

**CALIBRATION PROCEDURE FOR THE ALLEN-BRADLEY PLC
TEMPERATURE CONTROLLER:**

Note: The following procedure utilizes an Omega Model CL23A Digital Calibrator/Thermometer. If an equivalent calibrator/thermometer is substituted, Follow the operational procedures for that unit.

Materials required:

1. An operational Allen-Bradley Programmable Logic Controller.
2. An Omega Model CL23A Digital Calibrator/Thermometer with a current certification of calibration.
3. A J thermocouple calibration cable consisting of...
 - A. One (1) subminiature J thermocouple male connector (Omega P/N: SMP-J-F) to connect to calibrator.
 - B. 36" length of J thermocouple connection cable.
4. Operation manual for the Omega Model CL23A Digital Calibrator/Thermometer.
5. A J thermocouple monitor cable consisting of:
 - A. 36" length of J thermocouple connection cable with female connector (Omega #OST-J-F) on one end and One (1) subminiature J thermocouple male connector (Omega P/N: SMP-J-F) to connect to calibrator.
6. Small flat blade screwdriver (3/32").
7. Phillips screwdriver (#2).
8. Wiring diagram for the Urania heat sealer.
9. A short piece of wire (approximately 2" with 3/8" insulation stripped on both ends).
10. This document.

Calibration Procedure:

Note: The Omega CL23A display shows tenths of a degree, while the Allen-Bradley display does not show decimal places. However, the Allen-Bradley does react to tenths of a degree, and the calibration procedure reflects this.

Note: This procedure calibrates the front temperature controller first.

1. Turn power off to heat sealer.
2. Open sealing head cover.
3. Remove the two (2) #6-32 flat-head Phillips screws that retain the terminal strip cover. See image below.
4. Remove terminal strip cover.
5. Use the flat blade screwdriver to loosen the two screws that hold the front thermocouple. The thermocouple is attached to the upper half of the terminal strip. The positive lead (white) is attached to terminal #11, and the negative lead (red) is attached to terminal #09.

Front controller: The thermocouple is attached to the upper half of the terminal strip.
The positive lead (white) is attached to terminal #11, and the negative lead (red) is attached to terminal #09.

Rear controller: The thermocouple is attached to the upper half of the terminal strip.
The positive lead (white) is attached to terminal #07, and the negative lead (red) is attached to terminal #08.

6. Remove only the set of thermocouple wires you are calibrating first. Remove thermocouple leads from the terminal strip.
7. Install the leads of the thermocouple calibration cable in place of the thermocouple removed in steps 5 and 6. Make certain the white lead is connected to terminal #11, and the red lead is attached to terminal #09.
8. Connect the male plug of the calibration cable to the voltage output terminal (I1) of the Omega Model CL23A Digital Calibrator/Thermometer.
9. Power up the calibrator. Make sure unit is set to read a “J” type thermocouple. Refer to Operation Manual.
10. Change operation of the calibrator from **METER** mode to **CALIB** mode if necessary. Refer to operation manual.
11. Power up sealer unit. Wait for the system to complete its power up sequence before proceeding.
- **WARNING: A SEVERE PINCH HAZARD EXISTS WHEN OPERATING SEALER WITH THE COVER OPENED. KEEP HANDS AWAY FROM ROTATING COMPONENTS.**
12. Move the function lockout key switch to **select temperature, select force, and select run speed** position.

