SCC Inc.

Commissioning Checklist

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Master Panel Commissioning Checklist

Prerequisites to Commissioning an SCC Master Panel

☐ Have access to the following documents:

- ☐ SCC or OEM supplied electrical drawings
- ☐ Master Panel Installation Instructions, TS-2100
- ☐ Master Panel Technical Instructions, TS-2000
- ☐ Touchscreen Kit Installation Instructions, TS-1100 (if local touchscreens are used)
- ☐ LMV Manual

☐ All burners and boilers should be commissioned and operational.

☐ Any Local SCC Touchscreen Kits are to be commissioned prior to the master panel.

☐ Header temperature or pressure sensor installed in the main header and wired to the master panel analog input terminals (***Page 12-13 Master Panel Technical Instructions***).

If each boiler is equipped with an SCC Touchscreen Kit:

☐ Each local SCC Touchscreen Kit is wired to the Master Panel with a dedicated ethernet cable (***Page 16-18 Master Panel Technical Instructions***).

☐ Each local SCC Touchscreen Kit is confirmed with a proper IP Address. (***Page 26-29 Touchscreen Kit Installation Instructions***).

*If each boiler is equipped with an LMV and **no** SCC Touchscreen Kit:*

☐ Each boiler equipped with an LMV and no SCC Touchscreen Kit should be wired to the Master Panel in a daisy chain configuration. This is different for LMV3's and LMV5's. (***Page 19-25 Master Panel Technical Instructions***).

Each LMV5 requires a TS-5X-KT

Each LMV3 requires a TS-3M-KT or OCI412.10

If each boiler is not equipped with a SCC Touchscreen Kit:

☐ External devices such as combustion air dampers are wired to the correct locations in the Master Panel (***Page 9-10 Master Panel Installation Instructions***).

☐ The Modbus parameters and Modbus address in each LMV and RWF55 must be set correctly, including if a RWF55 for water level control is used (***Page 148-51 Master Panel Installation Instructions***).

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☐ Review the sequence of operations (***Page 11-13 Master Panel Installation Instructions***).

☐ Set the Master Panel Local-Off-Remote switch to Off (***Page 54 Master Panel Installation Instructions***). This will prevent the master panel from turning the boilers on while Master Panel settings are configured.

☐ Log in to the Master Panel (***Page 14-15 Master Panel Installation Instructions***).

☐ Configure the System Setup Screen (***Page 17-23 Master Panel Installation Instructions***).

☐ Configure the header sensor input, being sure to name it properly. For steam systems name it HEADER, for hydronic systems name it LOOP SUPPLY. (***Page 24-26, 28 Master Panel Installation Instructions***). Other system variables can be assigned using different names (***Page 39 Master Panel Installation Instructions***).

Once the System Setup Screen has been configured an image of each boiler should be shown on the overview screen (***Page 52 Master Panel Installation Instructions***). If any boiler's lead lag status is labeled **Comm Fault,** the LMV, RWF, or TS Kit is not communicating with the Master Panel. This is likely due to one of the following items:

- *Incorrect Connection Method selected on the System Setup Screen (Ethernet = SCC TS Kit at boiler, Serial = LMV or RWF only at boiler)*
- *Incorrect Load Controller selected on the System Setup Screen*
- *Incorrect Boiler Touchscreen Kit IP Address*
- *LMV or RWF Modbus parameters and or address not set properly*
- *Wiring error*

Once all boilers are communicating it may be prudent to put each boiler in local control, so steam pressure or water temperature does not drop while the remaining Master Panel settings are configured. To do this, simply set each individual boiler H-O-A switch to HAND (Manual Inactive) and the boilers will run according to their local set points (***Page 63 Master Panel Installation Instructions***)

☐ Configure the Setpoints Screen (***Page 67-73 Master Panel Installation Instructions***)

☐ Configure the Lead Selection Screen (***Page 74-77 Master Panel Installation Instructions***)

☐ Configure the Lag Start/Stop Screen (***Page 78-86 Master Panel Installation Instructions***)

☐ Create a backup of the Master Panel System Settings (***Page 101-103 Master Panel Installation Instructions***)

☐ Set the Individual boiler H-O-A switches to Auto (***Page 63 Master Panel Installation Instructions***).
Set the Master Panel Local-Off-Remote Switch to Local (***Page 54 Master Panel Installation Instructions***).

The Master Panel will now command the boilers according to the settings entered. The boilers should be observed over a period of time to see how they react to changes in load. PID and Lag Start Stop settings may need to be adjusted to ensure boilers are reacting properly.

Notes on Tuning the PID settings:

- Start by setting the D (Derivative) and the I (Integral) to 0. The D parameter is almost never used and can be set to 0.
- The P (proportional) value determines at what value below setpoint the Master Panel will max out the demand percentage commanding all available boilers to high fire. If the SP (setpoint) =100 and P=10, then the Master Panel will command all available boilers to high fire when the PV (process variable) =90. When PV=95 the Master Panel will make the Demand percentage ½ of the maximum. As an equation it would be: $\frac{SP-PV}{P}$. The actual boiler firing rates will look different depending on the modulation type that was selected. When tuning the P value, it is best to start with a P value that is larger than needed and then gradually adjust it down as you observe the boilers. Try starting with a P value that is 20% to 25% of the setpoint. If the boilers are cycling on and off in quick succession and the Master Panel is overshooting the setpoint, it is likely that the P value is too small. If the Master Panel does not increase the firing rates of the boilers fast enough, the P value is too large, and it should be slowly decreased. You should continue reducing the P value until the PV is relatively steady but just below the setpoint. Now it is time to introduce the I parameter.
- The I value uses both time away from setpoint and distance from setpoint to create a timer. For example, if I=200, SP=100, and the PV is holding steady at 90, the I value will start to increase the firing rate after 20 seconds. This is because the PV has been 10 units below SP for 20 seconds (10*20s = 200). Tuning the I value is similar to the P value; set the I value higher than necessary and work down. Try starting at 1000 and watch how the boilers react. There should be very little reaction at first, but once the “timer” runs out it will start to increase the demand percentage. If the PV starts to overshoot the SP, then the I value is likely too small. If the PV doesn’t make it to SP or is too slow, then the I value is too large. You should continue to reduce the I value until the PV tracks the SP with some small variance.

- The process above is effective when the low fire setting of a single boiler is less than the lowest load demand of the system. If the inverse is true and the low fire setting of a single boiler is greater than the lowest possible system load, then I and D should be set to 0 and only P should be used. Preventing boiler cycling in this situation is impossible but can be minimized by choosing settings that allow the PV to exceed the SP by as much as can be tolerated.