Temperature Control Board Installation Procedure

1. **SCOPE**
   a. The scope of this procedure is to explain the steps involved in installing the Helios Temperature Control boards, both single and multiple boards, into the ASM Temperature Controller. This is typically performed while replacing the obsolete Foxboro board(s).

2. **TOOLS REQUIRED**
   a. Hex tool to open the Front Panel of the Temperature Controller.
   b. Diagonal Cutters for cutting cable ties.
   c. Small blade Screwdriver
   d. Hex wrench set.
   e. Small cable ties (3-4”)

3. **SYSTEM STATE**
   a. The system should be in the following state:
      i. Cold Idle, Safety 1 or Safety 3 state.
      ii. Lamp Contactor OFF.
      iii. Process gases OFF.

4. **PROCEDURE – SINGLE BOARD**

   a. Toggle the power switch on the Temperature Controller front panel to the OFF position.
   b. Using the Hex tool, open the Front Panel.
   c. Remove the upper and lower plastic bars, which secure the boards in place, by removing the six thumb screws. Set these aside for now.
   d. Pull the board, that is to be replaced, out from the card chassis.
   e. Remove the top clamp on the ribbon cable anchor ties to free up the cables. Use the flat blade screwdriver, if necessary.

f. Disconnect the three ribbon cables, signals, keypad and display, from the Foxboro board.
g. Disconnect the 24VAC power cable from the Foxboro board.
h. Remove the board from the Chassis and set aside.
i. Install the Temp Control board Chassis Ground wire by performing the following steps (Refer to Figure 1):
    i. Slide the end of the wire with the female contact into the empty slot on the 24VAC power cable connector (Pin 3). Make sure to orient the contact correctly so that the contact will lock into place.
    ii. Connect the other end of the wire to the existing ground wire, which is located on the lower left of the chassis near the Front Panel hinge, by removing the screw holding the wire in place using a hex wrench, add the new ground wire ring terminal, then replacing the holding screw.

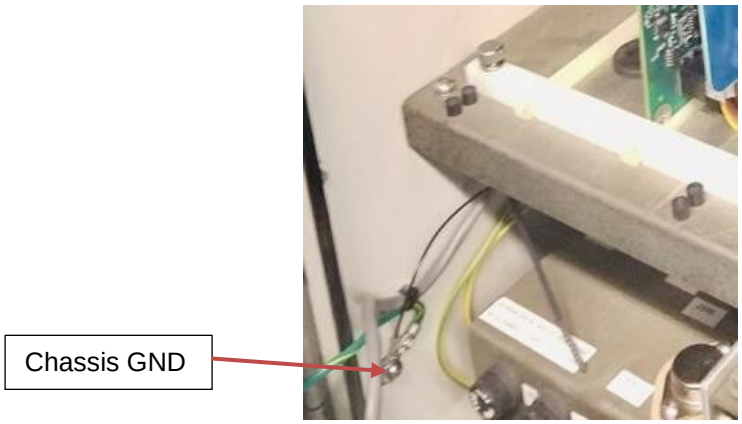

FIGURE 1

j. On the Helios Temperature Control board, install the jumper to select the applicable zone position, Center, Front, Side or Rear (See Figure 2).

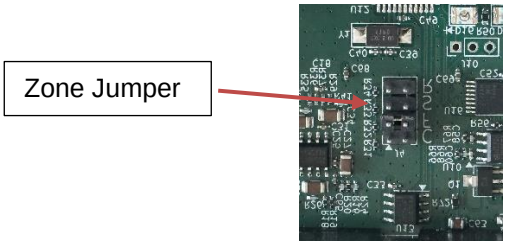

FIGURE 2

k. Connect the 24VAC power cable.
l. Connect the three ribbon cables, signals, keypad and display.