13. Once the function lockout key switch is in select mode the blue **login & logout** buttons will be displayed. Under these buttons you will see a blue square display box. This box displays who is currently logged into the HMI display. In order to calibrate the heat sealer, you must be logged in as administrator. If the display is not already login as administrator, then press the blue **logout** button. Once complete, press the blue **login** button. A gray windows popup will be displayed. Once displayed, press the gray **user name (F2)** button. This will bring up a keyboard. Type in “**admin**” using the keyboard and press the “**enter**” key on the keyboard. This will bring you back out to the gray windows popup display screen. Next, press the gray **password (F3)** button. This again will bring up a keyboard to allow you to enter the password. Type in “**10014**” using the keyboard for the 5000 P Plus sealer. Type in “**1234**” using the keyboard for the 5000 P sealer. Then press the “**enter**” key on the keyboard. This will close out the popup screen and bring you back out to the main screen. You should now see “**admin**” in the lower blue square under the blue **login & logout** buttons.
14. Once logged as administrator, press the blue “**Go to Setup**” button in the top right corner or the HMI Display. This will bring you to the setup screen. Once you are in the setup screen, press the pink “**Admin Setup**” button. The HMI display screen will now display admin setup options. In the lower left hand corner of the admin setup screen will be the temperature calibrate offset area.
15. Press the **CHANGE/ENTER** key on the Omega CL23A. The numeric display will begin to flash.
16. Use the keypad of the Omega CL23A to key in the calibration low value of **100.0°C**. Press the **CHANGE/ENTER** key to accept the value.
17. The Omega CL23A outputs a voltage that corresponds to a “**J**” type thermocouple at **100.0°C**.
18. Check the actual displayed value in the lower left hand corner of the admin setup screen for the front temperature controller or the rear depending on which controller being calibrated. It should display **100**. If it does not, use the following procedure:
 - A. If the value is lower than **100**, press the blue display area button next to the temperature calibrate offset label. Be certain to use the offset window for the temperature controller being calibrated. Pressing this area will pop up a keyboard to enter in a value. Since the value is below **100**, you will need to enter in a positive offset value.

Note: The value entered on the keyboard is in tenths of a degree. In order to enter a value of one degree, you will have to enter a “**10**” on the keyboard.

Since the value is lower than 100 degrees, increase the offset in one tenth of a degree increments until the actual temperature changes to 100 degrees.

For example: If you entered an offset of 0.1 and the actual temperature does not change, enter an offset of 0.2, check the actual temperature and repeat as necessary. Once the actual temperature changes to 100 you are ready for the next step.

- B. If the value is higher than **100**, press the blue display area button next to the temperature calibrate offset label. Be certain to use the offset window for the temperature controller being calibrated. Pressing this area will pop up a keyboard to enter a value. Since the value is above **100**, you will need to use a negative offset value.

Note: The value entered on the keyboard is in tenths of a degree. In order to enter negative one degree, you will have to enter a “**-10**” on the keyboard.

Since the value is greater than 100 degrees, decrease the offset one tenth of a degree at a time until the actual temperature changes to 99 degrees. Then, enter an offset one tenth of a degree more positive until the actual temperature reaches 100.

For example: If you entered an offset of -0.1 and the actual temperature does not change, enter an offset of -0.2, check the actual temperature and repeat as necessary. Once the actual temperature changes to 99 degrees, enter an offset one tenth of a degree more positive and the actual temperature should read 100. When it does, you are ready for the next step.

- C. If the display does show **100**, do not assume it is **100.0**, because it could be in the range of **100.0** to **100.9**. Rather, press the blue display area button next to the temperature calibrate offset label in the temperature calibrate offset area. Be certain to use the correct offset window for the temperature controller being calibrated. By pressing this area will pop up a keyboard to enter a value in. Since the value is 100 you will need to enter a negative offset.

Note: The value entered on the keyboard is in tenths of a degree. In order to enter negative one degree, you will have to enter a “**-10**” on the keyboard.

Since the value is around 100 degrees, decrease the offset one tenth of a degree at a time until the actual temperature reaches to 99 degrees. Then enter an offset one tenth of a degree more positive until the actual temperature reaches 100.

For example: If you entered an offset of -0.1 and the actual temperature does not change, enter an offset -0.2, check the actual temperature and repeat as necessary. Once the actual temperature changes to 99 degrees enter one tenth of a degree more positive and the actual temperature should read 100. When it does, you are ready for the next step.

