpoint. The default is 130oF.
 - **Building Recirc Loop:** set to “Enabled” if the building domestic return is coming into the upper inlet of the heaters.

6.3.4 Operating Controls

The **Operating Controls** screen provides access to multiple operating parameters for the plant and units in a WHM cascade.

NOTE: This screen, and all the screens accessible from this screen, is available only after WHM Cascade functionality has been enabled (see the **Unit Mode** parameter in [Section 6.3.1](#)). If the unit is configured as a **WHM Manager**, the parameters apply to this unit and all WHM Client units.

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1. Go to: Main Menu → Advanced Setup → WHM Cascade → Operating Controls.

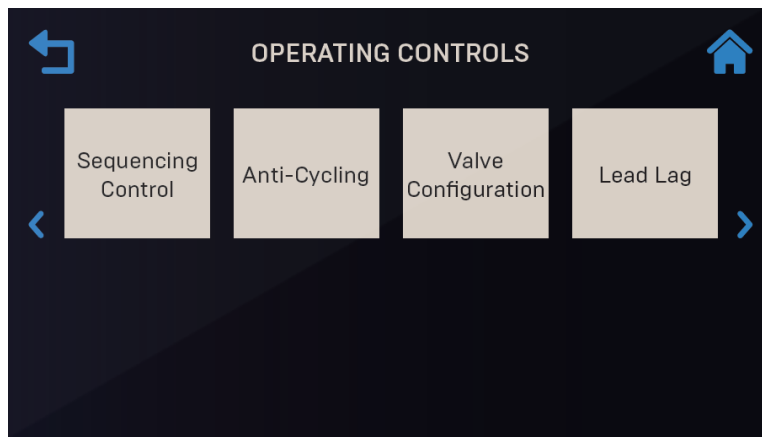


Figure 6-19: WHM Cascade: Operating Controls Screen

6.3.4.1 Sequencing Controls

The Sequencing Controls screen offers options related to the sequencing of units in the plant.

NOTE: This screen is available only after WHM Cascade functionality has been enabled (see the **Unit Mode** parameter in [Section 6.3.1: Cascade Configuration](#)). If the unit is configured as a **WHM Manager**, the parameters apply to this unit and all WHM Client units. If the unit is configured as a **WHM Client**, the parameters configured on the **WHM Manager** will take precedence.

NOTE: The parameters on this screen depend on the **Application** chosen in [Section 6.3.3](#).

1. Go to: Advanced Setup → WHM Cascade → Operating Controls → Sequencing Controls.

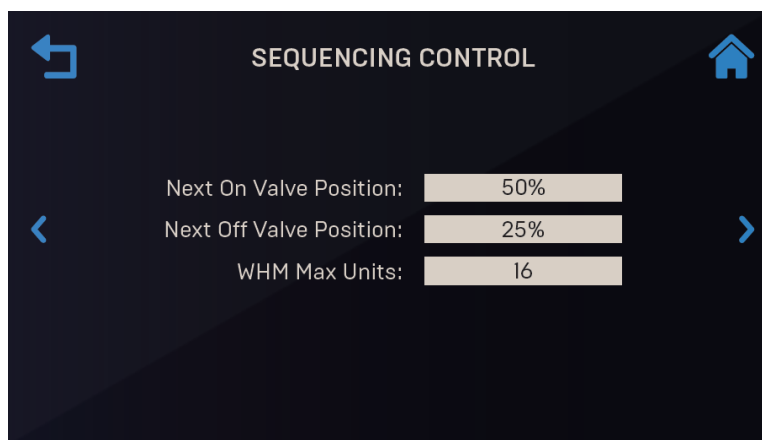


Figure 6-20: Operating Controls: Sequencing Controls Screen

2. The parameters that appear on this screen depend which **Application** is chosen in [Section 6.3.3](#) and whether the unit is configured as a WHM Manager or WHM Client in [Section 6.3.1](#). The following parameters appear only when the unit is configured as a WHM Manager:
 - **Next On Valve Pos:** Determines the valve position that triggers the next SH (Space Heating) unit to come online. (Range: 16% to 100%)
 - **Next Off Valve Pos:** Determines the valve position that triggers the next SH (Space Heating) unit to come offline. (Range: 16% to 100%)
 - **WHM Max Units:** The maximum number of heaters that will fire. For example: if there are 5 water heaters, but this is set to 3, the plant will not fire more than 3 water heaters. This is the same setting as in CASCADE COMMUNICATION. (Range: 1 to 16)

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6.3.4.2 Anti-Cycling Control

The parameters in the Anti-Cycling Control screen are used to prevent unwanted cycling.

NOTE: This screen is available only after WHM Cascade functionality has been enabled (see [Unit Mode](#) parameter in [Section 6.3.1: Cascade Configuration](#)). If the unit is configured as a **WHM Manager**, the parameters apply to this unit and all **WHM Client** units. If configured as a **WHM Client**, the parameters configured on the **WHM Manager** will take precedence.

Go to: **Advanced Setup** → **WHM Cascade** → **Operating Controls** → **Anti-Cycling Controls**.

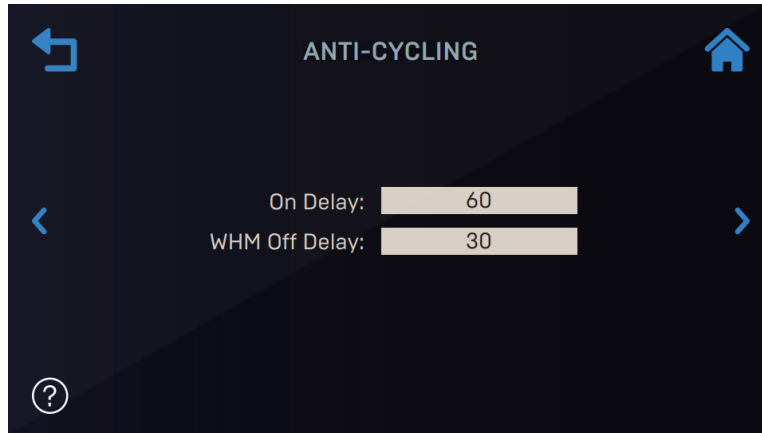


Figure 6-21: Operating Controls: Anti-Cycling Control Screen

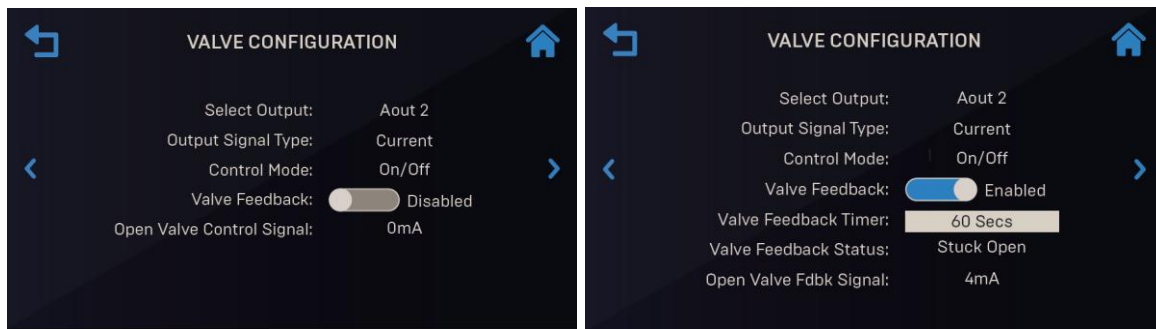
- **On Delay:** The minimum time that the WHM Manager must wait, after calling for a water heater to fire, before it asks another water heater to fire. (Range: 30 to 300 sec.)
- **WHM Off Delay:** The amount of time to keep the isolation valve open after a unit shuts down. (Range: 30 to 300 sec.)

6.3.4.3 Valve Configuration

The Valve Configuration screen contains parameters necessary for communicating with and controlling the external sequencing valves on the water heaters in a WHM cascade.

NOTE: This screen is available only after WHM Cascade functionality has been enabled (see the [Unit Mode](#) parameter in [Section 6.3.1: Cascade Configuration](#)). If the unit is configured as a **WHM Manager**, the parameters apply to this unit and all **WHM Client** units. If configured as a **WHM Client**, the parameters configured on the **WHM Manager** will take precedence.

1. Go to: **Advanced Setup** → **WHM Cascade** → **Operating Controls** → **Valve Configuration**.



Valve Feedback = Disabled Valve Feedback = Enabled

Figure 6-22: Operating Controls: Valve Configuration Screen

2. In **Select Output**, choose:
 - **Aout 2:** For use with AERCO supplied valves.
3. The following parameters appear for both values of **Select Output**:
 - **Output Signal Type:** Select **Current** or **Voltage**.
 - **Control Mode:** Choose one: **On/Off**
 - **Valve Feedback:** Choose **Enabled** or **Disabled**. If **Enabled**, the following additional parameters appear:
 - **Valve Feedback Status:** A read-only display of the current valve status.
 - **Valve Feedback Timer:** The time to detect the **Valve Feedback Status** (Range: 30 to 240 sec.)
 - **Open Valve Fdbk Signal:** A read-only display of the signal expected when the isolation valve is open.

6.3.4.4 Lead/Lag

The **Lead/Lag** screen allows you to create a Lead/Lag profile that the WHM Cascade will follow.

NOTE: This screen is available only after WHM Cascade functionality has been enabled (see the **Unit Mode** parameter in [Section 6.3.1: Cascade Configuration](#)). If the unit is configured as a **WHM Manager**, the parameters apply to this unit and all **WHM Client** units. If the unit is a **WHM Client**, the parameters configured on the **WHM Manager** will take precedence.

1. Go to: **Advanced Setup → WHM Cascade → Operating Controls → Lead/Lag**.

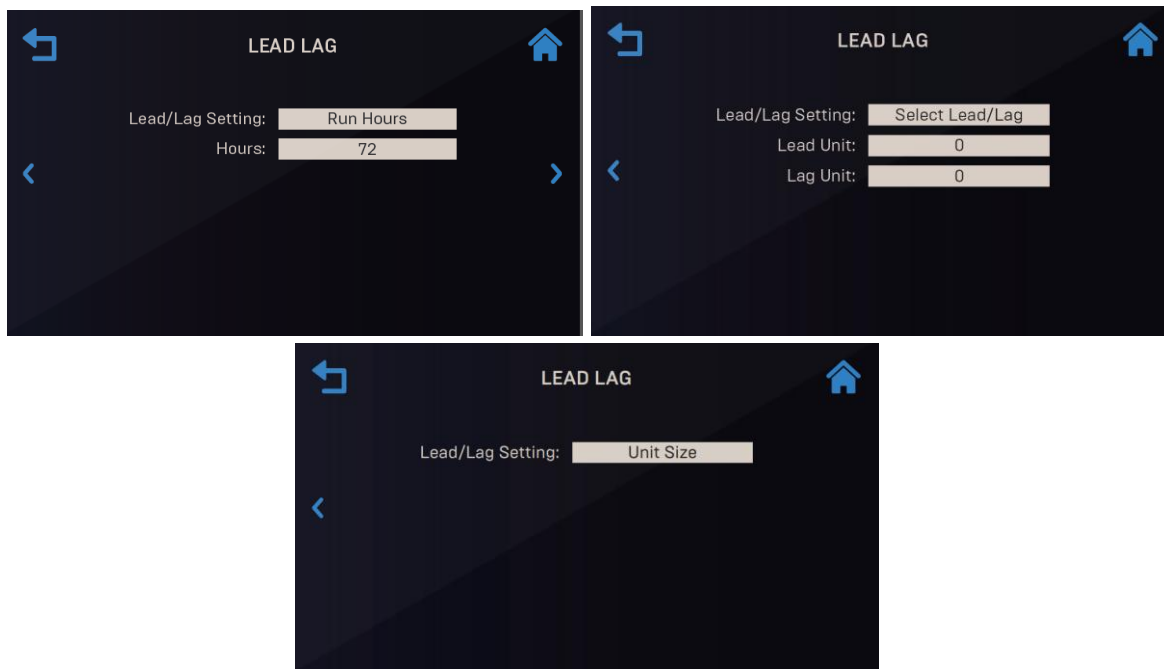


Figure 6-23: Operating Controls: Lead/Lag Control Screens

2. Set the **Lead/Lag Setting** to one of the following (default = **Run Hours**):
 - **Run Hours:** Specify number of hours after which Lead unit is rotated. (25 - 225)
 - **Unit Size:** Perform Lead/Lag based on unit size, starting with the smallest capacity.
 - **Select Lead/Lag:** Specify the address of the Lead and Lag units. (Range: 0 to 127)

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6.3.5 Sanitation Settings

The Sanitation Settings screen allows you to customize the sanitation process.

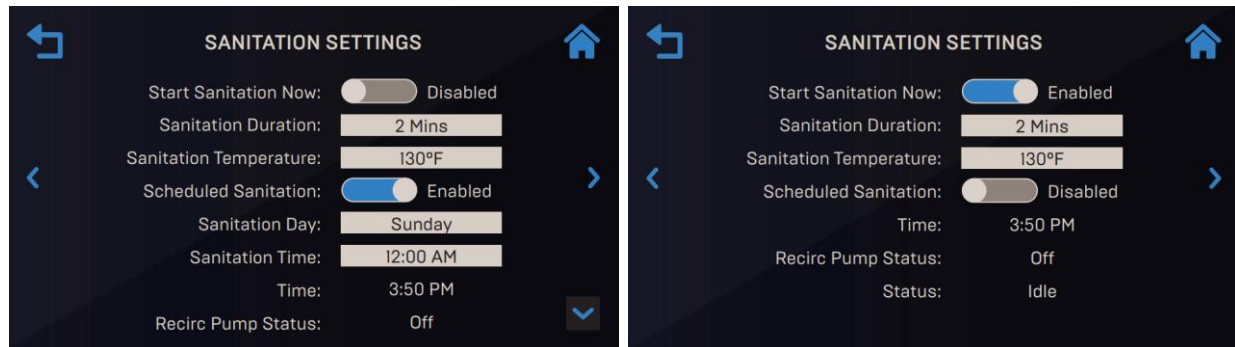


Figure 6-24: Operating Controls: Sanitation Settings Screens

Go to: WHM Cascade → Sanitation Settings. The following parameters appear:

- **Start Sanitation Now:** Set to Enabled to run the sanitation sequence.
- **Sanitation Duration:** Range 1 to 60 min.
- **Sanitation Temperature:** The setpoint temperature for sanitation. Currently defaults to the same as the DHW setpoint.
- **Scheduled Sanitation:** Sanitation can be set to run weekly at a certain day and time.
- **Sanitation Day:** The day for sanitation to occur.
- **Sanitation Time:** The time-of-day for sanitation to occur.
- **Time:** Shows the actual time-of-day.

6.4 COMM & FAILSAFE

The Comm & Failsafe screen allows you to configure all communication interfaces for purposes such as BAS, Predictive Maintenance, or Smart Devices. Each option is described below.

1. Go to: Main Menu → Advanced Setup → Comm & Failsafe.

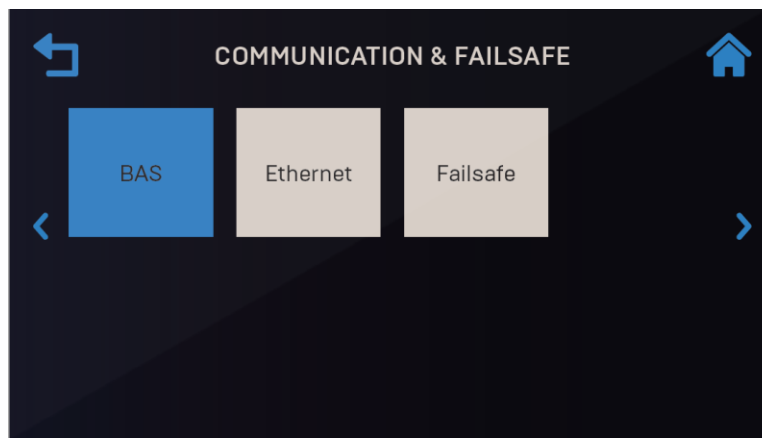


Figure 6-25: Advanced Setting: Comm & Failsafe

NOTE: You can navigate from one Comm & Failsafe screen to the next in round-robin fashion using the Page Left and Page Right icons on each screen.

6.4.1 BAS (Building Automation System)

The BAS screen provides communication parameters for both BACnet and Modbus interfaces.

