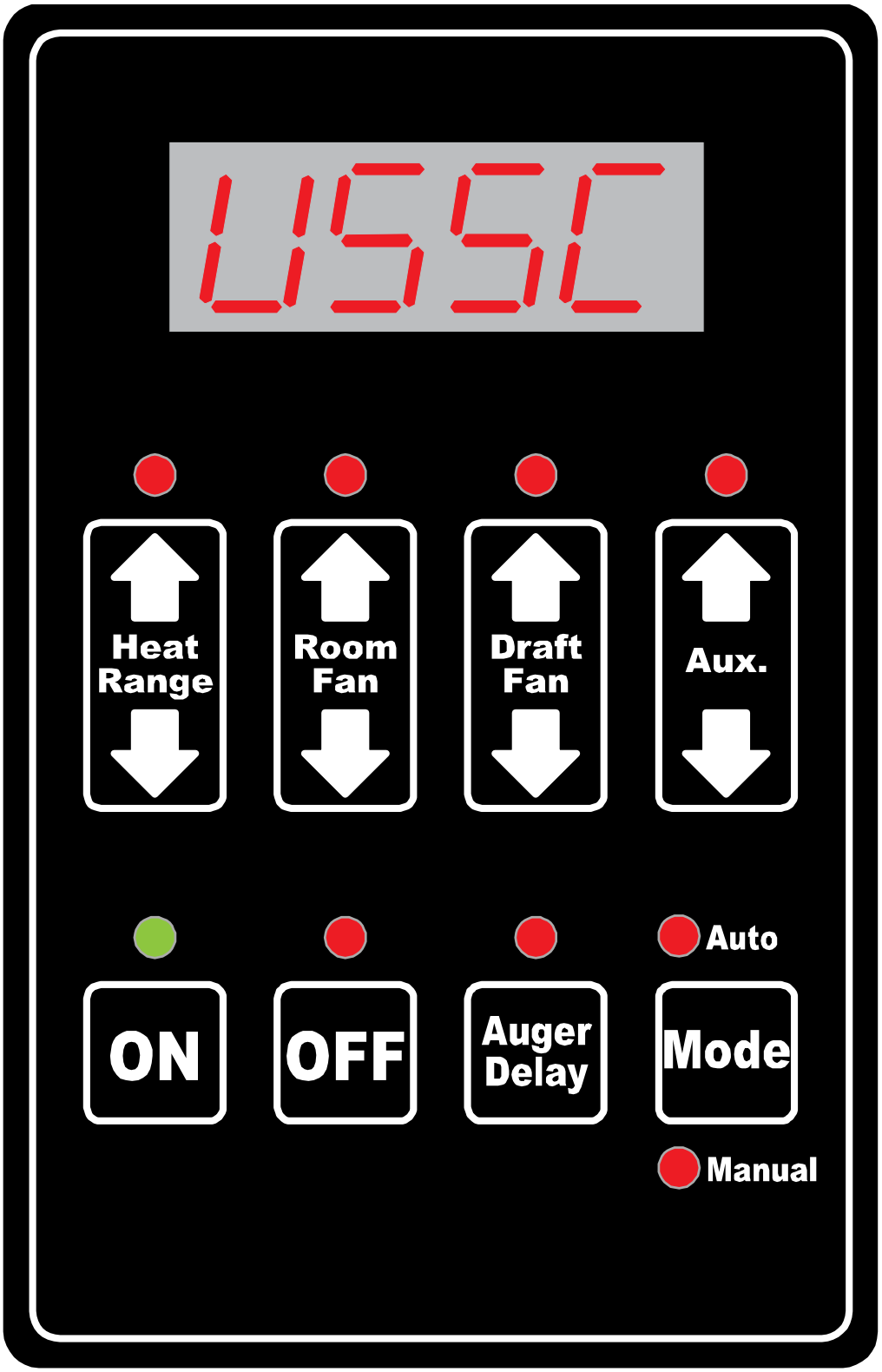
4 Digit 6300 Multifuel Furnace Control
Operating Manual Firmware Revision 7.01



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1. Overview including diagram

The 4 Digit 6300 Multifuel Furnace Control automates the process of burning select fuels to produce heat. The control allows you to precisely control the amount of fuel dispensed into the burn chamber, the amount of air used to burn the fuel, and the amount of warm air circulating in the room. Figure 1 shows a diagram of the Furnace Control.