19. Press the **CHANGE/ENTER** key on the Omega CL23A. The numeric display will begin to flash.
20. Use the keypad of the Omega CL23A to key in the calibration next value of **200.0°C**. Press the **CHANGE/ENTER** key to accept the value.
21. The Omega CL23A outputs a voltage that corresponds to a “**J**” type thermocouple at **200.0°C**.
22. Check the actual displayed value for the front temperature controller or the rear depending on which controller being calibrated. It should display **200**. If it does not, use the following procedure:

- A. If the value is lower than **200**, press the blue display area button next to the temperature calibrate offset label. Be certain to use the offset window for the temperature controller being calibrated. Pressing this area will pop up a keyboard to enter in a value. Since the value is below **200**, you will need to enter in a positive offset value.

Note: The value entered on the keyboard is in tenths of a degree. In order to enter a value of one degree, you will have to enter a “**10**” on the keyboard.

Since the value is lower than 200 degrees, increase the offset in one tenth of a degree increments until the actual temperature changes to 200 degrees.

For example: If you entered an offset of 0.1 and the actual temperature does not change, enter an offset of 0.2, check the actual temperature and repeat as necessary. Once the actual temperature changes to 200 you are ready for the next step.

- B. If the value is higher than **200**, press the blue display area button next to the temperature calibrate offset label. Be certain to use the offset window for the temperature controller being calibrated. Pressing this area will pop up a keyboard to enter a value. Since the value is above **200**, you will need to use a negative offset value.

Note: The value entered on the keyboard is in tenths of a degree. In order to enter negative one degree, you will have to enter a “**-10**” on the keyboard.

Since the value is greater than 200 degrees, decrease the offset one tenth of a degree at a time until the actual temperature changes to 199 degrees. Then, enter an offset one tenth of a degree more positive until the actual temperature reaches 200.

For example: If you entered an offset of -0.1 and the actual temperature does not change, enter an offset of -0.2, check the actual temperature and repeat as necessary. Once the actual temperature changes to 199 degrees, enter an offset one tenth of a degree more positive and the actual temperature should read 200. When it does, you are ready for the next step.

- C. If the display does show **200**, do not assume it is **200.0**, because it could be in the range of **200.0** to **200.9**. Rather, press the blue display area button next to the temperature calibrate offset label in the temperature calibrate offset area. Be certain to use the correct offset window for the temperature controller being calibrated. By pressing this area will pop up a keyboard to enter a value in. Since the value is 200 you will need to enter a negative offset.

Note: The value entered on the keyboard is in tenths of a degree. In order to enter negative one degree, you will have to enter a “**-10**” on the keyboard.

Since the value is around 200 degrees, decrease the offset one tenth of a degree at a time until the actual temperature reaches to 199 degrees. Then enter an offset one tenth of a degree more positive until the actual temperature reaches 200.

For example: If you entered an offset of -0.1 and the actual temperature does not change, enter an offset -0.2, check the actual temperature and repeat as necessary. Once the actual temperature changes to 99 degrees enter one tenth of a degree more positive and the actual temperature should read 200. When it does, you are ready for the next step.

23. Now that the Front Temperature Controller is calibrated at the low and high setpoints, the calibration process is complete for this controller.
 24. Power off the sealer.
 25. Use the flat blade screwdriver to loosen the two screws that hold the leads of the thermocouple calibration cable. Remove the cable. Replace the leads from the front thermocouple. The positive lead (white) is attached to terminal #11, and the negative lead (red) is attached to terminal #09.
 26. Repeat the above steps for the rear temperature controller. The rear thermocouple is connected to the sealer head terminal strip at terminals #08 (red, negative lead) and #07 (white, positive lead).
 27. When the rear temperature controller is calibrated, turn power off to the heat sealer. Remove the thermocouple calibration cable and replace the leads of the rear thermocouple.
 28. Replace the cover on the sealer head terminal strip. Install and tighten the two #6-32 flat head Phillips screws that hold the cover in place.
 29. Close the sealer head cover.
 30. Press the **CALIB/METER** key on the Omega CL23A. The numeric display will change to open with J on the top, C on the bottom right corner, and meter on the left.
 31. Plug in the J thermocouple monitor cable into the T2 Connector on the Omega CL23A. Plug the other end into the thermocouple connector under the sealer control head labeled for the temperature controller being monitored (Front or Rear).
- Note: Do not use the connector located near the sealer motor. The connector near the motor is connected to a separate set of thermocouples and does not read the thermocouples connected to the temperature controller.
32. Power up the sealer. Press the blue reset button on the front panel. Then press the sealer start button. Wait for temperature to reach set point and then verify the temperature of both the front and rear temperature controllers. The temperature should read within 1 degree of actual displayed temperature. If not the calibration for that controller should be performed again. If both temperatures are within one degree, then the calibration is complete.

