

Boiler, Volume Water Heater, Low-Temp Heater, with Touchscreen Start Up Guide

Sizes 500 - 2000



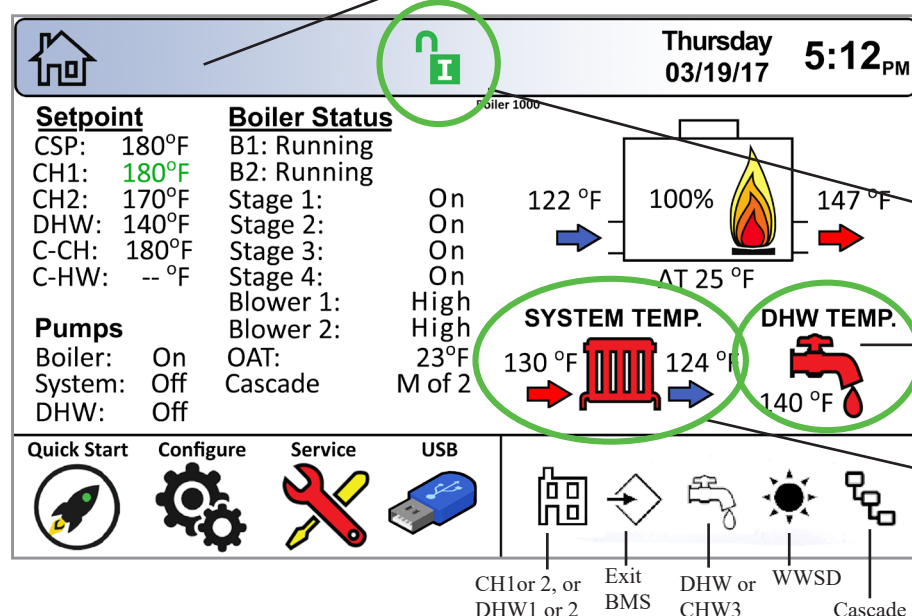
This Start Up Guide is intended to be supplemental to this product's 'Installation and Operating Manual' which is also included with the product, or can be found online.

H2392000-

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1. The Home Screen



The Navigation Bar is at the top left of every screen. As you go further in, more icons will appear. If you want to go back to a higher screen, simply touch that icon. Or the 'Back Button' which will move back one screen at a time.

To enter the installer password, simply touch the pad lock icon, type 17 and hit Enter.

DHW Sensor is present.

System Temp sensors are present. Supply (red), Return (blue)

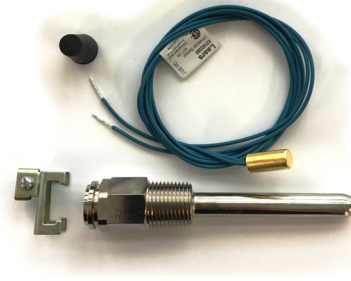
1.A Home Screen Active Icons Icons will appear, if they are available.

Name	Icon	Description
Security		Displays the current lock status. Touch the lock icon to lock or unlock the Touchscreen Display.
Quick Start		Provides quick touch access to the most commonly used parameters for easy installation.
Configure		Will take you to ALL of your configurations and parameters for a detailed setup of the unit. This is the largest group of menu screens.
Service		Allows the service technician to access the basic diagnostic and troubleshooting information.
Messages		Will show an 'Exclamation' when there is a message. Clicking onto the Message icon will take you to the message itself. The USB functionality will show the USB Icon at this location, if being used.
Active Demands		Will show icons that indicate the active parameters that are currently in demand.
Navigation Bar		The Navigation Bar is the constant indicator of where you are as you navigate into and out of the touchscreens. ERROR Codes also show in the Navigation Bar when there is one of several unit errors or shut-downs that have occurred.
Date & Time	Thursday 03/19/17 5:12 PM	For Display Only. To change date and time, go to the Configuration menu.

2. Boiler and Water Heater Sensor Locations

The install kit provides you with three identical sensors. These can be used in the System Return, System Supply and/or the Domestic Hot Water Sensor locations as well as a Boiler Inlet Sensor replacement.

One well is provided but the sensors are capable of surface mounting depending on application and desired sensitivity.