- Go to: **Main Menu → Advanced Setup → Comm & Failsafe → BAS.**
- The default is **Off**. To enable communication with a BAS, press **BAS** and choose the communication protocol:
 - BACnet IP
 - BACnet MSTP
 - Modbus TCP
 - Modbus RTU



Figure 6-26: Comm & Failsafe: BAS Screen, BAS = BACnet IP



BACnet MSTP



Modbus TCP

Modbus RTU

Figure 6-27: Comm & Failsafe: BAS Screens

The table below lists the parameters available depending on the option chosen in Step 2:

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TABLE 6.14: BAS Parameters				
Parameters Available	BACnet		Modbus	
	IP	MSTP	RTU	TCP
Baud Rate		✓	✓	
Communication Address	✓	✓	✓	✓
Node Offset	✓	✓		
Device Instance	✓	✓		
Port Number	✓			
Local IP Address	✓			✓
Status	✓	✓	✓	✓
BAS Temp Format	✓	✓	✓	✓
Security	✓			✓
BAS IP (Security = Enabled)	✓			✓
BAS MAC (Security = Enabled)	✓			✓
Allow System Disable	✓	✓	✓	

The following are descriptions of each parameter:

- **Baud Rate:** Choose between **9600**, **19200**, **38400** or **115200**.
- **Communication Address:** Specify network address on the BAS network (0 to 127)
- **Node Offset:** The starting address range for AERCO units.
- **Device Instance:** Identifies the device on a BACnet network (read-only). It is generated from the **Node Offset** added to the **Communication Address** field. This value must be unique on a BACnet network.
- **Port Number:** Specify BAS port to which the unit will communicate (0xBAC0 – 0xBACF).
- **Local IP Address:** Displays the local IP address of the Edge [ii] Controller.
- **Status:** Displays the status of BAS communications.
- **BAS Comm Timeout:** The amount of time BAS communication can be idle before the “No BAS Communication” message shows, and, if needed, failsafe operation occurs.
- **BAS Temp Format:** Choose Fahrenheit, Celsius or Points.
- **Security:** Choose whether to **Enable** or **Disable** BAS Security. This option prohibits communication to any devices as specified by the IP address and MAC address, per parameters below. If enabled, the following additional parameters appear:
 - **BAS IP:** Specifies the IP address of the BAS server.
 - **BAS MAC:** Specifies the MAC address of the BAS server.
- **Allow System Disable:** If set to **Yes** (the default), a BAS front-end application can initiate a system shutdown or an individual unit shutdown by writing **85** to one of the addresses below via BACnet or Modbus (not available for ProtoNode). The BAS can reen able the system/unit by sending **0** to the same address.
For BACnet: WHM Manager BACnet = **229**; WHM Client BACnet = **80**
For Modbus: WHM Manager Modbus = **40229**; WHM Client Modbus = **40081**

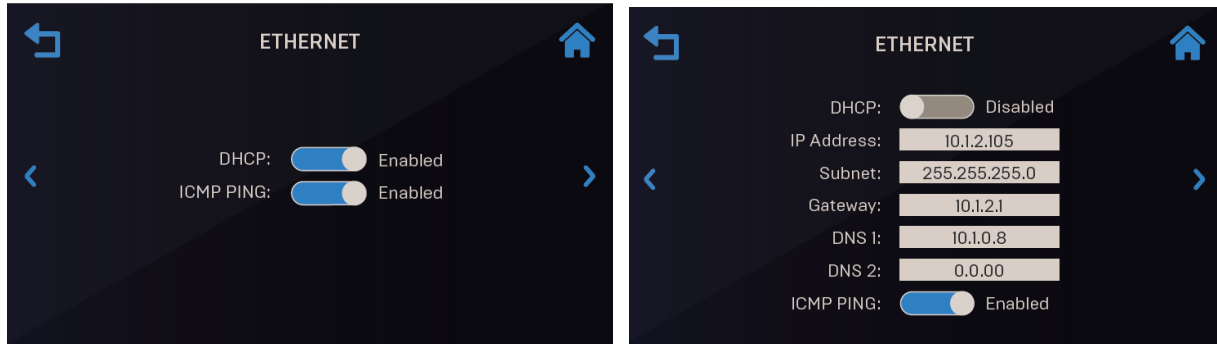
NOTE: The Remote Password (address AV:2) must entered before the system shutdown, or before the individual unit shutdown command is sent, otherwise, the command will be ignored.

6.4.2 Ethernet

The **Ethernet** screen will typically have the DHCP option **Enabled**, and therefore won't require additional configuration. If the DHCP is **Disabled**, the parameters shown below are available for editing with addresses the unit can use to communicate with the network.

NOTE: Ethernet communication requires an Ethernet cable plugged into the Ethernet port on the Controller's left side (see Figure [Section 6.2.7.1: Preparing for Firmware Update](#)).

1. Go to: **Main Menu → Advanced Setup → Comm & Failsafe → Ethernet.**



DHCP Enabled

DHCP Disabled

Figure 6-28: Comm & Failsafe: Ethernet Screen

2. If DHCP is **Disabled**, manually enter the communication parameters, typically provided by a network administrator, in the following parameters:
 - IP Address
 - Subnet
 - Gateway
 - DNS 1
 - DNS 2
3. If ICMP Ping is **Enabled**, the unit will respond to a ping from a network administrator.

6.4.3 Communication Failsafe

The **Communication Failsafe** option specifies how the unit will operate when either the Manager communication or a Remote Signal is lost, and the unit has to operate independently.

1. Go to: **Main Menu → Advanced Setup → Comm & Failsafe → Communication Failsafe.**

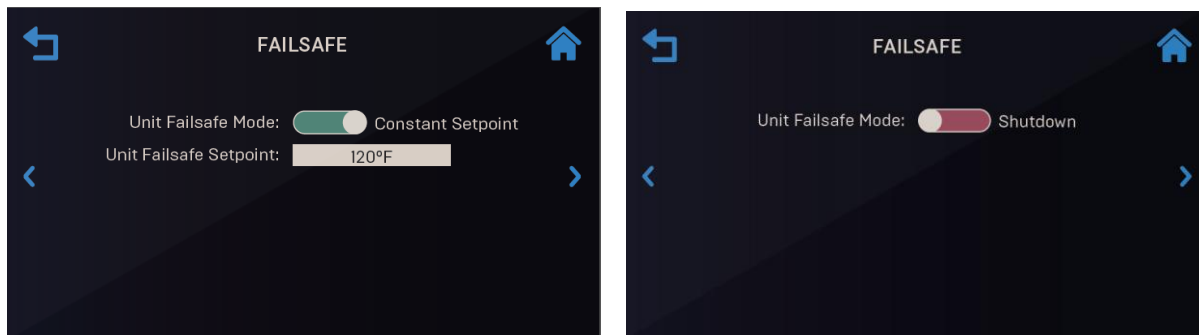


Figure 6-29: Comm & Failsafe: Communication Failsafe Screens

2. Set the **Failsafe Mode** parameter to either **Constant Setpoint** or **Shutdown**.
 - If you chose **Constant Setpoint**, one additional parameter appears:
 - **Unit Failsafe Setpoint:** Set to unit's default setpoint if communication fails.

6.5 Ancillary Devices

The Ancillary Devices screen allows configuration of all unit inputs and outputs.

1. Go to: Main Menu → Advanced Setup → Ancillary Devices.

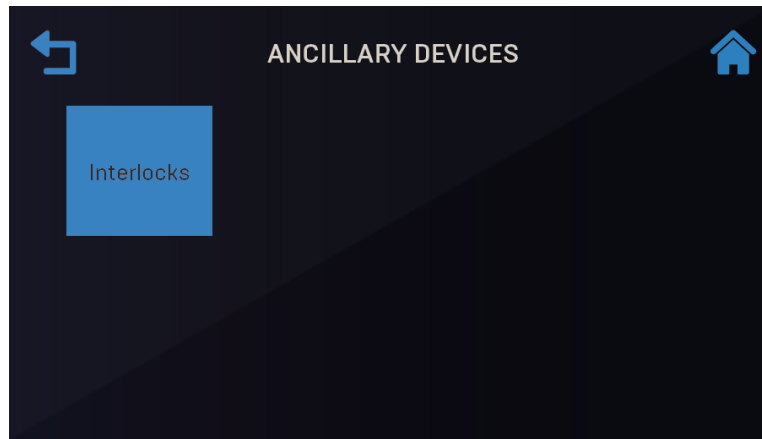


Figure 6-30: Advanced Setting: Ancillary Devices Screen

NOTE: To navigate from one **Ancillary Device** screen to the next in round-robin fashion use the **Page Left** and **Page Right** icons on each screen.

6.5.1 Interlocks

The Controller offers two interlock circuits, **Remote Interlock** and **Delayed Interlock**, both of which can interface with an Energy Management Systems (EMS) or a Building Automation System (BAS) and auxiliary equipment such as pumps or louvers. Both must be in the closed position to allow the unit to fire. They must be connected to the following pins on the unit's I/O board (see the *Innovation 1600-2000 Installation, Operation and Maintenance Manual* (OMM-0175) for more info):

- **Remote Interlock** wired to connector strip J6, pins 1 and 2
- **Delayed Interlock** wired to connector strip J6, pins 3 and 4
-

1. Go to: Main Menu → Advanced Setup → Ancillary Device → Interlocks.

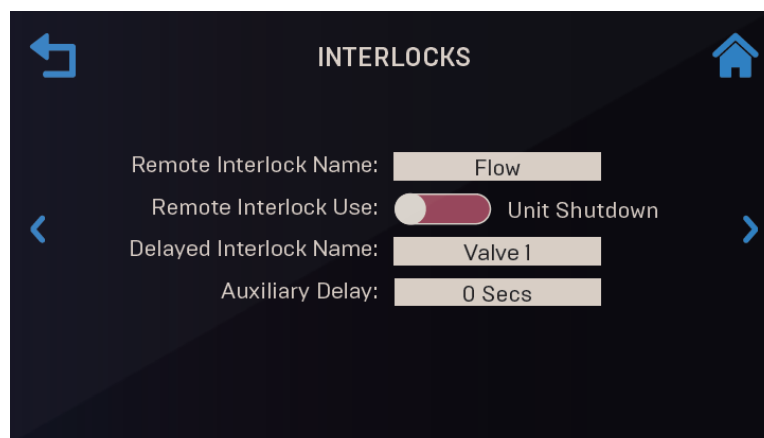


Figure 6-31: Ancillary Devices: Interlocks Screen

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2. The following parameters Configure the **Remote Interlock**:
 - **Remote Interlock Name:** Choose one of the following:
 - Flow ○ Louver
 - Damper ○ Other
 - **Remote Interlock Use:** Specifies what will shut down if the selected interlock switch is open, either the individual water heater or the full system. Choose **System Shutdown** or **Water heater Shutdown**.
3. The following parameters configure the **Delayed Interlock**. This interlock includes an adjustable delay timer, which delays the ignition sequence, allowing sufficient time for a proving switch to be made to prevent a fault.
 - **Delayed Interlock Name:** Choose one of the following:
 - Valve 1 ○ Valve 2
 - Louver ○ Louver 2
 - **Auxiliary Delay:** Select the interlock delay. **If the unit has a Sequencing Isolation Valve, this must be set to 120 seconds or the maximum time required for the isolation valve to fully open** (Range: 0 to 240 sec.)

6.6 Performance

The **Performance** screen provides access to control and performance parameters for O₂ Trim, Temperature and Fire Control functionality. All three **Performance** screens apply only to the individual unit (they are not part of WHM functionality).

Some unit level parameters are not applicable if WHM is enabled. In that case, those parameters are greyed out or hidden. As a result, the screens shown below may include parameters that don't appear on the unit you are working on.

The O₂ Trim option is enabled only on units equipped with a functional O₂ sensor. If the O₂ sensor is not detected or has faulted, the O₂ Trim button is greyed out.

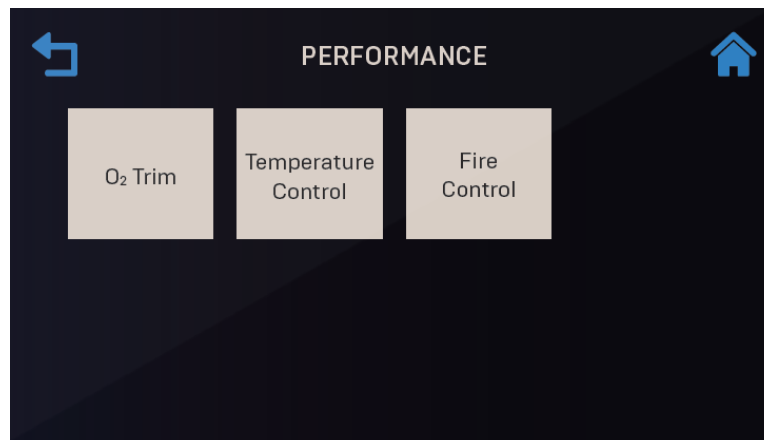


Figure 6-32: Advanced Setting: Performance

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6.6.1 O₂ Trim

The O₂ Trim screen provides access to O₂ Trim settings, O₂ Trim Parameters and O₂ Trim status parameters. Note, the parameters in those screens are not available until O₂ Trim has been successfully activated in the O₂ Trim Settings screen (see Section 6.6.2, below).

1. Go to: Main Menu → Advanced Setup → Performance → O₂ Trim.

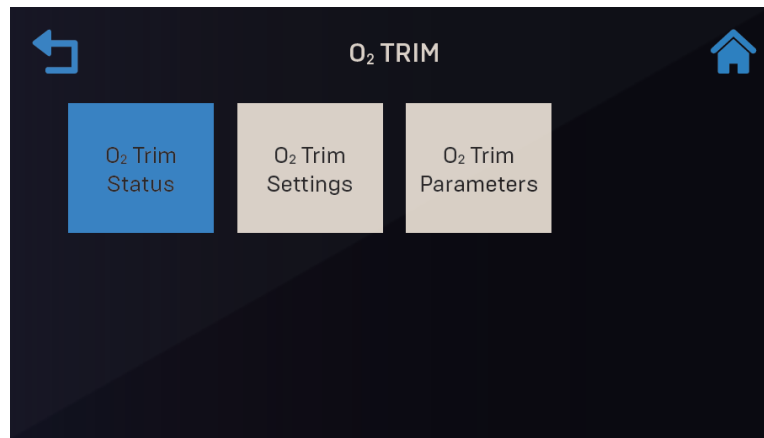


Figure 6-33: Performance: O₂ Trim Screen

6.6.1.1 O₂ Trim Settings

O₂ Trim functionality is enabled/disabled and configured from this screen.

NOTE: O₂ Trim must be **activated** before it can be **enabled**. It is activated on all Innovation units before they are shipped. If a new controller is installed, it must be reactivated, which requires entry of the Activation Code, created by AERCO specifically for each unit. This process can be initiated from this screen, but you must have the Activation Code to complete the process. Each Activation Code is based on the serial number of the unit and is therefore specific to that unit only. Once O₂ Trim has been successfully activated, O₂ Trim can be disabled and re-enabled without having to re-activate it.

O₂ Trim functionality is automatically disabled if the O₂ sensor is removed or faulted.

1. Go to: Main Menu → Advanced Setup → Performance → O₂ Trim → O₂ Trim Settings.
This screen includes the ? (Help) option.

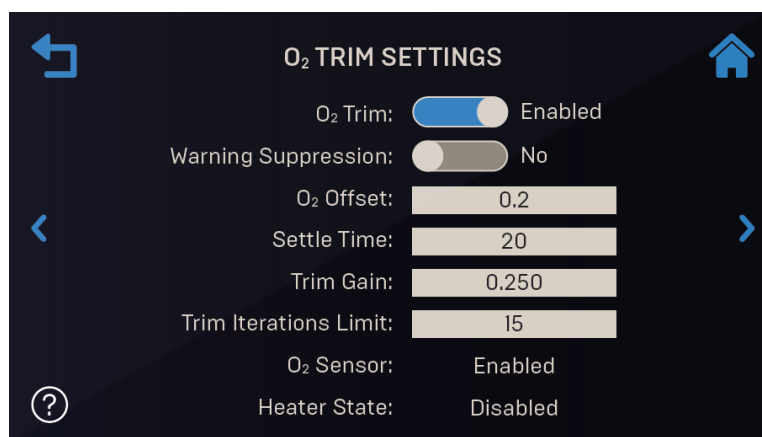


Figure 6-34: O₂ Trim: O₂ Trim Settings Screen

2. Use the O₂ Trim toggle to enable O₂ Trim functionality.

NOTE: If you are enabling O₂ Trim for the first time after the Controller was replaced, the Activation procedure is initiated; the Serial Number, Trim ID, Fixed ID and Activation Code parameters appear. You must contact AERCO to get an Activation Code.

3. Configure the remaining parameters as follows:
 - **Warning Suppression:** Set to **Yes** or **No**. No disables all O₂ Trim warnings.
 - **O₂ Offset:** Sets the O₂ offset to conform to an external analyzer (Range: -3.0 to 3.0).
 - **Settle Time:** Specifies the amount of time for the blower speed to settle after adjusting the blower voltage. (Range: 5 to 120 seconds)
 - **Trim Gain:** A multiplier used to calculate an offset to the blower voltage. (Range: 0.100 to 0.500)
 - **Trim Iteration Limit:** Specifies the maximum number of blower voltage adjustment iterations allowed in a single trim event. (Range: 10 to 45, Default = 15)
 - **O₂ Sensor:** Displays current sensor status, either **Enabled** or **Disabled**. If **Disabled** (for example, the sensor requires service), O₂ sensor warnings are suppressed.

6.6.1.2 O₂ Trim Parameters

Each Innovation model has specific default valve positions. The **O₂ Trim Parameters** screen provides the ability to view, and if necessary, adjust the **O₂ Target**, **O₂ Upper Limit** and **O₂ Lower Limit** to suite specific conditions at each default valve position on this unit only.