SPEED CALIBRATION PROCEDURE FOR 5000 P & 5000 P PLUS HEAT SEALER:

Note: The following procedure utilizes an Shimpo Model DT-105 Contact Tachometer.
If an equivalent Contact Tachometer is substituted, follow the operational procedures for that unit.

Materials required:

11. An operational 5000 P or 5000 P Plus Heat Sealer.
12. A Shimpo Model DT-105 Contact Tachometer with a current certification of calibration.
13. Operation manual for the Shimpo Model DT-105 Contact Tachometer.
14. A cover plug for running sealer without cover installed.
15. This document.

Calibration Procedure:

Note: Make sure the sealer mechanical setup is correct as stated in the manual and the adjustable sealing parameters are correctly set before performing this procedure. The speed calibration of sealer was factory set before shipment to hold within 2% of set speed. Perform this calibration procedure only if speed verification is out by more than 2%.

Note: The Shimpo Model DT-105 Contact Tachometer display shows tenths, while the heat sealer HMI display does not show decimal places.

33. Turn power off to heat sealer.
34. If heat sealer was running, wait for heat sealer to cool completely down before proceeding.
35. Open sealing head cover. Caution should be taken because some areas of the heat sealer may still be hot. If hot, wait additional time for the sealer to cool down before performing the next step.
36. Perform the sealer cleaning procedure as stated in this manual. The sealer must be cleaned for speed calibration.
37. Install a separate cover plug in cover socket mounted on rear plate of the heat sealer. Use extreme caution around the exposed moving mechanisms and heating system when the cover sealer is removed.
38. Remove the Shimpo Model DT-105 Contact Tachometer from its case. Install the 6” circular disk on the end of the tachometer from its case.
39. Power up the Tachometer by pressing the white button on the right side of the unit. Make sure the unit is set to read in “Inches per Minute”. Refer to Operation Manual for details.
40. Power up sealer unit. Once powered up, make sure all e-stops are not depressed. If any are, reset them. The blue button on the front panel should illuminate. Once the blue button is illuminated, press the button to reset the main power to the heat sealer system.
41. When the power is restored to the sealer, wait for the green “**Start Sealer**” button to appear on the HMI display panel. Press the “**Start Sealer**” button once to begin the sealer warm-up procedure. Use caution as the sealer will start motion and apply heat to the heating bars.
- **WARNING: A SEVERE PINCH HAZARD EXISTS WHEN OPERATING SEALER WITH THE COVER OPENED. KEEP HANDS AWAY FROM ROTATING COMPONENTS AND ANY ITEMS THAT WILL BE HOT!**
42. Move the **Function Lockout** key switch to “**Select Temperature, Select Force, and Select Run Speed**” position.

