

## TIMED AUTOMATIC SOOTBLOWER & STACK CORROSION CONTROL OPERATION

The following describes the components, operation, and function of the Timed Automatic Sootblower used in conjunction with the Stack Corrosion Control Operation. All components are interconnected, wired and tested for single 120 V. 60 HZ, 1ph electrical connection.

### ELECTRICAL COMPONENTS

1. INDICATING CONTROL PANEL (combining Automatic Sootblower and Stack Corrosion Control) including:
  1. Terminal Strip providing customer 120V power connection and a thermocouple connection.
  2. "Power on/off" switch and "Indicating light" opens the circuit to operate the Stack Corrosion Control Assembly including the indicating controller modulating damper actuator, and thermocouple.
  3. "Sootblower on/off" switch opens the circuit to operate the Timed Automatic Sootblower Assembly including the Electric Steam Valve Assembly, Pneumatic Drive Cylinder Assembly.
  4. Duration Timer controls the length of time between sootblowing cycles (off/interval) and the length of time at the Pneumatic Drive Cylinder Assy. (on/duration). A control knob for each setting allows for specific times within the ranges.
  5. Delay Timer controls the Electric Steam Valve Assembly and the Modulating Electric Valve Assembly during the sootblowing cycle causing the controller to put the Damper Actuator in an override position, driving the damper(s) to the bypass position. When the Pneumatic Cylinder Assembly returns to its original position, the delay timer causes the Steam Valve to close and returns the Thermocouple to its normal function concerning the Stack Corrosion Control.
2. PNEUMATIC DRIVE CYLINDER ASSY is controlled by a solenoid valve. The solenoid is energized at the beginning of the sootblowing cycle by the Delay Timer, allowing the ram to move outward to its furthest position. At the end of its stroke the timer de-energizes the solenoid valve, allowing the stroke to retract to its original position.
3. MODULATING ELECTRIC DAMPER ASSY receives a signal from the temperature controller and modulates the dampers to bypass the flow of exhaust, to maintain the desired temperature. During the sootblowing cycle damper moves to the full bypass position. This allows the soot to be blown out through the center of the economizer until the end of the sootblowing cycle.
4. ELECTRIC STEAM VALVE ASSY is energized to open (5 seconds) during sootblowing operation allowing 50-100 PSIG steam to the sootblower assembly - and energized again to close after the sootblowing cycle is complete.
5. EXHAUST TEMPERATURE INDICATING CONTROLLER (for Stack Corrosion Control) receives a signal from the thermocouple sensing the exhaust temperature leaving the economizer and controls the Modulating Electric Damper Assembly.
6. THERMOCOUPLE (for Stack Corrosion Control) is remote mounted (by others) sensing the exhaust gas temperature leaving the economizer.

### FUNCTION

Cain Industries' exclusive Timed Automatic Sootblower design is a fully adjustable sootblower which avoids the day to day operator attendance to run the sootblower in specific timed intervals. The actual blowing down of soot collecting on the fins utilizes special flood-jet type nozzles for achieving maximum velocity and a concentrated spray pattern specifically directed at the heat transfer surfaces. The Sootblower Assembly contains ring nozzle assembly(s) for inward blowing per standard economizer, with a varied amount of nozzles depending on the economizer size. The ring nozzle assembly is attached to a manifold and powered up and down (vertical installation) or side to side (horizontal installation) by a Pneumatic Drive Cylinder.

During the sootblowing operation, the internal damper automatically is adjusted to the full bypass position and steam or air is also automatically controlled to enter the economizer. The flue gas then changes from the normal gas flow to bypass gas flow direction, enabling a unique 'cross flow cleaning' to take place. This type of cleaning occurs because the ring nozzle assembly encompasses the heat transfer surfaces and blows transverse to the fin tube row while the flue gases blow longitudinal to the row. Operating the combustion source at maximum output conditions, during blowdown cycle increases the velocity over the fin tubing, however it is not mandatory. The sootblowing sequence can operate at any load condition. The complete cleaning occurs as a result of an effective sootblower design having to penetrate only a maximum of three coils or rows.