1. Go to: **Main Menu → Advanced Setup → Performance → O₂ Trim → O₂ Trim Parameters**.

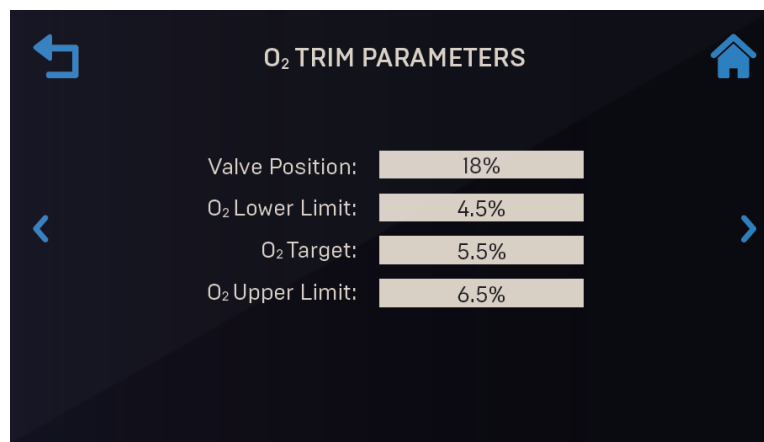


Figure 6-35: O₂ Trim: O₂ Trim Parameters

2. Select a pre-defined **Valve Position** for the unit, from the minimum up to 100%.
3. Enter values in the following three parameters for the position chosen in Step 2, as needed to suite site specific conditions:
 - **O₂ Lower Limit:** Must be at least 1% lower than O₂ Upper Limit. (Range: 2.5% to 5.5%)
 - **O₂ Target:** Must be between O₂ Upper & O₂ Lower Limits. (Range: 3.0% to 8%)
 - **O₂ Upper Limit:** Must be at least 1% higher than O₂ Lower Limit. (Range: 5.5% to 8.5%)
4. If necessary, repeat Step 2, choosing another valve position, then repeat Step 3 to enter appropriate values in the three parameters for the new valve position.

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6.6.1.3 O₂ Trim Status

The O₂ Trim Status screen displays the current status of various O₂ Trim parameters and allows you to enable/disable O₂ Monitoring functionality on this unit only.

1. Go to: **Main Menu → Advanced Setup → Performance → O₂ Trim → O₂ Trim Status.**

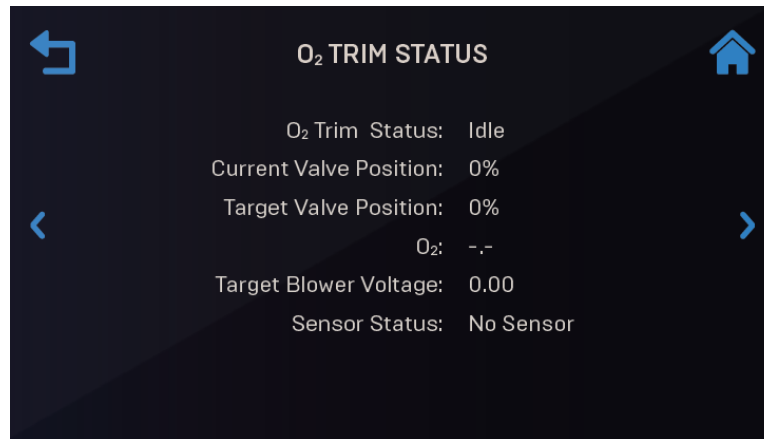


Figure 6-36: O₂ Trim: O₂ Trim Status

2. This screen displays the following “read only” parameters:
 - **Sensor Status:** The current status of the O₂ Sensor.
 - **Current Valve Position:** The A/F Valve’s actual current position.
 - **Target Valve Position:** The A/F Valve’s target position.
 - **O₂:** The current O₂ level.
 - **Target Blower Voltage:** The target voltage

6.6.2 Temperature Control

The Temperature Control screen provides access to PID Settings, Temperature Conformance and Setpoint Range parameters for the unit. All three controls apply to this unit only.

1. Go to: **Main Menu → Advanced Setup → Performance → Temperature Control.**

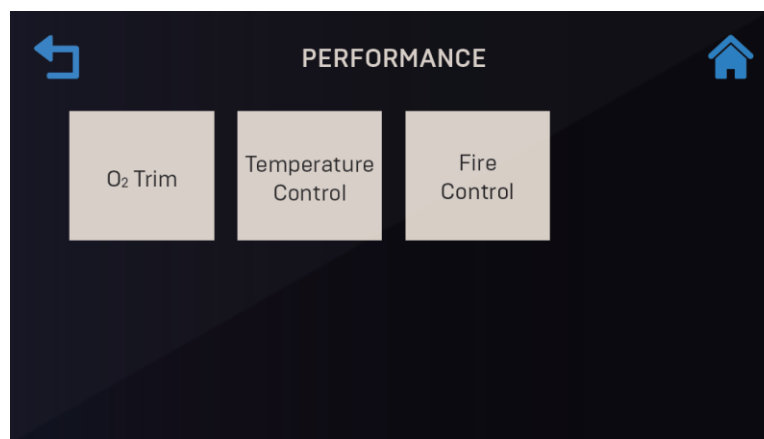


Figure 6-37: Performance: Temperature Control

NOTE: To navigate from one Temperature Control screen to the next in round-robin fashion, use the **Page Left** and **Page Right** icons on each screen.

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6.6.2.1 PID Setting

The **PID Setting** screen provides access to PID parameters associated with Space Heating, Other and DHW applications, plus the option to restore factory PID defaults.

1. Go to: **Advanced Setup → Performance → Temperature Control → PID Settings.**

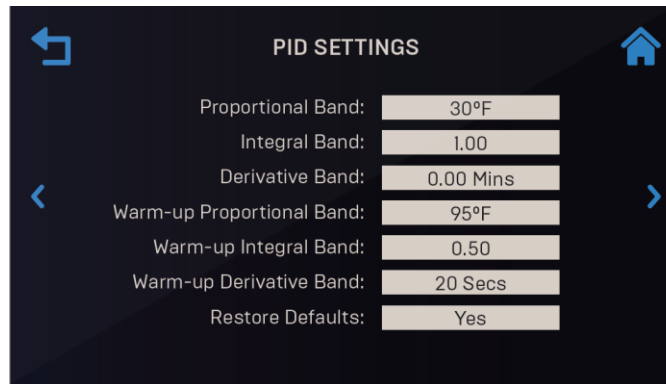


Figure 6-38: Temperature Control: PID Setting

2. This screen includes the following parameters:
 - **Proportional Band:** Generates a fire rate based on the error that exists between the setpoint temperature and the actual outlet temperature. If the error is less than the proportional band setting, the fire rate will be less than 100%. If the error is equal to or greater than the proportional band setting, the fire rate will equal 100% (1-120°F).
 - **Integral Band:** Specifies the fraction of the output, due to setpoint error, to add or subtract from the output each minute to move towards the setpoint (0.00-2.00, default = 1.00).
 - **Derivative Band:** This value responds to the rate of change of the setpoint error. It specifies the time that this action advances the output (0.00-2.00 min.).
 - **Warm-up Prop Band, Warm-up Integral Band, Warm-up Derivative Band:** These three parameters eliminate Temperature Overshoots during the “Warmup” period of a cold ignition cycle by temporarily modifying the PID Gain parameter during warmup.
 - **Restore Defaults:** Set to Yes to reset all parameters to the factory default.

6.6.2.2 Temperature Conformance

The **Temperature Conformance** screen provides access to parameters that define acceptable temperature ranges for the unit.

1. Go to: **Advanced Setup → Performance → Temperature Control → Temperature Conformance.**



Figure 6-39: Temperature Control: Temperature Conformance

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2. This screen includes the following parameters:

- **Deadband High & Deadband Low:** These two settings create an “outlet temperature” zone in which no Valve Position corrections will be attempted. This zone operates with an outlet temperature between **Active Setpoint + Deadband High** and **Active Setpoint – Deadband Low**. (Range: 0 to 25°F for both).
- **Temperature Hi Limit:** This temperature is the absolute maximum the unit is allowed to reach. If the Outlet temperature exceeds this value, the unit will shut down until the temperature cools below this temperature.

6.6.2.3 Setpoint Range

The **Setpoint Range** screen includes all **Setpoint** and **Setpoint Setback** parameters that apply to this unit only. This screen includes ? (Help) functionality.

NOTES:

- Many of this screen’s parameters also appear in [Section 6.3.4.6: Setpoint Range](#), which is available only to units configured as a **WHM Client** or **WHM Manager**. That section is available when this section is unavailable (see previous bullet).
- The parameters that appear on this screen depend on which **Application** is chosen in [Section 6.2.6: Unit Application Configuration](#).

1. Go to: **Main Menu → Advanced Setup → Performance → Temperature Control → Setpoint Range**.

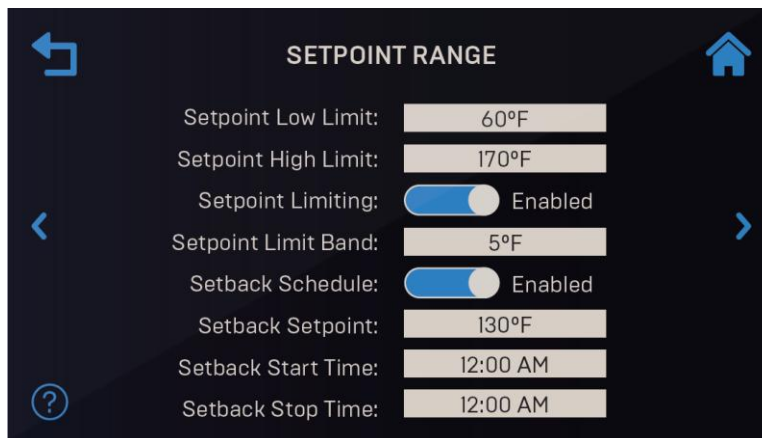


Figure 6-40: Temperature Control: Standalone Setpoint Range

1. Configure **Unit Setpoint Low Limit** and **Unit Setpoint High Limit** parameters (the names include SH, DHW or Other, depending on the **Unit Application** chosen in [Section 6.2.6: Unit Application Configuration](#)). Taken together, these two parameters determine the temperature range within which the setpoint for the chosen **Application** can vary.

Setpoint Low Limit: Sets the minimum Setpoint Limiting temperature (range: 20 to 245°F or Unit Setpoint High Limit).

Setpoint High Limit: Sets the maximum Setpoint Limiting temperature (range: 20 or Unit Setpoint Low Limit up to 245°F).

2. The following parameters are available for *all* values of the **Unit Application** parameter:

- **Setpoint Limiting:** If Enabled, the **Setpoint Limit Band** appears and **Setpoint Limit** functionality is enabled. This functionality acts as a temperature limiting governor. Should a unit’s outlet temperature equal **Setpoint High Limit**, a PID function will intervene and maintain the outlet temperature at the **Setpoint High Limit** minus the **Setpoint Limit Band**:

SECTION 6: Advanced SetUP

- **Setpoint Limit Band:** (If **Setpoint Limiting** = **Enabled**): Sets the number of degrees *below Setpoint High Limit* the unit's outlet temperature must fall before the unit restarts (Default = 5°F (2.8°C), Range = 0°F to 10°F (0°C to 5.5°C))
- 3. The **Setback Setpoint** features can be used to lower the Setpoint during periods when a lower Setpoint is appropriate, such as at night. To enable this feature, set **Setback Schedule** to **Enabled**, then configure the following additional parameters:
 - **Setback Setpoint:** The Setpoint that will be in effect during the Setback period.
 - **Setback Start Time:** The **Setback** period's *start* time (example: 11:00 PM). This parameter also appears in
 - **Setback Stop Time:** The **Setback** period's *end* time (example: 5:00 AM).

6.6.2.4 Feedforward Settings

Go to: **Main Menu** → **Advanced Setup** → **Performance** → **Temperature Control** → **FFWD Settings**. Feedforward Settings can be configured using the following parameters:

- **Feedforward Temp:** A read-only value of the mixed Outlet and Inlet temperature used to determine the amount of heat needed to make setpoint.
- **PID+Ffwd Output:** The total valve position output based on both the feedforward value and the feedback (PID) value calculated.
- **Feedforward Output:** valve position output based on the feedforward value only.
- **Min Load Adjust:** Adjusts the output by adding an offset to the breakpoint chart at minimum flow. This is used to fine tune FeedForward (FFWD) output at low flow levels. (-50 - +50°F).
- **Max Load Adjust:** Changes the scaling of the breakpoint chart to maximum flow.
- **Outlet Feedback:** Enables Outlet Feedback functionality.
- **Feedback Gain:** The percentage of feedback from the water outlet sensor the algorithm factors to determine fire rate (0.01 – 1.00).
- **Feedback Start Position:** The position where to start adding the Max Feedback linearly.
- **Feedback End Position:** The Feedback end position (0 – 100%), at which the full Max Feedback is added to the valve position when Outlet Feedback is enabled.
- **Max Feedback:** Specifies the maximum Feedback percent to add to the valve position at the Feedback End Position, (0 – 100%).
- **Feedback Value:** Displays the current feedback value being added to the valve position.
- **Breakpoint at 100% ... Breakpoint at 0%:** Allows breakpoint temperature settings to be entered for 100% to 0% in 10% increments (30 – 230°F).
- **Above 70°F Value:** If the inlet water temp is above 70°F, algorithm adds offset provided by this item to all the 11 breakpoints ("breakpoint at 100" – "breakpoint at 0"). (-10 - +10°F).
- **Below 70°F Value:** If the inlet water temp is below 70°F, algorithm adds offset provided by this item to all the 11 breakpoints ("breakpoint at 100" – "breakpoint at 0"). (-10 - +10°F).
- **Temperature Governor:** Enables temperature governor limiting functionality, which reduces the effective Fire Rate as the Outlet Temperature approaches the High Temperature Limit.
- **Governor Limit-5 to Governor Limit-15:** When the Outlet Temperature exceeds the Temperature Hi Limit by 5 to 15°F, the effective Fire Rate will be reduced by the value entered in GOV Limit-5 through GOV Limit-15 (0 – 100°F)

6.6.3 Fire Control

The Fire Control screen provides access to functionality that affects the firing of this unit. All four controls apply to this unit only.

1. Go to: Main Menu → Advanced Setup → Performance → Fire Control.



Figure 6-41: Performance: Fire Control

NOTE: Navigate from one Fire Control screen to the next in round-robin fashion using the Page Left and Page Right icons on each screen.

6.6.3.1 Purge Control

The Purge Control screen contains parameters associated with the purge process for this unit.

1. Go to: Main Menu → Advanced Setup → Performance → Fire Control → Purge Control.

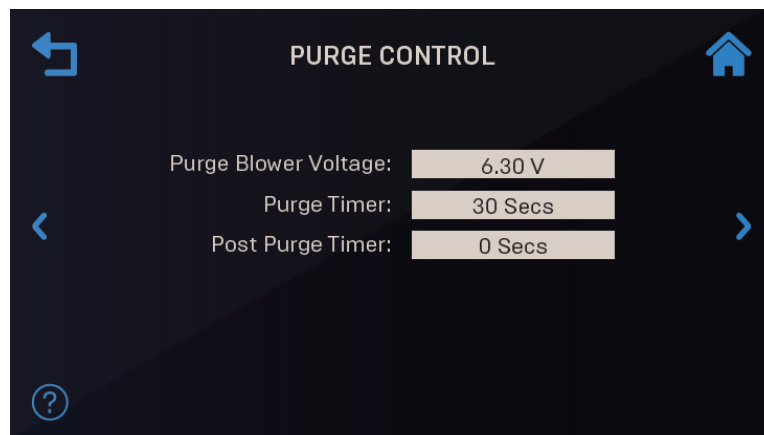


Figure 6-42: Fire Control: Purge Control

2. This screen includes the following parameters:
 - **Purge Blower Voltage:** Allows adjustment of the blower speed (blower output voltage) during the Purge cycle. (Range: 2.0 to 10.0 V)
 - **Purge Timer:** Allows adjustment of the pre-ignition purge time. (Range: 5 to 60 sec.)
 - **Post Purge Timer:** Allows adjustment of the purge time when a unit shuts down. (Range: 0 to 60 sec.)

6.6.3.2 Ignition Control

The Ignition Control screen displays parameters related to ignition that apply to this unit only.

1. Go to: Advanced Setup → Performance → Fire Control → Ignition Control.

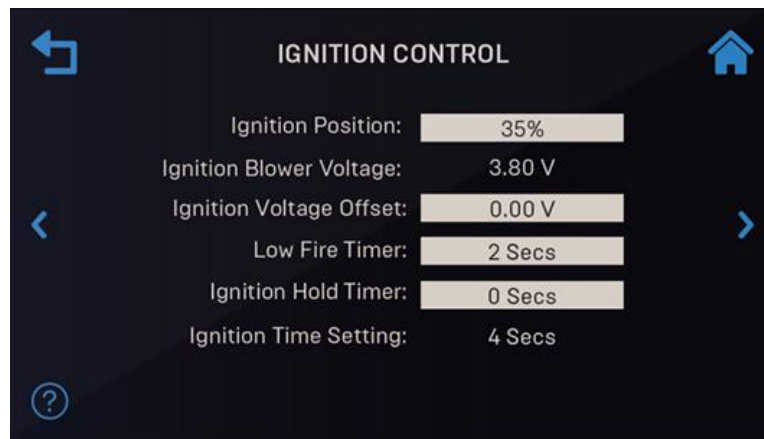


Figure 6-43: Fire Control: Ignition Control

2. The following ignition control parameters are available:

- **Ignition Position:** Sets the air fuel valve position at which the unit will ignite. This allows you to set the air fuel valve position during the ignition sequence (Range: 5% to 60%).
- **Ignition Blower Voltage:** Sets the blower voltage during ignition.
- **Ignition Voltage Offset:** (Range: 0.25 to 10.0 V)
- **Low Fire Timer:** Specifies how long to remain in the low fire position after ignition, before going to the desired output. (Range: 2 to 600 sec.)
- **Ignition Hold Timer:** Sets number of seconds (0 to 60) the unit stays in ignition position.
- **IGN Time Setting:** Displays max allowable time between confirmation of gas valve opening (POC) and a stable flame detected; some legacy units allowed up to 7 seconds.

