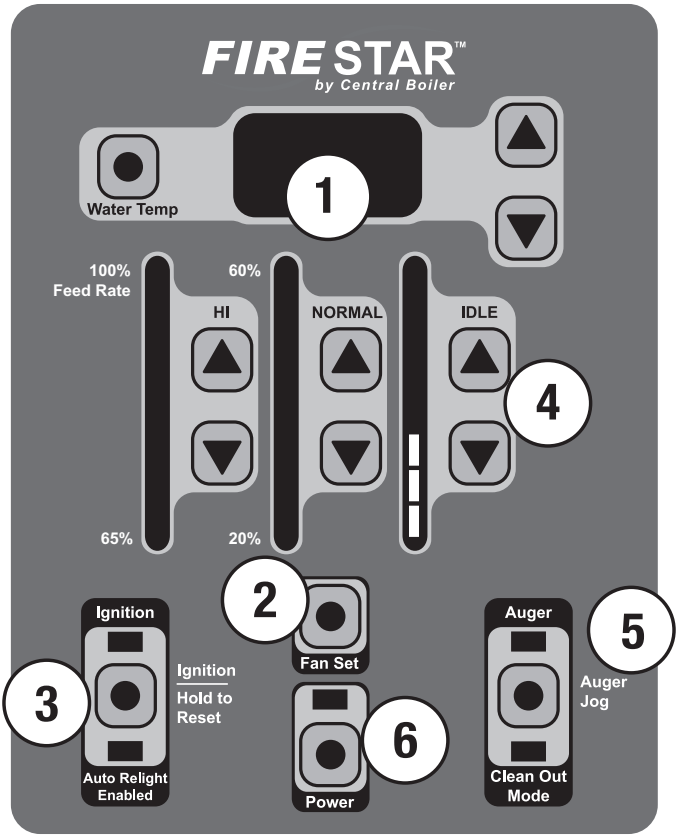
FireStar Control Panel
Operating Instructions and Controller Variables

Software Version 1.0

UNDERSTANDING THE FIRESTAR CONTROL PANEL

Before operating the *FIRE*STAR Control Panel, become familiar with the information the control panel provides and the procedures for making changes to settings. The control panel has been programmed with factory default settings. If fine-tuning is desired, refer to the appropriate section of these operating instructions for more information.



1. 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.

2. The Fan Set button may be used in conjunction with the three mode (HI / NORMAL / IDLE) and buttons to change the fan speed for each mode.

3. The Ignition button starts the Gas Ignitor and may be used to enable/disable the Auto Relight mode.

4. The feed rate settings in each of the three modes (HI / NORMAL / IDLE) may be changed here. During operation, the light bar will indicate the feed rate setting for the mode the controller is currently in. May also be used in conjunction with the Fan Set button to change the fan speed for each mode.

5. The Auger Jog button may be used to manually control the burner and transfer augers and/or to enable Clean Out mode. The Auger light is on any time the augers are running.

6. The Power button is used to turn the *FIRE*STAR control on and off. It does not disable all electrical power to the furnace.

INITIAL START-UP

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

1. Press the Power button. Upon startup, the lights on the control panel and the LED display will cycle through a lamp test and then go off. The LED display will indicate the actual system 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 Jog button. Continue to hold the Auger Jog button until fuel enters the burn chamber.

3. To start the Gas Ignitor, press and hold the Ignition button until the LED display indicates SAFE and the burner fan starts. During ignition, the ignition light will stay on.

4. Press the Ignition ⦿ button twice within one second to enable the Auto Relight function. The Auto Relight Enabled light will turn on.

NOTE: If during ignition the LED display indicates SAS and the ignition light is off, check the gas supply.

HOW THE GAS IGNITOR STARTS

The ignition process is a series of steps that automatically occur to ensure the Gas Ignitor starts properly before the system begins to operate. During ignition, the following will take place:

1. The burner fan will start to provide air for combustion.
2. Once the pressure switch senses air flow, it will energize the gas ignition module.
3. Both the transfer and burner augers run, delivering fuel to the burn chamber.
4. The gas ignition module ignites the gas burner to start burning the fuel in the burn chamber.
5. The gas burner will continue to burn until the burn chamber reaches a high enough temperature to sustain burning the fuel, at which time the controller will turn off the gas burner.

HOW THE BURNER OPERATES

To best utilize the fuel and obtain the most efficiency, the controller automatically changes from NORMAL to HI mode when the water temperature drops and then back to NORMAL once the water temperature rises. When the water temperature reaches the water temperature setting, the controller will change to IDLE mode. The controller will again change to NORMAL mode when the water temperature drops. This cycle repeats as necessary to maintain the system water temperature.

CHANGING FIRESTAR CONTROL PANEL SETTINGS

NOTE: Until you become familiar with the operation of your *FIRE*STAR control panel, consult your Central Boiler dealer before making changes to the factory default settings.

Water Temperature

Normally the system water temperature will be displayed. To display the water temperature setting, press the **Water Temp** button. The default setting is 175˚F-185˚F. To raise the water temperature setting, press and hold the **Water Temp** button; then press the button. To lower the water temperature setting, press and hold the **Water Temp** button; then press the button. The water temperature setting can be set between 150˚F and 195˚F.

HI, NORMAL and IDLE modes

Changes in system heat load, fuel quality and a number of other conditions may make it desirable to change the feed rate to the burner in one or more of the three operating modes (HI / NORMAL / IDLE).

To view the current feed rate setting:

During operation, the light bar will indicate the feed rate setting for the mode the controller is currently in.

To view all feed rate settings:

1. Press any of the or buttons for the HI, NORMAL or IDLE modes. The light bars will display the current feed rate settings.

To change the feed rate settings:

1. In each mode (HI / NORMAL / IDLE), you can press the button to decrease the feed rate setting or press the button to increase the feed rate setting. The new feed rate setting will be displayed on the light bar.

Fan Set

If the feed rate is changed for any mode (HI / NORMAL / IDLE), it may be necessary to change the burner fan speed for that mode to optimize burner operation. In IDLE mode, the fan only runs when the Auger light is on.

To view the current fan speed settings:

1. Press and hold the Fan Set button. The light bars will display the current fan speed settings.

To change the fan speed settings:

1. Press and hold the Fan Set button; then press the or button for the respective mode to decrease or increase the fan speed setting. Decreasing the setting (fewer lights on the light bar) lowers the fan speed. Increasing the setting (more lights on the light bar) increases the fan speed.

Auto Relight

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) and the controller is in NORMAL or HI mode, the controller will automatically change to Ignition mode in an attempt to relight and raise the burner temperature.

NOTE: A drop in burner temperature may be caused by wet or contaminated fuel or by an extended IDLE mode time, for example.

If after three Ignition mode 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 notify that the burner fire has gone out.

NOTE: Before resetting the controller after the auto relight function has failed, be sure to find the cause of the burner not being operational (e.g., wet or contaminated fuel, mechanical problem, etc.).

WARNING

Do not attempt any service on the burner without first disconnecting the main power supply to the furnace. Make sure there is no hot ash in the burn chamber or furnace.

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.

To enable the Auto Relight function:

1. 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. The burner will operate normally until the burner auger is empty and the fire goes out.

To start Clean Out mode:

1. Press the Auger Jog ⦿ button three times within two seconds. The Clean Out mode light will turn on and the transfer auger will be disabled. To speed the process, press and hold the Auger Jog ⦿ button.

To cancel Clean Out mode:

1. Press the Auger Jog ⦿ button three times within two seconds. The Clean Out mode light will turn off and the burner and transfer augers will run as normal.

To reset auger and fan settings to factory default settings:

1. Press the Power ⦿ button to turn off the controller; then, while pressing and holding the IDLE mode ▼ and ▲ buttons, press the Power ⦿ button to turn on the controller.

To reset all controller settings to factory default settings and perform Self-Test:

1. 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. All settings will be reset to the factory default settings and the controller will perform a Self-Test.

2. During the Self-Test, the following will occur:

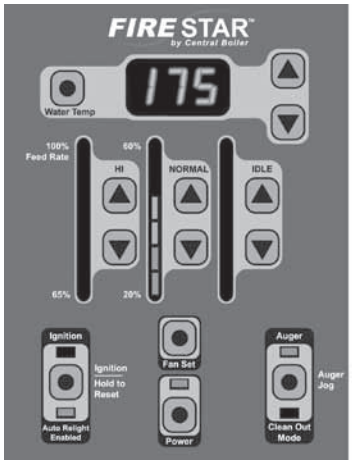
    a. The LED display will first indicate the burner temperature, then the water temperature and finally the center section of the display digits will flash.

b. The system will operate in HI mode for 10 seconds.

c. The ignition process will begin (see How the Gas Ignitor Starts). The system will operate in NORMAL mode for 1 minute.

d. After a delay of 10 seconds, all outputs will be disabled and the controller will shut off.

DISPLAY READOUT DEFINITIONS



LO	Low Water Alarm
HI	High Water Temperature
b b	Back Burn Alarm
FO	Fire Out Alarm
LOC	Control Panel Locked
UL	Control Panel Unlocked
GAS	Gas Mode

Alarms

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 LO until the water level is above the sensor. Refer to the furnace owner's manual for procedure to correct low water situation.

High Water Temperature: the LED display will flash HI until the water temperature drops below 195˚F.

Back Burn: the LED display will flash b b 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 has dropped.

Fire Out: the LED display will flash FO 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 enable Auto Relight to attempt lighting the burner again.

Controller Lock

The controller can be locked at any time to prevent unauthorized operation. After locking the controller while turned off, it will not be possible to start the controller or change any settings until it is unlocked. The controller may also be locked while it is operating. After locking the controller while turned on, it will not be possible to turn the controller off or change settings.

To lock the controller:

Rapidly press the **Water Temp** button four times. The LED display will indicate LOC for five seconds.

To unlock the controller:

Rapidly press the **Water Temp** button four times. The LED display will indicate UL for several seconds.

Power Off

To turn the controller on or off, press and hold the **Power** button for at least one second. After turning off the controller, release the **Power** button for at least one second before turning power back on.

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 enabled once power returns.

Troubleshooting/System Restarting

If there appears to be a system error, attempt to restart the system. 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.

FOR DEALER USE ONLY

CHANGING *FIRE*STAR CONTROLLER VARIABLES

Software Version 1

The *FIRE*STAR control relies on several variables for operation. The control panel has been programmed with factory default settings. If fine-tuning is desired, the variables can be changed.

To enter Setup mode:

Press and hold the Water Temp button for 20 seconds until the LED display changes from the water temperature to a "1."

Changing Control Variables:

While in Setup mode, select the control variable you want to change (see Selecting Control Variables). To make changes, press the **Water Temp** button. The current value is displayed. Press the or buttons to modify the setting. Press the **Water Temp** button to accept the value and return to the selection menu.

Selecting Control Variables:

There are 10 variables that may be changed within the Setup mode. To select a variable while in Setup mode, press the Water Temp or buttons until the number representing the variable appears in the display. The following list indicates each variable's number, name, the default factory settings, and a brief description of the function.

1. **Water Temperature Setpoint: 175-185 (˚F)**

   When the water temperature is above this setting, the control will change to IDLE mode.

2. **IDLE to NORMAL Differential: 2 (˚F)**

   When the water temperature is less than the Water Temperature Setpoint minus the IDLE to NORMAL Differential, the controller will change from IDLE mode to NORMAL mode. For example, with the default factory settings, the controller will change from IDLE mode to NORMAL mode when the water temperature is less than 185˚F – 2˚F (or 183˚F).

3. NORMAL to HI Differential: 2 (˚F)

When the water temperature is less than the Water Temperature Setpoint minus the IDLE to NORMAL Differential minus the NORMAL to HI Differential, the controller will change from NORMAL mode to HI mode. For example, with the default factory settings, the controller will change from NORMAL mode to HI mode when the water temperature is less than 185˚F – 2˚F – 2˚F (or 181˚F).

4. Restart Time: 1 (minute)

Time that must pass before the controller will change from NORMAL mode to HI mode, even if the water temperature is low enough and the burner temperature is high enough.

5. Burner Temperature Setpoint: 300 (˚F)

When operating in NORMAL or HI mode, the controller constantly checks the burner temperature. If the burner temperature is below the Burner Temperature Setpoint, the controller will immediately change from HIGH mode to NORMAL mode. If Auto Relight is enabled, Gas Ignition is started.