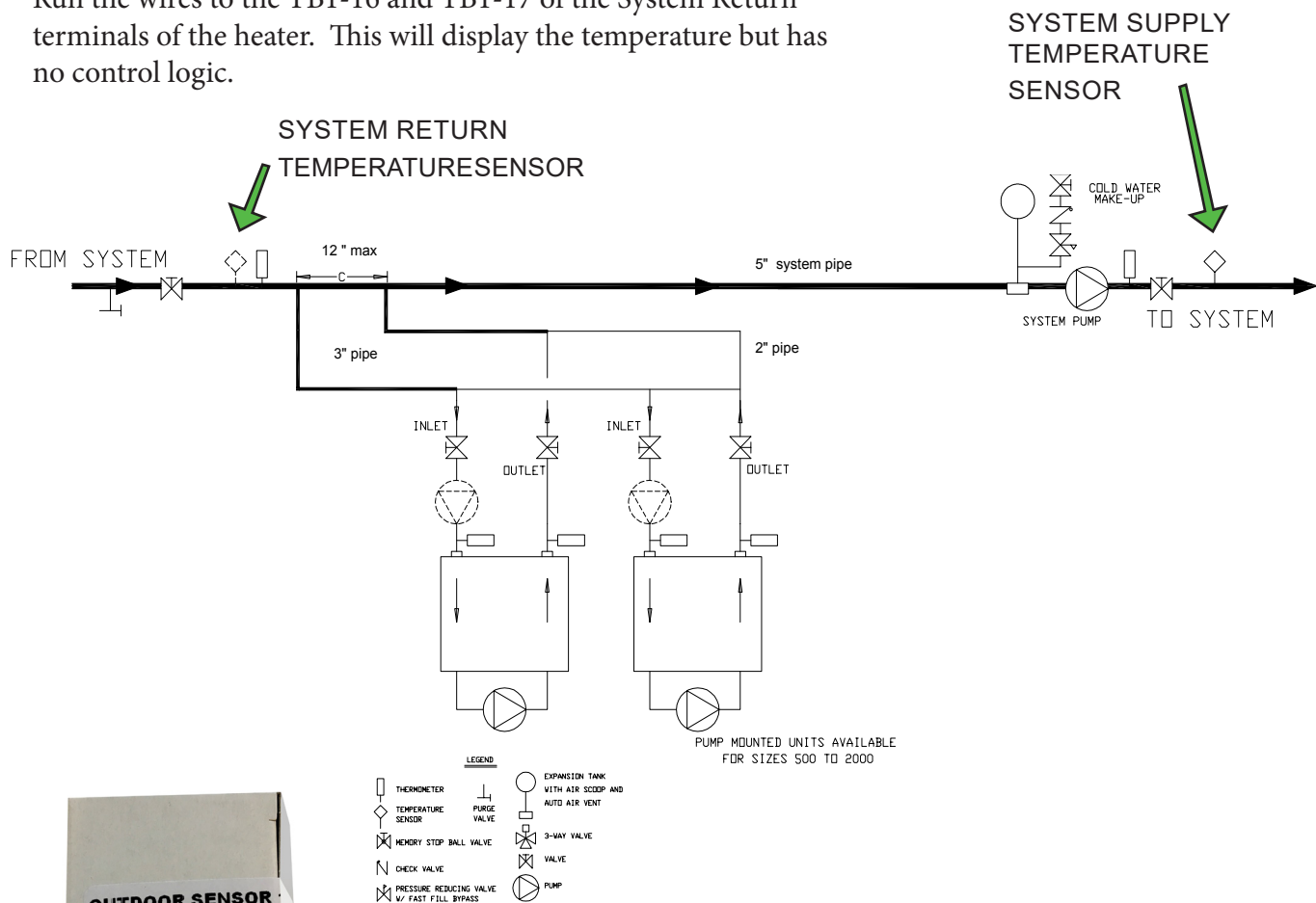


For Boiler: Install the System Supply Sensor into the common system loop after the outlet tee from the heater. This is the target sensor when installed.

Run wires back to the heater terminal block located on the right side of the boiler. Using the provided insertion tool install the wires into TB1-14 and TB1-15.

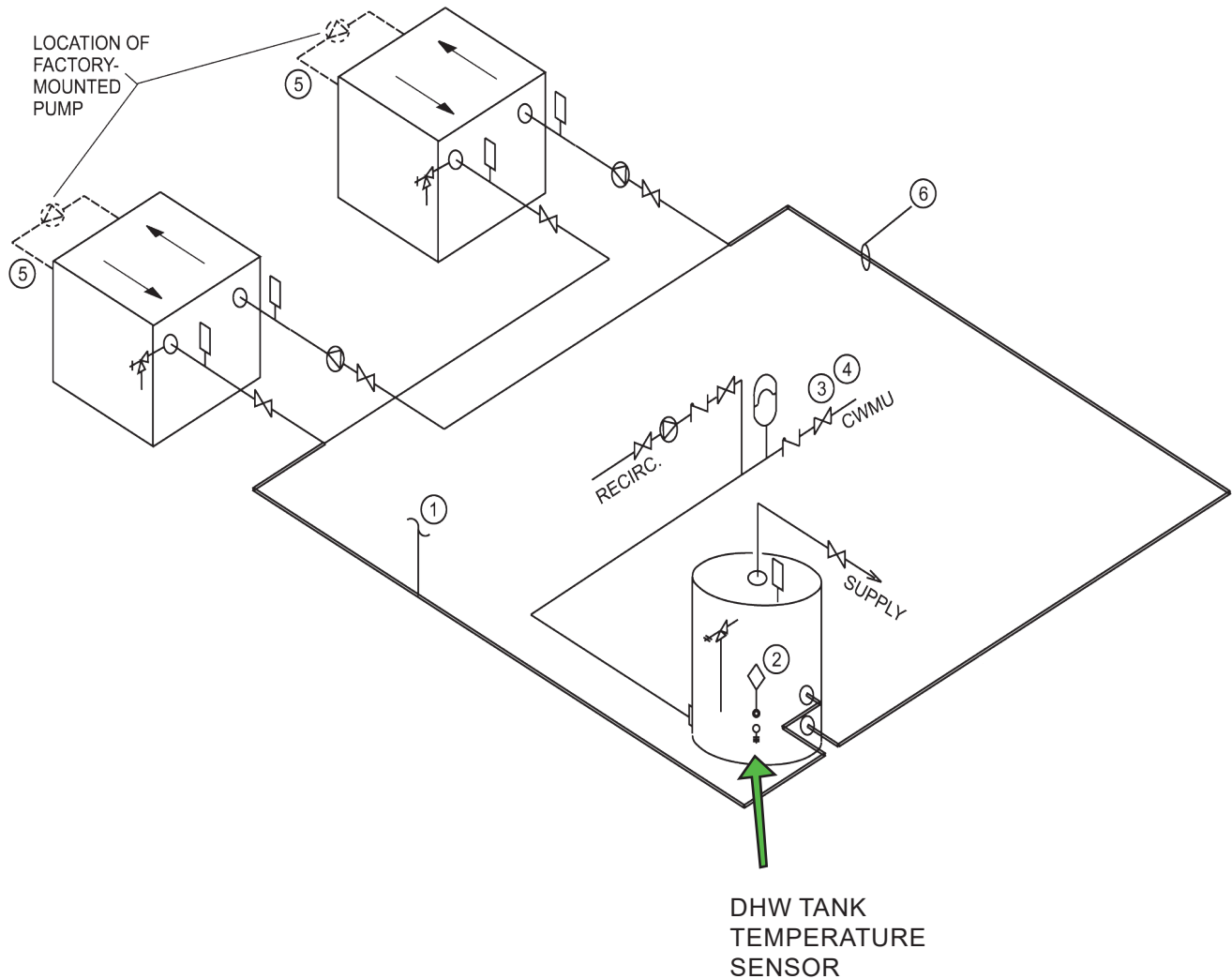
Install the System Return Sensor into the common system loop prior to the inlet tee to the heater.

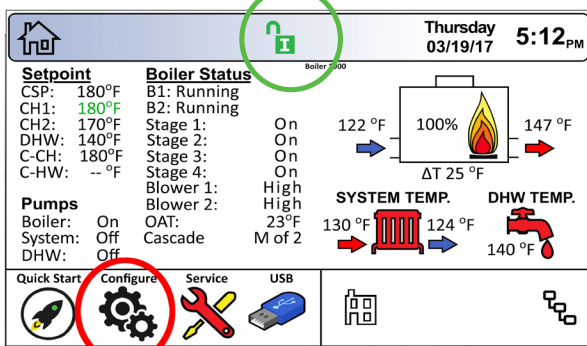
Run the wires to the TB1-16 and TB1-17 of the System Return terminals of the heater. This will display the temperature but has no control logic.



Install the Outdoor Sensor preferably on the North wall out of the sun light. Thermostat wire can be used to return the sensor to TB1-20 and 21.

