

The dump zone temperature control is designed to operate one or more heat zones to prevent high boiler temperatures from occurring during low load conditions. This setting should be set 20° F above the operating limit setting with a maximum setting of 200° F. Also refer to the dump zone wiring instructions for specific use applications. See Appendix H for example dump zone wiring applications.

The ash temperature monitoring control incorporates a digital process controller for operating the coal grate motor based on ash temperature in the grate area. It maintains active monitoring of grate temperature. In **Mode 1** the controller may cycle the grates while the boiler fan operates or not. In **Mode 2** the controller will only operate when the draft fan is running. This control also reduces the likelihood of unburned coal being dumped into the ash pan.

This control is factory set to 140° F and should not be adjusted to more than 10° F higher or lower than the factory setting for best operation (refer to Appendix G for instructions). When reading the digital readout, *PV* refers to the *process variable*, or actual ash temperature reading. *SV* refers to the *set point variable*, or the temperature set point of the control. Based on factory settings, when the temperature of the ash drops to 5° F below the reading indicated at *SV* the grates will cycle on, operating until ash temperature climbs to the *SV* value.

The grate interval timer allows the grate motor run time to be adjustable. This is made up of two Schneider timers located in the control box. Adjusting the run time of the grate motor will enable the boiler to be fine tuned and allow for a better burn percentage. Keep in mind that most Coal gun boilers will not need adjusted. Your boiler is already setup for most situations and adjusting the timer is primarily to adapt the boiler to conditions like very low or very high demand.

The **on timer** and the **off timer** consist of a white dial and a black knob. The white dial on the timer allows you to select the scale (i.e.:

seconds, minutes, and hours.). The black knob selects the duration or a percentage of the scale selected by the white dial. For example if the white dial is set to the scale 1-10min and the black knob is set at 5 then it will time out around five minutes. A stop watch must be used to be sure that the change is made accurately. The **off** timer should always be set equal to or higher than the **on** timer. Usually setting the **off** timer 20 to 30 seconds longer than the **on** timer is appropriate.

If the timers were adjusted incorrectly and need to be reset follow these parameters.

The **factory setting** for the **on timer** is as follows: The white dial is set at 6-60sec and the black knob is set at 4 1/2

The **factory setting** for the **off timer** is as follows: The white dial is set at 1-10min and the black dial is set at 3.

When adjusting the timer only do so when you can observe the boilers operation every hour or two for eight hours. To ensure the grate operation is not changed too much too quick each adjustment should not change the grate operation more than 30 seconds each cycle. All adjustments must be checked with a stop watch to ensure that it was made properly. Always allow 48 hours for the boiler to acclimate to the adjustment made before making another 30 second adjustment. **CAUTION** if the timer is adjusted to keep the grate motor off too long, it will cause the fire to travel towards the hopper triggering the heat sensor which will turn off the boiler. The same can happen if the grate switch is left off too long.

In high demand situations the boiler may be able to produce more heat. Increase the **on timer** value by turning up the white dial to 1-10min. and set the black dial to 2. Allow 48 hours for the boiler to acclimate to the change. If more adjustment is needed increase the black knob on both the **on** and **off timers** thirty seconds each. Repeat these steps as needed but do not exceed

setting the on timer higher than 9 ½ and the off timer at 10. As always make sure the off timer is set longer than the on timer by at least 30 seconds.

If the coal ash has a high percentage of unburned coal reducing the run time of the grate may help. It is not advisable to make adjustments unless the problem is persistent. To adjust the run time of the grate, turn down the set value of the **on timer** 30 seconds with the black knob. Allow the change to acclimate for 48 hours. If a large percentage of the coal ash is still unburned after 48 hours, turn down the set value of the **on timer** 30 seconds with the black knob. When demand on the boiler increases inspect the boiler twice daily to ensure the grate is removing enough ash to allow the boiler to keep up with demand and to also make sure that the fire is not burning into the hopper.