6. Gas Differential: 100 (˚F)

The controller will operate in Ignition mode until the burner temperature reaches the Burner Temperature Setpoint plus the Gas Differential.

7. Gas Burn Time: 10 (minutes)

Maximum time that the controller will operate in Gas Ignition mode.

8. Fire Out Time: 5 (minutes)

When the Auto Relight function is disabled, the time the controller will wait before checking the burner temperature and changing to Fire Out mode.

9. **Water Temp Offset: 0 (˚F)**

   Providing a means of manually calibrating the water temperature, the Water Temp Offset is the number of degrees that will be added or subtracted from all temperature readings.

10. **Burner Differential: 50 (˚F)**

    The controller can be in HI mode only when the burner temperature is above the Burner Temperature Setpoint plus the Burner Differential.

    The Burner Differential can only be set as high as the Gas Differential setting.

To exit Setup mode:

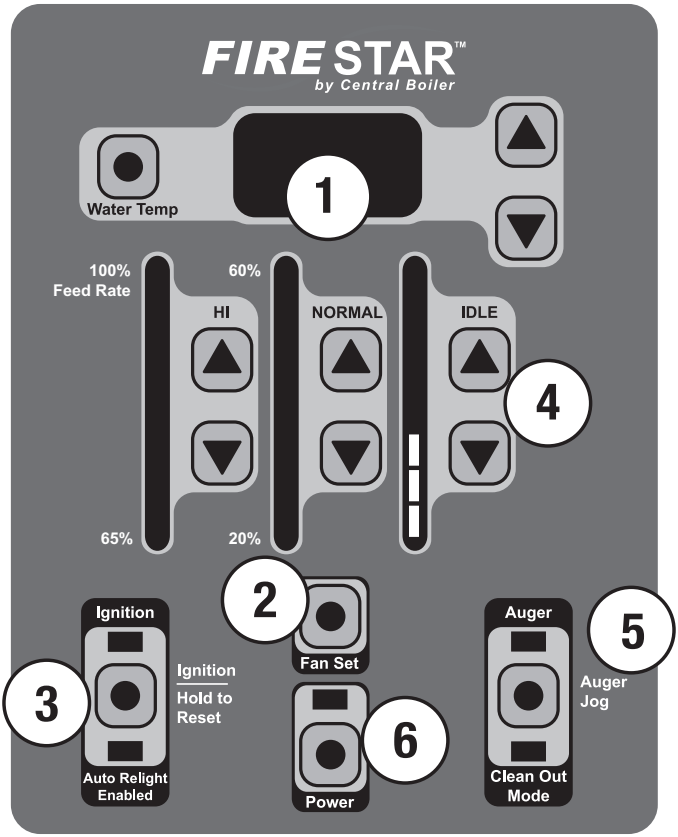
Wait 15 seconds (while not pressing any buttons) and the controller will automatically exit Setup mode.

FireStar Control Panel
Operating Instructions and Controller Variables

Software Version 1.2

UNDERSTANDING THE FIRESTAR CONTROL PANEL

Before operating the *FIRE*STAR Control Panel, become familiar with the information the control panel provides and the procedures for making changes to settings. The control panel has been programmed with factory default settings. If fine-tuning is desired, refer to the appropriate section of these operating instructions for more information.



1. 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.

2. The Fan Set button may be used in conjunction with the three mode (HI / NORMAL / IDLE) and buttons to change the fan speed for each mode.

3. The Ignition button starts the Gas Ignitor and may be used to enable/disable the Auto Relight mode.

4. The feed rate settings in each of the three modes (HI / NORMAL / IDLE) may be changed here. During operation, the light bar will indicate the feed rate setting for the mode the controller is currently in. May also be used in conjunction with the Fan Set button to change the fan speed for each mode.

5. The Auger Jog button may be used to manually control the burner and transfer augers and/or to enable Clean Out Mode. The Auger light is on any time the augers are running.

6. The Power button is used to turn the *FIRE*STAR control on and off. It does not disable all electrical power to the furnace.

INITIAL START-UP

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

1. Press the Power button. Upon startup, the lights on the control panel and the LED display will cycle through a lamp test and then go off. The LED display will indicate the actual system 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 Jog button. Continue to hold the Auger Jog button until fuel enters the burn chamber.

3. To start the Gas Ignitor, press and hold the Ignition button until the LED display indicates SAFE and the burner fan starts. During ignition, the ignition light will stay on.

4. Press the Ignition button twice within one second to enable the Auto Relight function. The Auto Relight Enabled light will turn on.

NOTE: If during ignition the LED display indicates SAS and the ignition light is off, check the gas supply.

HOW THE GAS IGNITOR STARTS

The ignition process is a series of steps that automatically occur to ensure the Gas Ignitor starts properly before the system begins to operate. During ignition, the following will take place:

1. The burner fan will start to provide air for combustion.
2. Once the pressure switch senses air flow, it will energize the gas ignition module.
3. Both the transfer and burner augers run, delivering fuel to the burn chamber.
4. The gas ignition module ignites the gas burner to start burning the fuel in the burn chamber.
5. The gas burner will continue to burn until the burn chamber reaches a high enough temperature to sustain burning the fuel, at which time the controller will turn off the gas burner.

HOW THE BURNER OPERATES

To best utilize the fuel and obtain the most efficiency, the controller automatically changes from NORMAL to HI mode when the water temperature drops and then back to NORMAL once the water temperature rises. When the water temperature reaches the water temperature setting, the controller will change to IDLE mode. The controller will again change to NORMAL mode when the water temperature drops. This cycle repeats as necessary to maintain the system water temperature.

CHANGING *FIRE*STAR CONTROL PANEL SETTINGS

NOTE: Until you become familiar with the operation of your FIRESTAR control panel, consult your Central Boiler dealer before making changes to the factory default settings.

Water Temperature

Normally the system water temperature will be displayed. To display the water temperature setting, press the **Water Temp** button. The default setting is 175˚F. To raise the water temperature setting, press and hold the **Water Temp** button; then press the button. To lower the water temperature setting, press and hold the **Water Temp** button; then press the button. The water temperature setting can be set between 150˚F and 195˚F.

Wood/Corn Mode

The controller's default setting is Corn Mode. In this mode, the auger will run for 3 seconds when delivering fuel. The controller may also be set to Wood Mode. In this mode, the auger will run for 5 seconds when delivering fuel.

To view the current fuel type setting:

1. Press and hold the HI and buttons. The NORMAL light bar will display the current fuel type setting. If the top half of the light bar is lit, the controller is in Corn Mode. If the bottom half of the light bar is lit, the controller is in Wood Mode.

To change the fuel type setting:

1. Press and hold the HI and buttons; then press the Normal or button to change between Corn and Wood modes. Once selection is made, let go of all buttons.

HI, NORMAL and IDLE Modes

Changes in system heat load, fuel quality and a number of other conditions may make it desirable to change the feed rate to the burner in one or more of the three operating modes (HI / NORMAL / IDLE).

To view the current feed rate setting:

During operation, the light bar will indicate the feed rate setting for the mode the controller is currently in.

To view all feed rate settings:

1. Press any of the or buttons for the HI, NORMAL or IDLE modes. The light bars will display the current feed rate settings.

To change the feed rate settings:

1. In each mode (HI / NORMAL / IDLE), you can press the ▼ button to decrease the feed rate setting or press the ▲ button to increase the feed rate setting. The new feed rate setting will be displayed on the light bar.

Fan Set

If the feed rate is changed for any mode (HI / NORMAL / IDLE), it may be necessary to change the burner fan speed for that mode to optimize burner operation. In IDLE mode, the fan only runs when the Auger light is on.

To view the current fan speed settings:

1. Press and hold the Fan Set ◉ button. The light bars will display the current fan speed settings.

To change the fan speed settings:

1. Press and hold the Fan Set ◉ button; then press the ▼ or ▲ button for the respective mode to decrease or increase the fan speed setting. Decreasing the setting (fewer lights on the light bar) lowers the fan speed. Increasing the setting (more lights on the light bar) increases the fan speed.

Auto Relight

The auto relight function in 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) and the controller is in NORMAL or HI mode, the controller will automatically change to Ignition mode in an attempt to relight and raise the burner temperature.

NOTE: A drop in burner temperature may be caused by wet or contaminated fuel or by an extended IDLE mode time, for example.

If after three Ignition mode 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 notify that the burner fire has gone out.

NOTE: Before resetting the controller after the auto relight function has failed, be sure to find the cause of the burner not being operational (e.g., wet or contaminated fuel, mechanical problem, etc.).

WARNING

Do not attempt any service on the burner without first disconnecting the main power supply to the furnace. Make sure there is no hot ash in the burn chamber or furnace.

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.

To enable/disable the Auto Relight function:

1. 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. The burner will operate normally until the burner auger is empty and the fire goes out.

To start Clean Out Mode:

1. Press the Auger Jog button four times within two seconds. The Clean Out Mode light will turn on and the transfer auger will be disabled. To speed the process, press and hold the Auger Jog button.

To cancel Clean Out Mode:

1. Press the Auger Jog button four times within two seconds. 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 reset auger and fan settings to factory default settings:

1. Press the Power ⏻ button to turn off the controller; then, while pressing and holding the IDLE mode ▼ and ▲ buttons, press the Power ⏻ button to turn on the controller.

To reset controller settings to factory default settings and perform Self-Test:

1. 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. Controller settings will be reset to the factory default settings, the LED display will flash **888** and the controller will perform a Self-Test.

NOTE: To reset ALL settings to factory default, it is necessary to reset both the auger and fan settings and the controller settings using the procedures above.

2. During the Self-Test, the following will occur:

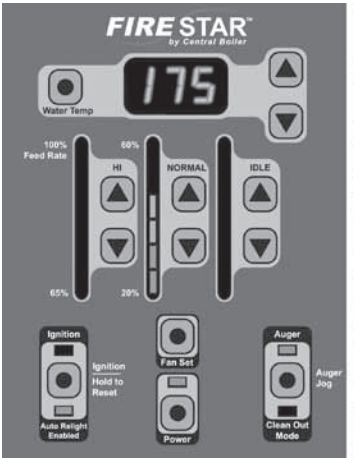
    a. The LED display will first indicate the burner temperature, then the water temperature and finally the center section of the display digits will flash.

    b. The system will operate in HI mode for 10 seconds.

    c. The ignition process will begin (see How the Gas Ignitor Starts). The system will operate in NORMAL mode for 1 minute.

    d. After a delay of 10 seconds, all outputs will be disabled and the controller will shut off.

DISPLAY READOUT DEFINITIONS



Low Water Alarm

High Water Temperature

Back Burn Alarm

Fire Out Alarm

Control Panel Locked

Control Panel Unlocked

Gas Mode

Alarms

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 LO until the water level is above the sensor. Refer to the furnace owner's manual for procedure to correct low water situation.

High Water Temperature: the LED display will flash HI until the water temperature drops below 195˚F.

Back Burn: the LED display will flash b b 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 has dropped.

Fire Out: the LED display will flash FO 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 enable Auto Relight to attempt lighting the burner again.

Silent Fire Out: the IDLE light bar will flash until the water temperature drops low enough and at least 30 seconds in IDLE mode pass.

NOTE: When operating in IDLE mode, if the burner temperature falls below 2/3 the Burner Temperature Setpoint, the controller will go into Silent Fire Out mode. The augers and fan will turn off and the IDLE light bar will flash until the water temperature falls below the Water Temperature Setpoint and at least 30 seconds have passed.

Controller Lock

The controller can be locked at any time to prevent unauthorized operation. After locking the controller while turned off, it will not be possible to start the controller or change any settings until it is unlocked. The controller may also be locked while it is operating. After locking the controller while turned on, it will not be possible to turn the controller off or change settings.

To lock the controller:

Rapidly press the **Water Temp** button four times. The LED display will indicate LOC for five seconds.

To unlock the controller:

Rapidly press the **Water Temp** button four times. The LED display will indicate UL for several seconds.

Power Off

To turn the controller on or off, press and hold the **Power** button for at least one second. After turning off the controller, release the **Power** button for at least one second before turning power back on.

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 enabled once power returns.

Troubleshooting/System Restarting

If there appears to be a system error, attempt to restart the system. 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.

FOR DEALER USE ONLY

CHANGING *FIRE*STAR CONTROLLER VARIABLES

Software Version 1.2

The *FIRE*STAR control relies on several variables for operation. The control panel has been programmed with factory default settings. If fine-tuning is desired, the variables can be changed.