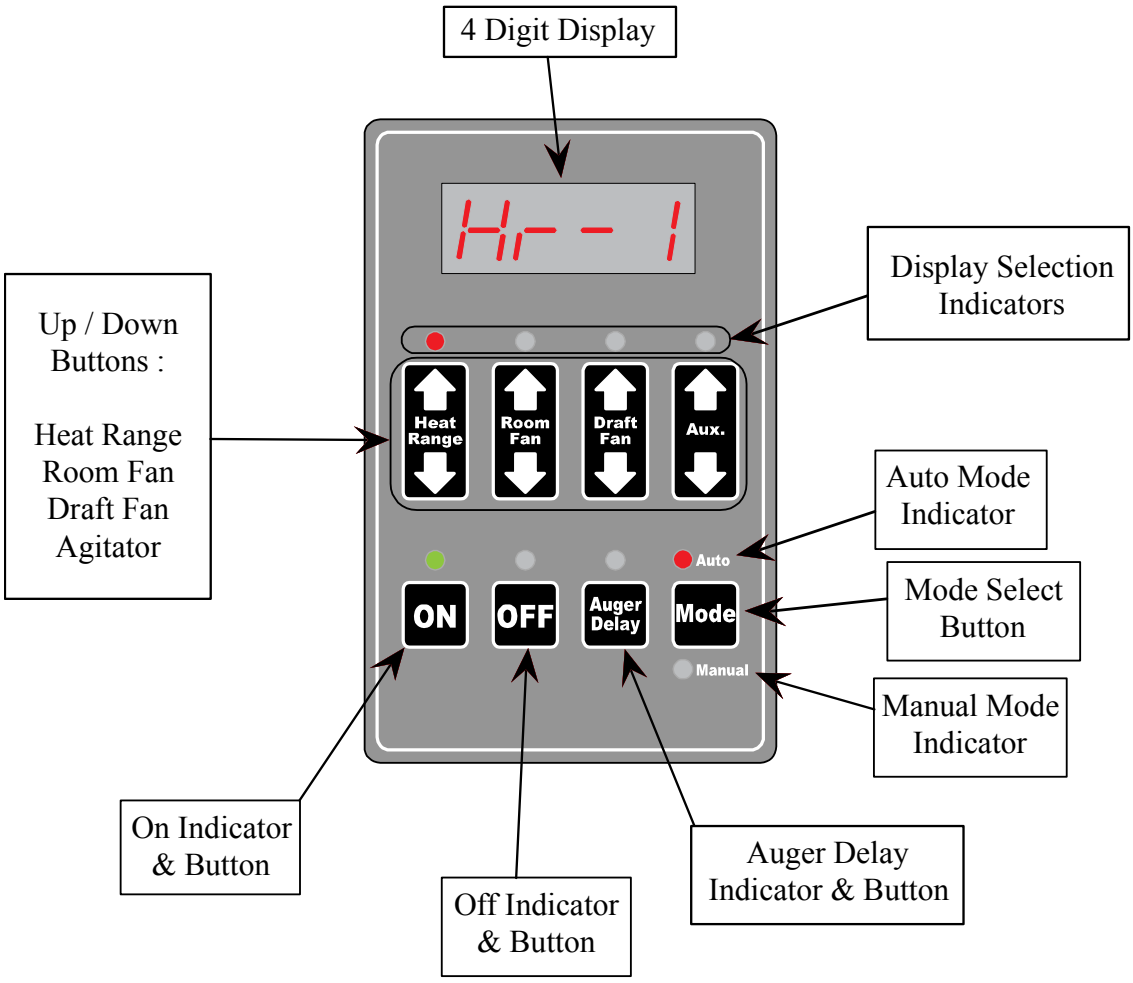

Figure 1 : Furnace Control Display Panel Components

2. Basics of combustion

The amount of heat produced by the furnace is proportional to the rate of fuel that is burned, and this rate is controlled by the heat range setting. In order to maintain combustion of the fuel at the desired rate, the air provided to the burn chamber by the exhaust or combustion fan must be maintained precisely. Too little air will result in a flame that is non-energetic or "lazy". If the fuel continues to flow with too little air for long enough, the burn pot will fill with too much fuel and the fire will go out. Too much air will result in a flame that is over-active. The flame in this situation is typically very blue at the bottom and resembles a blow torch. If this situation continues, the fuel in the burn pot will be consumed and the fire will go out. Matching the amount of air required for combustion to the fuel rate is the primary objective in effectively burning fuels of various types and qualities in your Multifuel Furnace. The furnace has been calibrated in the factory to burn the most typical fuels efficiently, but ultimately, if this doesn't provide the optimum flame for your fuel of choice, the air to fuel ratio can be easily adjusted to almost any fuel type and quality to burn effectively by following the procedures detailed in the remainder of this manual.