6.6.3.3 Operating Control

The Operating Control screens provide parameters to view or modify operating levels that apply to this unit only.

1. Go to: Advanced Setup → Performance → Fire Control → Operating Control.

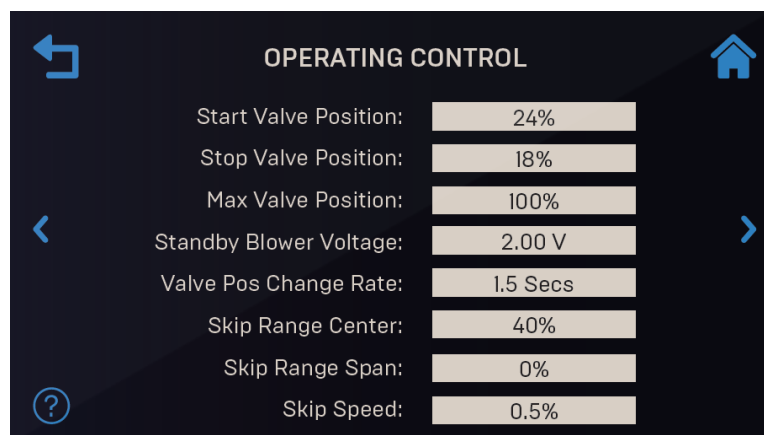


Figure 6-44: Fire Control: Operating Control Levels

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2. The following operating control parameters are available:

- **Start Valve Position:** Specifies valve position at Start Level (range: 0 - 40%)
- **Stop Valve Position:** Allows Stop Level to be set to a valve position (range 0% to **Start Valve Position**).
- **Max Valve Position:** Sets max allowable valve position for the unit. (Range: 40 to 100%)
- **Standby Blower Voltage** (0.0 to 10.0V): Sets blower voltage when unit is in Standby Mode, during which the blower motor remains “ON” at low speed, to limit power cycles. AERCO recommends keeping the default. However, individually vented units in positive pressure water heater rooms may set this between **2.00** and **0** volts to compensate.
- **Valve Position Change Rate:** Defines the rate at which the **valve position** will progress from one step to the next. (Range: 0.5 to 60 sec.)
- **Skip Range Center, Skip Range Span, Skip Speed:** Together, these three parameters can be used to define a Fire Rate “skip zone” the Controller will avoid (**Skip Range Cntr** = the center of the range). These can be used in the rare instance when a unit emits an objectionable noise at a certain Fire Rate and no other remedy resolves the problem. The Controller will then skip-over the “skip” Fire Rate.

6.6.3.4 Anti-Cycling Controls

The **Anti-Cycling Controls** screen provides parameters that can be used to reduce unnecessary cycling on this unit only.

1. Go to: **Advanced Setup → Performance → Fire Control → Anti-Cycling Controls**.



Figure 6-45: Fire Control: Standalone Anti-Cycling Controls

2. The following parameters can delay shutdown reduce excessive cycling:

- **On Delay:** Specifies the minimum length of time a unit must stay **off** after shutting down or going into standby. (Range: 0 to 600 sec.)
- **Shutoff Delay Temp:** Specifies the number of degrees above setpoint which the outlet temperature can rise without triggering a unit shut down (Range: 0 to 25°F).
- **Demand Offset:** This parameter reduces excessive ON/OFF cycling in AUTO mode. When this entry $\neq 0$, the unit will not turn on again until **Valve Position In** reaches the **Start Level** value **AND** the outlet temperature goes below **Demand Offset**. In addition, the water heater will fire at the ignition Valve Position level or below for a period of one minute. When this entry is set to zero, the unit will turn on again as soon as the **Valve Position In** reaches the **Start Level** value. There will not be a one-minute delay when firing at the 29% valve position level.

SECTION 7: UNIT STATUS

The **Unit Status** screen provides access to a variety of parameters that show the status of the unit. In addition, in a WHM Cascade, on the unit designated as a “Manager,” it provides access to screens that display parameters showing the status of the entire cascade.

It is accessed by pressing **Unit Status** on the **Main Menu**.

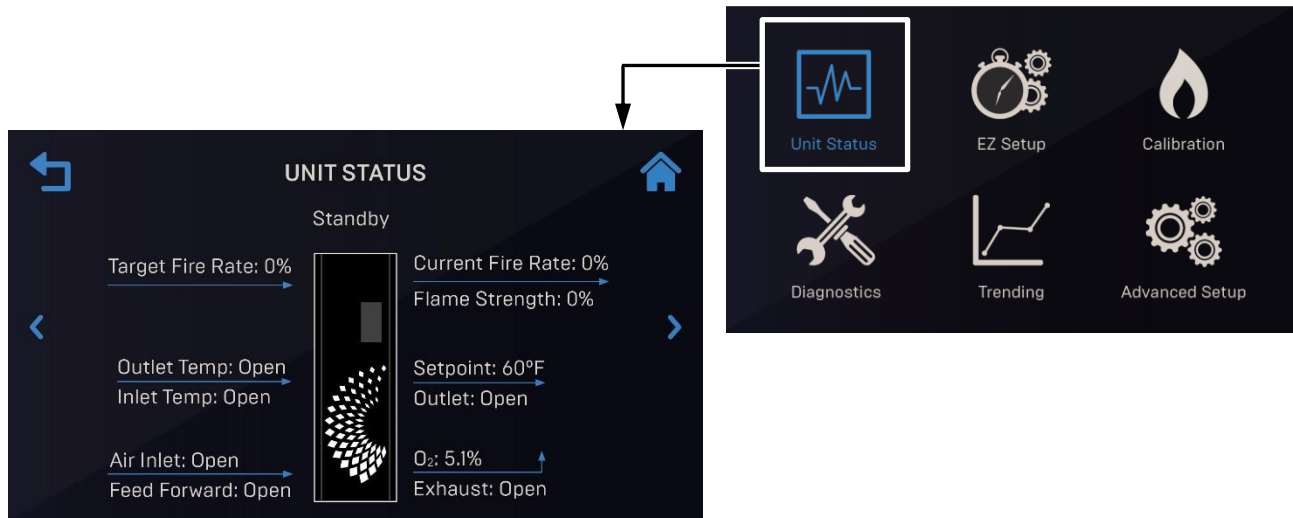


Figure 7-1: Unit Status Screen

This Section includes the following topics:

[7.1: Ignition Sequence](#)

[7.1.1: Demand](#)

[7.1.2: Auxiliary Delay Timers](#)

[7.1.3: Purging](#)

[7.1.4: Spark Cleaning](#)

[7.1.5: Ignition](#)

[7.2: Unit Status](#)

[7.3: Plant Status](#)

[7.4: WHM Cascade Status](#)

[7.5 Runtime Statistics](#)

[7.6: Unit Event History](#)

[7.7: Plant Event History](#)

[7.8: O2 Trim](#)

[7.9 Ignition Sequence \(Summary\)](#)

IMPORTANT!

Before starting these instructions, you must ensure that the unit has the latest Edge Controller firmware. See *Section 6.2.7: Firmware Update* to install the latest firmware.

SECTION 7: Unit Status

Unlike most areas of the system, navigation is performed exclusively with the **Page Left** and **Page Right** arrows to move from screen to screen. The order of navigation depends on whether the unit is part of a WHM Cascade or a standalone unit. The order of navigation is as follows:

Screen Name	WHM	Standalone
Unit Status	✓	✓
Plant Status	✓	
WHM Cascade Status	✓	
Runtime Statistics	✓	✓
Unit Event History	✓	✓
Plant Event History	✓	
O ₂ Trim (if activated)	✓	✓
Last Ignition Status	✓	✓

If there is a fault, the indicator will appear below the screen's title bar at the top of the screen.

7.1 Ignition Sequence

When the unit starts the ignition sequence, the **Ignition Sequence** screen automatically appears (see below). This screen displays the status of each step in the ignition sequence on five rectangles, with the first step, **Demand**, at the bottom. The rectangle for each step is grey before starting, then turns green when the step successfully concludes. Various text notes appear on the right side of the screen at each step. The last screen, **Last Ignition Status** serves as a summary screen. This summary remains in effect until the next successful ignition.

The ignition process, which starts with a call for heat, consists of the following steps:

1. **Demand**
2. **Auxiliary Delay:** (Demand turns green)
3. **Purging:** (Demand and Aux Delay turns green)
4. **Spark Cleaning** (Demand, Aux Delay and Purging turns green)
5. **Ignition** (Demand, Aux Delay, Purging and Spark Cleaning turns green)
6. **Summary** (All stages turns green)

7.1.1 Demand

1. Upon a demand for heat, the **Demand** rectangle turns blue and, if the sequence has a delay timer, those timers display appropriate values.

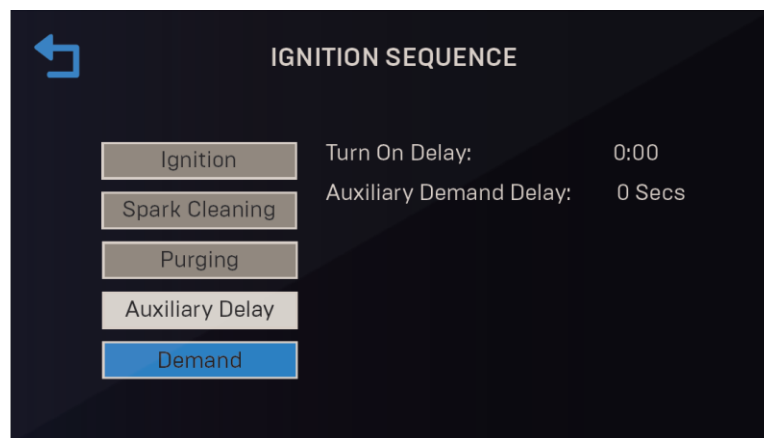


Figure 7-2: Ignition Sequence Step 1 – Demand

2. Upon expiration of the internal 4 second Ignition and Safety (IGST) control Demand delay the unit progresses to the **Auxiliary Delay** sequence.

SECTION 7: Unit Status

7.1.2 Auxiliary Delay Timers

1. Upon expiration of the internal 4 second IGST Demand delay, **On Delay Timer** starts, followed by **Auxiliary Delay Timer** (if any). In both cases, the displays the count down.

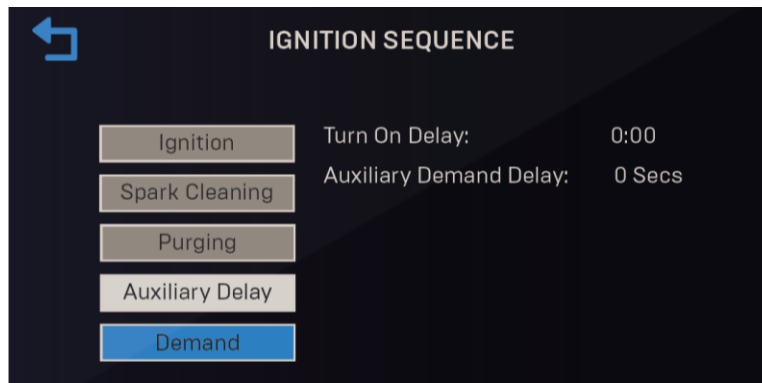


Figure 7-3: Ignition Sequence Step 2 – Auxiliary Delay

2. When the **On Delay Timer** and all the interlock switches are closed, the **Auxiliary Delay** rectangle turns green, and the unit progresses to the **Purging** sequence.
 - If the interlock switches are closed and On Delay time has expired, the **Auxiliary Delay** rectangle immediately changes to green, allowing for the purge cycle to begin.
 - If any of the interlock switches are not closed when the auxiliary timer expires, the **Auxiliary Delay** rectangle turns red and the corresponding interlock fault is displayed.

7.1.3 Purging

1. All switches required to be met **during** the purge cycle have a checkbox, which turns blue once the switch is met. If any switch fails, its checkbox will turn red with a white X and the unit will display a fault message explaining the failure. The safety circuit switches are:
 - Blower Proof
 - Blocked Inlet
 - Purge Position
 - Ignition Position

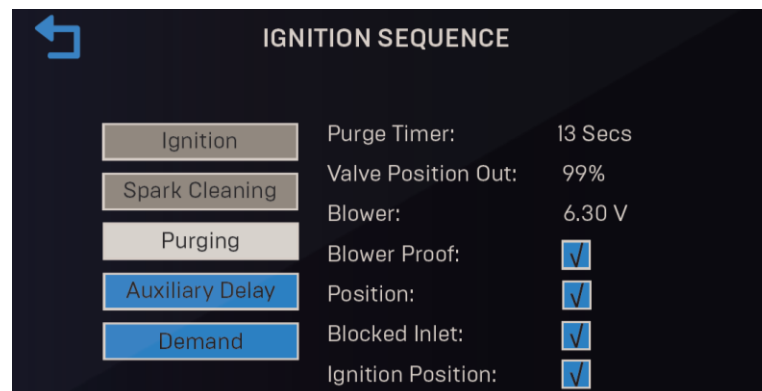


Figure 7-4: Ignition Sequence - Screen 3, Purge

2. The following additional parameters are displayed:
 - **Purge Timer:** The purge cycle's elapsed time in seconds
 - **Valve Position Out:** The Air Fuel Valve's position
 - **Blower Voltage:** The blower voltage as the unit purges
3. Upon expiration of purge timer, if all the switches are met, the **Purging** rectangle turns green, and the system progresses to **Spark Cleaning**. If the purge timer expires before all the switches have been met, the **Purging** rectangle turns red.

7.1.4 Spark Cleaning

1. The Spark Cleaning Timer begins, typically for 10 seconds.

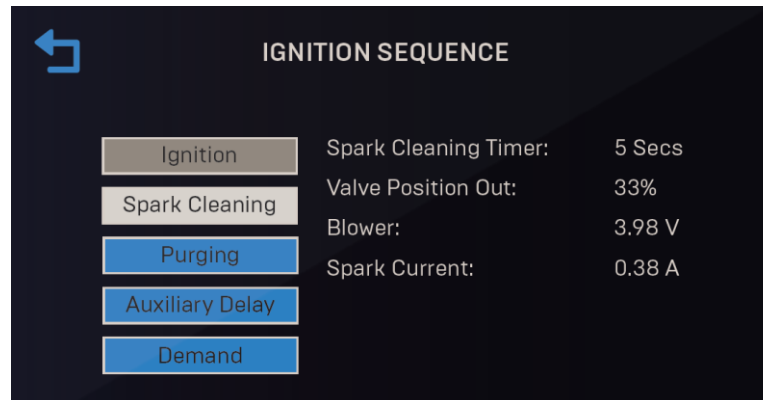


Figure 7-5: Ignition Sequence - Screen 4, Spark Cleaning

2. The Valve Position Out and Blower Voltage continue from the Purging sequence.
3. The Spark Current (amps drawn from spark across igniter) is displayed. If this value goes outside the set threshold range (typically 0.1 to 0.4 A), the Spark Cleaning rectangle turns red and Spark Current Fault is displayed.
4. Upon expiration of the Spark Current Timer, if the spark current remains within range, the Spark Cleaning rectangle turns blue, and the system progresses to the Ignition trial.

7.1.5 Ignition

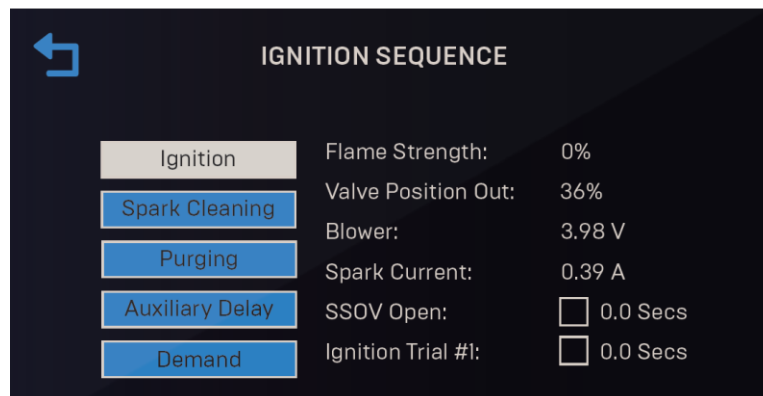


Figure 7-6: Ignition Sequence - Screen 5, Ignition

The screen now displays the following additional parameters:

1. **Flame Strength** – Remains 0 until the flame sensor(s) senses flame, then displays flame strength between 0-100%. A flame strength less than 70% will lead to flame loss.
2. **SSOV Open** – The check box turns blue if the SSOV opened in the required 4 second time period. The time it took appears next to the check box. If the SSOV does not open within 4 seconds, the box turns red, and the unit displays a fault message.
3. **Ignition Trial #** – Displays current trial attempt (1-3) and begins a timer once the SSOV is proven open. The check box turns blue if flame is proven within 4 seconds or red if *not* proven. If the trial is not successful, the trial number is incremented, and the timer is reset. If the flame is not proven after 3 attempts, a fault message appears.

