

# Power Flame Incorporated

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## RECOMMENDED SPECIFICATION

### DC-3 SEQUENCE OVERFIRE DRAFT CONTROL

Begin the DC-3 specification as follows:

The contractor shall furnish and install a UL approved Power Flame Model DC-3 Sequence Overfire Draft Control System. The controller shall be installed in the burner panel and must have a two line vacuum florescent display for all tuning and scaling operations and for display of variables such as draft pressure. The operator interface must be have four pushbuttons on the front panel for all operator functions such as alarm acknowledgement, selection of displays and control functions. The display must include set points and tuning parameters and operational values such as flue gas temperature, draft pressure and alarms.

The controller must sense the draft pressure by direct connection to the furnace tap without the need for an external transmitter. The controller must have a piezoresistive silicon sensing element that is capable of measuring positive or negative pressures within the range of 0 to + or – 2" W.C.. This element must be temperature compensated and must produce a signal that is directly proportional to the differential pressure between atmospheric and the furnace pressure.

The controller must be field configurable for selecting the sequence mode from non-sequencing to sequencing with post and pre-purge capability and for positive or negative set point control applications. Post and pre-purge capability must have adjustable time delays of 20 to 120 seconds selectable from the front panel. The controller must retransmit the draft pressure as 4-20 mADC signal for recording or remote display and must have Modbus (selectable as 9600 or 19200 baud rate) communications as standard.

The controller must have an electronic draft indicator. The draft pressure must be indicated on the two line vacuum florescent display for the range.

The controller must include a closed/auto/open selector switch and all necessary relays for full programming and control actions. The closed position will bypass all automatic functions and closes the damper. The open position will open the damper and the boiler can be operated in the case of controller malfunction or boiler maintenance. In the automatic position the controller will maintain the desired setting to within one-hundredth (0.01) inch water column by varying the position of the draft damper. The controller will include proportioning band adjustment and will filter out the furnace pulsation without loss of sensitivity.

The controller circuit shall interconnect with the combustion safeguard and limit control circuits governing burner operation, to provide fixed damper opening for pre-purge and stable ignition, full modulation of damper during firing, and close damper after boiler shut down. However, burner shall shut down when switch is moved from automatic. The open damper switch shall provide means to fully open damper without interrupting firing.

The controller must have a UL approved draft cutoff switch, Model AFS-952, that will shut down the system in the event of an unsafe draft condition in the furnace extending over 8 seconds. The switch must be mounted inside the controller cabinet. After safe draft is reestablished, the combustion system must recycle from the original starting position. The cutoff point of the minimum draft switch shall be adjustable from zero to within two-hundredths (0.02) inch of the operating draft. The relay panel and solid-state control section shall each be of the modular type, permitting easy replacement. The controller shall also indicate alarm values on the display.

The controller output shall drive a 150 inch-pound torque rotary actuator. Unit must be equipped with an adjustable "start position" switch. A purge position signal switch must be an integral part of the operator. The operator must be equipped with a mechanism permitting selection of any partially open setting of the damper for the purge position (minimum 20 percent). This feature must allow the full range of the damper opening to be utilized during the firing cycle, and also permit adjustment of the purge position to provide maximum opening of the damper without adverse effect on pilot operation.

All necessary linkage, including adjustable clevises, pipe adapters, and damper lever arms must be designed for the particular use of the equipment to be installed, to provide free, smooth and rigid operation, but eliminate unnecessary play and lost motion.

Options:

-TC option:

The controller must have an internal flue gas temperature indicator and transmitter and meet ISA Sequence M alarm functions. A Type J Thermocouple shall be provided and remote mounted by the contractor.

The controller shall accept the input from the thermocouple directly and shall display the temperature on the front panel vacuum florescent display. The controller must have the capability of setting the alarm temperature, provide a flashing display of temperature alarms and have two alarm contact outputs. The controller must have local reset; remote reset or automatic alarm reset capability. The controller must have dual fail-safe SPDT contacts for remote alarming or indication. This temperature must re-transmitter as a 4-20 mADC signal for the range of 32 deg F to 1000 deg F. The controller must have the capability of temperature display in degree Celcius via front panel operation. Thermocouple failure must result in a fail-safe response by immediately going to the maximum output of 20 mADC.

-RM option:

The controller may be remote mounted in a separate enclosure.