3. Before starting the furnace for the first time

Make sure to test the functionality of your new furnace's outputs before starting your first fire. After following the procedures for setting up the furnace do the following :

1. Plug in the furnace and verify that the display shows "USSC" followed by the version number which should correspond to the version number of this document.
2. Make sure that the hopper and burn pot are empty.
3. Check to make sure there are no foreign materials in the burn chamber.
4. Make sure that the front door and hopper lid are closed.
5. Press the ON button.
6. Verify that the ON LED comes on (blinking) and the display shows Cr-1. In addition, the Heat Range indicator should be lit and the Auto Mode Indicator should be lit. If any other LEDs are on or flashing, consult the section on “Display Indicators” for possible reasons.
7. You should hear the exhaust motor come on immediately and all other systems should remain off.
8. After 4 minutes, the auger and agitator should begin turning for short periods of time.
9. The room fans will not turn on until either the exhaust has reached the warm stove temperature or the heat range is greater than 2.
10. Press the OFF button and verify that the auger motor turns for a few seconds and all lights on the control turn off.
11. Fill the hopper with fuel.
12. You're now ready to start your Multifuel furnace.

4. Lighting the furnace

1. Make sure the furnace is off and the burn pot is initially empty.
2. Place a small handful of wood or fire starting pellets in the burn pot.
3. Squirt a small amount of fire starter gel on top of the pellets in the burn pot.
4. Light the fire starter and wait for approximately 1 minute for the fire to start actively burning.
5. Press the ON button and use the Heat Range Buttons to select a heat range of 1 ("Cr-1"). This is the corn feed setting. For wood pellets press and hold the Heat Range Up and Heat Range Down buttons together for 3 seconds. The display will change to ("Pr-1").
6. Your furnace is equipped with a manual damper that should be positioned in the center of the High and Low Air marks. If you wish to control the combustion air manually, press the mode button to light the MANUAL LED and adjust the damper to obtain the proper air to fuel ratio otherwise, make sure the mode button is set for Auto Mode.
7. Four minutes after turning the furnace on, the auger will begin to feed fuel into the burn pot. If the fuel is not consumed quickly enough on startup, you may need to delay the fuel feed by pressing the Auger Delay Button. This will cause the auger and agitator to stop for 1 minute. If the fuel is being consumed too quickly as the furnace starts, you may need to provide more fuel by pressing and holding the ON button to force the auger to turn.
8. Once the fuel starts to burn aggressively, the furnace has been successfully started and you can follow the procedures below to fine tune the operation to your desired setting.

5. Adjusting the heat range

Increasing the heat range causes more fuel to be consumed and increases the heat output of the furnace. Use the Heat Range Up or Down buttons to change the amount of fuel to be burned from level 1 to level 5. If you are burning shelled corn with a moisture content of approximately 11% in your Multifuel furnace, a heat setting of 1 delivers 5.00 pounds of corn per hour, and a heat setting of 5 can provide up to 20.00 pounds of corn per hour. We have found that the factory fuel settings are a good balance between heat output and fuel consumption. In addition, the furnace will cycle between high and low when more fuel is added due to the room air duct maximum temperature being exceeded. We suggest leaving the fuel settings alone and adjusting the draft fan settings to make your fuel burn better. By default, the settings for the room fan, the draft fan, and the agitator are automatic meaning that they will be set by the control depending on the value of the heat range. If you wish to adjust the fuel to air ratio or change the frequency of the agitator movement, you can fine tune these settings as described in the following sections.

To quickly modify the corn delivery rates for heat setting 1 and heat setting 5 from the defaults of 5.00 and 13.0 pounds per hour, press the HEAT RANGE DOWN and AUX DOWN buttons to adjust the minimum fuel (heat range 1) or use the HEAT RANGE UP and AUX UP buttons to adjust the maximum fuel (heat range 5). Once the value for the fuel rate is displayed, use the AUX UP and AUX DOWN buttons to raise or lower the feed rate, and press ON to save the changes and exit or OFF to exit without saving any changes.

