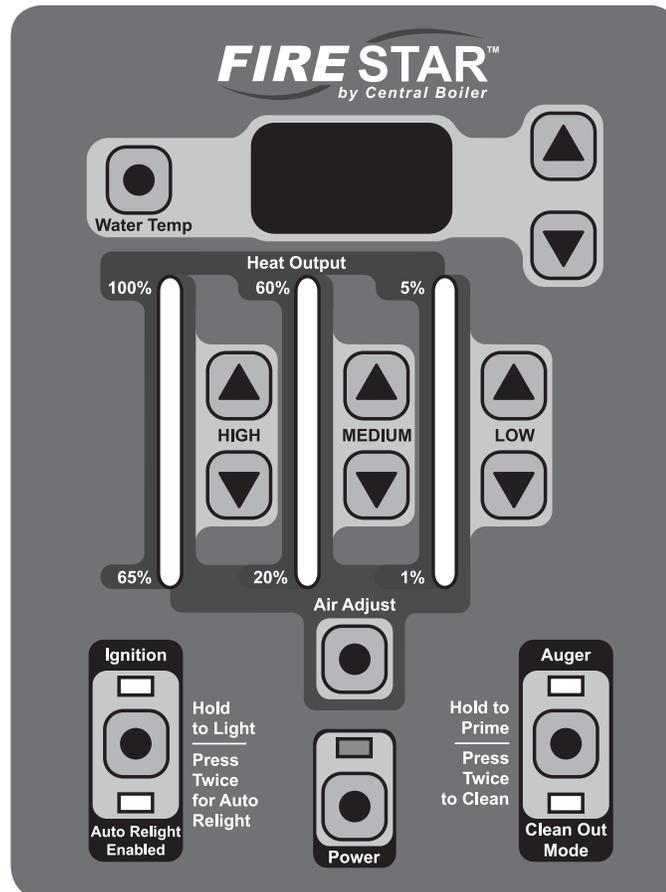


FIRE STAR™

OPERATION MANUAL



SOFTWARE VERSIONS 2.1 and 2.2



For parts and accessories, service or repairs, call your authorized Central Boiler dealer or heating contractor. Record the information below for future reference.

Serial Number	Installation Date
Dealership Name	Phone Number
Owner Name	

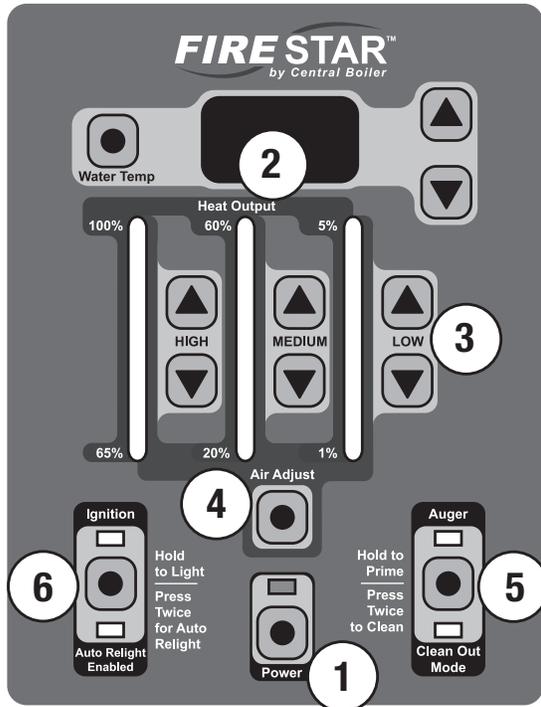


**Save This Manual
For Future Reference**

7-Oct-2014 • (p/n 9000257)

NOTES

FIRESTAR CONTROLLER (versions 2.1 and 2.2)



The FireStar controller is designed to cycle between three operating modes to control the amount of fuel fed to the burn chamber and the amount of air for combustion, thereby regulating the amount of heat transferred into the water in the furnace.

Before operating the FireStar Controller, become familiar with the information the control panel provides and with the procedures for making changes to settings. The controller has been programmed with default settings (factory settings) that may be adjusted to match your heating requirements.

1. The **Power** button is used to turn the FireStar controller on and off. To turn the controller on or off, press and hold the **Power** button for at least one second. The **Power** button does not disable all electrical power to the furnace.
2. During normal operation, the LED display indicates the actual temperature of the system water. Other information will also be displayed on the LED display depending on settings, modes, etc. The **Water Temp** button may be used to display the water temperature setting or, used in conjunction with the **▲** and **▼** buttons, to change the water temperature setting.

