SELECTRONIX, INC.
WOODINVILLE, WA

SUPERSTEP SERIES 4000

SEQUENCING STEP

CONTROLLERS

Product ADDENDUM

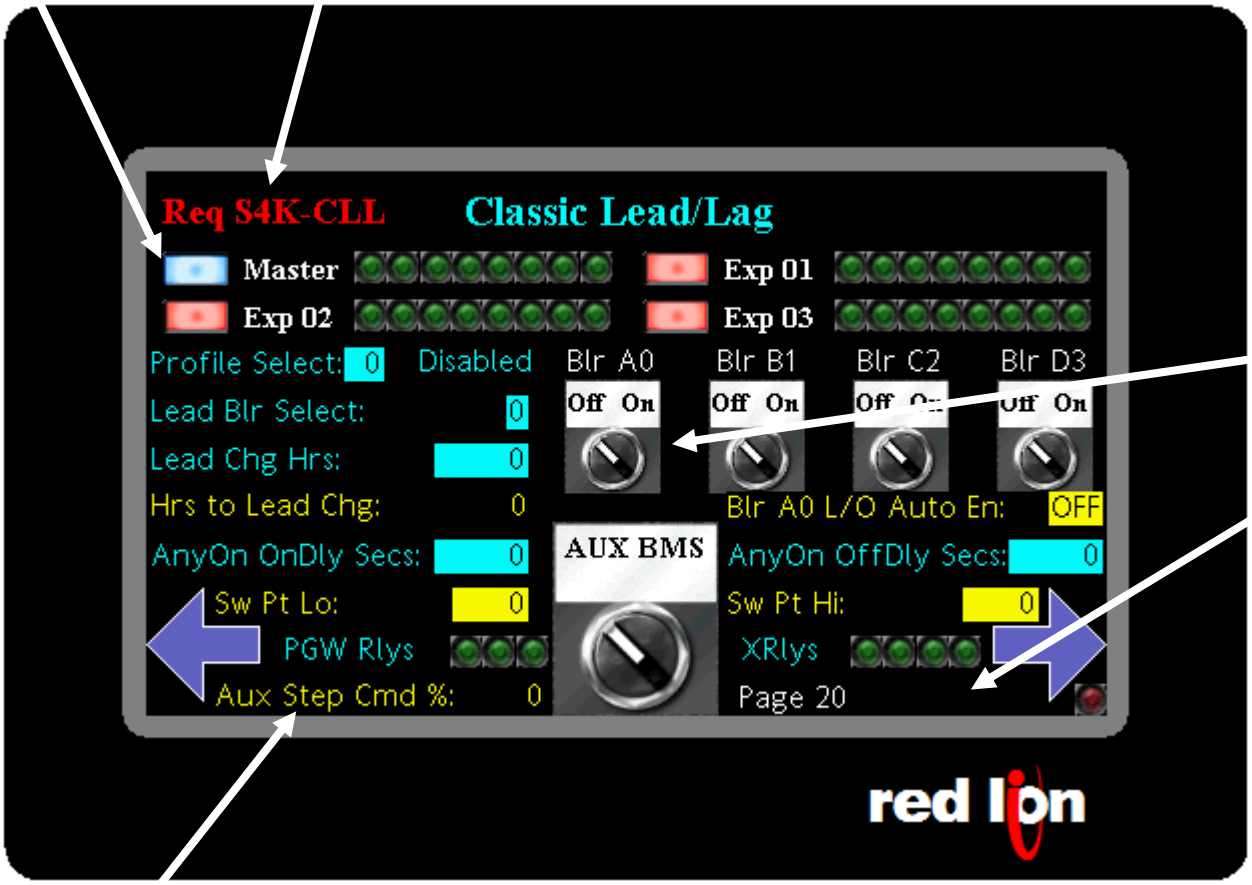
Classic Lead/Lag

for Selectronix Building Management Interface

Selectronix SLC4000 Classic Lead Lag Features And Controls

Blue is Lead unit
Green is Enabled
Red is Disabled

CLL Enabled if S4K V7.00+
or
Req S4K-CLL if not



Individual Boiler Enables

Status Msgs, if any, appear here

BMS or Aux Step Cmd %

Description

Classic Lead/Lag (CLL) control has been added to the Selectronix Building Management Interface (BMI) system, using a special version of the popular SLC4000 (S4K) controller. The CLL provides the more traditional form of Lead/Lag control with a choice of profiles, including a user-defined custom profile. This supplements our Proportional Optimized Progressive Sequencing (POPS) for gas boilers, or Proportional Progressive Sequencing (PPS) for electric boilers. The PPS provides an analog signal to control subordinate Extended Sequencer Chains (ESC) of SLC4000 units,