6. Adjusting the draft fan or combustion air mixture (flame quality)

Adjusting the draft fan is the most direct means of changing the quality of the flame in the burn chamber. One way to tell if your fuel to air mixture ratio is set correctly is to watch the level of fuel in the burn pot. If it increases over time, increase the amount of air. If instead, it decreases over time, decrease the amount of air. There are three methods of adjusting the air flow for the furnace.

Method 1 : Changing the fan speeds for low and high settings directly.

The fan speed can be adjusted for a fan setting of 1 and a fan setting of 9. From the factory, the low air value is 150 of 500, and the high air value is 400 of 500. A proportional distribution is made from the low end to the high end across all heat settings. To adjust fan output levels for fan setting 1 and fan setting 9 from the defaults of 150 and 400, press the DRAFT FAN DOWN and AUX DOWN buttons to adjust the minimum output level (fan setting 1) or use the DRAFT FAN UP and AUX UP buttons to adjust the high level (fan setting 9). Once the value for the fan setting is displayed, use the AUX UP and AUX DOWN buttons to raise or lower the setting, and press ON to save the changes and exit or OFF to exit without saving any changes. Small adjustments to these values can make large variations to the output air so don't change them by much before confirming whether too much of a change is being made.

Method 2 : Changing the draft fan setting.

When you press either the DRAFT FAN UP button or the DRAFT FAN DOWN, the Draft Fan Indicator is lit and the Heat Range Indicator goes out. The display will show "Df-A" for automatic, or "Df-1" to "Df-9" for manual settings. If you do not press another button for 5 seconds, the display will revert back to the Heat Range Setting mode. While the Draft Fan Indicator is lit, the DRAFT FAN UP and DRAFT FAN DOWN buttons can be used to adjust the draft fan speed. To produce more air, try increasing the draft fan setting to a value of 1 greater than the heat range setting. For example, if you are running at a heat range setting of 2, and the fire needs more air, try a draft fan setting of 3 first, then go higher if needed. While you can quickly change the draft fan settings, it make take several minutes for the effect of changing the value to show up in the quality of the flame so be sure to wait until the flame seems to stabilize for at least ten minutes before deciding whether the change you have made is appropriate. To reduce the air, try decreasing the draft fan setting to a value of 1 less than the heat range setting. For example, if you are operating at a heat range setting of 2 and the fire needs less air, try a draft fan setting of 1. If you reach the draft fan limit of 1 or 9 in attempting to create the correct ratio, it may be necessary to try a different heat range setting to allow more adjustment of the heat range. When the draft fan setting is anything other than "DF-A" the Auto Indicator will flash if the control is in the Automatic mode. To return to an automatic setting for the draft fan, increase the value until "Df-A" is displayed. This will cause the draft fan to be set to the same value as the heat range as you change the heat range. If the setting for the draft fan is not automatic, any

adjustment made to the heat range setting will have to be made proportionally to the draft fan setting. This mixture ratio can vary depending on the fuel type and quality.

Method 3 : Manual control through the use of the Damper

If you wish to control the air flow by use of the damper only, the system can be put into manual mode by pressing the MODE button. In the Manual mode, the Manual Mode Indicator will be lit and the Automatic Mode Indicator will be off. In the Manual mode, the fan is operated at its highest setting, and the air can be tailored to suit your needs by moving the damper.

7. Viewing the room fan level (room heat output rate)

The room fan control is completely dependent on the measured temperatures. To determine how many of the two available room fans are running, use the ROOM FAN UP or ROOM FAN DOWN button. When you press either the ROOM FAN UP button or the ROOM FAN DOWN button, the Room Fan Indicator is lit and the Heat Range Indicator goes out. The display will show "Rf-0" for none, or "Rf-1" for 1 room fan or "Rf-2" for both room fans.