Never make adjustments to the grate interval timer that would inhibit the grate motor from running less than 30 seconds every 10 minutes.

The power switches are located on the front of the control panel. The “Main” switch will shut off all power to the unit. The “Grate” switch will shut down the grate motor function.

WARNING:



Fuses must be replaced with the same amperage and fuse type as supplied with the unit!

Thermostat Connection

Hydronic Coal Guns do not require a connection to a building thermostat for operational purposes. The boiler water temperature is controlled by the aquastats.

Steam

Steam Coal Guns require a connection to a building thermostat. The switching relay on the Steam Coal Gun has two T terminals to which a low voltage thermostat must be connected.

BOILER DUMP ZONE APPLICATIONS

Unlike oil or gas fired boilers, solid fuel boilers will still produce some additional heat after the call for heat has ended. This will cause the boiler temperature to rise if no zones are calling for heat. It is possible to see temperature rise 30° F or more under a low or no load condition. This will take place until the boiler’s radiation losses match the heat gain. It is recommended that a dump zone be connected to dissipate this excess heat to one or more zones in the system. Setting the operating limit no higher than 180° F allows for the heat rise to occur without exceeding the recommended maximum temperatures.

The dump zone aquastat can be used to activate a zone valve or circulator as a dry contact switch. A common setting for dump zone actuation would be 210° F, with the high limit set point adjusted to 10° - 20° lower. When this high limit is exceeded, and temperature reaches the dump zone limit, one or more zones will be energized and heat distributed until temperatures fall sufficiently. See Appendix H for a variety of dump zone wiring examples.

If the dump zone is connected to provide heat to a domestic hot water tank or heat exchanger, a mixing valve must be installed on the potable system supply to prevent an unsafe condition of overheating the domestic hot water. The mixing valve outlet should be set no higher than 125° F for potable use (for this type of dump zone, see Appendix H, Example 5).

Non Powered Dump Zone

A non powered dump zone is required. This is to provide a way to dump boiler heat in the event that power loss occurs. This hot-water circulation loop shall be able to dissipate at least 10% of the estimated rated heat output of the solid-fuel boiler when circulation is reduced because of an electrical power failure. The loop can only be made inoperative by a deliberate

manual action. The design parameters for sizing shall be a pipe size equal to or greater than 3/4 inch (18 mm), room temperature of 65°F (18°C), and mean water temperature of 180°F (82°C). The loop shall be positioned above the boiler, with features that promote natural thermal circulation of the water. The piping be such that excessive pressure will not be developed in any portion of the boiler or system. Larger diameters may be needed as boiler size increases. Figure 9 shows an application example of how this is accomplished.

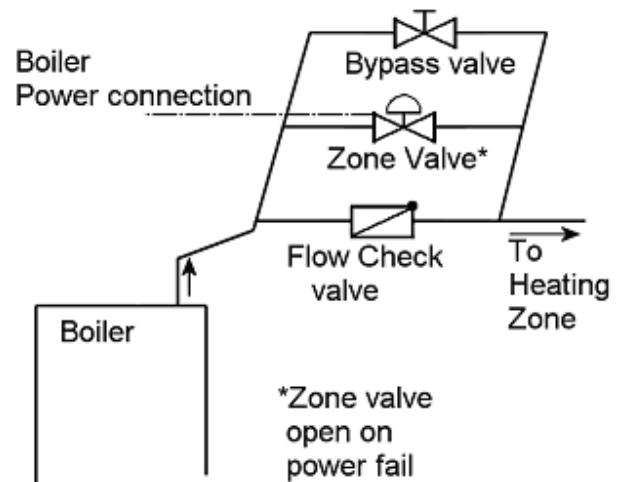


Figure 9: Non-Powered Dump Zone

This arrangement will allow a gravity flow of heat release in the event of a power failure. For other dump zone applications, see Appendix H.