For Water Heater: The DHW Sensor can be used to maintain your tank temperature. Install one of the sensors into the well of your tank and run the wires back to TB1-18 and 19. The faucet icon displays the temperature. DHW icon under the configuration menu lets you set your settings.



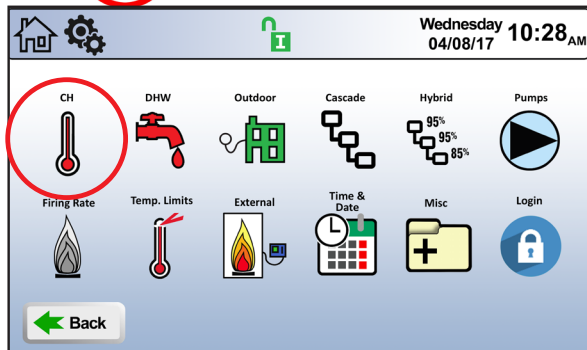


3. Configuration

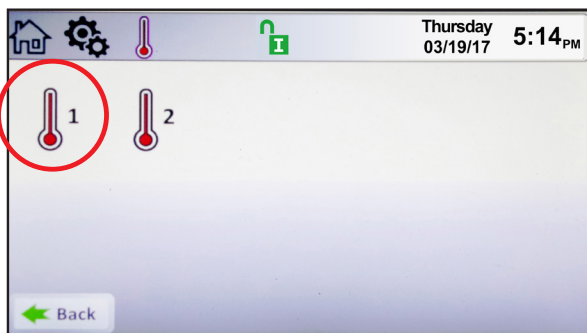


If your screen is locked, touch the lock icon, type in 17, touch Enter.

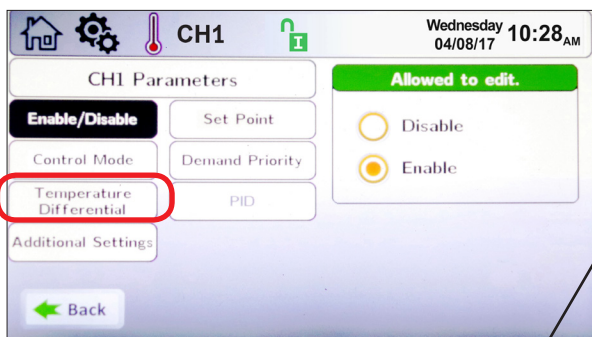
STEP 1. Touch the Configure Icon.



STEP 2. Touch the CH Function Icon.



STEP 3. Touch the CH1 Function Icon.



STEP 4. Select a parameter.

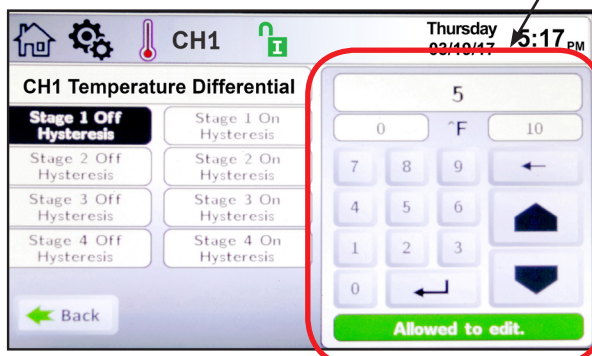
Example: Temperature Differential
(not available on Low-Temp models).

STEP 5. Select the item that you want to adjust.

Example: Stage 1 Off Hysteresis

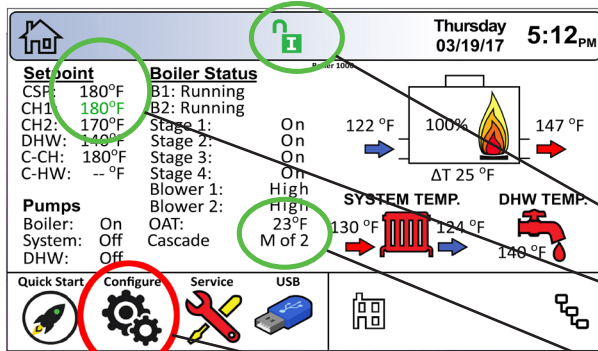
NOTE: *Hysteresis IS the differential* and each stage adds to the total differential. Meaning 3 stages with 5 degree on and 5 degrees off differentials will give a 30 degree total differential for all stages on, to all stages off.

A 150 degree setpoint with a 5 degree OFF hysteresis (differential) means the boiler will turn OFF at 155 degrees. A 150 degree setpoint with a 5 degree ON hysteresis (differential) means the boiler will re-fire at 145 degrees.



Make adjustments with the Up and Down arrows or Backspace. Hit enter to save the changes.

After setting each parameter to desired settings, use the Nav Bar or the Back Button to go back to previous screens and set other parameters.



3.A Outdoor Reset



NOTE: Outdoor Reset is applicable to hydronic units only, and since this functionality is not mandatory, it can be enabled/disabled on the outdoor reset configuration screen.

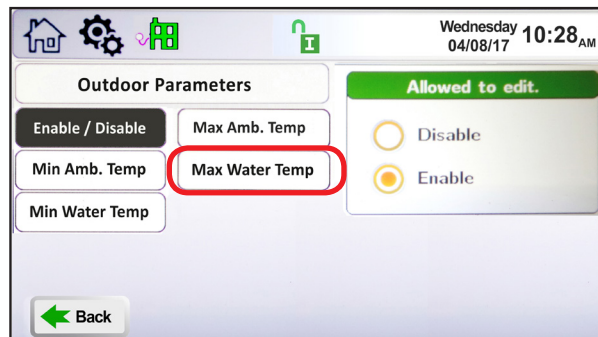
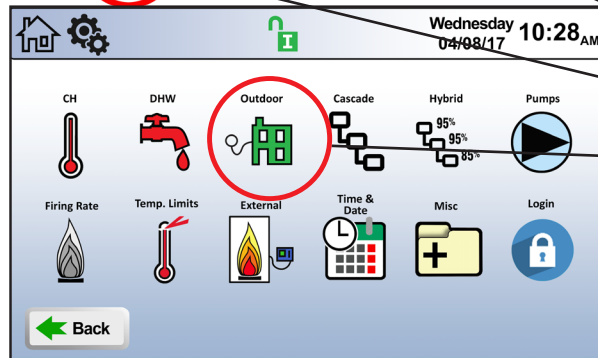
Ensure that the pad lock (log in) is set to Installer Mode.

When there is an active outdoor reset condition, the control set point (CSP) will vary from the programmed set point.

