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SLC4000TechNote13_BuildingManagementInterfaceWiringConsiderations

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1 General Wiring Considerations for All Systems

a. Refer to the applicable Installation and Operating Manual for specific wiring instructions for each of the component devices.
b. Refer to SLC4000TechNote10_EMISuppressionComponents.pdf, especially where the power quality is poor or when the system is in close proximity to pumps or variable frequency drive or other large motors.
c. For Building Management Interface(BMI) and non-BMI multiple boiler systems, the master SLC4000 (S4K) *must always be supplied line power* as this device provides the communication co-ordination between the other devices on the Selectronix network (SLCnet). The RLYCOM is wired from the alarm string to provide a hardware lockout of the source for the contactors or the flame enable signal.
d. Classic Lead Lag (CLL) systems have different considerations compared to non-CLL systems due to the manner in which boiler faults are handled.

2 Wiring Considerations for Single non-BMI Boiler Systems

a. The Master S4K as well as all of the Expansion units are to be wired so that line power (S4K TB120) and the RLYCOM (S4K TB109) are sourced from the manual and auto-reset alarm string. This provides a hardware interruption of the contactor power for the standard SLC4000-4 or SLC4000-8, or of the flame enable signal for SLC4000-1.

3 Wiring Considerations for Single BMI Boiler Systems

a. The Master S4K line terminal (S4K TB120) **is to be connected to line power at all times whenever the system is operational.**
b. The Master S4K RLYCOM(TB109), as well as any Expansion Unit is sourced from the safety string. This provides a hardware interruption of the contactor power for the standard SLC4000-4 or SLC4000-8, or of the flame enable signal for SLC4000-1.
c. Provide a relay sourced from the safety string to provide SPDT contacts to the master load limit terminals. These contacts ensure that all the pilot relays are turned OFF whenever the safety string is not providing power.
    - Connect the NO contacts between S4K master TB4 to TB5
    - Connect the NC contacts between TB5 and TB6

4 Wiring Considerations for non-BMI Multiple Boiler Systems

a. The Master S4K line terminal (S4K TB120) is to be **connected to line power at all times whenever the system is operational.**
b. The Master S4K RLYCOM(TB109), as well as any Expansion Unit is to be sourced from the safety string. This provides a hardware interruption of the contactor power for the standard SLC4000-4 or SLC4000-8, or of the flame enable signal for SLC4000-1.
c. The Expansion S4K line terminal (S4K TB120) is to be sourced from the manual and auto-reset alarm string. The loss of line power for this unit, causes the Master S4K to automatically reconfigure the system for the remaining S4K units.

5 Wiring Considerations for BMI CLL Multiple Boiler Systems

a. For multiple boiler systems, Classic Lead Lag is highly recommended as it provides additional and beneficial control options
b. The Master S4K line terminal (S4K TB120) is to be connected to line power at all times whenever the system is operational.
c. The Master S4K RLYCOM(TB109), as well as any Expansion Unit is to be sourced from the manual and auto-reset alarm string. This provides a hardware interruption of the contactor power for the standard SLC4000-4 or SLC4000-8, or of the flame enable signal for SLC4000-1.

6 Remote Enable – Dry Contact

6.1 Non-BMI

a. Refer to the boiler's wiring diagram for the correct terminals. The boiler is typically delivered with a jumper between these terminals. Replace the jumper with a series-connected dry contact.
b. Connect the safety string to both the Line input power and the RLYCOM terminals.