To enter Setup mode:

Press and hold the Water Temp button for 7 seconds until the LED display changes from the water temperature to a "1."

Changing Control Variables:

While in Setup mode, select the control variable you want to change (see Selecting Control Variables). To make changes, press the **Water Temp** button. The current value is displayed. Press the or buttons to modify the setting. Press the **Water Temp** button to accept the value and return to the selection menu.

Selecting Control Variables:

There are 11 variables that may be changed within the setup mode. To select a variable while in Setup Mode, press the Water Temp or buttons until the number representing the variable appears in the display. The following list indicates each variable's number, name, the default factory settings, and a brief description of the function.

1. **Water Temperature Setpoint: 175 (˚F)**

   When the water temperature is above this setting, the control will change to IDLE mode.

2. **IDLE to NORMAL Differential: 2 (˚F)**

   When the water temperature is less than the Water Temperature Setpoint minus the IDLE to NORMAL Differential, the controller will change from IDLE mode to NORMAL mode. For example, with the default factory settings, the controller will change from IDLE mode to NORMAL mode when the water temperature is less than 185˚F – 2˚F (or 183˚F).

3. **NORMAL to HI Differential: 2 (˚F)**

   When the water temperature is less than the Water Temperature Setpoint minus the IDLE to NORMAL Differential minus the NORMAL to HI Differential, the controller will change from NORMAL mode to HI mode. For example, with the default factory settings, the controller will change from NORMAL mode to HI mode when the water temperature is less than 185˚F – 2˚F – 2˚F (or 181˚F).

4. **Restart Time: 10 (minutes)**

   Time that must pass before the controller will change from NORMAL mode to HI mode, even if the water temperature is low enough and the burner temperature is high enough.

5. **Burner Temperature Setpoint: 300 (˚F)**

   When operating in NORMAL or HI mode, the controller constantly checks the burner temperature. If the burner temperature is below the Burner Temperature Setpoint, the controller will immediately change from HIGH mode to NORMAL mode. If Auto Relight is enabled, Gas Ignition is started.

NOTE: Burner Temperature Setpoint + Gas Differential can never exceed 470˚F. For example, at default settings, Burner Temperature Setpoint can only be increased to a maximum of 370 (Burner Temperature Setpoint of 370˚F + Gas Differential of 100˚F = 470˚F). Lowering Gas Differential will allow a higher Burner Temperature Setpoint to be set.

NOTE: When operating in IDLE mode, if the burner temperature falls below 2/3 the Burner Temperature Setpoint, the controller will go into Silent Fire Out mode. The augers and fan will turn off and the IDLE light bar will flash until the water temperature falls below the Water Temperature Setpoint and at least 30 seconds have passed.

6. **Gas Differential: 100 (˚F)**

   The controller will operate in Ignition mode until the burner temperature reaches the Burner Temperature Setpoint plus the Gas Differential.

7. **Gas Burn Time: 10 (minutes)**

   Maximum time that the controller will operate in Gas Ignition mode.

8. **Fire Out Time: 5 (minutes)**

   When the Auto Relight function is disabled, the time the controller will wait before checking the burner temperature and changing to Fire Out mode.

9. **Water Temp Offset: 0 (˚F)**

   Providing a means of manually calibrating the water temperature, the Water Temp Offset is the number of degrees that will be added or subtracted from all temperature readings.

10. **Burner Differential: 50 (˚F)**

    The controller can be in HI mode only when the burner temperature is above the Burner Temperature Setpoint plus the Burner Differential.

    The Burner Differential can only be set as high as the Gas Differential setting.

11. **Hardware Mode: 0 (Maxim)**

    Select 0 (default) to operate the *FIRE*STAR with a Maxim furnace; select 1 to operate with a Bio-Advantage power burner.

    NOTE: Setting #11 must correspond to the correct auger delay setting. Press and hold the HI ▼ and ▲ buttons. The IDLE light bar will display the current auger delay setting. If the top half of the light bar is lit, the controller is in the auger delay setting for the Maxim. If the bottom half of the light bar is lit, the controller is in the auger delay setting for the Bio-Advantage. Press the IDLE ▼ or ▲ buttons to modify the setting.

To exit Setup Mode:

Wait 15 seconds (while not pressing any buttons) and the controller will automatically exit Setup Mode.

TECHNICAL SPECIFICATIONS

These tables indicate the settings for the various modes and the corresponding values. Default values are shaded. For example, the value at setting 3 for Maxim IDLE mode fan voltage is 5.00 Volts.

	MAXIM					
	FAN VOLTAGE (V)			AUGER OFF TIME (SEC)		
SETTING	IDLE	NORMAL	HI	IDLE	NORMAL	HI
1	4.00	4.00	4.60	600	42	19
2	4.50	4.20	4.95	330	39	18
3	5.00	4.40	5.29	300	35	16
4	5.50	4.60	5.64	270	32	14
5	6.00	4.80	6.00	240	29	13
6	6.50	5.00	6.35	210	26	12
7	7.00	5.20	6.70	180	23	11
8	7.00	5.50	7.00	150	19	10

	BIO-ADVANTAGE					
	FAN VOLTAGE (V)			AUGER OFF TIME (SEC)		
SETTING	IDLE	NORMAL	HI	IDLE	NORMAL	HI
1	4.00	4.038	5.20	600	35	11
2	4.50	4.29	5.60	330	30	10
3	5.00	4.58	6.00	300	27	9
4	5.50	4.92	6.40	270	22	8
5	6.00	5.21	6.82	240	18	7
6	6.50	5.51	7.20	210	14	6
7	7.00	5.80	7.60	180	12	5
8	7.00	6.01	7.99	150	11	5

TROUBLESHOOTING

Primary EEPROM Failure (System will attempt to auto-correct): If the system detects failed EEPROM hardware, it will halt operations and flash "EEE." If this occurs, shut down the board and attempt both manual resets. If the problem persists, contact Central Boiler.

Secondary EEPROM Failure: If the EEPROM containing fan and auger settings has failed, the system will halt operations and the auger LEDs will illuminate as follows:

HI - Top half of light bar lit
NORMAL - Bottom half of light bar lit
IDLE - Top half of light bar lit

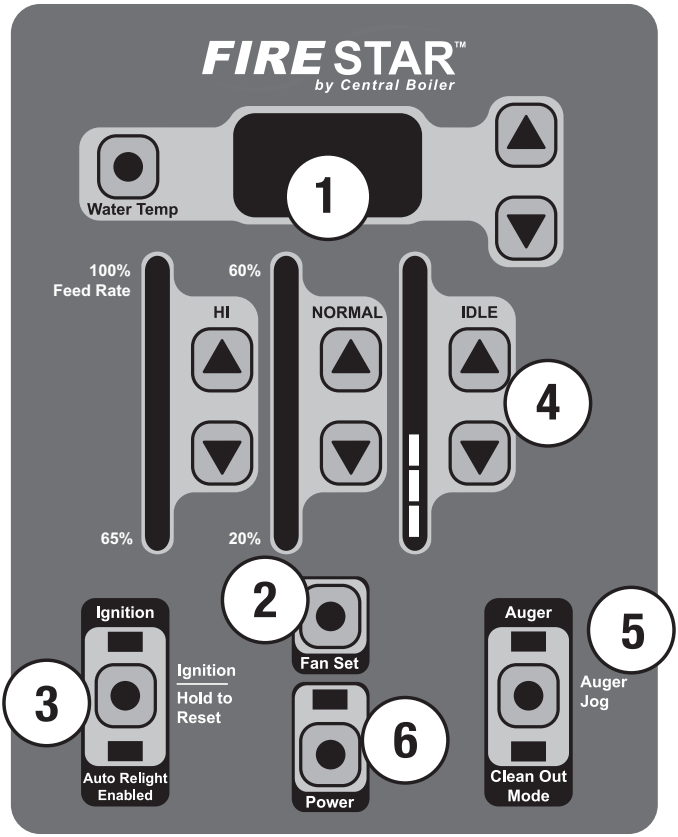
If this occurs, shut down the board and attempt both manual resets. If the problem persists, contact Central Boiler.

FireStar Control Panel
Operating Instructions and Controller Variables

Software Version 1.3

UNDERSTANDING THE FIRESTAR CONTROL PANEL

Before operating the FireStar Control Panel, become familiar with the information the control panel provides and the procedures for making changes to settings. The control panel has been programmed with factory default settings. If fine-tuning is desired, refer to the appropriate section of these operating instructions for more information.



1. 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.

2. The Fan Set button may be used in conjunction with the three mode (HI / NORMAL / IDLE) and buttons to change the fan speed for each mode.

3. The Ignition button starts the Gas Ignitor and may be used to enable/disable the Auto Relight mode.

4. The feed rate settings in each of the three modes (HI / NORMAL / IDLE) may be changed here. During operation, the light bar will indicate the feed rate setting for the mode the controller is currently in. May also be used in conjunction with the Fan Set button to change the fan speed for each mode.

5. The Auger Jog button may be used to manually control the burner and transfer augers and/or to enable Clean Out Mode. The Auger light is on any time the augers are running.

6. The Power button is used to turn the FireStar control on and off. It does not disable all electrical power to the furnace.

INITIAL START-UP

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

1. Press the Power button. Upon startup, the controller will display the software version number followed by a brief lamp test. The LED display will indicate the actual system 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 Jog button. Continue to hold the Auger Jog button until fuel enters the burn chamber.

3. To start the Gas Ignitor, press and hold the Ignition button until the LED display indicates SAFE and the burner fan starts. During ignition, the ignition light will stay on.

4. Press the Ignition button twice within one second to enable the Auto Relight function. The Auto Relight Enabled light will turn on.

NOTE: If during ignition the LED display indicates SAS and the ignition light is off, check the gas supply.

HOW THE GAS IGNITOR STARTS

The ignition process is a series of steps that automatically occur to ensure the Gas Ignitor starts properly before the system begins to operate. During ignition, the following will take place:

1. The burner fan will start to provide air for combustion.
2. Once the pressure switch senses air flow, it will energize the gas ignition module.
3. Both the transfer and burner augers run, delivering fuel to the burn chamber.
4. The gas ignition module ignites the gas burner to start burning the fuel in the burn chamber.
5. The gas burner will continue to burn until the burn chamber reaches a high enough temperature to sustain burning the fuel, at which time the controller will turn off the gas burner.

HOW THE BURNER OPERATES

To best utilize the fuel and obtain the most efficiency, the controller automatically changes from NORMAL to HI mode when the water temperature drops and then back to NORMAL once the water temperature rises. When the water temperature reaches the water temperature setting, the controller will change to IDLE mode. The controller will again change to NORMAL mode when the water temperature drops. This cycle repeats as necessary to maintain the system water temperature.

CHANGING FIRESTAR CONTROL PANEL SETTINGS

NOTE: Until you become familiar with the operation of your FireStar control panel, consult your Central Boiler dealer before making changes to the factory default settings.

Water Temperature

Normally the system water temperature will be displayed. To display the water temperature setting, press the **Water Temp** button. The default setting is 175˚F. To raise the water temperature setting, press and hold the **Water Temp** button; then press the button. To lower the water temperature setting, press and hold the **Water Temp** button; then press the button. The water temperature setting can be set between 150˚F and 195˚F.

To change the fuel type setting:

1. Press and hold the HI and buttons; then press the Normal or button to change between Corn and Wood modes. Once selection is made, let go of all buttons.

HI, NORMAL and IDLE Modes

Changes in system heat load, fuel quality and a number of other conditions may make it desirable to change the feed rate to the burner in one or more of the three operating modes (HI / NORMAL / IDLE).

To view the current feed rate setting:

During operation, the light bar will indicate the feed rate setting for the mode the controller is currently in.

To view all feed rate settings:

1. Press any of the or buttons for the HI, NORMAL or IDLE modes. The light bars will display the current feed rate settings.

To change the feed rate settings:

1. In each mode (HI / NORMAL / IDLE), you can press the button to decrease the feed rate setting or press the button to increase the feed rate setting. The new feed rate setting will be displayed on the light bar.

Fan Set

If the feed rate is changed for any mode (HI / NORMAL / IDLE), it may be necessary to change the burner fan speed for that mode to optimize burner operation. In IDLE mode, the fan only runs when the Auger light is on.

To view the current fan speed settings:

1. Press and hold the Fan Set button. The light bars will display the current fan speed settings.

To change the fan speed settings:

1. Press and hold the Fan Set button; then press the or button for the respective mode to decrease or increase the fan speed setting. Decreasing the setting (fewer lights on the light bar) lowers the fan speed. Increasing the setting (more lights on the light bar) increases the fan speed.