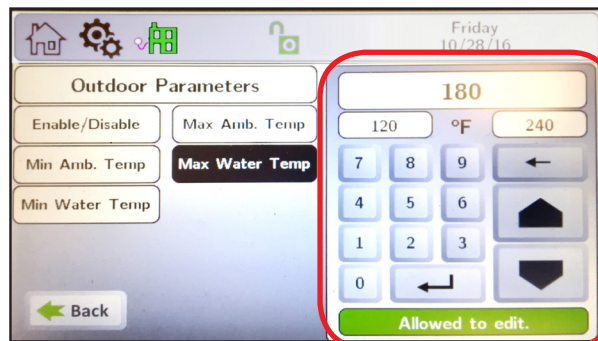
Outdoor Ambient Temperature (OAT)

STEP 1. Touch the Configure Icon.

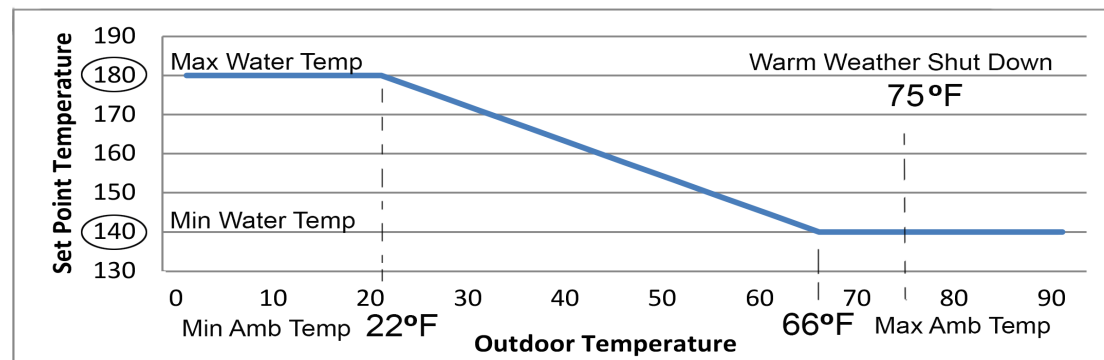
STEP 2. Touch the outdoor reset icon.



STEP 3. Select a parameter you wish to adjust.

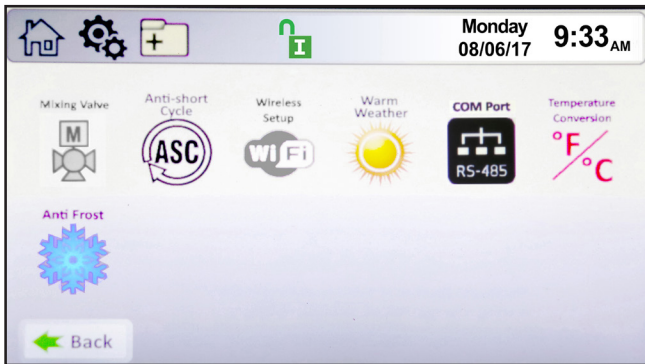


STEP 4. Make adjustments with the Up and Down arrows or Backspace. Hit enter to save the changes.



Outdoor Reset Curve.

3.B Miscellaneous Features



Miscellaneous Features Screen

The Miscellaneous Features screen provides navigation for the following items:

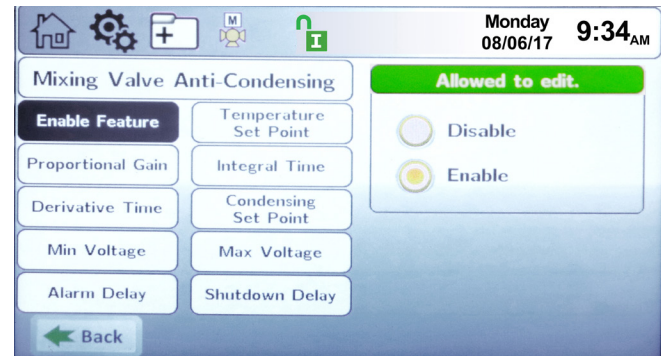
- **Mixing Valve *** – This feature applies to Low-Temp Models and Pool Heaters.
- **Anti-short Cycle** – This icon navigates to the Anti-short Cycle Configuration Screen.
- **Wireless Setup *** – This icon navigates to the Wireless Setup Screen, not available at this time.
- **Warm Weather** – This icon navigates to the Warm Weather Configuration Screen.
- **COM Port *** – This Icon navigates to a selection menu for either Modbus or BACnet MSTP protocols.
- **Temperature Conversion** – This icon navigates to the Temperature Conversion Configuration Screen.
- **Anti-Frost** – This icon navigates to the Anti-Frost Configuration Screen.

*See Installation Manual for more information.

3.B.1 The Mixing Valve



To navigate to the Mixing Valve Anti-Condensing Screen, touch the Configure Screen, then touch the Mixing Valve Icon on the Miscellaneous Features screen.



Mixing Valve Anti-Condensing Screen

The Mixing Valve Configuration Screen allows adjustment of the following parameters:

- **Enable Feature** – This allows the mixing valve to be enabled or disabled.
- **Temperature Set Point** – The mixing valve will maintain this temperature at the inlet to the boiler/heater.
- **Proportional Gain** – This value is the corrective action that is proportional to the error (set point – control temperature).
- **Integral Time** – This value is applied to the sum of the error over a period of time.
- **Derivative Time** – The value is applied to the rate of change of the error.
- **Condensing Set Point** – The condensing alarm and shutdown are based on this set point.
- **Min Voltage** – The minimum voltage the controller will send the mixing valve.
- **Max Voltage** – The maximum voltage the controller will send the mixing valve.
- **Alarm Delay** – If the boiler/heater inlet temperature is below Condensing Set Point for the duration of the Alarm Delay time, the controller will announce a condensing alarm.
- **Shutdown Delay** – If the boiler/heater inlet temperature is below the Condensing Set Point for the duration of the Shutdown Delay time, the boiler/heater will shut down and announce a condensing shutdown condition.

NOTE: Mixing Valve Max Voltage increases the internal temperature of the heat exchanger. Recommended high of 7500mV to avoid high limit tripping.

3.B.2 Warm Weather

Warm Weather Shutdown (WWSD) is applicable to hydronic units only, and since it is not mandatory, it can be enabled/disabled on the WWSD configuration screen.

WWSD - Shutdown Immediately

When the outdoor temperature, measured by the outdoor sensor, exceeds the WWSD set point, one of the following two conditions will occur. If the unit is idle, upon a call for heat, the unit will not turn on to satisfy a heat demand. If the unit is running to satisfy a call for heat, the unit will immediately shutdown. In either case, the WWSD icon will appear on the home screen.