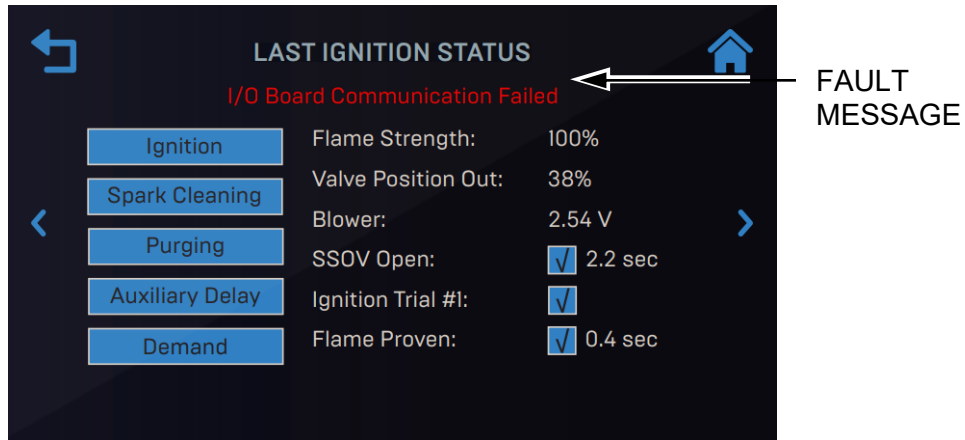


Figure 7-7: Ignition Sequence - Screen 6, Summary with Fault Message

Once flame is proven The **Ignition** box turns blue and **Flame Proven** appears with a blue checkmark and time it took for flame to be proven. The **Summary** and all parameters are automatically saved, including the ignition flame strength, SSOV time to open and ignition time. The **Summary** screen disappears within 5 seconds (unless you press **Home** or **Back**) but remains available in the round-robin operating screen pages until next successful ignition.

7.2 Unit Status

The **Unit Status** screen is the default Operating screen. It also appears when the unit powers on, comes out of sleep mode or has a successful flame. The system automatically transitions to the Ignition screen during the Ignition sequence.

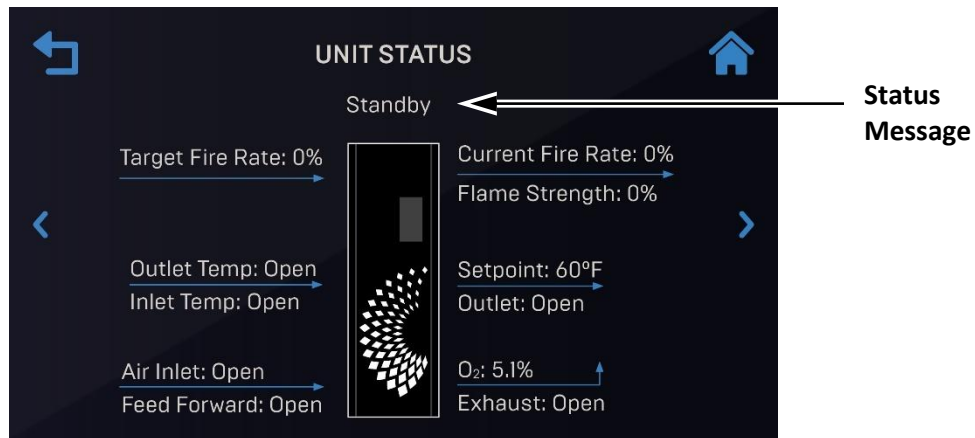


Figure 7-8: Example Unit Status Screen

In normal operation, the area just below the screen heading displays operating status. However, if there's an operating error, it displays the error condition in red.

- The **Flame Strength** is displayed in %, up to 100%.
- The **Setpoint** is not displayed if the unit is part of a "Client" in a WHM cascade.
- The **Max. Fire Rate** parameter is displayed when the max fire rate is set to a value other than 100% and the unit Target Fire Rate is -1% or more from the Max Fire Rate.

7.3 Plant Status (WHM Manager units only)

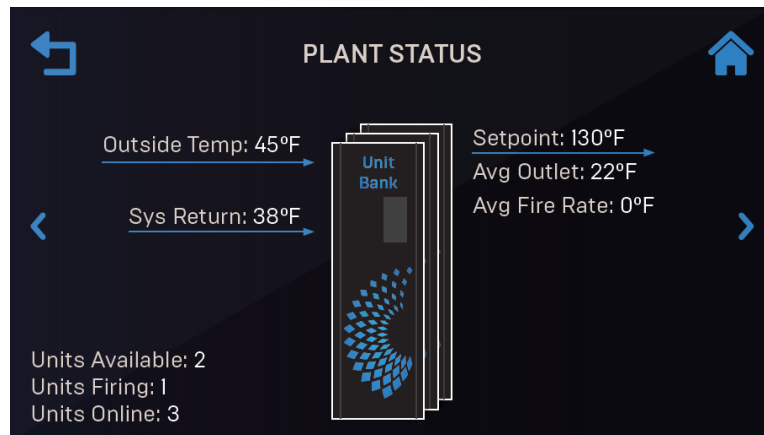


Figure 7-9: Plant Status Screen

The **Outside Temp** (Outdoor Air Temp Sensor), **Sys Return** (Rtn Hdr Temp Sensor), **DHW Supply** (DHW Temp Sensor) and **Other Supply** (Loop 2 Supply, not shown) are displayed when the associated sensors are enabled as part of a WHM Cascade. If a given sensor is enabled but no sensor is detected, the screen displays “Open” for the missing data.

7.4 WHM Cascade Status

This displays the status of all 16 possible water heaters, as well as pertinent WHM system settings. This screen is displayed in round-robin fashion only on the WHM Manager unit.

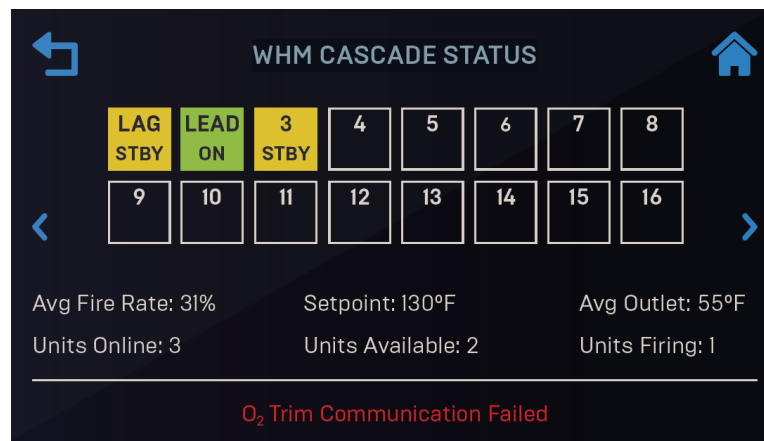


Figure 7-10: WHM Cascade Status Screen

- The data displayed on this screen depends on the Application(s) chosen in Section 6.3.3.
- The box color and text display the status of each water heater within the WHM cascade:

Unit Status		
Label	Status	Color
	Offline	BLACK
DIS	Disabled	GREY
FLT	Fault	RED
STBY	Standby	YELLOW
ON	Operating	GREEN
S LIM	Setpt Lim	AMBER
IGN	Igniting	WHITE
MAN	Manual Run	WHITE

SECTION 7: Unit Status

- The Lag unit displays **LAG** in place of the COM Address.
- The **Fire Rate** area displays the current fire rate for each Application in the cascade: **SH**, **DHW** and/or **Other**. The WHM Manager unit will drive all ignited water heaters at the fire rate specified for each Application.
- **SH Setpoint**, **DHW Setpoint** and/or **Other Setpoint** displays the current Active Setpoint for each Application in the cascade.
- **Supply** displays the current Header Temperature of the WHM cascade for each Application in the cascade.
- **Units Online** displays the total number of units actively connected to the WHM “Manager” unit via the WHM Modbus Network. This includes units that have Faulted and stopped communicating with the Manager.
- **Units Available** displays the total number of connected units either ON, being Ignited or in Standby Mode waiting to be Ignited.
- **Units Firing** displays the total number of units currently Ignited in the WHM System.

7.5 Runtime Statistics

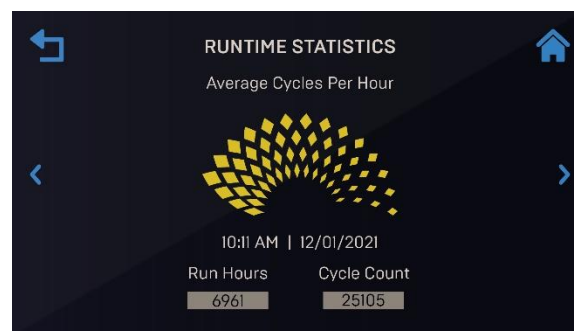
The **Runtime Statistics** screen displays the unit’s total run hours, total cycle count and a color-coded circle signifying the Average Cycles Per Hour.



Status = Green



Status = Red



Status = Yellow

Figure 7-11: Runtime Statistics Screen

If the cycle count exceeds 5 cycles per hour, an event is logged for the unit (a high cycle count does not lock out a unit). The Average Cycles Per Hour honeycomb is color coded as follows:

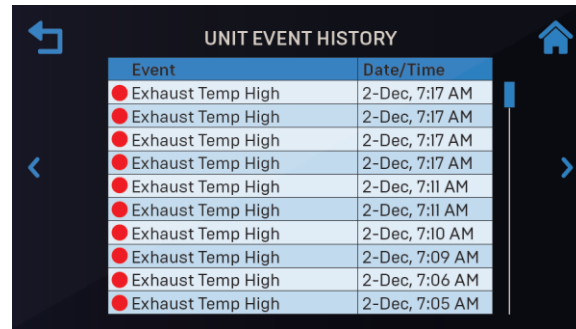
- **Green** = Less than 3 cycles per hour
- **Yellow** = Between 3 and 5 cycles per hour
- **Red** = More than 5 cycles per hour

SECTION 7: Unit Status

7.6 Unit Event History

The **Unit Event History** screen is a scrollable display of unit events, faults and warnings, arranged chronologically, with the most recent on the top. Each event includes the event name, date and time, and a color-coded honeycomb in front of the event name:

Red = Faults Yellow = Warnings Green = Events



Event	Date/Time
Exhaust Temp High	2-Dec, 7:17 AM
Exhaust Temp High	2-Dec, 7:17 AM
Exhaust Temp High	2-Dec, 7:17 AM
Exhaust Temp High	2-Dec, 7:17 AM
Exhaust Temp High	2-Dec, 7:11 AM
Exhaust Temp High	2-Dec, 7:11 AM
Exhaust Temp High	2-Dec, 7:10 AM
Exhaust Temp High	2-Dec, 7:09 AM
Exhaust Temp High	2-Dec, 7:06 AM
Exhaust Temp High	2-Dec, 7:05 AM

Figure 7-12: Unit Event History Screen

- The maximum event history (unit or plant) is 200 events.
- You can drag the scroll bar up and down to view additional events.
- You can press on any row to see the details of that event. The “Event” Details screen appears; the title of the screen depends on the “Event”.



EXHAUST TEMP HIGH DETAILS	
Date:	12/02/2021
Time:	7:11 AM
Event Code:	55
Valve:	0%
Outlet:	48°F
Lower Inlet:	36°F
Air:	Short
Exhaust:	Open
Flame Strength:	0%
O ₂ :	0.0%
O ₂ Trim:	Idle

EXHAUST TEMP HIGH DETAILS	
O ₂ :	0.0%
O ₂ Trim:	Idle
Blower Speed:	0 rpm
Blower:	0.00 V
Status:	1
SSOV Open:	0.0 Secs
Spark Current:	0.00 A
Ignition Time:	0.00
Cycles:	9923
Password Level:	5
Feedforward:	120°F

Figure 7-13: Event Details Screen – Exhaust Temp High Details Shown

The **Event Details** screen contains the following parameters:

- | | | |
|------------------|-----------------------|-----------------------------|
| • Date | • Outlet temperature | • Flame strength |
| • Time | • Inlet temperature | • O ₂ level |
| • Event Code | • Air temperature | • O ₂ Trim state |
| • Valve position | • Exhaust temperature | • |

7.7 Plant Event History

This screen is displayed in the round-robin queue on WHM Manager units only. It is similar to the unit **Event History** screen, in that it displays a list of events, however in this screen, the events can come from any unit in the cascade, with the **Unit ID** column indicating which unit the event occurred on, or **Plant** for plant level events such as communication fault with BAS.

The **Plant Event History** screen displays the same layout, number of events and color coding as the **Unit Event History** screen. However, plant-level events do not have additional details.

Event	Date/Time	Unit
High Water Temp	12-Oct, 3:23 PM	1
Exhaust Temp High	12-Oct, 2:23 PM	2
High Water Temp	11-Oct, 3:25 PM	1
Exhaust Temp High	10-Oct, 8:23 AM	2
High Water Temp	12-Oct, 3:23 PM	1
Disabled	12-Oct, 3:23 PM	2
Ignition Spark Fault	11-Oct, 4:25 PM	3
Ignition Spark Fault	10-Oct, 8:23 AM	3
Modbus Communication Fail	15-Oct, 9:22 AM	3
Modbus Communication Fail	17-Oct, 4:20 AM	3

Figure 7-14: Plant Event History

7.8 O₂ Trim

The O₂ Trim screen displays the O₂ Trim state and a graph showing the current valve position, O₂ level and blower voltage. It can be displayed on any unit on which the O₂ Trim is both activated and enabled (see Section 6.6.1). The O₂ Trim status (under the screen title) will be Disabled if the function is disabled after being successfully activated.

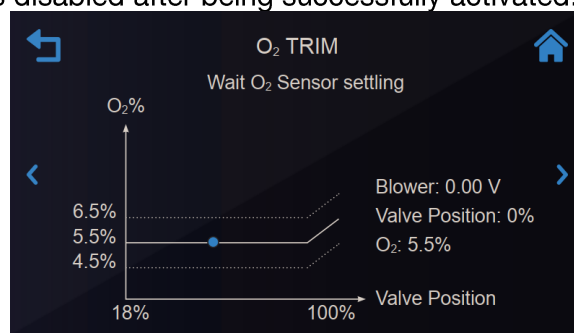


Figure 7-15: O₂ Trim

7.9 Ignition Sequence (Summary)

The Last Ignition Status screen displays a summary of the last ignition sequence, whether it is a successful or not. If unsuccessful, it shows the step that failed in red, and one or more check boxes and the status box has red X.

LAST IGNITION STATUS		
Ignition	Flame Strength:	100%
Spark Cleaning	Valve Position Out:	38%
Purging	Blower:	2.54 V
Auxiliary Delay	SSOV Open:	☒ 2.2 sec
Demand	Ignition Trial #1:	☒
	Flame Proven:	☒ 0.4 sec

LAST IGNITION STATUS		
I/O Board Communication Failed		
Ignition	Flame Strength:	100%
Spark Cleaning	Valve Position Out:	38%
Purging	Blower:	2.54 V
Auxiliary Delay	SSOV Open:	☒ 2.2 sec
Demand	Ignition Trial #1:	☒
	Flame Proven:	☒ 0.4 sec

Ignition Successful

Ignition Failed

Figure 7-16: Ignition Screen

SECTION 8: I/O NOMENCLATURE

The table below lists names that appear in the Controller's menu structure.