8. Adjusting the Auxiliary Output (Agitator)

Occasionally, it may be beneficial to modify the agitator output frequency. If for example, you are trying to burn corn with a high moisture content, reducing the frequency of agitator rotation may help allow the wet corn to dry on top of the coal bed before mixing it with the primary heat source. If on the other hand the fuel burns well but seems to clump together too much because the agitator is not moving enough, increasing the frequency of the agitator rotation may help reduce clumping in the fuel. By default, the agitator operates in the automatic mode where the setting is made to match the heat range setting. To change the frequency of agitator rotation, use the AUX UP or AUX DOWN buttons. When you press either the AUX UP or AUX DOWN button, the Aux Indicator is lit and the other setting indicators go out. The display will show "AU-A" for automatic or "AU-0" - "AU-9" for manual settings. If you do not press another button for 5 seconds, the display will revert to the Heat Range Setting mode. While the Aux Indicator is lit, the AUX UP and AUX DOWN buttons can be used to adjust the agitator rotation frequency. As with the Draft Fan and Room Fan settings, to return to an automatic setting for the agitator rotation frequency, increase the Aux level until "AU-A" is displayed. This will cause the agitator rotation frequency to be set to the same value as the heat range setting. When the Aux setting is manual (“AU-0” through “AU-9”), the Auto Indicator will flash unless the mode is set to Manual.

9. Auger Delay, Auger Bump, and Agitator Bump

Pressing the Auger Delay button causes the Auger and Agitator to stop moving for 1 minute. This can be cancelled by pressing the ON button. Pressing and holding the On button causes the Auger to be turned on continuously. These functions can be helpful when making adjustments to the furnace burn settings to maintain a fire while changing values or in recovering from delays in operation such as adding fuel to the hopper. When the furnace is off and cool, the AUX UP and AUX DOWN buttons can be used to rotate the agitator to make it easier to remove the burn pot for cleaning.

10. Combustion Chamber Pressure Switch

The combustion chamber pressure is monitored by a pressure switch located inside the furnace. If the door is opened during normal operation or a strong negative pressure is created in the room or a strong wind is blown into the flue, the furnace will increase the Draft Fan to full power to reduce the emission of smoke in the room. While this occurs, the Draft Fan Indicator will blink indicating that the combustion chamber has lost pressure, and the Auger and Agitator will stop turning. If the pressure switch is not maintained for 10 seconds(the door is open for example), the fuel feed will stop and the flame will go out.

11. Turning the furnace off

Pressing the OFF button will cause the furnace to enter a shutdown mode. If the furnace has reached operating temperature, the OFF Indicator will blink until the shutdown procedure succeeds in lowering the furnace temperature. The Room Fan will stay on to cool the furnace, and the Exhaust Fan will stay on to remove smoke and heat from the combustion chamber. The Agitator will stop. The Auger will bump the fuel out of the auger every few seconds to prevent the fuel in the auger from burning. Once the temperature of the burn chamber falls below about 105 degrees F and the pressure switch detects that the door is closed, the fans will stop and the Auger will run for a few seconds to purge the auger system of any burned fuel. At this point, the OFF Indicator will go out and the furnace will turn completely off. If during burning, the stove has reached the warm stove temperature (typically at a measured exhaust temperature of 150 degrees F), the shutdown procedure will also include a 15 minute shutdown timer that will keep the stove in the shutdown state for at least 15 minutes regardless of whether it is cool or pressure is detected. The 15 minute timer can be turned off by pressing the off button during shutdown. This will cause the system to exit shutdown and return to the “OFF” mode as soon as the door is closed and the stove is cool.

12. Error Codes

During normal operation, the furnace is constantly monitored for problems. In the event of an error condition, the furnace is stopped and an error code is displayed as follows :

Er 1 - The high limit temperature sensor was tripped.
- Inadequate ventilation,
- Room fan failure,
- Exhaust blockage,
- Electrical Open in over temperature switch or wiring

Er 2 - Furnace ran out of fuel in normal operation.
- Hopper empty
- Auger output failure or jam
- Flame or Fuel quality caused fire to go out
- Electrical Open in low temperature switch or wiring

Er 3 - The furnace was unable to reach the Room Fan On temperature within the startup time.
- Flame or Fuel quality caused the fire to burn too slowly or go out
- Auger output failure or jam
- Hopper empty on startup
- Electrical Open in low temperature switch or wiring

Er 4 - The power failed while the furnace was hot, and when power was restored, the fire was out.
- Power loss
- Electrical Open in low temperature switch or wiring

Er 5 - The Auger output fuse has blown.
- Auger motor jammed or bad

Er 6 - The Agitator output fuse has blown.
- Agitator motor jammed or bad

Er 7 - The Exhaust blower output fuse has blown.
- Exhaust Fan motor jammed or bad

Er 8 - The Room fan blower output fuse has blown.
- Room Fan motor jammed or bad

Er 9 - Zero Cross Input failed
- AC Supply frequency out of range
- Zero Cross Optocoupler Failure

Er10 - Interlock with master system lost

Er11 – Vacuum Switch Failure

13. Display Indicators

Several situations or events are indicated in normal operation by blinking display indicators or segments in the display :

Flashing On Indicator : This means that the furnace is in the “Lighting” state waiting for either a 3 minute timeout to begin burning or for the furnace to reach the warm temperature whichever comes first.