WWSD – Shutdown After Demand is Satisfied

When the outdoor temperature, measured by the outdoor sensor, exceeds the WWSD set point, one of the following two conditions will occur. If the unit is idle, upon a call for heat, the unit will not turn on to satisfy a heat demand, and the WWSD icon will be shown on the home screen. If the unit is running to satisfy a call for heat, the unit will satisfy the heat demand and then the WWSD shutdown icon will appear. As long as the unit is in a WWSD condition, no additional heat demands will be satisfied.

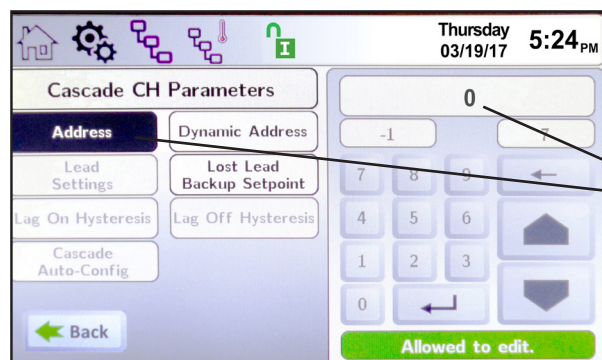
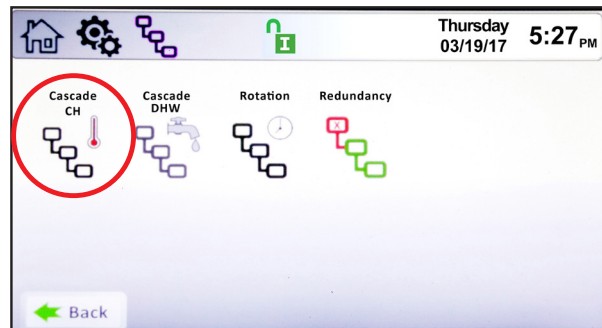
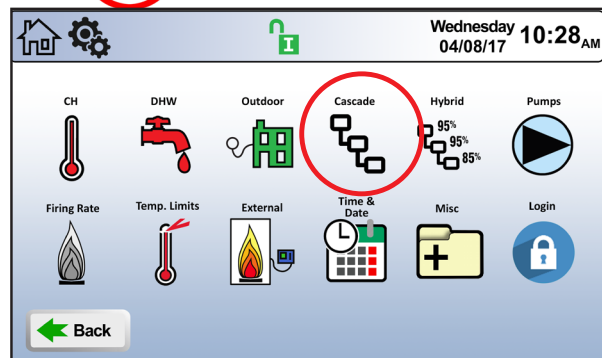
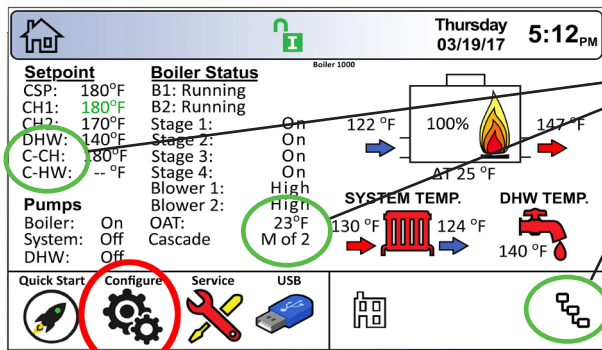
Warm Weather Shut Down – Disabled (default)

When the outdoor temperature, measured by the outdoor sensor, exceeds the WWSD set point, nothing occurs.

The Warm Weather Configuration Screen allows adjustment of the following parameters:

- **Temp Min** – Upon an active warm weather shutdown condition, this is the temperature at which the Unit will reset the shutdown condition to satisfy a heat demand.
- **Temp Max** – This is the temperature at which the warm weather shutdown condition will occur.
- **Feature Options** – This parameter provides the ability to either disable warm weather shutdown or upon a warm weather condition, configure the Unit to shut down immediately or to shut down after the current heat demand is satisfied.
- **Summer Kick CH** – This is the amount of time the boiler pump is energized if it hasn't cycled for an extended period of time.
- **Summer Kick DHW** – This is the amount of time the DHW pump is energized if it hasn't cycled for an extended period of time.
- **Summer Kick SYS** – This is the amount of time the SYS pump is energized if it hasn't cycled for an extended period of time.
- **Summer Kick Period** – The duration of time between heat demands that the boiler will wait before exercising the boiler, DHW, and system pumps.

Warm Weather Configuration Screen



3.C Cascade

Indicates cascade

An installation with two or more units may be configured for cascade operations. A maximum of 8 units can be configured in a cascade installation. One unit will be configured as the lead unit, with the remaining units configured as lag units. Refer to the Installation Manual for details on wiring for cascade communication between the lead and lag units.

The Cascade Screen provides four navigation icons to configure the system for cascade operations. These navigation icons are:

- **Cascade CH** – This icon navigates to the setup screen for hydronic cascade operations. This icon is available on hydronic units only (boilers).
- **Cascade DHW** – This icon navigates to the setup screen for volume water cascade operations. This icon is available on volume water units only (water heaters).
- **Rotation** – This icon navigates to the cascade rotation screen.
- **Redundancy** – This icon navigates to the setup screen for cascade Leader redundancy functionality.

To configure a unit as the lead unit, select Address and set the address to “0”. The unit is now configured as the lead boiler/heater. Setting the address to a “-1” takes the unit out of cascade mode.

Once configured as the lead unit, the “Lead Settings” button becomes selectable. Touching this button navigates to the “Lead Settings” screen.

To complete a cascade setup with lag units, touch Cascade Auto Config and press OK. The lead boiler will find and address the lag boilers through their dynamic address.

Lead Unit Needs:

- OAT Sensor (if the cascaded system is to have outdoor reset)
- System Sensor
- Heat Demand (at least one of the following)
 - CH1
 - DHW1
 - 0-10VDC
 - RS485 BMS
- System Pump (depending on design)

The Lead Settings Screen allows adjustment of the following parameters:

- **Set Point** – This parameter is the system supply temperature the cascade heat demand is trying to satisfy.
- **Proportional Gain** – This value is the corrective action that is proportional to the error (set point – control temperature). Increasing this parameter increases the response to the error.
- **Integral Time** – This value is applied to the sum of the error over a period of time. Adding the integral term can help to achieve the set point.
- **Derivative Time** – This value is applied to the rate of change of the error. Adding the derivative term can help with sudden changes in temperature, and may help prevent overshooting.
- **Demand Priority** – This parameter sets the heat demand priority in relation to other heat demands. The higher the number, the higher the priority it is assigned.
- **Off Hysteresis** – The temperature above the set point (Set Point + Off Hysteresis) at which the controller will turn off all stages.
- **On Hysteresis** – The temperature below the set point (Set Point – On Hysteresis) at which the controller begins to turn on stages.
- **Max Lag Temp** – The maximum outlet temperature the cascaded boilers/heaters are allowed to supply the system at their individual boiler/heater outlet water sensor.
- **Lead Settings** – This button is only selectable when configured as the lead boiler/heater. When configured as the lead boiler/heater, touching this button navigates to the Lead boiler/heater settings.
- **Lost Lead Backup Set Point** – This is used for cascade redundancy, see Section 6 of your Install & Operating Manual. When configured for Cascade Redundancy - Boiler Internal Set Point, this parameter is the maximum outlet temperature the local boiler/heater is allowed to supply the system.
- **Cascade Auto-Config** – This is only adjustable at the lead boiler/heater. Once configured as the lead boiler/heater, pressing this button will initiate the lead boiler/heater to find and address all lag boilers automatically.