Name	Function	Comments
Relays On I/O Board (Controlled by MCB Board)		
Swing Valve 1 Relay	Storage Tank 1	
Backup Relay	Spare	
V2/Spare 1 Relay	Spare	
DHW Pump Relay	Storage Tank 1	
Spare 2 Relay	Spare	
Analog Output On I/O Board		
Spare Analog 1	spare	
BLR V.S. Pump	spare	
DHW V.S. Pump	recirculation pump	
Spare Analog Out 3	Waste Heat (future)	
Analog Output On Harness		
Blower	Blower control signal	
Cascade Valve		
Spare Analog Out 2		

Analog Input On I/O Board		
CO Input	CO sensor input	
Remote Analog In	Remote Setpoint or Fire Rate	
Spare Analog In 3		
Spare Analog In 1		
Spare Analog In 2		Dropdown Name list: -Remote Stpt 2 -Swing V1 Fdbk -Swing V2 Fdbk -BLr VSP Fdbk -DHW VSP Fdbk -SmartPlate VP -NOx
Analog Input On Harness		
Flow	Flow input	
Air Pump		
Cas Vlv Fdbk	Cascade Valve Feedback	

SECTION 9: EDGE [ii] CONTROLLER VIEWS

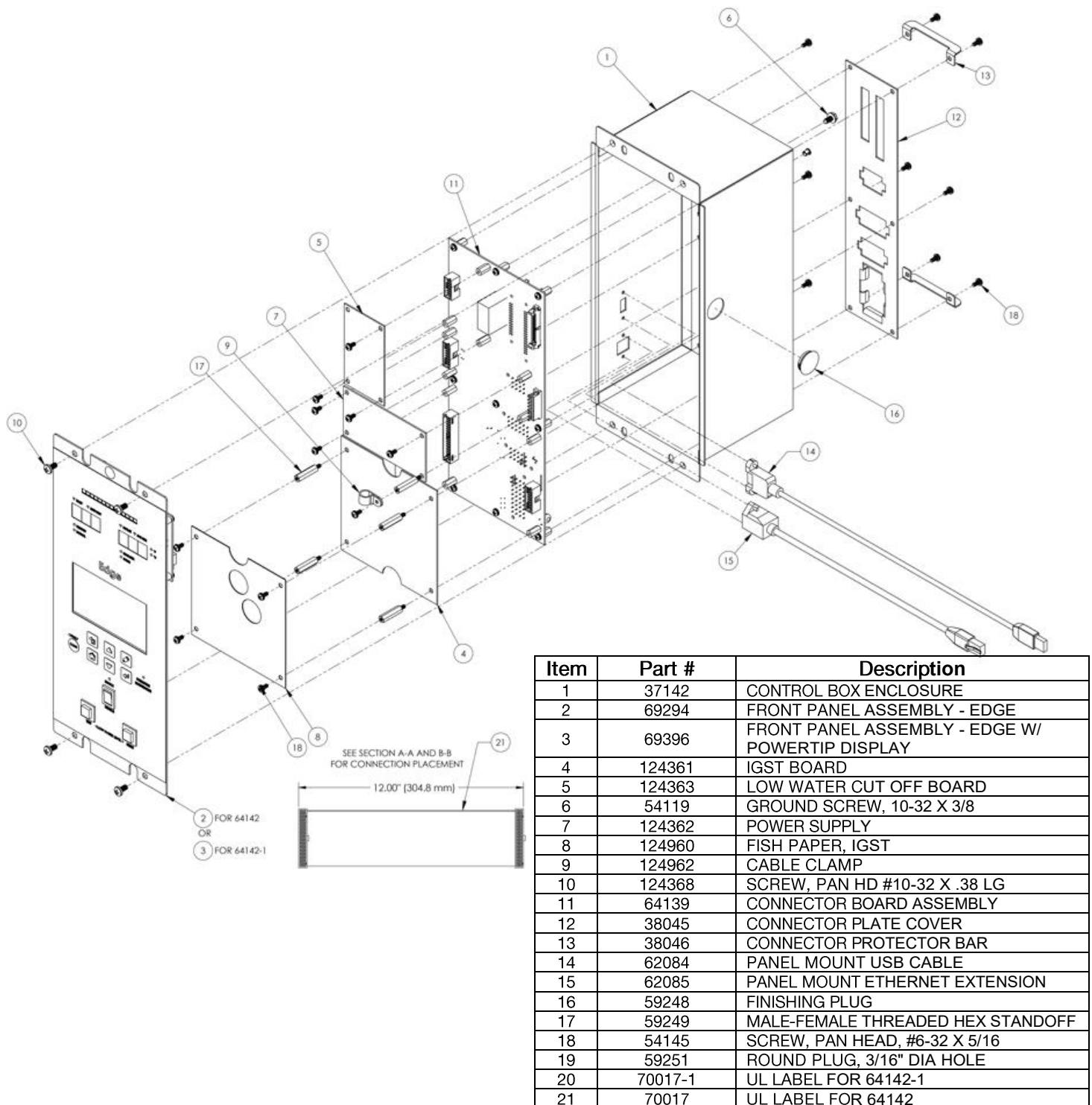


Figure 9-1: Edge [ii] Controller (P/N 69344-1) - Exploded View

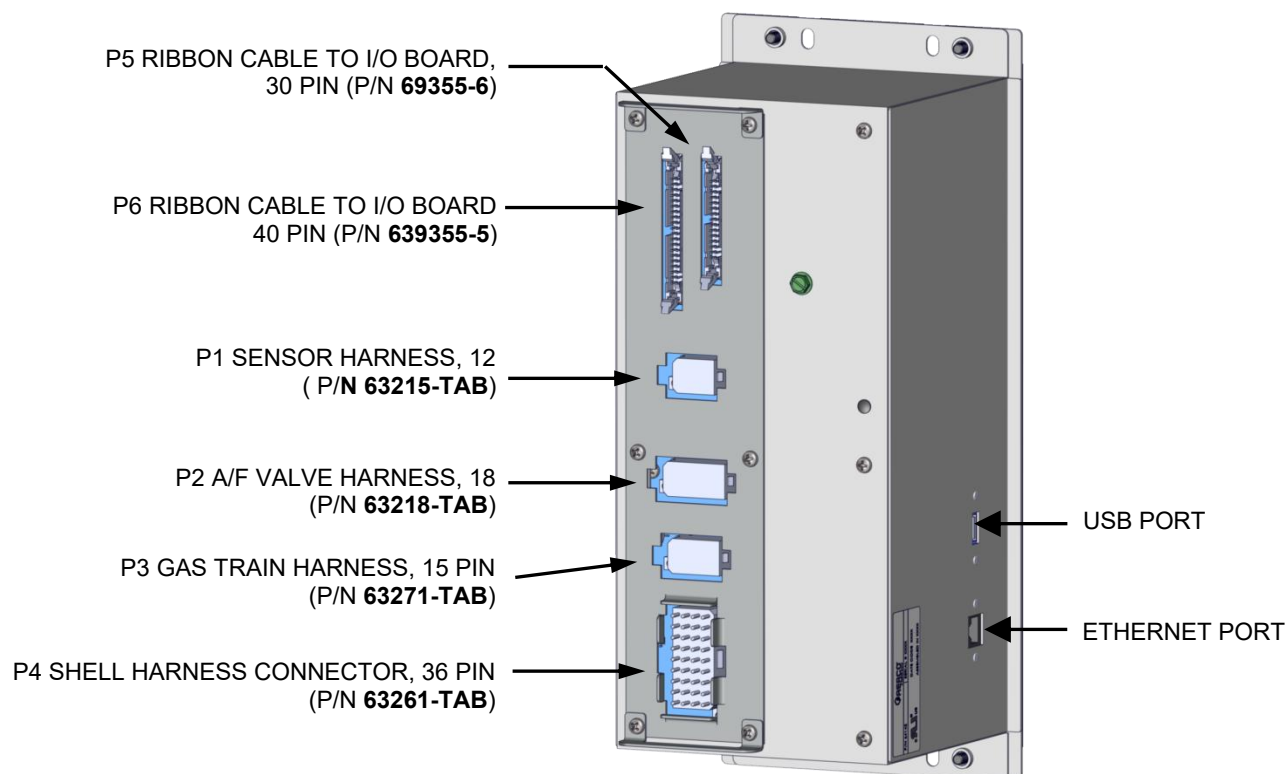


Figure 9-2: Edge [ii] Controller Rear View

SECTION 10: STARTUP, STATUS, FAULT MESSAGES

The Edge [ii] Controller displays status messages at various times showing the current state of the Controller. All status messages are displayed near the top of the touchscreen in **WHITE** text, just under the current screen's title.

10.1 Fault Messages

The Edge [ii] Controller displays the following status messages when appropriate. The # column lists the corresponding code returned to Building Automation Systems.

Four types of messages can appear on the Edge [ii] Controller's display screen:

- **Message:** Information about a current event or condition: no intervention required.
- **WARNING!** An abnormal event or condition occurred, but the unit continues to operate normally: no intervention required.
- **Fault:** An abnormal event or condition occurred that caused the unit to shut down. The unit will restart automatically once the cause of the fault is resolved.
- **Fault, Manual Reset:** An abnormal event or condition occurred that caused the unit to shut down. Corrective action may be required. Once the cause of the fault is resolved, the Controller's **CLEAR** button must be pressed manually to restart the unit.

TABLE 10-1: Edge [ii] Controller Fault Messages

#	FAULT MESSAGE	DESCRIPTION	TYPE
0	NO FAULTS		
1	Disabled	Indicates the Enable/Disable switch is set to Disabled . The display also shows the time (AM or PM) and date that the unit was disabled.	Message
2	Standby	Displayed when ON/OFF switch is in the ON position, but there is no demand for heat. The time and date are also displayed.	Message
3	Demand Delay	Demand Delay is active.	Message
4	Purging	The duration of the purge cycle during startup, in seconds.	Message
5	Ignition Trial	Displayed during ignition trial startup sequence. The duration of cycle counts up in seconds.	Message
6	Flame Proven	Displayed after flame has been detected for a period of 2 seconds. Initially, the flame strength is shown in %. After 5 seconds has elapsed, the time and date are shown in place of flame strength.	Message
7	Warmup	Displayed for 2 minutes during the initial warm-up only.	Message
8	High Water Temp Switch Open	The High-Water Temperature Limit switch is open.	Fault, Manual Reset
9	Low Water Level	The Low Water Cutoff board is indicating low water level.	Fault, Manual Reset
10	Low Gas Pressure Fault	The Low Gas Pressure Limit switch is open	Fault, Manual Reset
11	Gas Pressure Fault	The Gas Pressure Limit switch is not connected or malfunctioned	Fault, Manual Reset
12	Interlock Open	The Remote Interlock is open.	Fault, Manual Reset
13	Delayed Interlock Open	The Delayed Interlock is open.	Fault, Manual Reset

SECTION 10: STARTUP, STATUS, FAULT Messages

TABLE 10-1: Edge [ii] Controller Fault Messages			
#	FAULT MESSAGE	DESCRIPTION	TYPE
14	Airflow Fault During Purge	The Blower Proof switch opened during purge, or air inlet is blocked.	Fault, Manual Reset
15	SSOV Fault During Purge	The SSOV switch opened during purge.	Fault, Manual Reset
16	Prg Switch Open During Purge	The Purge Position Limit switch on the Air/Fuel Valve was open during purge.	Fault, Manual Reset
17	Ign Switch Open During Ignition	The Ignition Position Limit switch on the Air/Fuel Valve opened during ignition.	Fault, Manual Reset
18	Airflow Fault During Ign	The Blower Proof switch opened during ignition.	Fault
19	Airflow Fault During Run	The Blower Proof switch opened during run.	Fault, Manual Reset
20	SSOV Fault During Ignition	The SSOV switch closed or failed to open during ignition.	Fault, Manual Reset
21	SSOV Fault During Run	The SSOV switch closed for more than 15 seconds during run.	Fault, Manual Reset
22	Flame Loss During Ignition	The Flame signal was not seen during ignition or lost within 5 seconds after ignition.	Fault, Manual Reset
23	Flame Loss During Run	The Flame signal was lost during run.	Fault, Manual Reset
24	High Exhaust Temp Switch	The High Exhaust Temp switch is open.	Fault, Manual Reset
25	Loss of Power	The unit shut down due to loss of power	Fault
26	Loss of Sensor	Not used	Not used
27	Loss of Signal	Not used	Not used
28	High O ₂ Level	The O ₂ Sensor reading is <u>above</u> acceptable level.	Fault
29	Low O ₂ Level	The O ₂ Sensor reading is <u>below</u> acceptable level.	Fault
30	High CO Level	Not used	Not used
31	SSOV Relay Failure	A failure has been detected in one of the relays that control the SSOV.	Fault, Manual Reset
32	Residual Flame	The Flame signal was seen for more than 60 seconds during standby.	Fault, Manual Reset
33	Heat Demand Failure	The unit failed to fulfill the demand for heat.	Fault, Manual Reset
34	Ign Switch Closed During Purge	The Ignition Position Limit switch on the Air/Fuel Valve closed during purge.	Fault, Manual Reset
35	Prg Switch Closed During Ign	The Purge Position Limit switch on the Air/Fuel Valve was stuck closed during ignition.	Fault, Manual Reset
36	SSOV Switch Open	The SSOV switch opened during standby.	Fault, Manual Reset
37	Ign Board Comm Fault	A communication fault has occurred between the PMC board and Ignition board.	Fault
38	Wait	The unit is waiting for a process to run to completion.	Message
39	Direct Drive Signal Fault	The direct drive signal is not present or is out of range.	Fault
40	Remote Setpt Signal Fault	The Remote Setpoint signal is not present or is out of range.	Fault
41	Outdoor Temp Sensor Fault	The temperature measured by the Outdoor Air Sensor is out of range.	Fault
42	Outlet Temp Sensor Fault	Temperature measured by Outlet Sensor is out of range: - Sht = sensor is shorted - Opn = sensor is open-circuited	Fault

SECTION 10: STARTUP, STATUS, FAULT Messages

TABLE 10-1: Edge [ii] Controller Fault Messages			
#	FAULT MESSAGE	DESCRIPTION	TYPE
43	FFWD Temp Sensor Fault	The temperature measured by the Feed Forward (FFWD) Sensor is out of range.	Fault
44	High Water Temp	The temperature measured by the Outlet Sensor exceeded the Temp Hi Limit setting.	Fault
45	Line Voltage Out of Phase	The Line (Hot) and Neutral wires are reversed.	Fault, Manual Reset
46	Stepper Motor Failure	The Stepper Motor failed to move the Air/Fuel Valve to the desired position.	Fault, Manual Reset
47	Setpoint Limiting Active	Outlet temperature crossed the high setpoint limit. Setpoint limiting feature is active.	Fault
48	Modbus Comm Fault	A network communication fault	Fault
49	Wait Ignition Retry	The unit is waiting before retrying to ignite.	Message
50	WaitFault Purge	Fault while purging.	Message
51	Wait Retry Pause	Pause before retrial for ignition.	Message
52	Exhaust Temp Sensor Short	The Exhaust Temp Sensor has malfunctioned.	Warning
53	Exhaust Temp Sensor Open	Exhaust Temp Sensor is not connected or malfunctioned.	Warning
54	Warning Exhaust Temp High	The Exhaust temperature is above normal.	Warning
55	Exhaust Temp High	The Exhaust Temperature has exceeded 200°F (93.3°C).	Fault, Manual Reset
56	Inlet Water Temp Sensor Short	Inlet Water Temp Sensor has malfunctioned/shorted out.	Warning
57	Inlet Water Temp Sensor Open	Inlet Water Temp Sensor is not connected or malfunctioned.	Warning
58	Warning In Wtr Temp High	WARNING! Inlet water temperature is above normal.	Warning
59	Warning In Wtr Temp Low	WARNING! Inlet water temperature is below normal.	Warning
60	Inlet Gas Press Sensor Open	Inlet Gas Pressure Sensor not connected / malfunctioned.	Fault
61	Gas Plate Dp Sensor Open	Gas Plate Dp Sensor is not connected or malfunctioned.	Fault
62	O2 Percentage Low	The O2 % has gone below 2% for more than 30 seconds	Fault
63	O2 Sensor Malfunction	O ₂ Levels less than -4% or more than 24% for > 10 seconds.	Fault
64	Warning O2 Level High	The O ₂ is above normal operating limits.	Warning
65	Recirc Pump Failure	The recirculation pump has failed.	Fault, Manual Reset
66	Ignition Monitor	Ignition spark monitor indicated no or out of range spark.	Message
67	No Flow Safety Lockout	Not used	Not Used
68	Ignition Spark Fault	The O ₂ is above normal operating limits.	Fault, Manual Reset
69	Pre Ignition	The recirculation pump has failed.	Message
70	Cleaning Igniter	Displayed during ignition during Spark Cleaning cycle.	Message
71	Too Many Cycles In 24 Hours	The number of cycles exceeded the allowable limit.	Fault
72	Too Many Ovrtps In 24 Hours	The number of over-temperature events exceeded limit.	Fault
73	Air Sensor Fault	The Air Temp sensor has malfunctioned.	Fault
74	Auto Diagnostic Mode ACTIVE	The unit is in Auto Diagnostic Mode	Message
75	Auto Diagnostic Mode COMPLETED	Auto Diagnostic Mode has completed	Message
76	Auto Diagnostic Mode ABORTED	Auto Diagnostic Mode has aborted	Message
77	DHW Heating Active	The unit is actively heating domestic hot water.	Message
78	Water heater Cooling Off	The unit has ceased firing and is now cooling down.	Message
79	WHM Network Temp Sensor Fault	WHM network temp sensor fault.	Fault
80	WHM Network Temp Com Fault	WHM network temp communication fault.	Fault
81	WHM Local Header Sensor Fault	WHM local header sensor fault.	Fault

SECTION 10: STARTUP, STATUS, FAULT Messages

TABLE 10-1: Edge [ii] Controller Fault Messages			
#	FAULT MESSAGE	DESCRIPTION	TYPE
82	WHM Net Outdoor Sensor Fault	WHM net outdoor sensor fault.	Fault
83	WHM Net Outdoor Com Fault	WHM net outdoor communication fault.	Fault
84	WHM Local Outdr Sensor Fault	WHM local outdoor sensor fault.	Fault
85	WHM Client Com Fault	Communication with a WHM Client unit failed.	Message
86	O2 Cal Purge	O ₂ calibration is in purge cycle.	Message
87	Auto Calibration In Progress	O ₂ calibration is underway.	Message
88	Autocal Finished	O ₂ calibration is complete.	Warning
89	O2 Sensor Out Of Range	O ₂ sensor failed during O ₂ calibration.	Warning
90	O2 Warning Service Required	O ₂ Trim reached limit and O ₂ level is still out of range.	Message
91	Wait Sensor Warm-up	The unit is waiting for the O ₂ sensor to turn on.	Warning
92	Air Pump Failed O2 Trim Disabled	Air Aductor pump failed, disabling O ₂ trim functionality	Fault
93			NA
94	Isolation Valve Stuck Open	The isolation valve failed to <u>close</u> as expected.	Warning
95	Isolation Valve Stuck Closed	The isolation valve failed to <u>open</u> as expected.	Fault
96	Maintenance Overdue	Scheduled 12- or 24-month maintenance is overdue.	Warning
97	Maintenance Due Soon	Scheduled 12- or 24-month maintenance is due soon.	Warning
98	BAS System Disable	Unit is shut down remotely via BAS	Warning
99			NA
100			NA
101	Back Up Manager is not Compatible	The unit designated as the Backup Manager is not compatible with Manager functionality.	Warning
102	IO Board Communication Failed	I/O board communication has failed.	Warning
103			NA
104			NA
105	No BAS Communication	No communication from the Building Automation system	Warning
106	WHM Warm Weather Shutdown	WHM warm weather shutdown warning	Warning
107			NA
108			NA
109	WHM Header Temp BAS Comm Fault	BAS failed to update the WHM header temperature periodically	Warning
110	Supply Return Temp BAS Comm Fault	BAS failed to update the supply return temperature periodically	Warning
111			NA
112	WHM Return Sensor Short Warning	WHM return sensor is shorted. Check the wirings.	Warning
113	WHM Return Sensor Open Warning	WHM return sensor is disconnected	Warning
114			NA
115			NA
116	Supply Return Network Sensor Fault	Supply Return Network Sensor temperature out of range.	Warning
117	Supply Return Network Comm Fault	No response from supply return network sensor	Warning
120	Low Stack Temp Shutdown	Stack Guard temperature is below Stack Guard Low Limit	Fault
122	Stack Guard Sensor Short	Stack guard sensor is shorted	Warning
123	Stack Guard Sensor Open	Stack guard sensor is not installed	Warning

10.2 O₂ Trim Messages

The Edge [ii] Controller displays the following O₂ Trim Status and Warning messages when appropriate.