43. Once the function lockout key switch is in select mode the blue login and logout buttons will be displayed. Under these buttons you will see a blue square box displayed. This box is displaying who is currently logged in into the HMI display. In order to access the calibration menu for the heat sealer, you must be logged in as an administrator. If the display does not display administrator, then press the blue **logout** button. Once logout is complete, press the blue **login** button. A gray popup window will be displayed. Press the gray **user name (F2)** button. This will bring up a keyboard. Type in “**admin**” using the keyboard and press the enter key on the keyboard. This will bring you back out to the gray windows popup display screen. Next, press the gray **password (F3)** button. This will bring up a keyboard to allow password entry. If you’re working with a 5000 P Plus unit, the password is “**10014**”. If you’re working with a 5000 P unit, the password is “**1234**”. Then, press the enter key on the keyboard. This will close out the windows popup screen and return to the main screen. “**Admin**” should now be displayed in the lower blue square under the blue **login & logout** buttons.
 44. Once logged as administrator, press the blue “**Go to Setup**” Button in the top right corner or the HMI Display to change to a setup screen. On the setup screen, press the gray color “**Go to Drive Setup**” button. The HMI display screen will now display the drive setup options. In the left side of the HMI display screen is the drive speed set point in blue.
 45. Once in the drive setup screen, change the sealer speed set point in “Inches per minute” by pressing the blue box next to the label “**Sealer Speed Set Point in/min**”. By pressing this area, a pop up keyboard appears to enter the value. Enter in a value of “300” in the keyboard then press the “**Enter**” key. Once entered, the sealer will change to 300 inches per minute.
 46. Wait for speed to stabilize at 300 inches per minute. Check the actual speed on the front rollers by holding the Tachometer in the center of the front rollers. Pressing the white button on the side of the Tachometer will allow the meter to take a constant reading. Once a stable reading is displayed on the tachometer, release the white button on the side of the meter. This will lock the display so the value can be recorded. Compare the speed displayed on the tachometer to the speed displayed on the heat sealer. The two value should be within 6 inches per minute of each other. If not, proceed to the steps below. If the value is within 6 inches per minute. The calibration procedure does not need to be performed.
- D. If the speed read by the tachometer is greater than the display by more than **6 inches per minute**, press the “go back” button in the top corner of the display. This will return back to the setup screen options. Once at the setup screen, press the pink “Admin Setup” button. The HMI display screen will change to the admin setup options.

In the middle of the right side of the HMI display screen is the drive speed calculation factor in blue. This number is used to offset the drive speed calculation in the Programmable Logic Controller (PLC).

Note: The factory default value for this factor is “**43.88**” for a 5000 P Plus unit. The factory default value for this factor is “**57.00**” for a 5000 P unit.

Pressing the blue display area button next to the drive speed calculation factor label will pop up a keyboard. Enter in a smaller factor number to reduce the displayed speed.

- Note: A small change in the drive speed calculation factor will have a large impact on the displayed speed.

After the sealer speed as stabilized, check the speed with the tachometer and repeat adjustments as necessary until the displayed speed is within acceptable range.

- E. If the speed read by the tachometer is less than the display by less than **6 inches per minute**, then press the “go back” button in the top corner of the display. This will return back to the setup screen options. Once at the setup screen, press the pink “Admin Setup” button. The HMI display screen will change to the admin setup options.

In the middle of the right side of the HMI display screen is the drive speed calculation factor in blue. This number is used to offset the drive speed calculation in the Programmable Logic Controller (PLC).

Note: The factory default value for this factor is “**43.88**” for the 5000 P Plus unit. The factory default value for this factor is “**57.00**” for the 5000 P Plus unit.

Pressing the blue display area button next to the drive speed calculation factor label will pop up a keyboard. Enter in a larger factor number to increase the sealer displayed speed.

- Note: A small change in the drive speed calculation factor will have a large impact on the displayed speed.

After the sealer speed has stabilized, check the speed with the tachometer and repeat adjustments as necessary until the displayed speed is within acceptable range.

47. When the sealer speed calibration process is complete, exit out of the HMI setting displays by pressing the gray “**Go to Operator**” button. This will return to the main operator screen.
48. From the operator screen, press the blue **logout** button. This will log out the administrator for the heat sealer to prevent unauthorized set point adjustments.
49. Press the “**cool down**” button on the right-hand lower corner of the operator display. This will place the heat sealer in cool down mode for three (3) minutes. After three (3) minutes of cool-down, the heat sealer belts will stop and the heat sealer will return to the ready state.
50. Power off the heat sealer.
51. Remove the sealer cover plug installed. Then close the sealer cover.
52. After the steps above are complete. Power up the heat sealer and verify the sealer speed by performing the sealer speed verification as stated in this manual. If all the speed values are in specification, then the calibration is complete.