NOTE: All boilers/heaters must be wired for cascade operations prior to performing Cascade Auto-Config.

• **Cascade Release Demand** - When communications with the master is lost and the lag units continue to satisfy the cascade heat demand, pressing this button will remove the heat demand.

NOTE: This only applies when configured for cascade redundancy - Boiler Internal Set Point Control.

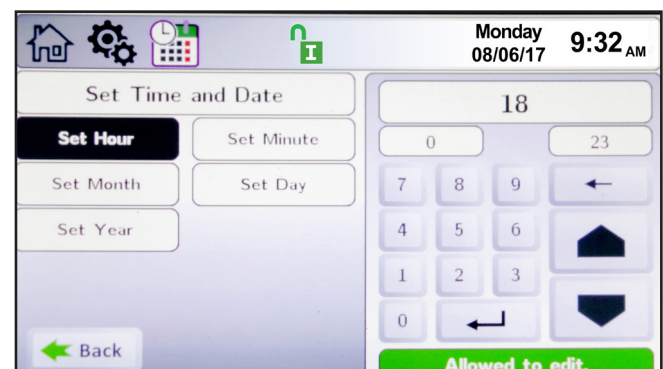
Once configured as a lag unit, the “Lag On Hysteresis” and “Lag Off Hysteresis” buttons are selectable. These parameters have the following functionality:

- **Lag On Hysteresis** – the value below the “Max Lag Temp” (Max Lag Temp – Lag On Hysteresis) that the boiler/heater will turn on to satisfy an active cascade demand, based on its local outlet water sensor.
- **Lag Off Hysteresis** – the value above the “Max Lag Temp” (Max Lag Temp + Lag Off Hysteresis) that the boiler/heater will turn off when satisfying an active cascade demand, based on its local outlet water sensor.

3.D Setting the Time and Date



To navigate to the Time & Date Configuration Screen, touch the Time & Date Icon on the Configure Screen.

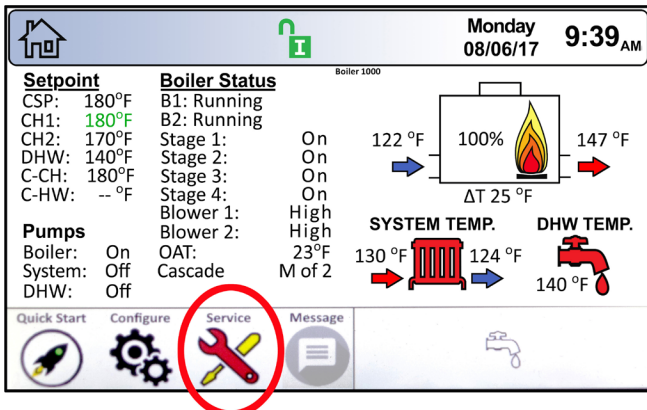


Time & Date Configuration Screen

NOTE: The Time is set in a 24 hour parameter, but displays only as a 12 hour clock with the AM/PM automatically added.

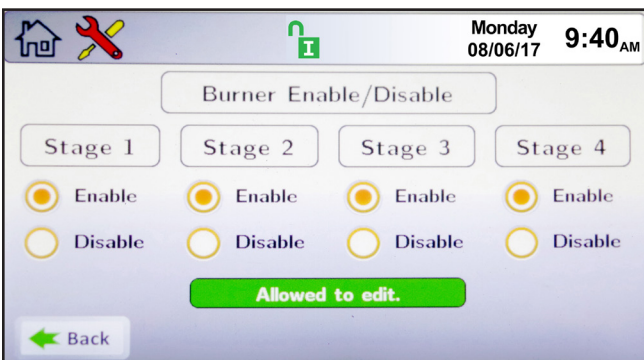
4. Service Screens

To navigate to the Service Screen, touch the Service Icon in the lower left-hand portion of the Home Screen.



Home Screen

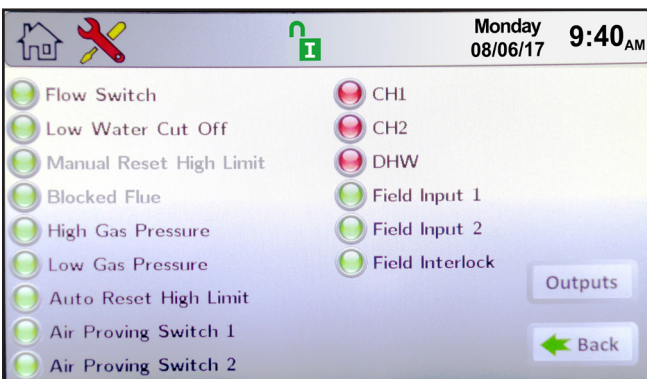
4.A Burner



The Burner Screen

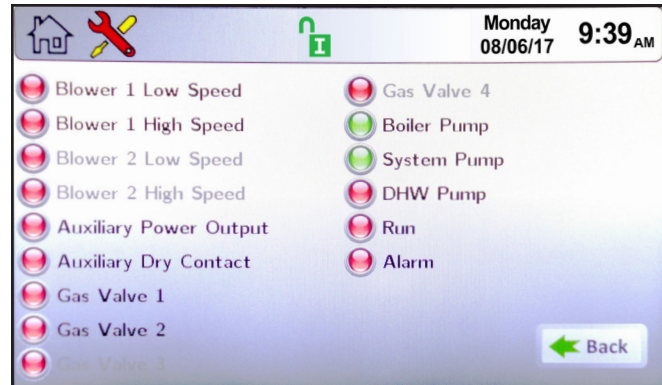
Control will only allow safe conditions for disabled stages.