3. The heat output (fuel feed rate) settings in each of the three modes (HIGH / MEDIUM / LOW) may be changed here using the **▲** and **▼** buttons. During operation, the light bar will indicate the heat output setting for the mode the controller is currently in. The **▲** and **▼** buttons may also be used in conjunction with the **Air Adjust** button to change the air setting for each mode.
4. The **Air Adjust** button may be used in conjunction with the HIGH, MEDIUM and LOW **▲** and **▼** buttons to change the combustion air flow setting for each mode. For HIGH and MEDIUM modes, decreasing the setting (fewer lights on the light bar) lowers the fan speed and increasing the setting (more lights on the light bar) increases the fan speed. For LOW mode, increasing or decreasing the setting will increase or decrease the length of time the fan runs each time the auger turns.
5. The **Auger** button may be used to manually feed fuel into the burn chamber and/or to enable Clean Out Mode. The Auger light is on any time the burner auger is running.
6. The **Ignition** button starts the Gas Ignitor and may be used to enable/disable the Auto Relight mode.

Initial Start-up

NOTE: Before starting the outdoor furnace, make sure that (1) the proper amount of Corrosion Inhibitor Plus™ has been added and the water level is full; (2) there is adequate clean, dry fuel in the hopper or supply bin; (3) the main electrical power supply to the outdoor furnace is on; (4) the gas supply for the gas ignitor and the gas control valve are both turned on; and (5) the ground rod has been installed and connected to the outdoor furnace.

CAUTION

Do not burn garbage, gasoline, naphtha, drain oil or other inappropriate materials.

1. Press the **Power** button. Upon start-up, the controller will display the software version number followed by a brief indicator light test. The LED display will indicate the furnace water temperature.
2. Fuel must be present in the burn chamber for the system to burn properly. To deliver fuel to the burn chamber, start the transfer and burner augers by pressing and holding the **Auger** button. Continue to hold the **Auger** button until fuel is visible in the burn chamber.
3. The Auto Relight Enabled light will be on by default. To disable/enable the Auto Relight function, press the **Ignition** button twice within one second.

- To start the gas ignitor if Auto Relight is disabled, press and hold the **Ignition**  button until the LED display indicates **OFF** and the burner fan operates. When a flame is present at the gas ignitor, the ignition light will stay on.

NOTE: Upon initial start-up, it is not uncommon for a substantial amount of condensation to be present in the firebox as the furnace is coming up to operating temperature. This is normal and the moisture will evaporate when the outdoor furnace reaches operating temperature. Condensation can also occur if the furnace is allowed to operate below 150°F (65°C) on a normal basis.

CAUTION

Regularly exposing the furnace firebox to excessive condensation can significantly reduce the life of the firebox.

Adjusting Water Temperature

Normally the furnace water temperature will be displayed. To display the water temperature setpoint, press the **Water Temp**  button. The default setting is 175°C (79°C). To raise or lower the water temperature setpoint, press and hold the **Water Temp**  button; then press the  and  button. The water temperature setpoint can be set between 150°F (65°C) and 190°F (88°C).

NOTE: To reduce condensation in the firebox, it is not recommended to set the water temperature setpoint below 165°F (74°C).

Burner Temperature

To display the temperature of the burner, press the **Water Temp**  button. The LED display will indicate the actual temperature of the burner up to 999 degrees or, if higher, as a decimal representation (e.g., 1500°F will display as 1.50).

Setting the FireStar Controller for Heat Load and Efficiency

The controller's factory default settings allow the furnace to operate properly in most installations without adjustment. These settings can be adjusted, however, for installations that require matching the furnace output to the heat demands of the system.