m. As necessary, install the C-clamp style cable holders to the ribbon cables to dress up the cables in an orderly fashion. Make sure that the clamps are outside of the board perimeter, so it does not interfere with the top cover when it is installed later.
n. Slide the Helios Temp Control board assembly into the card chassis.
o. Toggle the power switch on the Temperature Controller front panel to the ON position.
p. Verify the applicable Temp Control display comes up correctly. Initially when the power is turned on the display will scroll through a bootup sequence.
q. If the display indicates any temperature errors, push the ACK button on the keypad.
r. Perform the Temperature Control Boards TC & Setpoint Calibration Procedure (Doc # 19-241205-213400-01)
s. Heat up the Reactor and select multiple temperature setpoints to verify proper operation of the Temp Control board.
t. After testing the proper operation of the Temp Control board, put the system in a safe state then toggle the power switch on the Temperature Controller front panel to the OFF position.
u. Pull the applicable Temp Control board out of the chassis and install the Single Board cover (BOARD-COVER-TEMP CONT-SINGLE - Part #17-241107-161955-01) onto the four standoffs by pushing down on the board next to each standoff until it locks into place.
v. Slide the Helios Temp Control board assembly back into the card chassis.
w. Install the upper and lower plastic bars, which secure the board into place with the six thumb screws. This was previously removed in step c.
x. Toggle the power switch on the Temperature Controller front panel to the ON position.
y. This completes the board installation.

5. PROCEDURE – QUAD BOARDS

a. Toggle the power switch on the Temperature Controller front panel to the OFF position.
b. Using the Hex tool, open the Front Panel.
c. Remove the upper and lower plastic bars, which secure the boards in place, by removing the six thumb screws. Set these aside for now.
d. Pull one of the Foxboro boards, that is to be replaced, out from the card chassis.
e. Remove the top clamp on the ribbon cable anchor ties to free up the cables. Use the flat blade screwdriver, if necessary.
f. Disconnect the three ribbon cables, signals, keypad and display, from the Foxboro board. Verify that the applicable zone is marked on the cables to prevent mixing them up with the other zones. It may be helpful to use one of the supplied C-clamp style cable holders and clamp onto the ribbon cables to hold them together for later installation.
g. Disconnect the 24VAC power cable from the Foxboro board. Cut any cable ties as necessary.
h. Remove the board from the Chassis and set aside.
i. Repeat steps d. through h. for the remaining boards.

j. Install the Temp Control board Chassis Ground wire to any **one** [1] of the 24VAC power cables by performing the following steps (Refer to Figure 1):
   i. Slide the end of the wire with the female contact into the empty slot on the 24VAC power cable connector (Pin 3). Make sure to orient the contact correctly so that the contact will lock into place.
   ii. Connect the other end of the wire to the existing ground wire, which is located on the lower left of the chassis near the Front Panel hinge, by removing the screw holding the wire in place using a hex wrench, add the new ground wire ring terminal, then replacing the holding screw.

k. On the Helios Temperature Control board, verify the jumper to select the applicable zone position, Center, Front, Side or Rear are correct on each board (See Figure 2). The top to bottom orientation of the boards should be Center, Front, Side and Rear.

l. Connect the 24VAC power cable which the Chassis Ground wire was added in step j. to the Helios Temp Control board Power Cable Harness.

m. Connect the three ribbon cables, signals, keypad and display, to each of the applicable Temp Control boards. The top to bottom orientation of the boards should be Center, Front, Side and Rear. This should match the zone jumper settings in step k.

n. As necessary, install the C-clamp style cable holders to the ribbon cables to dress up the cables in an orderly fashion. Make sure that the clamps are outside of the board perimeter, so it does not interfere with the top cover when it is installed later.

o. Slide the Helios Temp Control boards assembly into the card chassis. It might be easiest to install the board assembly where the Front Foxboro used to be.

p. Toggle the power switch on the Temperature Controller front panel to the ON position.

q. Verify that all the Temp Control displays come up correctly. Initially when the power is turned on the display will scroll through a bootup sequence.

r. If the display indicates any temperature errors, push the ACK button on the keypad.

s. Perform the Temperature Control Boards TC & Setpoint Calibration Procedure (Doc # 19-241205-213400-01)

t. Heat up the Reactor and select multiple temperature setpoints to verify proper operation of the Temp Control board.

u. After testing the proper operation of the Temp Control board, put the system in a safe state then toggle the power switch on the Temperature Controller front panel to the OFF position.

v. Pull the Temp Control board assembly out of the chassis and install the Multi Board cover (BOARD-COVER-TEMP CONT - Part #17-241117-113844-01) onto the four standoffs by pushing down on the board next to each standoff until it locks into place.

w. Slide the Helios Temp Control board assembly back into the card chassis.

x. Install the upper and lower plastic bars, which secure the board into place with the six thumb

[1] **Note 1 - Only one Power Cable will be used for the four-board assembly. The assembly already has the Power Cable harness connected to each of the Temp Control boards.**

screws. This was previously removed in step c.

y. Toggle the power switch on the Temperature Controller front panel to the ON position.

z. This completes the board installation.