4.B Digital I/O (Input / Output)



Digital I/O Screen - Inputs

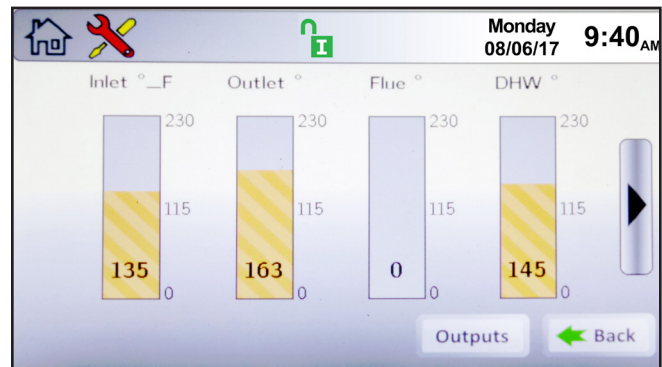
Green indicates closed switch.



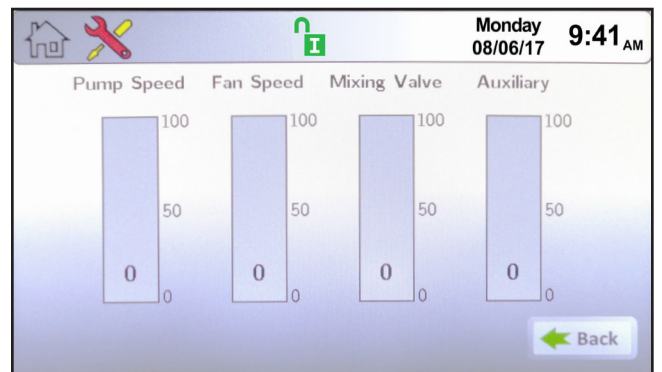
Digital I/O Screen - Outputs

Green indicates active devices.

4.C Analog I/O



Analog I/O Screen - Inputs



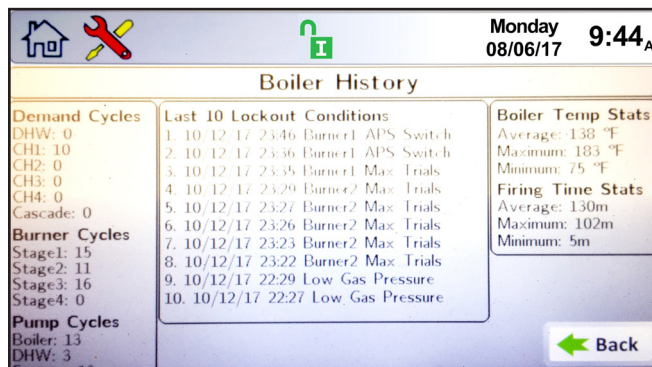
Analog I/O Screen - Outputs

4.D Screen Settings



Screen Settings Screen

4.E History

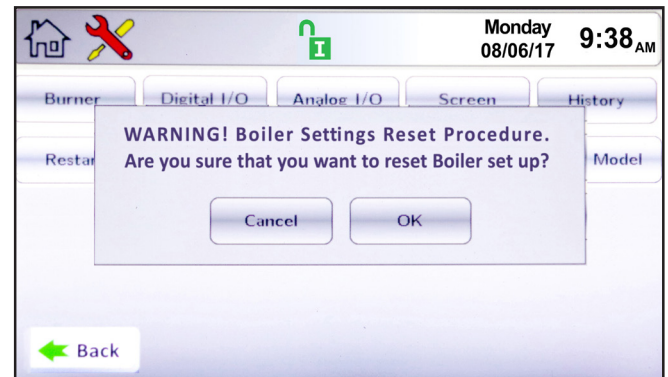


History Screen

4.F Restart

To recalibrate the touch screen. After pressing the Restart Button, promptly touch the touch screen and follow the calibration procedure as shown on the touch screen.

4.G Factory Reset



Factory Reset Screen

Touching the Factory Reset Button on the Service Screen resets all touch screen adjustable parameters back to the factory default setting.

5. Combustion Setup

Setting up your boiler or water heater for maximum combustion efficiency

Required tools: Manometer, Amp Tester, Allen Wrench Set, Combustion Analyzer.

1. Log in at the touchscreen as an installer.

WARNING

Improper adjustment may lead to poor combustion quality, increasing the amount of carbon monoxide produced. Excess carbon monoxide levels may lead to personal injury or death.

2. Disable Warm Weather Shut Down and Outdoor Reset if your unit is equipped with those options.
3. With a gas manometer, test the supply gas pressure. This unit requires a minimum supply gas pressure of 4" w.c. with a max of 13" wc.



Figure 1. Measure Supply Gas Pressure

		Natural Gas	Propane
Supply Gas Pressure	Typical	7" w.c. (1.7kPa)	11" w.c. (1.7kPa)
	Range	4" w.c. ≤ (supply pressure) ≤ 13" w.c.	
Manifold Gas Pressure		2.5" w.c. (0.62 kPa)	
		8%	9.2%

Table 1. Gas Pressure Range

4. If you have a CSD-1 boiler, reset the 'Low Gas Pressure Switch' by pressing the reset button.
5. Optional. Adjust your 'Stage Delay On Time' to 20 seconds so that this combustion test doesn't pre-heat the building loop.

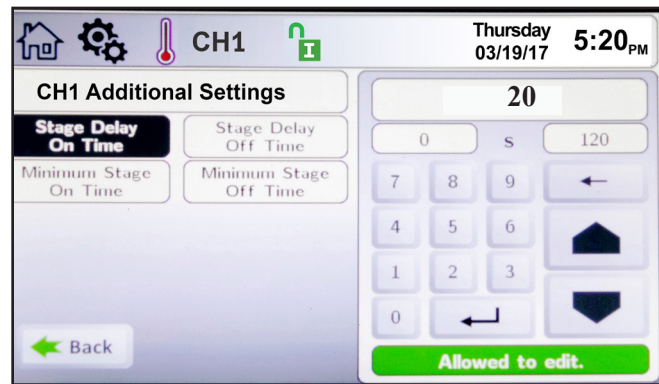


Figure 2. Stage Delay On Time

6. Check Manifold Gas Pressure at each gas valve. To check manifold gas pressure at each valve, the other valves/stages must be shut off/disabled. There are two ways to do this, Manually at the valve, or Electronically at the touchscreen display. If you have a 1 million BTU or larger unit, it is recommended to enable and disable your valves/stages electronically thru the display.

To electronically enable and disable the valves, go to the Service Screen and select 'Burner'.