Auto Relight

The auto relight function in 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) and the controller is in NORMAL or HI mode, the controller will automatically change to Ignition mode in an attempt to relight and raise the burner temperature.

NOTE: A drop in burner temperature may be caused by wet or contaminated fuel or by an extended IDLE mode time, for example.

If after three Ignition mode 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 FO to notify that the burner fire has gone out.

NOTE: Before resetting the controller after the auto relight function has failed, be sure to find the cause of the burner not being operational (e.g., wet or contaminated fuel, mechanical problem, etc.).

WARNING

Do not attempt any service on the burner without first disconnecting the main power supply to the furnace. Make sure there is no hot ash in the burn chamber or furnace.

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.

To enable/disable the Auto Relight function:

1. 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. The burner will operate normally until the burner auger is empty and the fire goes out.

To start Clean Out Mode:

1. Press the Auger Jog button three times within two seconds. The Clean Out Mode light will turn on and the transfer auger will be disabled. To speed the process, press and hold the Auger Jog button.

To cancel Clean Out Mode:

1. Press the Auger Jog button three times within two seconds. 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 reset auger and fan settings to factory default settings:

1. Press the Power button to turn off the controller; then, while pressing and holding the IDLE mode and buttons, press the Power button to turn on the controller.

To reset controller settings to factory default settings and perform Self-Test:

1. 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. Controller settings will be reset to the factory default settings, the LED display will flash **888** and the controller will perform a Self-Test.

NOTE: To reset ALL settings to factory default, it is necessary to reset the auger and fan settings and the controller settings using the procedures above.

2. During the Self-Test, the following will occur:

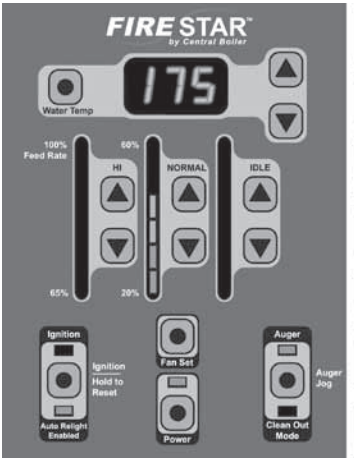
    a. The LED display will first indicate the burner temperature, then the water temperature and finally the center section of the display digits will flash.

    b. The system will operate in HI mode for 10 seconds.

    c. The ignition process will begin (see How the Gas Ignitor Starts). The system will operate in NORMAL mode for 1 minute.

    d. After a delay of 10 seconds, all outputs will be disabled and the controller will shut off.

DISPLAY READOUT DEFINITIONS



Low Water Alarm

High Water Temperature

Back Burn Alarm

Fire Out Alarm

Control Panel Locked

Control Panel Unlocked

Gas Mode

Alarms

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 LO until the water level is above the sensor. Refer to the furnace owner's manual for procedure to correct low water situation.

High Water Temperature: the LED display will flash HI until the water temperature drops below 195˚F.

Back Burn: the LED display will flash b b 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 has dropped.

Fire Out: the LED display will flash FO 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 enable Auto Relight to attempt lighting the burner again.

Silent Fire Out: the IDLE light bar will flash until the water temperature drops low enough and at least 30 seconds in IDLE mode pass.

NOTE: When operating in IDLE mode, if the burner temperature falls below 2/3 the Burner Temperature Setpoint, the controller will go into Silent Fire Out mode. The augers and fan will turn off and the IDLE light bar will flash until the water temperature falls below the Water Temperature Setpoint and at least 30 seconds have passed.

Controller Lock

The controller can be locked at any time to prevent unauthorized operation. After locking the controller while turned off, it will not be possible to start the controller or change any settings until it is unlocked. The controller may also be locked while it is operating. After locking the controller while turned on, it will not be possible to turn the controller off or change settings.

To lock the controller:

Rapidly press the **Water Temp** button four times. The LED display will indicate LOC for five seconds.

To unlock the controller:

Rapidly press the **Water Temp** button four times. The LED display will indicate UL for several seconds.

Power Off

To turn the controller on or off, press and hold the **Power** button for at least one second. After turning off the controller, release the **Power** button for at least one second before turning power back on.

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 enabled once power returns.

Troubleshooting/System Restarting

If there appears to be a system error, attempt to restart the system. 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.

FOR DEALER USE ONLY

CHANGING *FIRE*STAR CONTROLLER VARIABLES

Software Version 1.3

The *FIRE*STAR control relies on several variables for operation. The control panel has been programmed with factory default settings. If fine-tuning is desired, the variables can be changed.

To enter Setup mode:

Press and hold the Water Temp button for 7 seconds until the LED display changes from the water temperature to a "1."

Changing Control Variables:

While in Setup mode, select the control variable you want to change (see Selecting Control Variables). To make changes, press the **Water Temp** button. The current value is displayed. Press the or buttons to modify the setting. Press the **Water Temp** button to accept the value and return to the selection menu.

Selecting Control Variables:

There are 11 variables that may be changed within the setup mode. To select a variable while in Setup Mode, press the Water Temporbuttons until the number representing the variable appears in the display. The following list indicates each variable's number, name, the default factory settings, and a brief description of the function.

1. **Water Temperature Setpoint: 175 (˚F)**

   When the water temperature is above this setting, the control will change to IDLE mode.

2. **IDLE to NORMAL Differential: 2 (˚F)**

   When the water temperature is less than the Water Temperature Setpoint minus the IDLE to NORMAL Differential, the controller will change from IDLE mode to NORMAL mode. For example, with the default factory settings, the controller will change from IDLE mode to NORMAL mode when the water temperature is less than 185˚F – 2˚F (or 183˚F).

3. **NORMAL to HI Differential: 2 (˚F)**

   When the water temperature is less than the Water Temperature Setpoint minus the IDLE to NORMAL Differential minus the NORMAL to HI Differential, the controller will change from NORMAL mode to HI mode. For example, with the default factory settings, the controller will change from NORMAL mode to HI mode when the water temperature is less than 185˚F – 2˚F – 2˚F (or 181˚F).

4. **Restart Time: 10 (minutes)**

   Time that must pass before the controller will change from NORMAL mode to HI mode, even if the water temperature is low enough and the burner temperature is high enough.

5. **Burner Temperature Setpoint: 300 (˚F)**

   When operating in NORMAL or HI mode, the controller constantly checks the burner temperature. If the burner temperature is below the Burner Temperature Setpoint, the controller will immediately change from HIGH mode to NORMAL mode. If Auto Relight is enabled, Gas Ignition is started.

NOTE: Burner Temperature Setpoint + Gas Differential can never exceed 470˚F. For example, at default settings, Burner Temperature Setpoint can only be increased to a maximum of 370 (Burner Temperature Setpoint of 370˚F + Gas Differential of 100˚F = 470˚F). Lowering Gas Differential will allow a higher Burner Temperature Setpoint to be set.

NOTE: When operating in IDLE mode, if the burner temperature falls below 2/3 the Burner Temperature Setpoint, the controller will go into Silent Fire Out mode. The augers and fan will turn off and the IDLE light bar will flash until the water temperature falls below the Water Temperature Setpoint and at least 30 seconds have passed.

6. **Gas Differential: 100 (˚F)**

   The controller will operate in Ignition mode until the burner temperature reaches the Burner Temperature Setpoint plus the Gas Differential.

7. **Gas Burn Time: 10 (minutes)**

   Maximum time that the controller will operate in Gas Ignition mode.

8. **Fire Out Time: 5 (minutes)**

   When the Auto Relight function is disabled, the time the controller will wait before checking the burner temperature and changing to Fire Out mode.

9. **Water Temp Offset: 0 (˚F)**

   Providing a means of manually calibrating the water temperature, the Water Temp Offset is the number of degrees that will be added or subtracted from all temperature readings.

10. **Burner Differential: 50 (˚F)**

    The controller can be in HI mode only when the burner temperature is above the Burner Temperature Setpoint plus the Burner Differential.

    The Burner Differential can only be set as high as the Gas Differential setting.

11. **Hardware Mode: 0 (Maxim)**

    Select 0 (default) to operate the *FIRE*STAR with a Maxim furnace; select 1 to operate with a Bio-Advantage power burner.

    NOTE: Setting #11 must correspond to the correct auger delay setting. Press and hold the HI ▼ and ▲ buttons. The IDLE light bar will display the current auger delay setting. If the top half of the light bar is lit, the controller is in the auger delay setting for the Maxim. If the bottom half of the light bar is lit, the controller is in the auger delay setting for the Bio-Advantage. Press the IDLE ▼ or ▲ buttons to modify the setting.

To exit Setup Mode:

Wait 15 seconds (while not pressing any buttons) and the controller will automatically exit Setup Mode.

TECHNICAL SPECIFICATIONS

These tables indicate the settings for the various modes and the corresponding values. Default values are shaded. For example, the value at setting 3 for Maxim IDLE mode fan voltage is 5.00 Volts.

	MAXIM					
	FAN VOLTAGE (V)			AUGER OFF TIME (SEC)		
SETTING	IDLE	NORMAL	HI	IDLE	NORMAL	HI
1	4.00	4.00	4.60	600	42	19
2	4.50	4.20	4.95	330	39	18
3	5.00	4.40	5.29	300	35	16
4	5.50	4.60	5.64	270	32	14
5	6.00	4.80	6.00	240	29	13
6	6.50	5.00	6.35	210	26	12
7	7.00	5.20	6.70	180	23	11
8	7.00	5.50	7.00	150	19	10

	BIO-ADVANTAGE					
	FAN VOLTAGE (V)			AUGER OFF TIME (SEC)		
SETTING	IDLE	NORMAL	HI	IDLE	NORMAL	HI
1	4.00	4.038	5.20	600	35	11
2	4.50	4.29	5.60	330	30	10
3	5.00	4.58	6.00	300	27	9
4	5.50	4.92	6.40	270	22	8
5	6.00	5.21	6.82	240	18	7
6	6.50	5.51	7.20	210	14	6
7	7.00	5.80	7.60	180	12	5
8	7.00	6.01	7.99	150	11	5

TROUBLESHOOTING

Primary EEPROM Failure (System will attempt to auto-correct): If the system detects failed EEPROM hardware, it will halt operations and flash "EEE." If this occurs, shut down the board and attempt both manual resets. If the problem persists, contact Central Boiler.

Secondary EEPROM Failure: If the EEPROM containing fan and auger settings has failed, the system will halt operations and the auger LEDs will illuminate as follows:

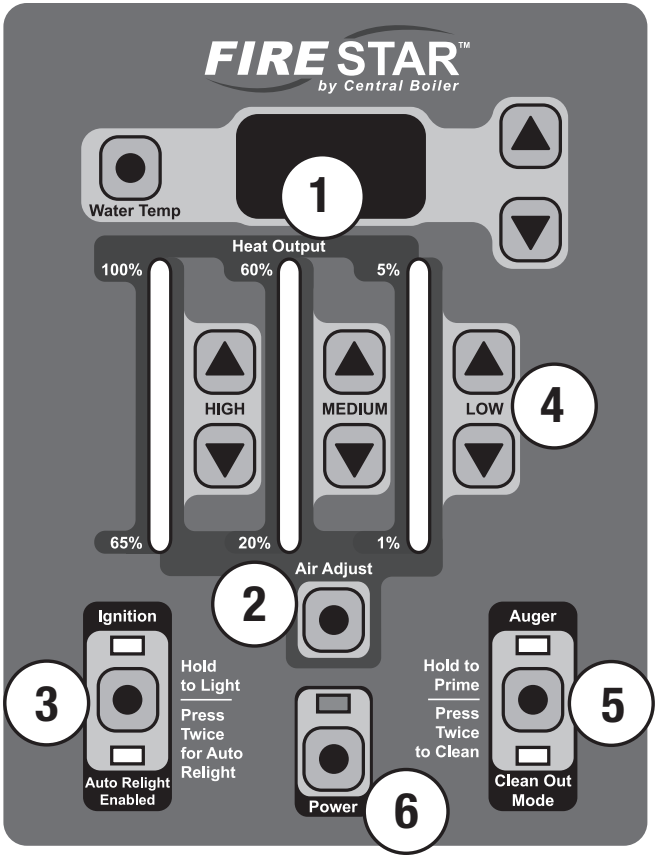
HI - Top half of light bar lit
NORMAL - Bottom half of light bar lit
IDLE - Top half of light bar lit

If this occurs, shut down the board and attempt both manual resets. If the problem persists, contact Central Boiler.