6.2 Single Boiler BMI - Dry Contact in the Safety String with GPDI Settings.

a. The master SLC4000 line power must ALWAYS be powered when the system is active.
b. Connect the safety string output to the RLYCOM terminal. ***This ensures that power to the contactors is removed when the safety string is opened.***
c. A **Remote Enable contact** may be wired in the safety string. Refer to the boiler's wiring diagram for the correct terminals. The boiler is typically delivered with a jumper between these terminals. Replace the jumper with a series-connected dry contact.
d. **Use a GPDI input to monitor the safety string, referred to as a Status input.** This input is used to **shut down the SLC4000 outputs**. ***This ensures that on safety string reset, the outputs are sequenced ON from 0 output***.
e. The master SLC4000 must have firmware of V5.24 or greater.
f. Set the **Status GPDI** properties:
    a. Inv, Signal Inversion to 0
        i. The Status signal is positive logic which report 'Active' when the Safety string is satisfied.
    b. AlmEn, Alarm Enable to 0
        i. No audible alarm is triggered on loss of the Status signal.
    c. SdEn, Shutdown Enable set to 0
    d. SDI, Shutdown Enable Invert to 1
        i. This triggers the SLC4000 shutdown on Status low.
        ***ii.* The signal is auto reset on Status returning to Active.**

7 Auxiliary Manual Command Sources – All BMI Configurations

"Aux/DDC" switch in the "Aux" position

a. ***The source for SLC4000 master controller command is sensed at the hardware terminals, TB2(+) and TB3***(-).
b. A 1K, 2W **potentiometer** may be used to manually control the quantity of energized steps.
    a. Connect this potentiometer:
        i. CW endpoint to TB1 (Identified as 0 ohms between wiper and this terminal at full CW)
        ii. Wiper to TB2
        iii. CCW endpoint to TB3 (Identified as 0 ohms between wiper and this terminal at full CCW)
        iv. Clockwise position energizes all the available steps.
c. Any of the compatible command signals may also be used. See the "…Installation and Operating Manual" for the SLC4000.
d. Set SW1 through SW5 DIP switches to match the input type.

7.1 Electric Boilers

a. **The Expansion S4K line terminal (S4K TB120 and TB121) is to be sourced from the safety string and the boiler's neutral.** The boiler's AC source may be the same or different from the AC source of the BMI's controller's S4K string. The loss of line power for this unit, causes the Master S4K to automatically reconfigure the system for the remaining S4K units. The CLL recognizes the loss of an S4K and performs a reset of the entire system for re-synchronization.

7.2 Gas Boilers

a. Multiple gas boiler systems may be wired the same as for the multiple electric boilers, but since gas boilers have a purge delay on restart, restarting all the boilers on the shutdown of a single boiler may create an unacceptable restart delay,
b. To avoid a total restart of all boilers on the shutdown of a single boiler, connect line power to the S4K line terminal (S4K TB120). On a limit string event, the contactor power or flame enable signal is interrupted, however, all Expansion units remain in the sequencer string, which results in 'dead' stages, until the limit event is resolved.

7.3 CLL Boiler Lockout Signal

a. Set "Resync on L/O" to ON and GPDI input configured as a Boiler Lockout.
- ***The CLL automatically switches the CLL Boiler On/Off switch to the OFF position on an active lockout signal.***
- **On Lockout reset, the CLL automatically switches the CLL *Boiler On/Off switch* back to ON.**

8 Extended Sequencer Chain (ESC) Configuration

a. **Extended Sequencer Chain (ESC).** For multiple boiler systems that require more than 8 steps/boiler, use an Extended Sequencer Chain comprised of SLC4000-1 units. The output of each SLC4000-1 provides a 0-10VDC, to its respective boiler. ***This configuration supports up to 4 boilers, with each boiler having up to 32 steps.***

b. **An additional benefit to the ESC boiler is that it may be configured as a totally independent boiler from the BMI by the additional of an auxiliary temperature or pressure controller and a Local/Remote switch.**

9 Supervisory Master

a. The purpose of a supervisory master is in a multiple boiler configuration is to allow each boiler to be wired identically avoiding the differences with the master wiring.
- **a. Remote Enable/Disable is a user-provided contact wired in series with the safety string.**

b. Any S4K may be configured as a supervisory master.

c. A supervisory master does not use any of the output relays to control contactors.

d. The Alternate Function relays DO operate, so for an SLC4000-8, relay energizes whenever any system relay is ON.

c. ***This configuration supports up to 4 boilers, with each boiler having up to 32 steps.***

10 Additional Questions?

The BMI is very flexible and scalable. Call us if you have unique requirements that are not covered by the above listed standard configurations.

- **Email techsupport@selectronix.us.**
- **Call us (425) 788-2979**