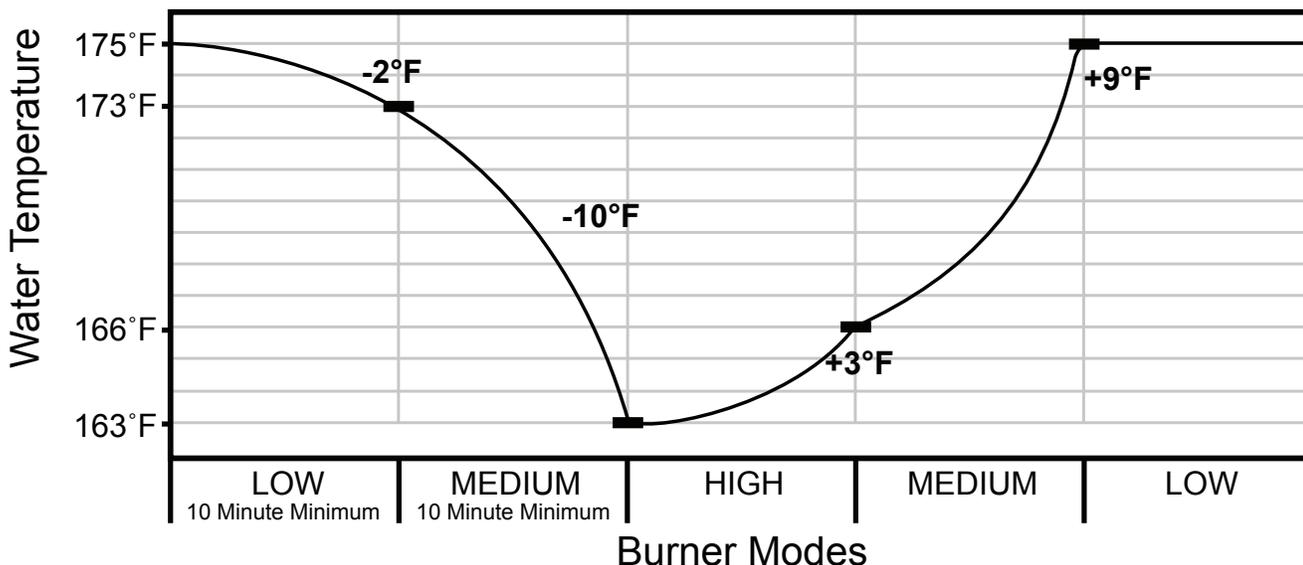
Heat Output Settings

For best results, determine the lowest water temperature setpoint the outdoor furnace can be set to that will supply enough heat to the heat emitters. For most installations, a water temperature setpoint of 175°F (79°C) should be adequate.

NOTE: Do not set the water temperature setpoint to less than 175°F (79°C) when a thermostatic valve (see Thermostatic Valves section) is installed.

If, as an example, the water temperature setpoint is 175°F (79°C), when a heat load is applied, there will be a delay before the water temperature starts to fall. When it falls 2°F, the controller will shift to MEDIUM mode. If operating in MEDIUM mode is unable to maintain the water temperature with the heat load applied, once the water temperature drops another 8°F (this variable is called the MEDIUM to HIGH differential), the controller will shift to HIGH mode.

**FireStar Controller - Maxim M255 P
Normal Operation***



If burner temperature is not high enough the controller will not switch from MEDIUM to HIGH mode.

*NOTE: This graph is based on factory default settings when the water temperature setpoint is 175°F.

NOTE: The controller will operate in MEDIUM mode for a minimum of 10 minutes before shifting into HIGH mode, regardless of temperature loss.

If the heat demand is less than 50% of the Maxim's output capacity, it is not necessary for the FireStar controller to shift into HIGH mode.

The MEDIUM to HIGH differential can be changed by your Central Boiler dealer to match the installation.

Monitor the outdoor furnace operation to determine if additional changes are needed, keeping in mind that it may take several cycles of the heat load before this becomes apparent.

LOW Mode

LOW mode is used to maintain the fire when the heat demand is low or not present.

NOTE: For most applications, the LOW heat output and air settings should be set to the lowest setting when using wood pellets. The LOW heat output and air settings may require additional adjustment if the fire does not relight (without using the gas burner) when shifting from LOW to MEDIUM, or if the outdoor furnace overheats when changing to a lower mode.

- The LOW heat output setting should be set as low as possible while still enabling the fire to relight when shifting into MEDIUM mode.
- If there is no fuel left in the burn chamber and the fire has gone out, the heat output is set too low. Increase the LOW heat output setting.
- If the water temperature increases above 195°F (90°C) when the furnace is in LOW, the heat output is set too high. Decrease the LOW heat output setting.

Monitor the outdoor furnace operation to determine if additional changes are needed, keeping in mind that it may take several cycles of the heat load before this becomes apparent.

MEDIUM Mode

The reason the FireStar Controller has a MEDIUM and HIGH heat output setting is for efficiency. In general, the MEDIUM heat output setting should be set high enough to minimize the amount of time the controller is in HIGH mode.

The outdoor furnace is most efficient when it is operating in MEDIUM mode and not shifting often into HIGH or LOW mode. The controller changes to MEDIUM mode when the water temperature drops 2° below the water temperature setpoint. MEDIUM mode represents 20%-60% of the outdoor furnace's heat output capacity.

NOTE: For most applications, the default MEDIUM heat output setting is adequate to allow the outdoor furnace to operate efficiently. For some heat load requirements or when burning a fuel other than wood pellets, it may be necessary to change this setting.

