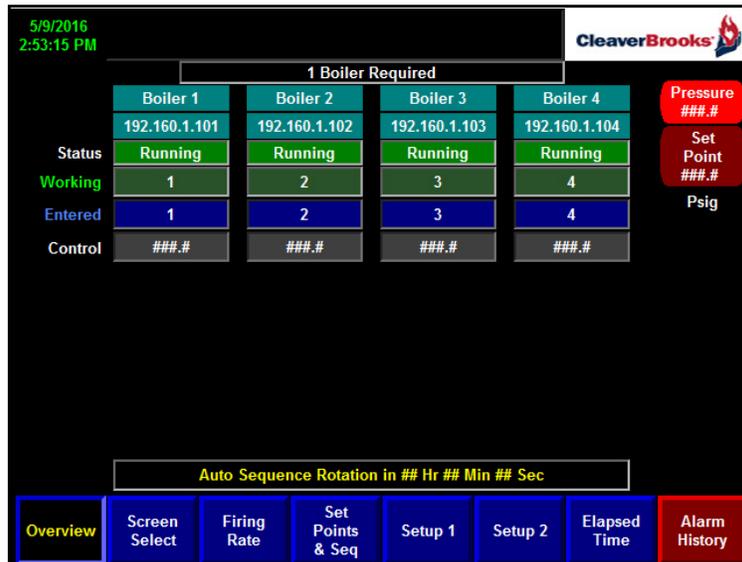# HAWK MASTER PANEL 4 — LEAD/LAG for up to FOUR BOILERS

Provides Lead/Lag control for up to four boilers when used in conjunction with the HAWK integrated boiler control system.

FEATURES AND BENEFITS

Controls Header Pressure and Temperature:

- Maintains steam pressure or hot water supply temperature based on system load demand.
- Compensates for varying losses between boiler and header.

Benefits:

- Maximizes system efficiency.
- Reduces cycling and boiler wear, thereby reducing maintenance and downtime costs.
- System shall be provided with a sequence to automatically rotate sequence in which the boilers are fired. Rotation shall be based on the elapsed time.
- Optimizes fuel savings.

Lead/Lag Start with Lead/Lag Modulation:

- Lead boiler operates at full capacity prior to starting lag boiler #1.
- Lag boiler #1 starts when the lead boiler's firing rate is close to the maximum. Operator can select this parameter via HMI.
- Lag boiler #1 starts modulation when the lead boiler reaches the maximum firing rate position.
- Subsequent lag boilers operate in the same fashion.
- Ideal for steam boilers.

Lead/Lag Start with Unison Modulation:

- Lead boiler operates at full capacity prior to starting the lag boiler.

- All boilers operate at the same firing rate as the lead boiler.

- Ideal for Hot Water boiler systems.

PRODUCT OFFERING

Cleaver-Brooks shall supply the following equipment:

- Boiler control for each boiler shall be the HAWK.

- Pressure (Steam) or temperature (Hot Water) transmitter shipped loose for mounting in the common header.

- Master Control Panel shipped loose for field mounting.

- Requires Ethernet/IP Communication Option

Sample Specifications
HAWK MASTER PANEL 4 — Lead/Lag for up to Four Boilers

PART 1 GENERAL

1.1   GENERAL

    A.   Lead/Lag Start with either Lead/Lag or Unison Modulation.

    B.   Boilers' Start and Stop

        1.   Steam pressure, or hot water temperature on hot water systems, is compared with the setpoint and controller's processor executes PID algorithm. Lead boiler is commanded to come on-line first. Lag boiler #1 is commanded to come on-line when a firing rate signal for the lead boiler reaches lag boiler start point. Lag boiler #1 is commanded to stop when a firing rate signal for the lead boiler reaches lag boiler stop point.

        2.   Lag boiler #2 is commanded to come on-line when a firing rate signal for the lag boiler #1 reaches lag boiler #2 start point. Lag boiler #2 is commanded to stop when a firing rate signal for the lag boiler #1 reaches lag boiler #2 stop point.

        3.   Subsequent boilers operate in a similar fashion.

    C.   Lead/Lag Modulation

        1.   Lag boiler #1 starts modulation after lead boiler reaches maximum firing rate (or firing rate selected by the operator).

        2.   Lag boiler #2 starts modulation after lag boiler #1 reaches maximum firing rate (or firing rate selected by the operator).

        3.   Subsequent boilers operate in a similar fashion.

    D.   Unison Modulation - Firing rates for all boilers are equal.

    E.   Hot Standby - System shall have a provision for keeping lag boilers in hot standby. Standby routine shall be based on a water temperature signal.

    F.   Firing Sequence Selection - Sequence in which boilers come on-line shall be selected via HMI. Adequate check shall be provided to disallow improper sequence selection.

    G.   Automatic Rotation of the Boilers - System shall be provided with a sequence to automatically rotate sequence in which the boilers are fired. Rotation shall be based on the elapsed time.

1.2   HMI (HUMAN MACHINE INTERFACE)

    A.   Master panel shall include HMI for display and selection of the following parameters:

    B.   Display

        1.   Available boilers

        2.   Number of boilers required

        3.   Selected sequence of firing

        4.   Control output to each boiler

        5.   Header steam pressure or water temperature on hot water systems

        6.   Setpoint

        7.   Elapsed time from last rotation

    C.   Selection

        1.   Number of boilers

      2.   Sequence of firing

      3.   Automatic or manual rotation

      4.   Individual boiler start and stop points with timers

      5.   Setpoint

      6.   Proportional, integral and derivative gains for control algorithm

1.3   APPLICATION AND SYSTEM REQUIREMENTS

A.   This option is applicable to full modulation burners utilizing the HAWK advanced boiler control system and modulating controls.

B.   Logic for Lead/Lag control shall reside in the Master Control Panel. Communication between the Master Panel and the individual Boiler Control Panels shall be via Ethernet communication or hard wiring.