FireStar Control Panel
Operating Instructions and Controller Variables
Software Version 1.4 and 1.5

UNDERSTANDING THE FIRESTAR CONTROL PANEL

Before operating the FireStar Control Panel, become familiar with the information the control panel provides and the procedures for making changes to settings. The control panel has been programmed with factory default settings. If fine-tuning is desired, refer to the appropriate section of these operating instructions for more information.



1. 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.

2. The **Air Adjust** button may be used in conjunction with the HIGH, MEDIUM and LOW and buttons to change the air 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.

3. The **Ignition** button starts the Gas Ignitor and may be used to enable/disable the Auto Relight mode.

4. The feed rate settings in each of the three modes (HIGH / MEDIUM / LOW) may be changed here. During operation, the light bar will indicate the feed rate 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.

5. The **Auger** button may be used to manually control the burner and transfer augers and/or to enable Clean Out Mode. The Auger light is on any time the burner auger is running.

6. 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.

INITIAL START-UP

NOTE: Before starting the furnace, make sure that (1) the proper amount of Corrosion Inhibitor 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 furnace is on and (4) the gas supply for the gas ignitor and the gas valve are both turned on.

1. Press the **Power** button. Upon startup, the controller will display the software version number followed by a brief lamp test. The LED display will indicate the actual system 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 enters the burn chamber.

3. To start the Gas Ignitor, press and hold the **Ignition** button until the LED display indicates SAS and the burner fan operates. During ignition, the ignition light will stay on.

4. Press the **Ignition** button twice within one second to enable the Auto Relight function. The Auto Relight Enabled light will turn on.

NOTE: If the LED display indicates SAS during ignition but the ignition light is off, the ignition control has detected a problem and disabled the gas burner. Ensure there is an adequate gas supply and/or contact your dealer for assistance.

HOW THE GAS IGNITOR OPERATES

The ignition process is a series of steps that automatically occur to ensure the Gas Ignitor starts properly before the system begins to operate. During ignition, the following will take place:

1. The burner fan will operate to provide air for combustion.

2. Once the pressure switch senses air flow, it will energize the gas ignition module.

3. Both the transfer and burner augers run, delivering fuel to the burn chamber.

4. The gas ignition module ignites the gas burner to start burning the fuel in the burn chamber.

5. The gas burner will continue to burn until the burn chamber reaches a high enough temperature to sustain burning the fuel, or for 10 minutes, at which time the controller will turn off the gas burner.

HOW THE BURNER OPERATES

To best utilize the fuel and obtain the most efficiency, the controller automatically changes from MEDIUM to HIGH mode when the water temperature drops and then back to MEDIUM once the water temperature rises. When the water temperature reaches the water temperature setting, the controller will change to LOW mode. The controller will again change to MEDIUM mode when the water temperature drops. This cycle repeats as necessary to maintain the system water temperature.

CHANGING FIRESTAR CONTROL PANEL SETTINGS

NOTE: Until you become familiar with the operation of your FireStar control panel, consult your Central Boiler dealer before making changes to the factory default settings.

Water Temperature

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

HIGH, MEDIUM and LOW Modes

Changes in system heat load, fuel quality and a number of other conditions may make it desirable to change the feed rate to the burner in one or more of the three operating modes.

To view the current feed rate setting:

During operation, the light bar will indicate the feed rate setting for the mode the controller is currently in.

To view all feed rate settings:

1. Press any of the or buttons for the HIGH, MEDIUM or LOW modes. The light bars will display the current feed rate settings.

To change the feed rate settings:

1. In each mode (HIGH / MEDIUM / LOW), you can press the ▼ button to decrease the feed rate setting or press the ▲ button to increase the feed rate setting. The new feed rate setting will be displayed on the light bar.

Air Adjust

If the feed rate is changed for any mode (HIGH / MEDIUM / LOW), it may be necessary to change the air setting for that mode to optimize burner operation.

To view the current air settings:

1. Press and hold the **Air Adjust** ◉ button. The light bars will display the current air settings.

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. For LOW mode, increasing or decreasing the setting will increase or decrease the length of time the fan runs.

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) and the controller is in MEDIUM or HIGH mode, 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 burner temperature is too low.

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 setting in LOW mode is not set high enough to sustain the fire.

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. The burner will operate normally until the burner auger is empty and the fire goes out.

To start Clean Out Mode:

Press the **Auger** button three times within two seconds. 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.

To cancel Clean Out Mode:

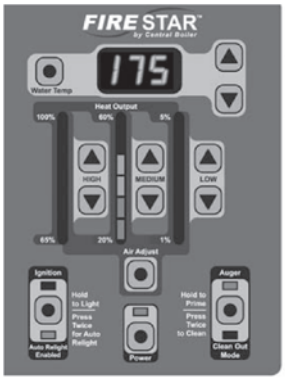
Press the **Auger** button three times within two seconds. The Clean Out Mode light will turn off and the burner and transfer augers will run as normal.

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 auger and air settings to factory default settings:

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

DISPLAY READOUT DEFINITIONS



LO	Low Water Alarm
HI	High Water Temperature
b b	Back Burn Alarm
FO	Fire Out Alarm
LOC	Control Panel Locked
UL	Control Panel Unlocked
GAS	Gas Ignition
EF	EEPROM Failure

Alarms

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

LO **Low Water:** the LED display will flash LO until the water level is above the sensor. Refer to the furnace owner's manual for procedure to correct low water situation.

HI **High Water Temperature:** the LED display will alternately flash HI and the water temperature if the water temperature reaches 200˚F/93˚C. The LED will continue to alternate between HI 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 feed rate settings in one or all of the three modes (HIGH / MEDIUM / LOW).

Back Burn: the LED display will flash bb 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 FO . 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 FO . 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.

EEPROM Failure: contact your dealer.

Controller Lock

The controller can be locked at any time to prevent unauthorized operation. After locking the controller while turned off, it will not be possible to start the controller or change any settings until it is unlocked. The controller may also be locked while it is operating. After locking the controller while turned on, it will not be possible to turn the controller off or change settings.

To lock the controller:

Rapidly press the **Water Temp** button four times. The LED display will indicate LOC for five seconds.

To unlock the controller:

Rapidly press the **Water Temp** button four times. The LED display will indicate UL 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 enabled once power returns.

WARNING

Do not attempt any service on the furnace without first disconnecting the main power supply to the furnace. Make sure there is no hot ash in the furnace.

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.

FOR DEALER USE ONLY

CHANGING FIRESTAR CONTROLLER VARIABLES FOR MAXIM® M175

Software Versions 1.4 and 1.5

The FireStar controller relies on several variables for operation. The control panel has been programmed with factory default settings. If fine-tuning is desired, the variables can be changed.

To Enter Setup Mode:

Press and hold the **Water Temp** button for 7 seconds until the LED display changes from the water temperature to a "1."

Changing Control Variables:

While in Setup Mode, select the control variable you want to change (see Selecting Control Variables). To make changes, press the **Water Temp** button. The current value is displayed. Press the or buttons to modify the setting. Press the **Water Temp** button to accept the value and return to the selection menu.

Selecting Control Variables:

There are 10 variables that may be changed within the setup mode. To select a variable while in Setup Mode, press the **Water Temp** or buttons until the number representing the variable appears in the display. The following list indicates each variable's number, name, the default factory settings, and a brief description of the function.

1. **Water Temperature Setpoint: 175 (˚F)**
   When the water temperature is above this setting, the control will change to LOW mode.

2. **LOW to MEDIUM Differential: 2 (˚F)**
   When the water temperature is less than the Water Temperature Setpoint minus the LOW to MEDIUM Differential, the controller will change from LOW mode to MEDIUM mode. For example, with the default factory settings, the controller will change from LOW mode to MEDIUM mode when the water temperature is less than 175˚F – 2˚F (or 173˚F).

3. **MEDIUM to HIGH Differential: 4 (˚F)**
   When the water temperature is less than the Water Temperature Setpoint minus the LOW to MEDIUM Differential minus the MEDIUM to HIGH Differential, the controller will change from MEDIUM mode to HIGH mode. For example, with the default factory settings, the controller will change from MEDIUM mode to HIGH mode when the water temperature is less than 175˚F – 2˚F – 4˚F (or 169˚F).

4. **Restart Time: 10 (minutes)**
   Time that must pass before the controller will change from MEDIUM mode to HIGH mode, even if the water temperature is low enough and the burner temperature is high enough.

5. **Burner Temperature Setpoint: 300 (˚F)**
   When operating in MEDIUM or HIGH mode, the controller constantly checks the burner temperature. If the burner temperature is below the Burner Temperature Setpoint, the controller will immediately change from HIGH mode to MEDIUM mode. If Auto Relight is enabled, Gas Ignition is started.

NOTE: When operating in LOW mode, if the burner temperature falls below 2/3 the Burner Temperature Setpoint, the controller will turn off the augers and fan and the LOW light bar will flash until the water temperature falls below the Water Temperature Setpoint and at least 30 seconds have passed.

6. **Gas Differential: 100 (˚F)**
   The controller will operate in Ignition mode until the burner temperature reaches the Burner Temperature Setpoint plus the Gas Differential.

7. **Gas Burn Time: 10 (minutes)**
   Maximum time that the controller will operate in Gas Ignition mode.

8. **Fire Out Time: 5 (minutes)**
   When the Auto Relight function is disabled, the time the controller will wait before checking the burner temperature and changing to Fire Out mode.

9. **Water Temp Offset: 0 (˚F)**
   Providing a means of manually calibrating the water temperature, the Water Temp Offset is the number of degrees that will be added or subtracted from all temperature readings.

10. **Burner Differential: 50 (˚F)**
    The controller can be in HIGH mode only when the burner temperature is above the Burner Temperature Setpoint plus the Burner Differential.

    The Burner Differential can only be set as high as the Gas Differential setting.

To Exit Setup Mode:

Wait 15 seconds (while not pressing any buttons) and the controller will automatically exit Setup Mode.

Changing/Viewing Auger Settings:

Press and hold the **HIGH** ▼ and ▲ buttons.

The MEDIUM light bar will display the current transfer auger setting. This setting is a percentage of time from 75% to 250% compared to the burner auger setting. Each step represents 25%. Default is 150%. Press the **MEDIUM** ▼ or ▲ buttons to modify this setting.

The LOW light bar will display the current burner auger setting. This setting is a duration of time from 1 to 5 seconds. Each setting represents 1 second. Default is 3 seconds. Press the **LOW** ▼ or ▲ buttons to modify this setting.

NOTE: Changing the burner auger "on" time will correspondingly change the burner auger "off" time. For example, if setting is 3 seconds on and 10 seconds off, changing the "on" time to 1 second will automatically change the "off" time to 3 seconds.

To Restore Controller Settings to Factory Default Settings and Perform Self-Test:

1. 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. Controller settings will be reset to the factory default settings, the LED display will flash and the controller will perform a Self-Test.

2. During the Self-Test, the following will occur:

   a. The LED display will first indicate the burner temperature, then the water temperature and finally the LED display will flash .

   b. The system will operate in HIGH mode for 10 seconds.

   c. The ignition process will begin and will operate for 1 minute (see How the Gas Ignitor Operates).

   d. After a delay of 10 seconds, all outputs will be disabled and the controller will shut off.

To Restore Auger and Fan Settings to Factory Default Settings:

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

NOTE: To restore ALL settings to factory default, it is necessary to restore the controller settings and the auger and fan settings.

TROUBLESHOOTING

Primary EEPROM Failure (System will attempt to auto-correct): If the controller detects failed EEPROM hardware, it will halt operations and flash EF . If this occurs, restore all settings to factory default and restart the controller. If the problem persists, contact Central Boiler.

Secondary EEPROM Failure: If the EEPROM containing fan and auger settings has failed, the controller will halt operations and the auger LEDs will illuminate as follows:

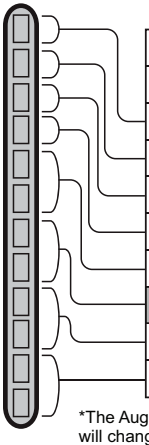
HIGH - Top half of light bar lit
MEDIUM - Bottom half of light bar lit
LOW - Top half of light bar lit

If this occurs, restore all settings to factory default and restart the controller. If the problem persists, contact Central Boiler.