Features

- **Time-based Lead Stage Rotation**
  a. The lead boiler may be changed on a programmable periodic time of 0 to 1000 hours (41+ days).
  b. The hours may be changed via the TSGW or **BMS**

- **Selectable Lead Stage**
  a. Changeable via the TSGW or **BMS**.

- ***Any S4K may be disabled, including the master unit***, by using the 2-pos switch on the CLL page, via the BMS, or a limit string action. ***This control is available for all profiles, including when the CLL profiles are disabled, allowing control over standard S4K, or POPS/PPS units!***

- **Indicators show individual S4K Status**
  a. Blue rectangle indicator is for the lead unit.
  b. Green rectangle indicator is for an enabled unit.
  c. Red rectangle indicator is for a disabled unit.

- **Up to 4 boilers** may be controlled directly, or 4 SLC4000-1 units may be used to control an Extended Sequencer Chain each comprised of up to 32 stages, each.

- **2-Position On/Off Boiler Enable/Disable**
  a. Allows operator or **BMS enable/disable** of the individual boilers.
  b. The switch is visible for any powered unit, and disappears if power to that unit is disconnected.

- **Automatic re-synchronization on plant configuration change:**
  a. Lead boiler change
  b. Boiler being enabled or disabled, either manually or due to a limit string interruption.
  c. On a plant configuration change, all relays are rapidly sequenced off, and sequenced back on to the proportional command considering the defined lead unit and available quantity of system relays.

- **Relay Signaling for Pumps, Fans, or Auxiliary Devices.**
  a. An SLC4060, Process Gateway (PGW) relay or an S4K Expansion Relay unit may be configured to operate whenever any step is active on the corresponding S4K.
  b. A programmable On Delay and/or Off Delay may be applied, which may be suitable for operating pumps or cooling fans.

- **Staggered and Custom Lead/Lag Modulation Profiles**
  Two variables define the switching points, Low Switch Point (LSP) Percent, and High Switch Point (HSP) Percent. The controller calculates the integral quantity of relays for each of the 2 switch points.
  The sequencing of the relays is as follows:
  1. On the lead boiler (LB), sequence to the HSP.
  2. On the next boiler (LB+1), sequence to the LSP
  3. On the LBr, sequence to all relays for that S4K.
  4. On the LB+1, sequence to the HSP.
  5. On the LB+2, sequence to the LSP.
  6. and so on
  7. The 50/50/100 pattern is a special variation of the standard staggered pattern
     a. On the lead boiler (LB), sequence to 50% of the relays-in-service..
     b. On the next boiler (LB+1), sequence to 50% of the relays-in-service.
     c. On the LBr, sequence to all relays for that S4K.
     d. On the *LB+2,* sequence to 50% of the relays-in-service, and so on..

8. For the Custom profile, the LSP is automatically adjusted to a value that ensures at least one relay is turned on

- **Parallel Modulation Profile**
  Parallel modulation adds or removes each stage equally across all enabled boilers, starting from the lead unit.

- **Profile Select** and Pre-defined Profiles (LSP/HSP)
  - **a. Disabled (0)**
    - ***i.*** The system relinquishes the control to the master S4K. This enables the native S4K sequencing, ***including POPS/PPS units.*** For all other profiles, the CLL controls the sequencing.
  - b. **100/0 (1)**
    - i. Provides control with the same sequencing as standard system
  - c. **80/20/100 (2)**
    - i. Provides staggered sequencing as previously defined. This profile might be selected for burners that are most efficient at a high flame rate.
  - d. **50/25/100 (3)**
    - i. Provides staggered sequencing as previously defined.
  - e. **50/50/100 (4)**
    - i. Provides staggered sequencing as previously defined. This profile might be selected for burners that are most efficient at a low flame rate.
  - f. **Parallel (5)**
    - i. Provides equal stages across all available S4Ks.
  - g. **Custom (9)**
    - i. The user defines the LSP and HSP, with HSP 25% higher than LSP. The LSP is automatically adjusted to turn on at least one relay, regardless of the quantity of relays in use on each individual S4K.
  - **h. Proportional or Linear Sequencing**
    - i. CLL uses the setting from the master S4K for independently sequencing either progressively or linearly.