- If the outdoor furnace operates in HIGH mode much of the time, increase the MEDIUM heat output setting one step. If the outdoor furnace changes from MEDIUM to LOW mode when there is a heat demand, lower the MEDIUM heat output setting one step.
- In a higher heat load installation such as radiant floor heat, an abrupt heat load change (i.e., when there is no longer a call for heat) will cause the controller to shift from HIGH to MEDIUM to LOW mode. A fuel such as wood pellets that burns easily will continue to provide heat in LOW mode and can cause the water temperature to increase above 195°F (90°C). In this instance, decrease the MEDIUM heat output setting so there is less remaining fuel when the controller changes from HIGH to LOW mode.

HIGH Mode

The reason the FireStar Controller has a MEDIUM and HIGH heat output setting is for efficiency. The most efficient setting for the HIGH mode is when the heat output setting is set as low as possible while still providing enough heat.

HIGH mode is used for peak or spike heat loads. The controller changes to HIGH mode when the water temperature drops 10°F below the water temperature setpoint. HIGH mode represents 65%-100% of the outdoor furnace's heat output capacity.

NOTE: The controller will operate in MEDIUM mode for a minimum of 10 minutes before shifting into HIGH mode, regardless of temperature loss.

- The most efficient setting for the HIGH heat output mode is the lowest setting possible that keeps the water temperature from dropping to 150°F (66°C). If the water temperature drops to 150°F (66°C), increase the HIGH heat output setting or reduce the heat load. Remember that a thermostatic valve must be installed in each set of hot supply and return lines to keep the water temperature from dropping below 150°F (66°C).
- If the fuel cannot burn fast enough (i.e., unburned fuel gets pushed into the ash pan), either lower the HIGH heat output setting, use a different type of fuel that will burn better, or mix in premium wood pellets with the fuel.

To View All Heat Output Settings:

1. Press any of the ▲ or ▼ buttons for the HIGH, MEDIUM or LOW modes. The light bars will display the current heat output settings.

To Change Heat Output Settings:

1. In each mode (HIGH, MEDIUM or LOW), press the ▲ button to increase the heat output or press the ▼ button to decrease the heat output. The new heat output setting will be displayed on the light bar.
2. The light bars will turn off and the new heat output setting(s) will take effect 15 seconds after no buttons are pressed.

Air Settings

The air setting for LOW mode increases or decreases the length of time the fan runs each time the auger turns.

NOTE: The LOW heat output and air settings should only require adjustment if the fire does not relight (without using the gas burner) when shifting from LOW to MEDIUM.

- If there is fuel left in the burn chamber, the water temperature has not increased above 195°F (90°C) and the fire has gone out, the fan setting for LOW mode is too low. Increase the fan setting for LOW mode.

The air settings for the MEDIUM and HIGH modes can be adjusted to provide the correct amount of combustion air to the fire. The proper setting for these two modes is the lowest setting that will still provide enough air for complete combustion (i.e., no smoke and no unburned fuel in the ash pan). If the air settings are too high, the extra air will take heat with it as it goes out the chimney. If the air settings are too low, complete combustion may not occur.

As a general rule, the air settings for the MEDIUM and HIGH modes should be within one bar of each other.

To optimally set the fan speeds for the MEDIUM and HIGH modes, it is best to use a CO₂ combustion meter and adjust for a reading of 11-13%. If a CO₂ combustion meter is not available, set the fan setting for each mode to the lowest setting that does not cause smoke to appear in the exhaust after the mode has operated for 15 minutes.

NOTE: In cold weather, steam in the exhaust will condense and appear as smoke, similar to the steam in the exhaust from an automobile.

To View the Current Air Settings:

1. Press and hold the Air Adjust ● button. The light bars will display the current air setting for each mode.

To Change the Air Settings:

1. Press and hold the Air Adjust ● button; then press the ▲ or ▼ button for the respective mode to decrease or increase the air setting. For HIGH and MEDIUM modes, decreasing the setting (fewer lights on the light bar) lowers the fan speed and increasing the setting (more lights on the light bar) increases the fan speed.
2. Release the Air Adjust ● button.

NOTE: Allow the fire in the burn chamber to stabilize for a few minutes after changing an air setting to assess what effect the change had before making another adjustment.

Auto Relight

The auto relight function is enabled by default. When the auto relight function is enabled, the controller continuously monitors the burner temperature. If at any time the burner temperature is less than the burner temperature setting (which is set at the factory), the controller will automatically start the gas ignition sequence in an attempt to relight and raise the burner temperature.

If after three gas ignition cycles, the burner temperature does not rise above the burner temperature setting, all outputs will be disabled, the Auto Relight Enabled light will flash, and the LED display will indicate **FD** to show that the ignition attempt has failed.