Flashing Off Indicator : This indicates that the furnace is in the “Shutdown” state waiting for the OFF button, or for a 15 minute period after the furnace was turned off, or for the furnace to cool down, or for the door to be closed.

Flashing dash in Heat Range Display : This indicates that the furnace is in the normal run mode and is ramping from the current heat range setting to the target heat range setting. Once the ramp is complete, the dash will stop flashing. For ramping from heat range 1 to 3, the default time is 12 minutes (90 seconds auger ramp time).

Flashing heat range value in Heat Range Display : For example, if the display is showing “hr-3” and the ‘3’ is blinking, this indicates that the furnace thermostat input is open and not calling for heat. While this is happening, the actual heat range value is 1 (low).

Flashing Automatic Mode Indicator : This indicates that the furnace is in normal operation and is running in the automatic mode. However, either the Draft Fan or Auxiliary setting is manually configured.

Solid Draft Fan Setting Indicator : This indicates that the furnace is in normal operation and that the vacuum sensor detects a loss of pressure either because the door is open or because there is a negative pressure in the room with respect to the exhaust. In this system it is normal for the Draft Fan LED to blink once every 5 seconds at low fan speeds.

Flashing Heat Range Setting Indicator : This indicates that the furnace is in normal operation and that an overtemperature condition exists causing the fuel to stop.

Flashing Auger Delay Indicator : This indicates that the furnace is in normal operation and that the hopper lid is open.

14. REC Factory Test

The REC Factory test is used in the factory where the electronics are manufactured to test the control function before the unit is shipped. To perform this test, press and hold the OFF and MODE buttons simultaneously for 3 seconds. To advance through the test, press any key unless otherwise noted in the test step.

Test Steps :

1. Seven Segment Cathode test - Each segment in the seven segment display area is turned on in turn.
2. Seven Segment Anode test - Each digit in the seven segment display area is turned on in turn.
3. Discrete Display LED test - Each LED indicator lamp is turned on in turn.
4. Full On Display test - All lamps on the display are turned on simultaneously.
5. Switch test - The display shows "S- 1". Press the following keys in sequence to verify switch operation and the displayed number will advance though each step :
   - Heat Range Up
   - Room Fan Up
   - Draft Fan Up
   - Aux Up
   - Heat Range Down
   - Room Fan Down
   - Draft Fan Down
   - Aux Down
   - On
   - Off
   - Auger Delay
   - Mode
6. EEProm Test - If the EEPROM test fails, the control will display "EEFL" otherwise the test is automatically advanced to the USSC Factory Test.

15. USSC Factory Test

The USSC Factory Test is used at the factory where the furnaces are assembled to test the functionality of the control and the furnace before the unit is shipped. To perform this test, press and hold the OFF and AUGER DELAY buttons simultaneously for 3 seconds. To advance through the test, press any key unless otherwise noted in the test step.