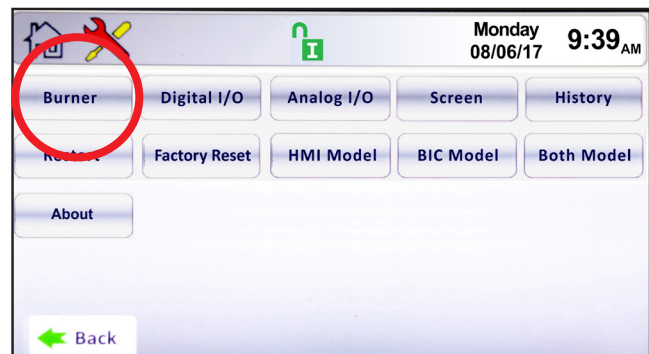


Figure 3. Service Screen

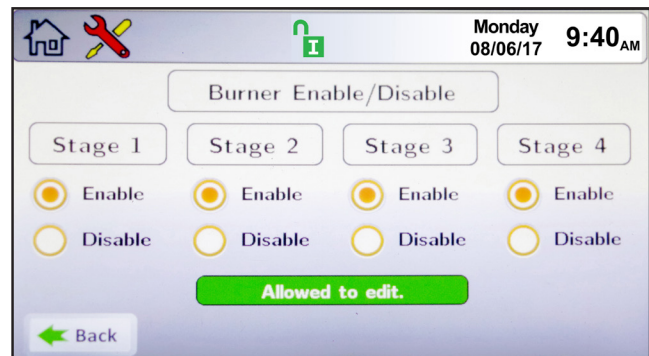


Figure 4. Burner Enable/Disable Screen

At this screen, you will notice that you can enable and disable all of the burner/stages on your unit. If you have a smaller model, you will have fewer burner/stages.

Enable 'Burner Stage 1' and disable the other

Burners. Then measure the manifold gas pressure at the outlet side of valve 1. Remove the metal cap at the location on the valve shown in Figure 5 and adjust the manifold gas pressure using an allen wrench.

Turn the adjustment screw clockwise to increase the gas pressure. Turn the adjustment screw counter clockwise to decrease the pressure. See Table 1 on page 12 for acceptable pressures for both Natural gas and Propane.

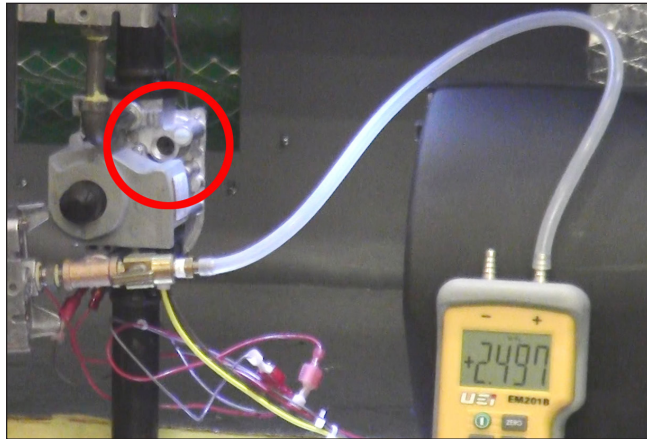


Figure 5. Measure/Adjust Manifold Pressure.

To Manually Enable and Disable each valve, there is a black switch on each valve. With valve 1 on, turn off the other valves, then measure the manifold gas pressure at the outlet side of valve 1. See Table 1 on page 12 for acceptable pressures for both Natural gas and Propane. Remove the metal cap at the location on the valve shown in Figure 5 and adjust the manifold gas pressure using an allen wrench.

Turn the adjustment screw clockwise to increase the gas pressure. Turn the adjustment screw counter clockwise to decrease the pressure. See Table 1 on page 12 for acceptable pressures for both Natural gas and Propane.

Repeat this step for each valve individually. When done, enable all valves.

7.A Optional. Check the amperage at your hot surface ignitor. Locate the hot surface ignitor wires and



Figure 7. Amp Meter looped around an HSI wire.

place your amp meter around one of the wires. . The hot surface ignitor wires pass thru the top of the burner chamber. This can be done quickly while the unit is in 'HSI Warm-up' stage. So move on to the next Step. See

7.B. Give the unit a call for heat, and then while the unit is in HSI Warm-up, read your amp meter. A good ignitor will be using 3.4 and 4.2 amps.

Note: If your hot surface ignitor is not performing properly, you will need to turn off the unit and replace the ignitor before continuing with this combustion test.

8. Close the front panel of the unit. But don't fasten it into place yet.

At this point you have done all the prep work and your stages are coming on and soon your boiler will be firing at 100%. It's time to measure CO₂ and adjust combustion.

9 Place your combustion analyzer into the vent test port. Wait for the CO₂ reading on your analyzer to steady. See Table 1 for acceptable CO₂ readings.

10. Open the front panel and locate the air damper which is next to the combustion fan. The larger units have 2 air dampers as they have two combustion fans. Loosen the two fasteners to the right of the combustion fan, to allow the damper to move a little.

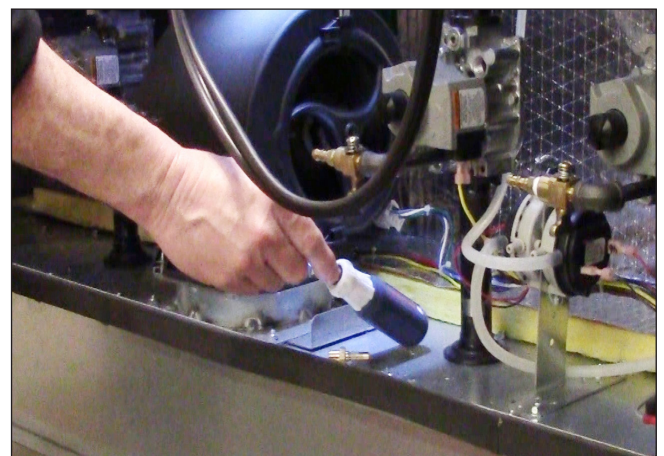


Figure 6. Adjust CO₂ at the air damper

If the CO₂ is too low, reduce the amount of air by closing the air damper. If it is too high, tap the damper open just a little. Slight adjustments are typically all that is needed.

Repeat Steps 8 thru 10 until the CO₂ shown on the combustion analyzer at an acceptable level.

Re-tighten the screws on the damper, when CO₂ is adjusted properly.

Notes:

All Manuals (Install & Operate, Start Up, and Service Manuals) can be downloaded at



www.laars.com

For Product and Service VIDEOS



<https://www.youtube.com/user/LaarsHeating>



H2392000-