The controller will maintain the system in a disabled condition and the Auto Relight Enabled light will continue to flash until one of the following occurs:

1. Press and hold the Ignition ● button for 15 seconds.
2. Press the Power ● button to turn off the controller; then press again to turn on the controller.
3. The main power to the furnace is turned off and then on again.

NOTE: Examples of situations that would cause the controller to go into auto relight mode: 1) Drop in burner temperature caused by wet or contaminated fuel or improper air setting; 2) Extended operation in LOW mode due to a low heat load; 3) Feed rate or air setting in LOW mode is not set high enough to sustain the fire; 4) Auger is plugged with swollen or expanded pellets; 5) Hopper is out of fuel; 6) Power outage.

NOTE: Before resetting the controller from **FD ensure adequate gas supply and find the cause of the burner not being operational (e.g., wet or contaminated fuel, mechanical problem, etc.).**

To enable/disable the Auto Relight function:

Press the Ignition ● button twice within one second. When enabled, the Auto Relight Enabled light will turn on.

Clean Out Mode

Situations may arise when it becomes necessary to empty all of the fuel from the burner auger (e.g., for service, at the end of season, etc.). In the Clean Out Mode, the transfer auger is disabled.

To start Clean Out Mode:

1. Make sure the Auto Relight is disabled.
2. Press the **Auger**  button two times within one second. The Clean Out Mode light will turn on and the transfer auger will be disabled. To speed the process, press and hold the **Auger**  button until the burner auger is empty.

To cancel Clean Out Mode:

Press the **Auger**  button two times within one second. The Clean Out Mode light will turn off and the burner and transfer augers will run as normal.

NOTE: If not cancelled, Clean Out Mode will run for 30 minutes. After 30 minutes the Clean Out Mode light will turn off and the burner and transfer augers will run as normal.

To restore to factory default settings:

Press the **Power**  button to turn off the controller; then, while pressing and holding the **Water Temp**  and  buttons, press the **Power**  button to turn on the controller.

LED Display Alarm Definitions

If any of the following alarms occur, system operations will be halted until the cause of the alarm is corrected.

 Low Water: the LED display will flash  until the water level is above the sensor. Check that the water level indicator rod is above the vent cap and, if necessary, add water according to the Water Quality and Maintenance section. If adding water does not correct the problem, contact your Central Boiler dealer.

 High Water Temperature: the LED display will alternately flash  and the water temperature if the water temperature reaches 200°F (93°C). The LED will continue to alternate between  and the water temperature until the water temperature drops to 195°F (90°C).

There is an external limit switch that can also lock the controller in the high water temperature alarm. This limit switch will trip at approximately 200°F (93°C) and automatically reset at 165°F (74°C).

If this alarm occurs often, you will need to lower the water temperature setpoint and/or adjust the heat output settings in one or all of the three modes (HIGH / MEDIUM / LOW).

 Back Burn: The LED display will flash  if the controller detects a high temperature in the burner auger area, even if the control panel is turned off. Everything but the burner auger will be disabled. The burner auger will run for two minutes, pause for 10 minutes, and continue as required. The Back Burn alarm will not stop until the controller detects that the temperature in the burner auger area has dropped.

 Fire Out: while in MEDIUM or HIGH mode, if the burner temperature drops below the burner temperature setpoint and, if enabled, the gas ignitor has tried to relight the burner three times, the controller will go into Fire Out mode and the LED display will flash . This will continue until the cause of the Fire Out alarm is corrected and the controller is reset. To clear the Fire Out alarm, turn the controller off and on again or press and hold the **Ignition**  button. This will reset the controller and allow normal operation.

NOTE: while in LOW mode, if the burner temperature drops below the burner temperature setpoint, the LED display will not flash . the LOW light bar will flash and augers will be disabled until the water temperature drops low enough for the controller to change to MEDIUM mode. No action is required.

To Lock/Unlock Controller

The controller can be locked to prevent unauthorized access to the controller settings. *To lock the controller:* Press the **Water Temp**  button four times within three seconds. The LED display will indicate  (locked) for several seconds. *To unlock the controller:* Press the **Water Temp**  button four times within three seconds. The LED display will indicate  (locked) for several seconds.

Power Outage

In the event of a power outage, the controller is programmed to return to its previous state. If the system was powered on, it will automatically restart. If enabled prior to the power outage, Auto Relight will be enable once power returns.

Troubleshooting/System Restarting

If there appears to be a controller error, attempt to restart the controller using the **Power**  button. If a standard restart fails to correct an apparent error, shut off the main power at the source for one minute and then try again. If that does correct an apparent error, contact your Central Boiler dealer.



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