1. Exhaust Fan Output Test – The display will show “drft”. The exhaust fan is turned on full then reduced to a level just above the typical minimum pressure switch setting. The ON LED indicates whether the pressure sensor is detected. If the pressure switch is not detected, the fan ramps to full on for two seconds then returns to the previously established level if the pressure switch closes. If the Draft Fan Fuse is not blown and the fuse detection circuit is functioning, the Draft Fan LED will be lit and the other three top row LEDs will be off.
2. Room Fan 1 Output Test - The display will show “rfn1”. The room fan 1 is turned on full. If the Room Fan 1 Fuse is not blown and the fuse detection circuit is functioning, the Room Fan LED will be lit and the other three top row LEDs will be off.
3. Room Fan 2 Output Test - The display will show “rfn2”. The room fan 2 is turned on full. Since there is no blown fuse detection circuit on the daughter board fan, none of the top row LEDs should be lit.
4. Agitator Output Test - The display will show “agit”. The agitator motor is turned on full. If the Agitator (AUX) Fuse is not blown and the fuse detection circuit is functioning, the Aux LED will be lit and the other three top row LEDs will be off.
5. Auger Output Test - The display will show “augr”. The auger motor is turned on full. If the Auger Fuse is not blown and the fuse detection circuit is functioning, the Heat Range LED will be lit and the other three top row LEDs will be off.
6. Hopper Switch Test – The display will show “hppr”. If the hopper switch is open (lid is open), the ON LED will turn on otherwise, it will be off.
7. Thermostat Input Test – The display will show “stat”. If the thermostat input is shorted, the ON LED will turn on, otherwise, it will be off.
8. Interlock Switch Test – The display will show “intl”. If the interlock is made (closed), the ON LED will turn on otherwise, it will be off.
9. Fluegas Thermistor Test – The display will show the fluegas temperature in degrees F.
10. Vent Thermistor Test – The display will show the vent temperature in degrees F.
11. Ambient Thermistor Test – The display will show the temperature of the daughter board thermistor in degrees F.
12. AC Frequency Test - Displays the measured AC Frequency in hertz followed by the letter ‘H’.
13. Watchdog Reset – The watchdog timer is tested to ensure that the board can be reset. The message “BYE” is displayed until the watchdog resets the board.

16. Adjusting Operational Constants

To adjust the operation constants, press and hold the MODE and AUGER DELAY buttons simultaneously for 3 seconds. The display will show "C- 1". Use the HEAT RANGE UP or HEAT RANGE DOWN buttons to change the constant number (see the list of values below). When the desired constant is displayed, press the ON button to toggle between viewing and editing the value. While editing a parameter, use the AUX UP and AUX DOWN buttons to adjust the value to the desired point, then press ON again to return to the constant number list. Press the OFF button to exit the adjust operational constants mode.

- C- 1 - Reset to defaults (hold Mode and Auger Delay buttons for 3 seconds to reset all to defaults)
- C- 2 - Fuel Lbs Per Hour HR 1 (0-20.00) - This is the fuel rate in pounds per hour for a heat range setting of 1. The default is 5.00lbs.
- C- 3 - Fuel Lbs Per Hour HR 9 (0-20.00) - This is the fuel rate in pounds per hour for a heat range setting of 9. The default is 13.lbs. The fuel rates used between settings 1 and 9 are linearly interpolated between these two settings.
- C- 4 - Agitator On Percentage HR 1 (0-100) - This is the Percent On time for the Agitator for a setting of 1. The default is 25%.
- C- 5 - Agitator On Percentage HR 9 (0-100) - This is the Percent On time for the Agitator for a setting of 9. The default is 50%. The percent on time for the Agitator used between settings 1 and 9 are linearly interpolated between these two settings.
- C- 6 - Draft Fan Level HR 1 (0-500) - This is the Draft fan output level for a draft fan setting of 1. The default is 150/500.
- C- 7 - Draft Fan Level HR 9 (0-500) - This is the Draft fan output level for a draft fan setting of 9. The default is 400/500.
- C- 8 – Fuel Rate Type Compensation (50%-200%) – This parameter affects how much the auger runs to produce a given fuel rate. The default fuel rates are based on corn. This is the default setting for this parameter, or 100%. If the parameter is adjusted up, the auger rate is increased proportionally. If the fuel being used is less dense than corn (wood pellets for instance), it may be necessary to raise this parameter to compensate. This makes the programmed lbs per hour correspond to the particular fuel type. Typically, wood pellets need to be run at 120% to compensate for their lower density and slower travel through the auger system.
- C- 9 - Ramp Seconds for Increasing Level (0-300) - When the heat range setting is adjusted, the control will ramp from the current setting to the target setting to avoid abrupt changes in the outputs that could cause problems with the flame quality. The Ramp Seconds value sets the amount of time to spend on each heat range setting (1-9 pseudo ranges not 1-5 user ranges) as the current setting is ramping toward the target. If the current setting is ramping down toward a lower target, the ramp value is half this number. The default value is 120 seconds.
- C-10 - Startup Minutes for Detecting Warm Furnace - (10-60) This is the amount of time the control will wait for the furnace to reach the warm temperature (110

Degrees F) after the furnace has been started before shutting down and reporting an Error condition Err3. The default is 30 minutes.