NOTE: The processor in the FireStar controller is similar to the processors in computers. All processors are subject to requiring an occasional restart in order to reset information.

TECHNICAL SPECIFICATIONS

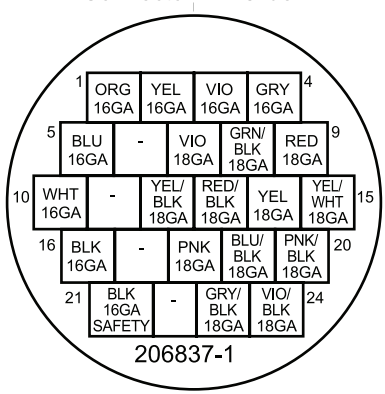
The following illustration indicates the steps for the various modes and the corresponding values. Default values are shaded. For example, the default value for HIGH mode fan voltage is 5.75 Volts.



FAN VOLTAGE (V)			AUGER OFF TIME (SEC)*		
HIGH	MEDIUM	LOW	HIGH	MEDIUM	LOW
7.00	6.00	5.00	10	19	125
6.75	5.75	5.00	11	23	150
6.50	5.50	5.00	12	26	190
6.25	5.25	5.00	13	29	220
6.00	5.00	5.00	14	32	260
5.75	4.75	5.00	16	35	330
5.50	4.62	5.00	18	39	550
5.25	4.50	5.00	19	42	1000

*The Auger Off Time values shown are for the default 3-second “on” time. These values will change automatically if the “on” time is changed. See Changing/Viewing Auger Settings.

Main Harness
Connector Pin Order

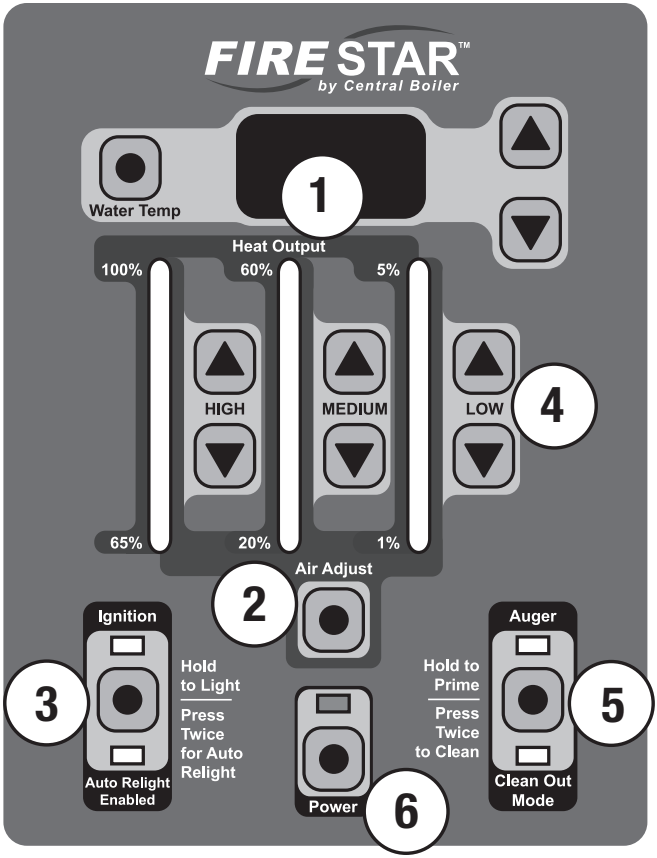


FireStar Control Panel
Operating Instructions and Controller Variables

Software Version 2.1

UNDERSTANDING THE FIRESTAR CONTROL PANEL

Before operating the FireStar Control Panel, become familiar with the information the control panel provides and the procedures for making changes to settings. The control panel has been programmed with factory default settings. If fine-tuning is desired, refer to the appropriate section of these operating instructions for more information.



1. 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.

2. The **Air Adjust** button may be used in conjunction with the HIGH, MEDIUM and LOW and buttons to change the air 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.

3. The **Ignition** button starts the Gas Ignitor and may be used to enable/disable the Auto Relight mode.

4. The feed rate settings in each of the three modes (HIGH / MEDIUM / LOW) may be changed here. During operation, the light bar will indicate the feed rate 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.

5. The **Auger** button may be used to manually control the burner and transfer augers and/or to enable Clean Out Mode. The Auger light is on any time the burner auger is running.

6. 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.

INITIAL START-UP

NOTE: Before starting the furnace, make sure that (1) the proper amount of Corrosion Inhibitor 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 furnace is on and (4) the gas supply for the gas ignitor and the gas valve are both turned on.

1. Press the **Power** button. Upon startup, the controller will display the software version number followed by a brief lamp test. The LED display will indicate the actual system water temperature.

2. Fuel must be present in the burn chamber for the system to burn properly. To deliver fuel to the burn chamber, operate 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. To start the Gas Ignitor, press and hold the **Ignition** button until the LED display indicates GAS and the burner fan operates. When a flame is present at the gas ignitor, the ignition light will stay on.

4. Press the **Ignition** button twice within one second to enable the Auto Relight function. The Auto Relight Enabled light will turn on.

NOTE: If the LED display indicates GAS during ignition but the ignition light is off, the ignition control has detected a problem and disabled the gas burner. Ensure there is an adequate gas supply and/or contact your dealer for assistance.

IGNITION SEQUENCE

The ignition sequence is a series of steps that automatically occur to ensure the gas ignitor starts properly before the system begins to operate. During ignition, the following will take place:

1. The burner fan will operate to provide air for combustion.

2. Once the pressure switch senses air flow, it will energize the gas ignition module.

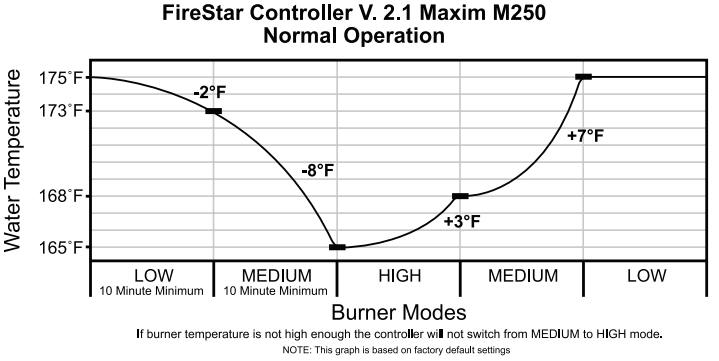
3. The gas ignition module turns on the gas valve and spark electrode, igniting the gas burner to start burning the fuel in the burn chamber.

4. Both the transfer and burner augers run for 60 seconds, delivering fuel to the burn chamber.

5. The gas burner will continue to burn until the burn chamber reaches a high enough temperature to sustain burning the fuel, or for 10 minutes, at which time the controller will turn off the gas burner.

HOW THE BURNER OPERATES

To best utilize the fuel and obtain the most efficiency, the controller automatically changes from MEDIUM to HIGH mode when the water temperature drops and then back to MEDIUM once the water temperature rises. When the water temperature reaches the water temperature setting, the controller will change to LOW mode. The controller will again change to MEDIUM mode when the water temperature drops. This cycle repeats as necessary to maintain the system water temperature.



CHANGING FIRESTAR CONTROL PANEL SETTINGS

NOTE: Until you become familiar with the operation of your FireStar control panel, consult your Central Boiler dealer before making changes to the factory default settings.

Water Temperature

Normally the system water temperature will be displayed. To display the water temperature setting, press the **Water Temp** button. The default setting is 175˚F/79˚C. To raise or lower the water temperature setting, press and hold the **Water Temp** button; then press the ▲ or ▼ button. The water temperature setting can be set between 150˚F/65˚C and 190˚F/88˚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˚F or, if it is higher, as a decimal representation (e.g., 1500˚F will display as 1.5).

HIGH, MEDIUM and LOW Modes

Changes in system heat load, fuel quality and a number of other conditions may make it desirable to change the feed rate to the burner in one or more of the three operating modes.

To view the current feed rate setting:

During operation, the light bar will indicate the feed rate setting for the mode the controller is currently in.

To view all feed rate settings:

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

To change the feed rate settings:

1. In each mode (HIGH / MEDIUM / LOW), you can press the ▼ button to decrease the feed rate setting or press the ▲ button to increase the feed rate setting. The new feed rate setting will be displayed on the light bar.

Air Adjust

If the feed rate is changed for any mode (HIGH / MEDIUM / LOW), it may be necessary to change the air setting for that mode to optimize burner operation.

To view the current air settings:

1. Press and hold the **Air Adjust** ● button. The light bars will display the current air settings.

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. For LOW mode, increasing or decreasing the setting will increase or decrease the length of time the fan runs.

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) and the controller is in HIGH mode, the controller will automatically start the gas ignition sequence in an attempt to relight and raise the burner temperature. If the controller is in LOW or MEDIUM mode, the controller will go into Cold Burner mode (see Display Readout Definitions).

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.

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. The burner will operate normally until the burner auger is empty and the fire goes out.

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:

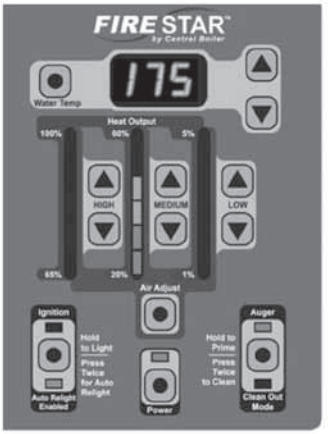
Press the **Auger** button two times within one second. The Clean Out Mode light will turn off and the burner and transfer augers will run as normal.

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 auger and air settings to factory default settings:

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

DISPLAY READOUT DEFINITIONS



LO	Low Water Alarm
HI	High Water Temperature
b b	Back Burn Alarm
FO	Fire Out Alarm
LOC	Control Panel Locked
UL	Control Panel Unlocked
GAS	Gas Ignition
EF	EEPROM Failure

Alarms

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

LO **Low Water:** the LED display will flash LO until the water level is above the sensor. Refer to the furnace owner's manual for procedure to correct low water situation.

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

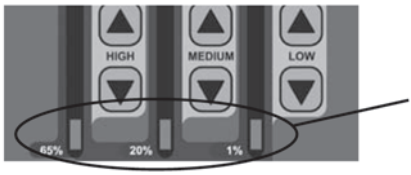
There is an external limit switch that can also lock the controller in the high water temperature alarm. This limit switch will trip at approximately 200˚F/93˚C and automatically reset at 165˚F/74˚C.

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

Back Burn: the LED display will flash bb 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 FO . 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 FO . 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.



Bottom three LED lights will flash to indicate Cold Burner (see description below)

Cold Burner: the bottom three LED lights will flash if at any time the burner temperature is less than the burner temperature setting, the water temperature is still high, and the controller is in LOW or MEDIUM mode. The controller will stop the fuel supply and turn off the fan until the water temperature drops low enough for the controller to change to HIGH mode. No action is required.

EEPROM Failure: contact your dealer.

Controller Lock

The controller can be locked at any time to prevent unauthorized operation. After locking the controller while turned off, it will not be possible to start the controller or change any settings until it is unlocked. The controller may also be locked while it is operating. After locking the controller while turned on, it will not be possible to turn the controller off or change settings.

To lock the controller:

Rapidly press the **Water Temp** button four times. The LED display will indicate LOC for five seconds.

To unlock the controller:

Rapidly press the **Water Temp** button four times. The LED display will indicate UL 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 enabled once power returns.

WARNING

Do not attempt any service on the furnace without first disconnecting the main power supply to the furnace. Make sure there is no hot ash in the furnace.

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.

FOR DEALER USE ONLY

CHANGING FIRESTAR CONTROLLER VARIABLES FOR MAXIM® M250

Software Version 2.1

The FireStar controller relies on several variables for operation. The control panel has been programmed with factory default settings. If fine-tuning is desired, the variables can be changed.

To Enter Setup Mode:

Press and hold the **Water Temp** button for 7 seconds until the LED display changes from the water temperature to a "1."

Changing Control Variables:

While in Setup Mode, select the control variable you want to change (see Selecting Control Variables). To make changes, press the **Water Temp** button. The current value is displayed. Press the or buttons to modify the setting. Press the **Water Temp** button to accept the value and return to the selection menu.

Selecting Control Variables:

There are 10 variables that may be changed within the setup mode. To select a variable while in Setup Mode, press the **Water Temp** or buttons until the number representing the variable appears in the display. The following list indicates each variable's number, name, the default factory settings, and a brief description of the function.