TABLE 10-2: Edge [ii] Controller O ₂ Trim Messages		
FAULT MESSAGE	Type	MESSAGE DESCRIPTION
O ₂ Auto Calibration In Progress	Status	O ₂ auto-calibration is underway
Autocal Finished	Status	O ₂ auto-calibration has completed
Wait Sensor Warm-up	Status	
O ₂ Auto Cal Done	Status	
O ₂ Level Out Of Range	Warning	Sensor auto calibration offset required is more than $\pm 3\%$
O ₂ Warning Service Required	Warning	Appears if the O ₂ level is outside of its limits for more than 5 minutes.
O ₂ Percentage Low	Warning	The O ₂ % has gone below 2% for more than 30 seconds
O ₂ Sensor Malfunction	Warning	Occurs if O ₂ Levels are less than -4% or more than 24% for more than 10 seconds.
Warning O ₂ Level High	Warning	O ₂ Levels > 9% and < 24% for more than 30 seconds {auto-reset when value comes back in range}

10.3 WHM Cascade Messages

The Edge [ii] Controller displays the following messages related to Water heater Sequencing Technology (WHM):

TABLE 10-3: Edge [ii] Controller WHM Cascade Messages	
MESSAGE	Type
All heaters Off	Status
All On > 90% Fire Rate	Warning
All On-Raise Fire Rate	Status
Auto Cycling On	Status
Water heater Ignited	Status
WHM Client Com Fault	Warning
WHM FAILSAFE	Warning
WHM in Control	Status
WHM in Deadband	Status
WHM Overtemp	Fault
Failsafe Active	Status
Igniting First	Status
Igniting Next Water heater	Status
Lower Fire Rate	Status
On Temperature	Status
One Water heater Mode	Status
Raise Fire Rate	Status
Remote Sig Fault	Fault

Appendix A: I/O Board Connections

Each unit comes from the factory fully wired with an internal operating control system. No field control wiring is required for normal operation. However, the Edge [ii] Controller used with your unit does allow for some additional control and monitoring features. Wiring connections for these features are made on the Input/Output (I/O) board located behind the unit's removable front panel, as shown in Figure B-1.

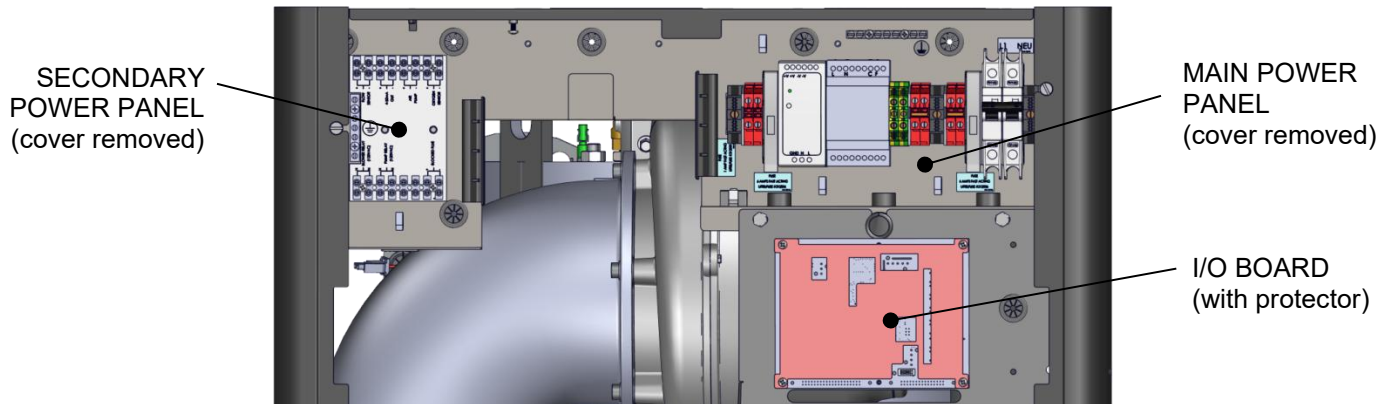


Figure B-1: Power Panel and Input/Output (I/O) Board Location

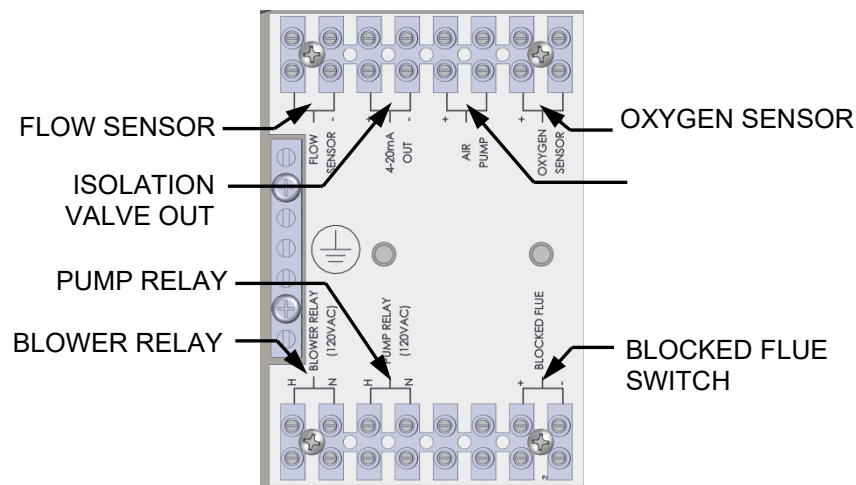


Figure B-2: Secondary Power Panel Terminals

SECTION 10: STARTUP, STATUS, FAULT Messages

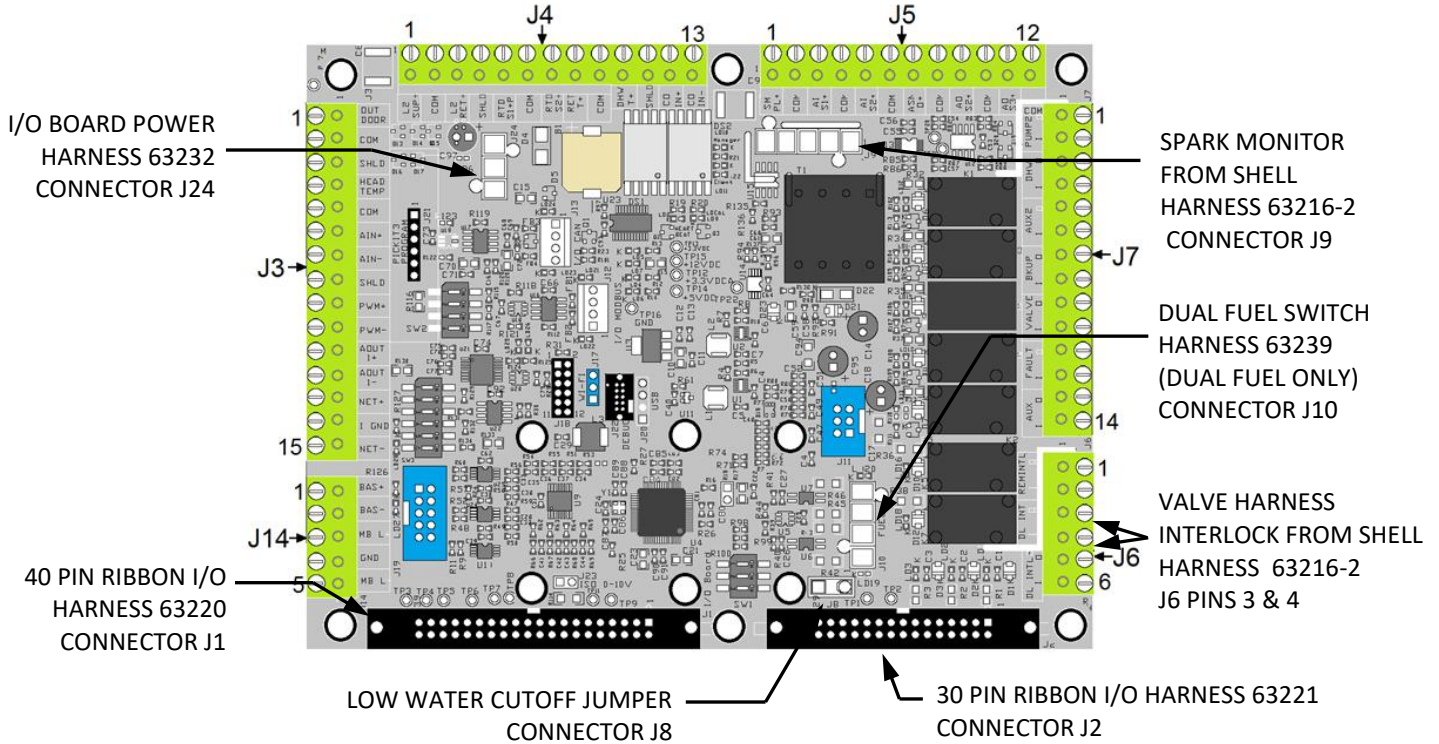
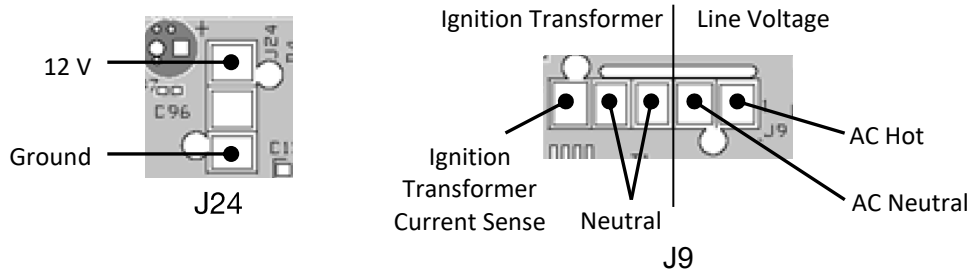


Figure B-3: I/O Board Cable Connections

The I/O board contains the terminal listed below, arranged on removable, named connector strips J3 through J7 and J14, plus Molex connectors for unit harnesses. The maximum gauge of wires connecting to the I/O board is 14.



NOTE: To facilitate making the connections, these strips can be lifted off the I/O board. The entire strip is then remounted on the I/O board after all connections have been made. If a connector strip is removed, it must be re-mounted in its original orientation (connecting wires arranged around the *outside* perimeter of the I/O board).

Connector Strip J3 Terminals		
Pin #	Name	Description
1	Outside Temp +	Connections to Outside Air Temperature (OAT) sensor (P/N 61048). Used on Manager and Backup Manager units. Required for the OUTDOOR RESET mode of operation. To enable this mode, go to the Controller's Main Menu → Advanced Setup → Unit → Application Configuration and set SH Operating Mode to Outdoor Reset , then configure the related parameters.
2	Outside Temp -	
3	Shield	Connection to the shield from any cable.

SECTION 10: STARTUP, STATUS, FAULT Messages

Connector Strip J3 Terminals		
Pin #	Name	Description
4	Supply Header +	Connection to the Supply Header temperature sensor (2 wire sensor P/N 24410 , or 4 wire sensor P/N 61058) for: - Main Loop (in a Variable-Primary application) - Secondary Loop (in a Primary-Secondary application) - Loop 1 (in a Multi-application) Typically, used on Manager and Backup Manager units.
5	Supply Header –	
6	Remote Analog In +	
7	Remote Analog In –	Connection to the Analog Remote Signal, if Operating Mode = Remote Setpoint. Used on Manager and Backup Manager units.
8	Shield	Connection to the shield from any cable.
9	PWM Input +	Reserved for future use.
10	PWM Input –	
11	BLR V.S. Pump +	Reserved for future use. Water heater Variable Speed Pump. Connection for the VFD signal to the pump,
12	BLR V.S. Pump –	
13	WHM/WHM RS485 +	Dedicated to internal communication between units in a WHM or WHM system. ACS (legacy) panel should also be connected to this terminal.
14	RS485 Iso Gnd	
15	WHM/WHM RS485 -	

Connector Strip J4 Terminals		
Pin #	Name	Description
1	Supply Loop 2	In a multiple application configuration, connection to the 2 nd loop <u>supply</u> header temperature sensor.
2	Sensor Ground	Ground connection for Supply Loop 2
3	Return Loop 2	In a multiple application environment, connection to the 2 nd loop <u>return</u> header temperature sensor.
4	Shield	Connection to the shield from any cable.
5	RTD Spare 1	Reserved. Spare temp sensor
6	Sensor Ground	Ground connection for RTD Spare 1
7	RTD Spare 2	Reserved. Spare temp sensor
8	Return Header	Connection to the Supply Header temperature sensor (2 wire sensor P/N 24410 , or 4 wire sensor P/N 61058) for: - Main Loop (in a Variable-Primary application) - Secondary Loop (in a Primary-Secondary application) - Loop 1 (in a Multi-application) Typically, used on Manager and Backup Manager units.
9	Sensor Ground	Ground connection for Return Header Temp sensor
10	DHW Temp	Connect the DHW tank temperature or DHW Loop Supply Temperature sensor
11	Shield	Connection to the shield from any cable.
12	CO/Analog In +	Reserved for future use
13	CO/Analog In -	

Connector Strip J5 Terminals		
Pin #	Name	Description
1	Spare Analog In 3 +	Connection to one of the following signals: - SmartPlate Valve input - Swing V1 feedback - Swing V2 Feedback
2	Spare Analog In 3 -	
3	Spare Analog In 1 +	
4	Spare Analog In 1 -	
5	Spare Analog In 2 +	

SECTION 10: STARTUP, STATUS, FAULT Messages

Connector Strip J5 Terminals		
Pin #	Name	Description
6	Spare Analog In 2 -	- VS Pump Feedback (Variable Speed Pump Feedback) - Remote Setpoint 2 - DHW VSP Fdbk To assign/program its function, go to the Controller's Main Menu → Advanced Setup → Ancillary Devices → Analog Inputs, then set the Input parameter to Spare Analog In 1, Spare Analog In 2, or Spare Analog In 3.
7	Spare Analog Out 1 +	Connection to one of the following signals: - Fire Rate - Cascade Valve To assign/program its function, go to the Controller's Main Menu → Advanced Setup → Ancillary Devices → Analog Outputs, then set the Output parameter to Spare Analog Out 1.
8	Spare Analog Out 1 -	
9	DHW V.S. Pump +	Connection to the VFD signal to a DHW Variable Speed Pump, installed between: - The 4-port buffer tank and SmartPlate - The water heater and SmartPlate in a 2-port buffer tank configuration.
10	DHW V.S. Pump -	
11	Spare Analog Out 3 +	Connection to the Fire Rate signal. To assign/program its function, go to the Controller's Main Menu → Advanced Setup → Ancillary Devices → Analog Outputs, then set the Output parameter to Spare Analog Out 3.
12	Spare Analog Out 3 -	

Connector Strip J6 Terminals		
Pin #	Name	Description
1	Remote Interlock Out	Connection to an auxiliary device interlock, such as louver open feedback or flow sensor.
2	Remote Interlock Return	
3	Delayed Interlock 1 Out	Connection to an auxiliary device interlock that requires a delay before the plant starts firing.
4	Delayed Interlock 1 Return	
5	Delayed Interlock 2 Out	Connection to an auxiliary device interlock that requires a delay before the plant starts firing.
6	Delayed Interlock 2 Return	

Connector Strip J7 Terminals		
Pin #	Name	Description
1	Spare 2 Relay N.O.	Connection to an auxiliary device enable/disable signal, such as: - System Pump - Summer Pump - Pump 2 - Louver - Louver 2 - Damper - Other To assign/program its function, go to the Controller's Main Menu → Advanced Setup → Ancillary Devices → Relays, then set the Relay to Spare 2 Relay and the Name to one of the above devices.
2	Spare 2 Relay Com	
3	DHW Pump Relay N.O.	Connection to a DHW Pump enable/disable signal.
4	DHW Pump Relay Com	

SECTION 10: STARTUP, STATUS, FAULT Messages

Connector Strip J7 Terminals		
Pin #	Name	Description
5	V2/Spare 1 Relay N.O.	Connection to an auxiliary device enable/disable signal, such as: - Swing Valve 2 - System Pump - Summer Pump - Pump 2 - Louver - Louver 2 - Damper - Other To assign/program its function, go to the Controller's Main Menu → Advanced Setup → Ancillary Devices → Relays , then set the Relay to V2/Spare 1 Relay and the Name to one of the above devices.
6	V2/Spare 1 Relay Com	
7	Reserve Relay N.O.	Connection to a reserve/backup water heater enable/disable signal.
8	Reserve Relay Com	
9	Swing Valve 1 Relay N.O.	Connection to a Swing Valve 1 enable/disable signal.
10	Swing Valve Relay Com	
11	Fault Relay N.O.	Connection to a Fault/Remote Alarm enable/disable signal.
12	Fault Relay Com	
13	Aux Relay N.O.	Connection to an auxiliary device enable/disable signal.
14	Aux Relay Com	

Connector Strip J14 Terminals		
Pin #	Name	Description
1	BAS RS485 +	Connection to the building automation system (BAS) network (Modbus RTU, BACnet MSTP). For IP network, use the Ethernet port.
2	BAS RS485 -	
3	RS485 Local +	Reserved for internal use only
4	RS485 Ground	
5	RS485 Local -	

Appendix B: Edge [ii] Controller Firmware Update

1. Introduction

There are two options for obtaining a new Controller firmware version from AERCO; both require the firmware to first be downloaded to a USB device:

IMPORTANT!