- C-11 – Overtemp Setpoint - (0-700) This is the measured flue gas temperature that will cause an overtemp condition. In this condition, the control will stop augering fuel until the temperature returns to a safe operating point. The default is 575 degrees F.
- C-12 – Cutback Setpoint - (0-700) This is the measured flue gas temperature that will cause a cutback condition. In this condition, the control will ramp the heat range down based on the ramp seconds described above divided by 2 until the temperature falls below the cutback setpoint. The default is 550 degrees F.
- C-13 – Room Fan On Setpoint - (0-700) This is the temperature that the measured flue gas can reach before a the flue controlled foom fan turns on. If the measured temperature is higher than this setpoint, the control will turn on the flue controlled room fan. This variable also serves to indicate to the control that the stove is warm. If the measured temperature is higher than this setpoint, the stove is considered warm and will not create an Er 3. Whether or not the stove is warm also determines if the unit will recover from a power failure. If the stove is warm when power is lost and cold when it returns, it will shutdown with an Er 4 error. The default is 200 degrees F.
- C-14 – Cold Stove Setpoint - (0-700) This variable is used to determine when the furnace is cold and ready to be shut down. If during the shutdown sequence the measured temperature is less than this value, the furnace will stop running the fans to cool it off. The default is 120 degrees.
- C-15 – Low Temp Vent Heatrange – (0-9) This variable is used to control the vent controlled room fan. If the pseudo heat range (1-9) is greater than this number, the vent controlled room fan will turn on. If the pseudo heat range is less than this number, the vent controlled room fan will turn off. The default for this parameter is 3.
- C-16 – High Temp Vent Setpoint – (70-400) This variable is used to limit the maximum vent temperature. If the measured vent temperature is greater than the High Temp Vent Setpoint, the furnace will reduce the heat range by 1. If the vent temperature falls below the setpoint – 5, the heat range will ramp back to normal. The default for this setpoint is 225 degrees.
- C-17 – Auger Period in Seconds – (5-20) This is the fixed auger period. The on-time is calculated based on the setpoint fuel rate in lbs and the full on rate set in C-18. The default is 10.00 Seconds.
- C-18 – Full On Fuel Rate in Lbs/Hour – (7-40) This is the fuel rate that would be delivered if the auger was turned 100% of the time. This definition is for corn only (see proportional offset parameter C8). The default value for this parameter is 36 lbs of corn per hour.
- C-19 – Ignore Sense Errors (0-1) When this parameter is set to 1, the sensor errors including Interlock, and all fuse detection errors are disabled. The default is 0 (sense errors enabled).
- C-20 – Ignore Vacuum Switch (0-1) When this parameter is set to 1, the vacuum switch is ignored. The default is 0 (do not ignore the vacuum switch).

- C-21 – Bump Rate in Lbs (0-0.5) When the furnace is in shutdown, this parameter can be used to force a small amount of fuel to be pushed through the auger to keep the fuel in the auger from getting hot. The default is 0lbs per hour.
- C-22 – Purge Seconds (0-120) After shutdown, the auger can be run for a fixed amount of time to dump any fuel that may have become hot in the auger. By default, the auger will run in this purge mode for 30 seconds after shutting down.

17. Serial Communication

With a special serial adapter board and cable, the status of the furnace can be monitored by a pc. Any terminal emulation program that can operate at 300 Baud, No Parity, 8 Data Bits and 1 Stop bit may be used to monitor the furnace state. Every 4 seconds, a string of characters is sent by the furnace to the monitoring PC. The format of the string is decoded by the FurnaceLogger.exe application.

18. Reprogramming the processor

In the event that software revisions are made, they can be programmed into the unit via the special serial board and cable used in section 18 above. The new software will be supplied as a binary file with the extension .rom. The reprogramming software is only available for Windows PCs, and can be downloaded from http://www.roanokecontrols.com/download. The link to download the Reprogram Flash executable is currently setup_reprog_flash_v06.exe. After installing this program on the pc, select Atmel ATMega161 as the Target System from the top dropdown list. Select the com port from the com port drop down list, and then press the Load Binary File button to load the new software into the PC program. Power up the furnace (remove and reattach power cord) with the Aux Up and Down buttons held. The two upper most left digits in the display will begin to flash. Press the Program Flash button on the PC program and wait for the update complete message to be displayed. Power down the control and power it back up to confirm that the new version number has been updated.

19. Factory Defaults

To return the control to its original factory default settings, press and hold the AUX UP and AUX DOWN buttons together for three seconds.