1. **Water Temperature Setpoint: 175 (˚F)**
   Range: 150-190
   When the water temperature is above this setting, the control will change to LOW mode.

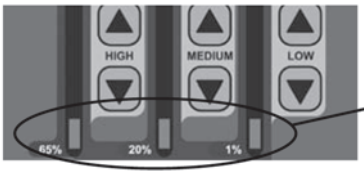
2. **LOW to MEDIUM Differential: 2 (˚F)**
   Range: 1-20
   When the water temperature is less than the Water Temperature Setpoint minus the LOW to MEDIUM Differential, the controller will change from LOW mode to MEDIUM mode. For example, with the default factory settings, the controller will change from LOW mode to MEDIUM mode when the water temperature is less than 175˚F – 2˚F (or 173˚F).

3. **MEDIUM to HIGH Differential: 8 (˚F)**
   Range: 1-30
   When the water temperature is less than the Water Temperature Setpoint minus the LOW to MEDIUM Differential minus the MEDIUM to HIGH Differential, the controller will change from MEDIUM mode to HIGH mode. For example, with the default factory settings, the controller will change from MEDIUM mode to HIGH mode when the water temperature is less than 175˚F – 2˚F – 8˚F (or 165˚F).

NOTE: Changing this variable will automatically change the HIGH to MEDIUM differential. The HIGH to MEDIUM Differential is a ratio of the MEDIUM to HIGH Differential and a numeric value from 1 to 10. When the water temperature is this far above the temperature at which the controller changed into HIGH mode, the controller will change to MEDIUM mode.

4. **Restart Time: 10 (minutes)**
   Range: 0-990
   Time that must pass before the controller will change from MEDIUM mode to HIGH mode, even if the water temperature is low enough and the burner temperature is high enough.

5. **Burner Temperature Setpoint: 300 (˚F)**
   Range: 100-470
   When operating in MEDIUM or HIGH mode, the controller constantly checks the burner temperature. If the burner temperature is below the Burner Temperature Setpoint, the controller will immediately change from HIGH mode to MEDIUM mode. If Auto Relight is enabled, Gas Ignition is started.



Bottom three LED lights will flash to indicate Cold Burner (see description below)

Cold Burner: the bottom three LED lights will flash if at any time the burner temperature is less than the burner temperature setting, the water temperature is still high, and the controller is in LOW or MEDIUM mode. The controller will stop the fuel supply and turn off the fan until the water temperature drops low enough for the controller to change to HIGH mode. No action is required.

6. **Gas Differential: 100 (˚F)**
   Range: 1-100
   The controller will operate in Ignition mode until the burner temperature reaches the Burner Temperature Setpoint plus the Gas Differential.

7. **Gas Burn Time: 10 (minutes)**
   Range: 1-20
   Maximum time that the controller will operate in Gas Ignition mode.

8. **Fire Out Time: 10 (minutes)**
   Range: 1-20
   When the Auto Relight function is disabled, the time the controller will wait before checking the burner temperature and changing to Fire Out mode.

9. **Water Temp Offset: 0 (˚F)**
   Range: -10 to 10
   Providing a means of manually calibrating the water temperature, the Water Temp Offset is the number of degrees that will be added or subtracted from all temperature readings.

10. **Burner Differential: 200 (˚F)**
    Range: 0-500
    The controller can be in HIGH mode only when the burner temperature is above the Burner Temperature Setpoint plus the Burner Differential.

    The Burner Differential can only be set as high as the Gas Differential setting.

To Exit Setup Mode:

Wait 15 seconds (while not pressing any buttons) and the controller will automatically exit Setup Mode.

Changing/Viewing Auger Settings:

Press and hold the **HIGH** ▼ and ▲ buttons.

The MEDIUM light bar will display the current isolation auger setting. This setting is a percentage of time from 100% to 275% compared to the feed auger setting. Each step represents 25%. Default is 150%. Press the **MEDIUM** ▼ or ▲ buttons to modify this setting.

The LOW light bar will display the current feed auger setting. This setting is a duration of time from 1 to 3 seconds. Each setting represents 1 second. Default is 3 seconds. Press the **LOW** ▼ or ▲ buttons to modify this setting.

NOTE: Changing the feed auger "on" time will correspondingly change the feed auger "off" time. For example, if setting is 3 seconds on and 10 seconds off, changing the "on" time to 1 second will automatically change the "off" time to 3 seconds.

To Restore Controller Settings to Factory Default Settings and Perform Self-Test:

1. 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. Controller settings will be reset to the factory default settings, the LED display will flash **888** and the controller will perform a Self-Test.

2. During the Self-Test, the following will occur:

   a. The LED display will first indicate the burner temperature, then the water temperature and finally the LED display will flash **---** .

   b. The system will operate in HIGH mode for 10 seconds.

   c. The ignition process will begin and will operate for 1 minute (see How the Gas Ignitor Operates).

   d. After a delay of 10 seconds, all outputs will be disabled and the controller will shut off.

To Restore Auger and Fan Settings to Factory Default Settings:

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

NOTE: To restore ALL settings to factory default, it is necessary to restore the controller settings and the auger and fan settings.

TROUBLESHOOTING

Primary EEPROM Failure (System will attempt to auto-correct): If the controller detects failed EEPROM hardware, it will halt operations and flash EF. If this occurs, restore all settings to factory default and restart the controller. If the problem persists, contact Central Boiler.

Secondary EEPROM Failure: If the EEPROM containing fan and auger settings has failed, the controller will halt operations and the auger LEDs will illuminate as follows:

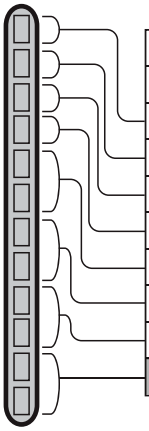
HIGH - Top half of light bar lit
MEDIUM - Bottom half of light bar lit
LOW - Top half of light bar lit

If this occurs, restore all settings to factory default and restart the controller. If the problem persists, contact Central Boiler.

NOTE: The processor in the FireStar controller is similar to the processors in computers. All processors are subject to requiring an occasional restart in order to reset information.

TECHNICAL SPECIFICATIONS

The following illustration indicates the steps for the various modes and the corresponding values. Default values are shaded. For example, the default value for HIGH mode fan voltage is 6.25 Volts.



FAN VOLTAGE (V)			AUGER OFF TIME (SEC)*		
HIGH	MEDIUM	ON TIME (seconds)	HIGH	MEDIUM	LOW
8.00	5.75	60	13	27	99
7.75	5.50	56	14	31	112
7.50	5.25	51	15	36	131
7.25	5.00	47	16	42	156
7.00	4.75	42	18	52	192
6.75	4.50	38	20	67	266
6.50	4.25	34	22	92	366
6.25	4.00	30	24	147	599

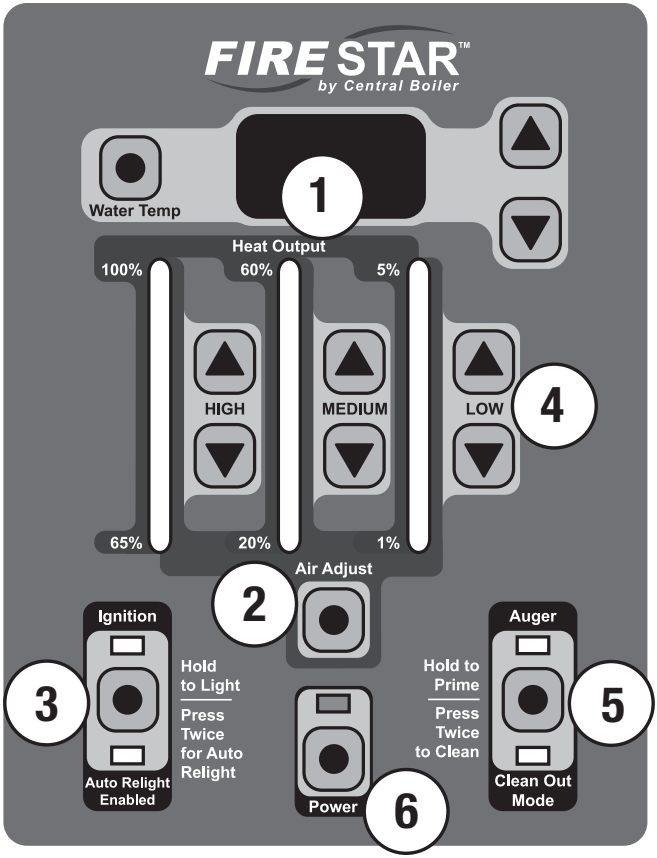
*The Auger Off Time values shown are for the default 3-second “on” time in HIGH and MEDIUM modes, and for the default 1-second “on” time in LOW mode. These values will change automatically if the “on” time is changed. See Changing/Viewing Auger Settings.

FireStar Control Panel
Operating Instructions and Controller Variables

Software Version 2.2

UNDERSTANDING THE FIRESTAR CONTROL PANEL

Before operating the FireStar Control Panel, become familiar with the information the control panel provides and the procedures for making changes to settings. The control panel has been programmed with factory default settings. If fine-tuning is desired, refer to the appropriate section of these operating instructions for more information.



1. 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.

2. The **Air Adjust** button may be used in conjunction with the HIGH, MEDIUM and LOW and buttons to change the air 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.

3. The **Ignition** button starts the Gas Ignitor and may be used to enable/disable the Auto Relight mode.

4. The feed rate settings in each of the three modes (HIGH / MEDIUM / LOW) may be changed here. During operation, the light bar will indicate the feed rate 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.

5. The **Auger** button may be used to manually control the burner and transfer augers and/or to enable Clean Out Mode. The Auger light is on any time the burner auger is running.

6. 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.

INITIAL START-UP

NOTE: Before starting the furnace, make sure that (1) the proper amount of Corrosion Inhibitor 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 furnace is on and (4) the gas supply for the gas ignitor and the gas valve are both turned on.

1. Press the **Power** button. Upon startup, the controller will display the software version number followed by a brief lamp test. The LED display will indicate the actual system water temperature.

2. Fuel must be present in the burn chamber for the system to burn properly. To deliver fuel to the burn chamber, operate 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. To start the Gas Ignitor, press and hold the **Ignition** button until the LED display indicates GAS and the burner fan operates. When a flame is present at the gas ignitor, the ignition light will stay on.

4. Press the **Ignition** button twice within one second to enable the Auto Relight function. The Auto Relight Enabled light will turn on.

NOTE: If the LED display indicates GAS during ignition but the ignition light is off, the ignition control has detected a problem and disabled the gas burner. Ensure there is an adequate gas supply and/or contact your dealer for assistance.

IGNITION SEQUENCE

The ignition sequence is a series of steps that automatically occur to ensure the gas ignitor starts properly before the system begins to operate. During ignition, the following will take place:

1. The burner fan will operate to provide air for combustion.

2. Once the pressure switch senses air flow, it will energize the gas ignition module.

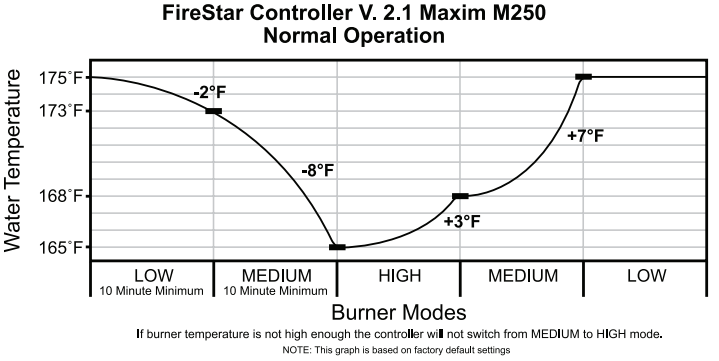
3. The gas ignition module turns on the gas valve and spark electrode, igniting the gas burner to start burning the fuel in the burn chamber.

4. Both the transfer and burner augers run for 60 seconds, delivering fuel to the burn chamber.

5. The gas burner will continue to burn until the burn chamber reaches a high enough temperature to sustain burning the fuel, or for 10 minutes, at which time the controller will turn off the gas burner.

HOW THE BURNER OPERATES

To best utilize the fuel and obtain the most efficiency, the controller automatically changes from MEDIUM to HIGH mode when the water temperature drops and then back to MEDIUM once the water temperature rises. When the water temperature reaches the water temperature setting, the controller will change to LOW mode. The controller will again change to MEDIUM mode when the water temperature drops. This cycle repeats as necessary to maintain the system water temperature.