- The Edge Controller cannot read encrypted USB devices. All instructions below must be performed using un-encrypted USB devices.
- These instructions must be carried out on a computer that can write to un-encrypted USB devices.

Option 1: Download it to an external computer and save it on a USB device – See Section 3.

Option 2: Download it via an Ethernet cable directly to a USB device plugged into the side of Controller – See Section 4.

Once the firmware is on the USB device, that device is then plugged into the side of the Controller and the Controller then performs the update.

2. Preparing for Firmware Update

Complete the following steps to save the current setup, which includes the current state of all settings/parameters. The setup will be restored *only if necessary*, as described in Section 6.

1. Remove the unit's front panel, to expose the USB port on the Controller's left side.
2. On the Controller go to **Main Menu → Advanced Setup → Unit → Settings Transfer**.

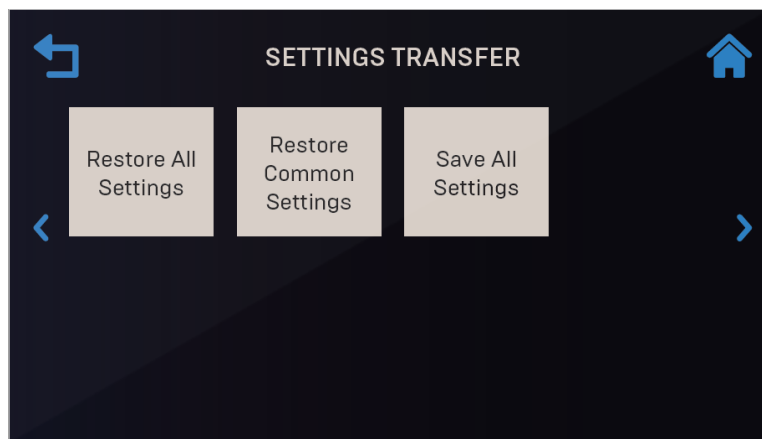


Figure B-1: Unit: Settings Transfer Screen

3. Choose **Save All Settings**; the Save Destination screen appears.

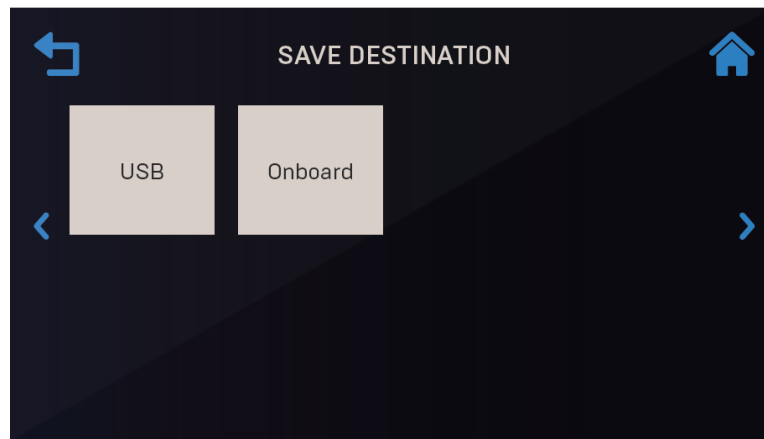


Figure B-2: Unit: Save Source Selection

1. Chose where you want to save the current setup:
 - **Onboard:** Saves the current setup file to the Controller's onboard memory.
 - **USB:** This is available if an un-encrypted USB device is plugged into the Controller's USB port; if no USB device is plugged in, it is greyed-out, as shown above.

NOTE: Each unit produces a setup file with a name unique to that unit that never changes. If that setup file has already been saved to the Controller's memory or a USB device, **this step will overwrite that file.** However, a USB device can hold multiple setup files for multiple units.

2. If the setup was successfully saved, the **Save Succeeded** screen appears; press **Continue** to proceed. If it failed, a **Save Unsuccessful** screen appears.

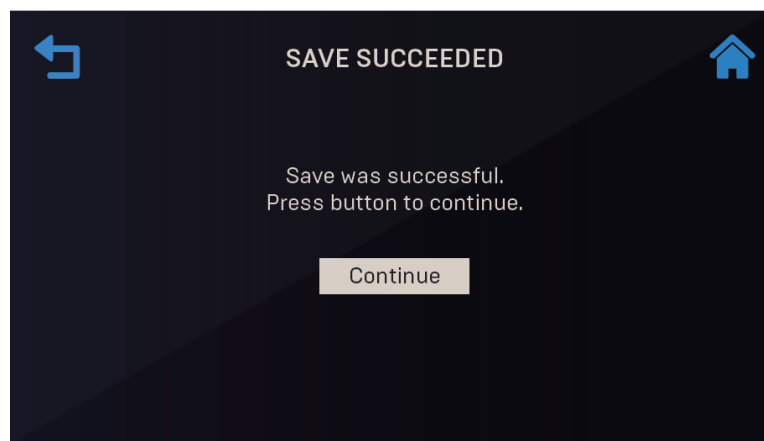


Figure B-3: Save Succeeded Screen

3. Before initiating the update, write down the following important settings on a piece of paper or take a screenshot. You will do a spot check of these values after the update.
 - a. **Serial Number and Unit Type** in **Advanced Setup → Unit → Unit Settings**.
 - b. **Combustion Calibration Summary** in **Calibration → Combustion Summary**.
 - c. **Application Setup** in **Main Menu → EZ Setup**. See summary, then abort.

SECTION 10: STARTUP, STATUS, FAULT Messages

The Controller is now ready for the firmware update. Complete the instructions in *one* of the next two sections below, depending on how the firmware will be downloaded:

- If the water heater connects directly to the Internet via an Ethernet cable or Wi-Fi , complete Section 4.
- If the water heater does **not** connect directly, complete Section 3.

3. Download to an External Computer

If the unit does **not** have a direct connection to the Internet via Ethernet cable or Wi-Fi, a AERCO technician must download the firmware to an **un-encrypted** USB device on an external computer. If you are **not** a AERCO technician, contact your local AERCO sales representative and request a copy of the latest Edge [ii] Controller firmware.

IMPORTANT!

All instructions below must be carried out on a computer that can write to un-encrypted USB devices and must be performed using an un-encrypted USB device. Note, not all USB devices will work; they must be FAT32, and generally 32 GB or less (available from PVI).

If you are a AERCO technician, complete the following to obtain the latest Edge firmware.

1. Plug the USB device into an external PC that can write to un-encrypted USB devices.
2. Go to the following URL: <https://training.watts.com/login/index.php>.
3. If you do not already have an account on this site, create one before continuing.
4. Scroll down the left navigation pane and open the **Edge Firmware** folder.
5. Copy the Edge [ii] Controller firmware file(s) (see Section 1 for the naming convention) to the **root directory** of your USB device, not a sub-folder. If the folder contains updated **Graphics**, **I/O Board** and/or **Display** files, copy all these files to the root directory without changing their names (unless instructed to do so).
6. You are now ready to update the Controller. Skip to *Section 5*. If needed, refer to the release notes for a running revision history.

4. Download Directly to the Controller

This option requires an **un-encrypted** USB device and an Ethernet cable. Once the new firmware is copied to the USB device, it will be loaded into the Controller in Section 5.

1. Remove the unit's front panel, to expose the USB port on the Controller's left side.
2. Insert an **un-encrypted** USB device in the USB port.
3. Plug an active Ethernet cable in the Ethernet port.

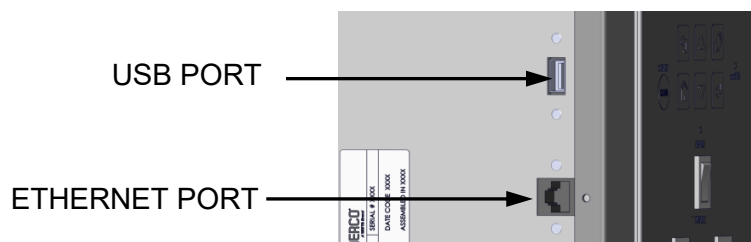


Figure B-4: USB Port Location

4. Set the **Enable/Disable** switch on the Controller's front face to the **Disable** position.
5. Go to: **Main Menu → Advanced Setup → Access** and enter your password.
6. Go to: **Main Menu → Advanced Setup → Unit → Firmware Update**.
7. Press the **Download Latest Version** button. The firmware is copied from the Internet directly to the USB device installed in Step 2. This may take a minute or more. With the Intelligent BootLoader installed, this step also downloads updated graphics and/or I/O Board files, plus additional files, if there are any.
8. Progress is displayed as the files are downloaded. Once completed, the screen displays **Downloads Complete**. If an error message is displayed, repeat the previous step, or complete the instructions in the previous section to download the file(s) to a USB device plugged into an external computer.



Figure B-5: Firmware Update Screen

NOTE: The download only needs to be performed once on a single USB device. That device can then be used to update all water heaters.

5. Updating the Controller's Firmware

Complete the instructions below to update the firmware from the USB device used above.

1. Verify the USB device containing the firmware is plugged into the Controller's USB port.
2. Verify that the **Enable/Disable** switch on the Controller's front face is set to **Disable**.
3. Go to: **Main Menu → Advanced Setup → Unit → Firmware Update** (enter your password if prompted; this screen requires a password). Note, the controls are disabled (greyed out) until the USB device is installed **and** the **Enable/Disable** switch is in the **Disable** position.
4. Press the **Update Main Control** button (see Figure B-5, above).
5. When done, the **Update Finished** screen appears displaying the new version number and the current date. **Do *not* remove the USB device until this screen appears.** Verify that the expected version and date is displayed. If so, press **OK** to continue.



Figure B-6: Update Finished Screen

6. If there are updated **Graphics**, **I/O Board** or **Display** files, the associated button(s) will be colored red (update required) or yellow (update recommended). Press all red and yellow buttons to update; if you press more than one button, the Controller automatically starts the next update when the previous update completes. During each update, the associated button is greyed out. Do not remove the USB device until **Update Finished** appears.



Figure B-7: Graphics Processing Screen

7. To ensure the firmware update was successful, you must now turn the water heater's power **OFF** and then back **ON**. Continue with the next step after restarting the water heater.
8. Once the Controller restarts, set the **Enable/Disable** switch back to **Enable** and remove the USB device. If there was a problem with the update, see Section 7.
9. Spot-check that the values recorded at the end of Section 2 are still in effect. This step should be performed whether or not the firmware update was successful.
 - a. **Serial Number** and **Unit Type** in **Advanced Setup** → **Unit** → **Unit Settings**.
 - b. **Combustion Calibration Summary** in **Calibration** → **Combustion Summary**.
 - c. **Application Setup**, in **EZ Setup**. See summary in first screen, then abort.
10. If the spot-check is successful, the process is complete. But if any of the settings changed, or you suspect the setup was corrupted, complete the instructions in Section 6.

6. Restore Settings After Firmware Update

If the spot check in the previous section failed, you should restore the setup and its parameters to their original state prior to the update.

1. Go to: **Main Menu → Advanced Setup → Unit → Settings Transfer.**

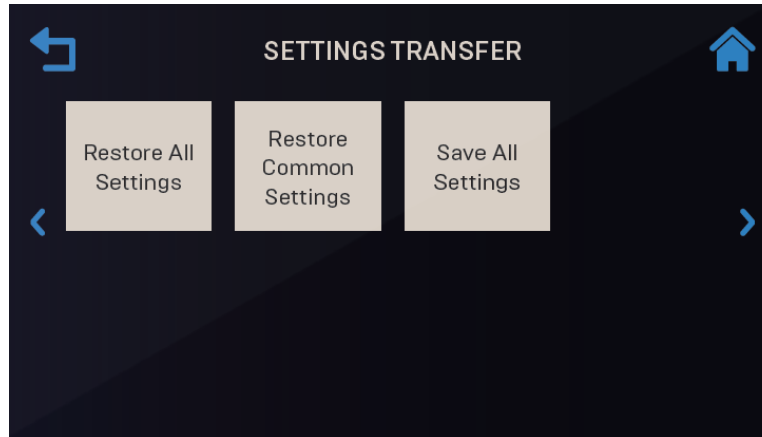


Figure B-8: Settings Transfer Screen

2. Choose **Restore All Settings**; the Restore Source screen appears.

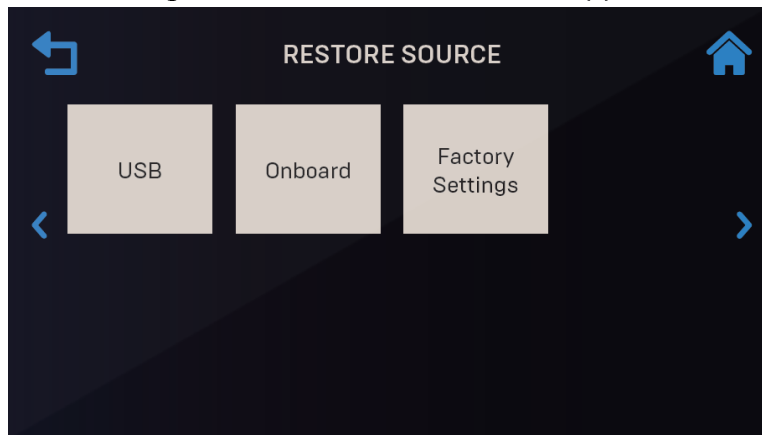


Figure B-9: Restore Source Screens

3. Choose where you saved the setup in Section 3, then press either:
 - **USB** if the same USB device is still plugged in.
 - **Onboard** If the setup was saved to the Controller's onboard memory.
4. The **Overwrite Calibration** screen now appears. Press **Yes** to overwrite the existing combustion calibration values or press **No** to retain the existing values.

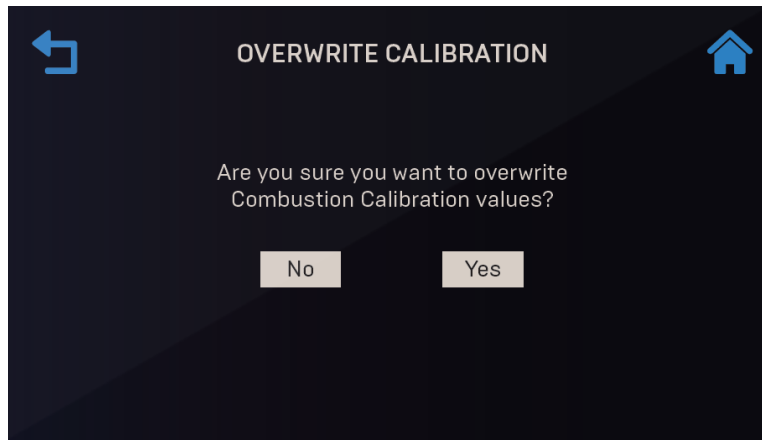


Figure B-10: Load Settings Screen

5. The saved setup is restored to the unit. The **Restore Succeeded** screen appears if the transfer completed successfully, and the unit then reboots in about 5 seconds. If there was a problem, the **Restore Failed** screen appears.

7. Troubleshooting

The Update buttons are grayed-out: The USB device is not recognized.

- The USB device is not inserted correctly. Remove and reinsert it.
- The USB device is not the correct type. Obtain the correct one.
- Update the Bootloader.

The display shows Bootloader File Not Found:

- Verify the correct file is on the disk.
- Verify that the **Product Type** is correct.

The Bootloader starts but does not complete: Check Status in the upper right LED Display.

Code 5 - USB Device Not Found.

- The USB device is not the correct type. Obtain a correct one.
- Update the Bootloader.
- Cycle the power to restore the old program, since it is not yet erased.

Code 21 – File Not Found

- Verify the correct file is on the disk.
- Cycle the power to restore the old program, since it is not yet erased.

Code 22 – The Hex File is corrupted.

- Recopy it to the USB device.
- Cycle the power to restore the old program, since it is not yet erased.

Code 23 - The Hex File is incomplete

- Recopy to the USB device. Ensure it's fully copied. Try "Eject" on the Computer.
- If it was copied via the Edge [ii] Controller, verify that you received the complete file.
- Cycle the power to restore the old program, since it is not yet erased.

Code 24 – 29 Programming Failure

- Programming Failed, Cycle the Power. The Bootloading will restart.

Code 30 - USB Device Removed.

- Do not touch or remove the USB device during programming.
- Cycle the Power. The Bootloading will restart.

Disaster Recovery:

The unit will not run after bootloading. The screen could be off and the displays will be counting.

1. Turn off the power.
2. Remove the top two screws from the Controller.
3. Loosen the bottom two screws.
4. Allow the front panel to tilt out slightly.
5. Ensure a USB device with the correct firmware is inserted in the USB port.
6. On the left side of the Controller there is a small button even with the center of the display. Press and hold this button while turning on the power.
7. The Bootloader will automatically restart.