- **Lead Blr Select**
  - a. Select any of the available units

- **Lead Chg Hrs:**
  - a. Select any quantity of hours between 0 and 1000 hours (41+ days)

- **Hrs to Lead Chg**
  - a. Calculated hours until the lead boiler changes.

- **Future Enhancements for 7" Screen**
  - a. The 7" screen has an integral battery-backed real-time clock which supports the following future enhancements:
    - i. Daily setback schedule
    - ii. Vacation setback schedule

- **Shutdown Master Relays on Limit String Input**
  - a. When a limit string trip occurs for the master unit, all contactors are immediately disabled, since the limit string power is connected to the RLYCOM terminal that supplies power to the contactors. The relays on the master unit, however, remain ON. A solution to reset these relays is to connect the limit string input for this boiler to PGW GPDI1 and define this input as a TSGW alarm:
    - i. PGW.GPDI.g_iGPDI1_MultiLbl == PGW.GPDI.MULTILBL_BLR_LO1
  - b. When the input is triggered, BlrEn0 is switched to OFF. All relays are sequenced off, and the plant re-configured for the dropout of this boiler.
  - c. A configurable parameter allows the boiler to be either automatically re-enabled or manually re-enabled, after the GPDI input is returned to normal operation. Refer to the "Blr A0 L/O Auto En" input.
  - d. The GPDI may be configured for either sense, allowing for both normal on or normal off signals.

- **Expansion Units on Limit String Trip**
  a. Expansion unit control power is sourced from the limit string power, so when a trip occurs, the control power, as well as all relays are shut off. The system automatically recognizes the loss of this S4K and re-configures for the dropout of this boiler. On limit string reset, all relays begin OFF.

- **Blr A0 L/O Auto En**
  a. Determines either automatic or manual re-enabling of boiler A0 when the limit string has been reset. See "Shutdown Master Rlys on Limit String Input" for GPDI setup requirements.
  b. If a master unit is configured as a 'supervisory' master with only one relay-in-service AND using a CLL profile,, set the master unit to 'Off' for correct operation.

- **PGW CLL Source Select**
  a. Each of the PGW relays may designate the CLL as a source. The relay is energized whenever any relay is on the respective boiler. The AnyOn OnDly and AnyOn OffDly are applied.

- **XRlys CLL Source Select**
  a. 2 new selections are provided to determine the source for activating the XRlys. CLL/XDI and CLL/BMS designates the CLL as a source. The relay is energized whenever any relay is on the respective boiler. The AnyOn OnDly and AnyOn OffDly are applied..

- **AnyOn OnDly Secs**
  a. If either the PGW or XRlys Source Select is set for CLL, this is the delay in seconds before the relay is energized.

- **AnyOn OffDly Secs**
  a. If either the PGW or XRlys Source Select is set for CLL, this is the delay in seconds after all relays on the S4K are off before the relay is de-energized.

- **PGW Rlys**
  a. The indicators show the state of the PGW relays for monitoring the CLL relay state..

- **XRlys Rlys**
  a. The indicators show the state of the XRlys relays for monitoring the CLL relay state..

- **Requirements**
  a. An SLC4000 Building Management Interface system.
  b. Any model of a standard SLC4000 or SLC4024 equipped with the CLL option, SLC4000-CLL. This option is purchased separately at time of order of the standard SLC4000 controller, and is installed at the factory. A CLL firmware version is 7.00 or higher.
  c. The CLL page in the TSGW displays 'CLL Enabled', otherwise displays 'Req S4K CLL'
  d. Expansion units may be any standard S4K unit.

- **How To Order**
  a. Order SLC4000-CLL in combination with any standard SLC4000 or SLC4024. The CLL version of firmware is installed in this unit. If multiple different SLC4000 units are ordered, specify the target CLL unit.