CHANGING FIRESTAR CONTROL PANEL SETTINGS

NOTE: Until you become familiar with the operation of your FireStar control panel, consult your Central Boiler dealer before making changes to the factory default settings.

Water Temperature

Normally the system water temperature will be displayed. To display the water temperature setting, press the **Water Temp** button. The default setting is 175˚F/79˚C. To raise or lower the water temperature setting, press and hold the **Water Temp** button; then press the ▲ or ▼ button. The water temperature setting can be set between 150˚F/65˚C and 190˚F/88˚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˚F or, if it is higher, as a decimal representation (e.g., 1500˚F will display as 1.5).

HIGH, MEDIUM and LOW Modes

Changes in system heat load, fuel quality and a number of other conditions may make it desirable to change the feed rate to the burner in one or more of the three operating modes.

To view the current feed rate setting:

During operation, the light bar will indicate the feed rate setting for the mode the controller is currently in.

To view all feed rate settings:

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

To change the feed rate settings:

1. In each mode (HIGH / MEDIUM / LOW), you can press the ▼ button to decrease the feed rate setting or press the ▲ button to increase the feed rate setting. The new feed rate setting will be displayed on the light bar.

Air Adjust

If the feed rate is changed for any mode (HIGH / MEDIUM / LOW), it may be necessary to change the air setting for that mode to optimize burner operation.

To view the current air settings:

1. Press and hold the **Air Adjust** ● button. The light bars will display the current air settings.

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. For LOW mode, increasing or decreasing the setting will increase or decrease the length of time the fan runs.

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) and the controller is in HIGH mode, the controller will automatically start the gas ignition sequence in an attempt to relight and raise the burner temperature. If the controller is in LOW or MEDIUM mode, the controller will go into Cold Burner mode (see Display Readout Definitions).

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 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.

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. The burner will operate normally until the burner auger is empty and the fire goes out.

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:

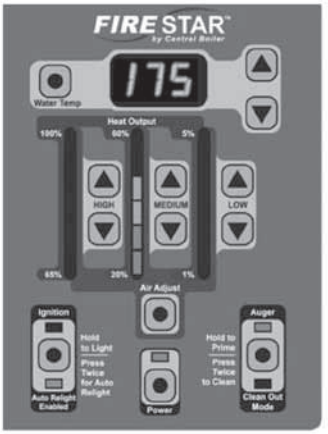
Press the **Auger** button two times within one second. The Clean Out Mode light will turn off and the burner and transfer augers will run as normal.

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 auger and air settings to factory default settings:

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

DISPLAY READOUT DEFINITIONS



LO	Low Water Alarm
HI	High Water Temperature
b b	Back Burn Alarm
FO	Fire Out Alarm
LOC	Control Panel Locked
UL	Control Panel Unlocked
GAS	Gas Ignition
EF	EEPROM Failure

Alarms

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

LO **Low Water:** the LED display will flash LO until the water level is above the sensor. Refer to the furnace owner's manual for procedure to correct low water situation.

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

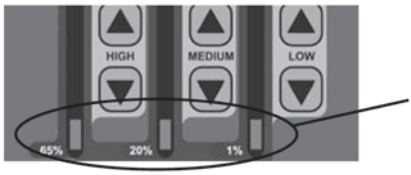
There is an external limit switch that can also lock the controller in the high water temperature alarm. This limit switch will trip at approximately 200˚F/93˚C and automatically reset at 165˚F/74˚C.

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

Back Burn: the LED display will flash bb 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 FO . 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 FO . 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.



Cold Burner: the bottom three LED lights will flash if at any time the burner temperature is less than the burner temperature setting, the water temperature is still high, and the controller is in LOW or MEDIUM mode. The controller will stop the fuel supply and turn off the fan until the water temperature drops low enough for the controller to change to HIGH mode. No action is required.

EEPROM Failure: contact your dealer.

Controller Lock

The controller can be locked at any time to prevent unauthorized operation. After locking the controller while turned off, it will not be possible to start the controller or change any settings until it is unlocked. The controller may also be locked while it is operating. After locking the controller while turned on, it will not be possible to turn the controller off or change settings.

To lock the controller:

Rapidly press the **Water Temp** button four times. The LED display will indicate LOC for five seconds.

To unlock the controller:

Rapidly press the **Water Temp** button four times. The LED display will indicate UL 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 enabled once power returns.

WARNING

Do not attempt any service on the furnace without first disconnecting the main power supply to the furnace. Make sure there is no hot ash in the furnace.

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.

FOR DEALER USE ONLY

CHANGING FIRESTAR CONTROLLER VARIABLES FOR MAXIM® M250

Software Version 2.2

The FireStar controller relies on several variables for operation. The control panel has been programmed with factory default settings. If fine-tuning is desired, the variables can be changed.

To Enter Setup Mode:

Press and hold the **Water Temp** button for 7 seconds until the LED display changes from the water temperature to a "1."

Changing Control Variables:

While in Setup Mode, select the control variable you want to change (see Selecting Control Variables). To make changes, press the **Water Temp** button. The current value is displayed. Press the or buttons to modify the setting. Press the **Water Temp** button to accept the value and return to the selection menu.

Selecting Control Variables:

There are 10 variables that may be changed within the setup mode. To select a variable while in Setup Mode, press the **Water Temp** or buttons until the number representing the variable appears in the display. The following list indicates each variable's number, name, the default factory settings, and a brief description of the function.

1. **Water Temperature Setpoint: 175 (˚F)**
   Range: 150-190
   When the water temperature is above this setting, the control will change to LOW mode.

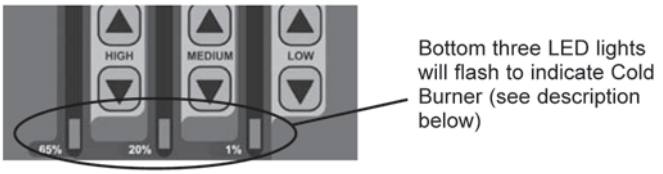
2. **LOW to MEDIUM Differential: 2 (˚F)**
   Range: 1-20
   When the water temperature is less than the Water Temperature Setpoint minus the LOW to MEDIUM Differential, the controller will change from LOW mode to MEDIUM mode. For example, with the default factory settings, the controller will change from LOW mode to MEDIUM mode when the water temperature is less than 175˚F – 2˚F (or 173˚F).

3. **MEDIUM to HIGH Differential: 8 (˚F)**
   Range: 1-30
   When the water temperature is less than the Water Temperature Setpoint minus the LOW to MEDIUM Differential minus the MEDIUM to HIGH Differential, the controller will change from MEDIUM mode to HIGH mode. For example, with the default factory settings, the controller will change from MEDIUM mode to HIGH mode when the water temperature is less than 175˚F – 2˚F – 8˚F (or 165˚F).

NOTE: Changing this variable will automatically change the HIGH to MEDIUM differential. The HIGH to MEDIUM Differential is a ratio of the MEDIUM to HIGH Differential and a numeric value from 1 to 10. When the water temperature is this far above the temperature at which the controller changed into HIGH mode, the controller will change to MEDIUM mode.

4. **Restart Time: 10 (minutes)**
   Range: 0-990
   Time that must pass before the controller will change from MEDIUM mode to HIGH mode, even if the water temperature is low enough and the burner temperature is high enough.

5. **Burner Temperature Setpoint: 300 (˚F)**
   Range: 100-470
   When operating in MEDIUM or HIGH mode, the controller constantly checks the burner temperature. If the burner temperature is below the Burner Temperature Setpoint, the controller will immediately change from HIGH mode to MEDIUM mode. If Auto Relight is enabled, Gas Ignition is started.



Cold Burner: the bottom three LED lights will flash if at any time the burner temperature is less than the burner temperature setting, the water temperature is still high, and the controller is in LOW or MEDIUM mode. The controller will stop the fuel supply and turn off the fan until the water temperature drops low enough for the controller to change to HIGH mode. No action is required.

6. **Gas Differential: 100 (˚F)**
   Range: 1-100
   The controller will operate in Ignition mode until the burner temperature reaches the Burner Temperature Setpoint plus the Gas Differential.

7. **Gas Burn Time: 10 (minutes)**
   Range: 1-20
   Maximum time that the controller will operate in Gas Ignition mode.

8. **Fire Out Time: 10 (minutes)**
   Range: 1-20
   When the Auto Relight function is disabled, the time the controller will wait before checking the burner temperature and changing to Fire Out mode.

9. **Water Temp Offset: 0 (˚F)**
   Range: -10 to 10
   Providing a means of manually calibrating the water temperature, the Water Temp Offset is the number of degrees that will be added or subtracted from all temperature readings.

10. **Burner Differential: 200 (˚F)**
    Range: 0-500
    The controller can be in HIGH mode only when the burner temperature is above the Burner Temperature Setpoint plus the Burner Differential.

    The Burner Differential can only be set as high as the Gas Differential setting.

To Exit Setup Mode:

Wait 15 seconds (while not pressing any buttons) and the controller will automatically exit Setup Mode.

Changing/Viewing Auger Settings:

Press and hold the **HIGH** ▼ and ▲ buttons.

The MEDIUM light bar will display the current isolation auger setting. This setting is a percentage of time from 100% to 188% compared to the feed auger setting. Each step represents 13%. Default is 126%. Press the **MEDIUM** ▼ or ▲ buttons to modify this setting.

The LOW light bar will display the current feed auger setting. This setting is a duration of time from 1 to 3 seconds. Each setting represents 1 second. Default is 3 seconds. Press the **LOW** ▼ or ▲ buttons to modify this setting.

NOTE: Changing the feed auger "on" time will correspondingly change the feed auger "off" time. For example, if setting is 3 seconds on and 10 seconds off, changing the "on" time to 1 second will automatically change the "off" time to 3 seconds.

To Restore Controller Settings to Factory Default Settings and Perform Self-Test:

1. 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. Controller settings will be reset to the factory default settings, the LED display will flash **888** and the controller will perform a Self-Test.

2. During the Self-Test, the following will occur:

   a. The LED display will first indicate the burner temperature, then the water temperature and finally the LED display will flash **- - -** .

   b. The system will operate in HIGH mode for 10 seconds.

   c. The ignition process will begin and will operate for 1 minute (see How the Gas Ignitor Operates).

   d. After a delay of 10 seconds, all outputs will be disabled and the controller will shut off.

To Restore Auger and Fan Settings to Factory Default Settings:

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

NOTE: To restore ALL settings to factory default, it is necessary to restore the controller settings and the auger and fan settings.

TROUBLESHOOTING

Primary EEPROM Failure (System will attempt to auto-correct): If the controller detects failed EEPROM hardware, it will halt operations and flash EF. If this occurs, restore all settings to factory default and restart the controller. If the problem persists, contact Central Boiler.

Secondary EEPROM Failure: If the EEPROM containing fan and auger settings has failed, the controller will halt operations and the auger LEDs will illuminate as follows:

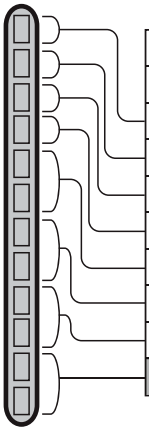
HIGH - Top half of light bar lit
MEDIUM - Bottom half of light bar lit
LOW - Top half of light bar lit

If this occurs, restore all settings to factory default and restart the controller. If the problem persists, contact Central Boiler.

NOTE: The processor in the FireStar controller is similar to the processors in computers. All processors are subject to requiring an occasional restart in order to reset information.

TECHNICAL SPECIFICATIONS

The following illustration indicates the steps for the various modes and the corresponding values. Default values are shaded. For example, the default value for HIGH mode fan voltage is 5.75Volts.



FAN VOLTAGE (V)			AUGER OFF TIME (SEC)*		
HIGH	MEDIUM	ON TIME (seconds)	HIGH	MEDIUM	LOW
7.50	5.75	60	13	27	99
7.25	5.50	56	14	31	112
7.00	5.25	51	15	36	131
6.75	5.00	47	16	42	156
6.50	4.75	42	18	52	192
6.25	4.50	38	20	67	266
6.00	4.25	34	22	92	366
5.75	4.00	30	24	147	599

*The Auger Off Time values shown are for the default 3-second “on” time in HIGH and MEDIUM modes, and for the default 1-second “on” time in LOW mode. These values will change automatically if the “on” time is changed. See Changing/Viewing Auger Settings.