

NCAT ASPHALT CONTENT TESTER

Installation Guide



ignition™

Upgrade for NCAT Furnace



InstroTek® Inc.

innovators in instrumentation technology

IGNITION™ INSTALLATION VIDEOS:

Use smartphone camera to scan code and watch live installation videos on youtube.



https://www.youtube.com/watch?v=qwT3_WClxv0



https://www.youtube.com/watch?v=xYTltvZKkuA



https://www.youtube.com/watch?v=QMDyUlP2aTE

TOOLS NEEDED:

Small Needle Nose Pliers



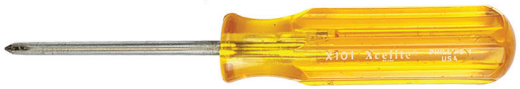
Small Precision Philips Screwdriver



Small Wire Cutter



Philips Screwdriver



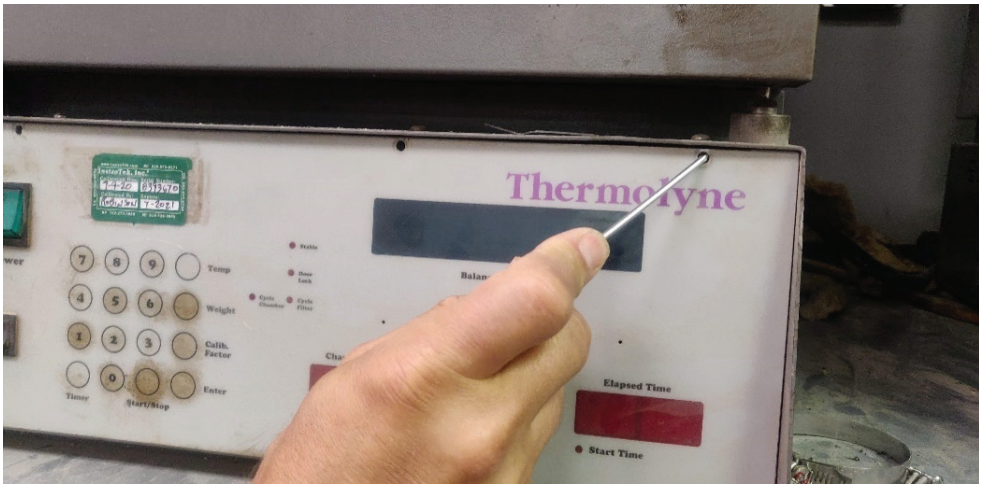
Small Adjustable Wrench **OR** Nut Driver Set



UNPLUG NCAT FURNACE BEFORE BEGINNING!

REMOVAL OF FRONT PANEL:

1. Remove the four screws holding the front panel in place.



2. Unplug all wires running to the front panel.

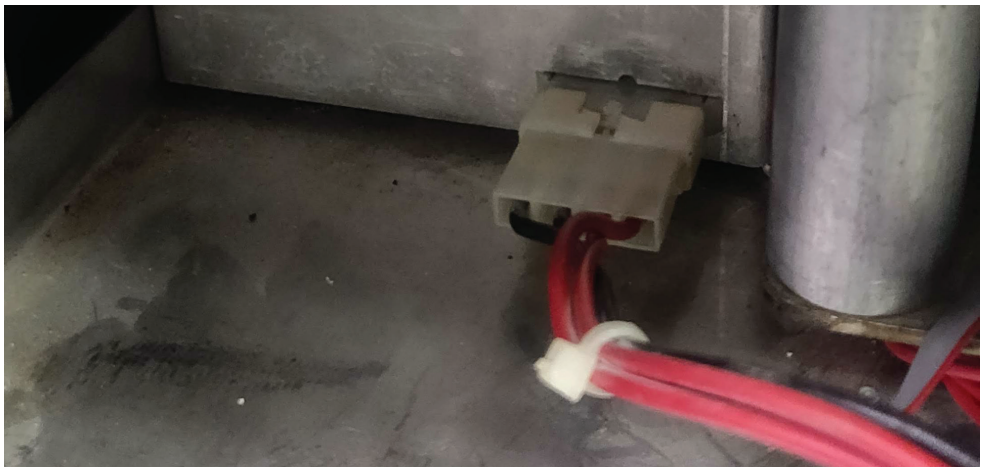
    a. Printer
    b. Ground
    c. Power Switch
    d. All wires plugged into circuit boards

3. Remove the two screws from the printer bracket and remove the printer from the front panel.

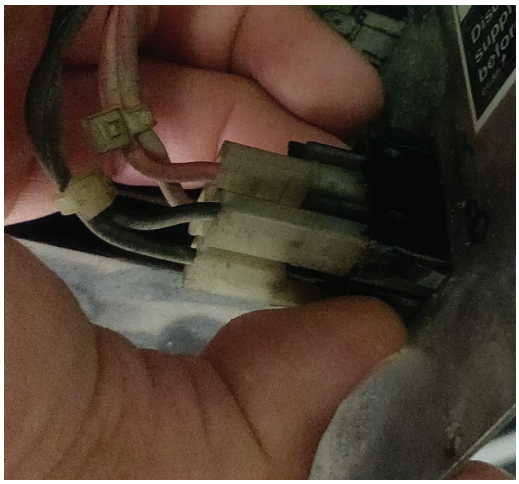
3. Remove the two screws from the printer bracket and remove the printer from the front panel.



4. Disconnect the power switch from inside the oven.



5. Press the tabs on the back of the power switch to remove it from the front panel.
    a. With older ovens unplug the wires from the power switch itself. Be sure to remember the location of the red and black wires.



6. Then unscrew the four screws on the left and right side of the front panel. This will detach the front panel from the oven and leaves the hinges attach to the oven.



DISCONNECT TRAY:

1. For newer model over undo the quick disconnect for the solenoid and solenoid switch as wall as the quick disconnect for the door switches.

2. For older ovens to remove the door solenoid and door solenoid switch you will need to remove:
    a. Red and white wires from the door solenoid
    b. Yellow and black wires from the door solenoid switch
    c. Unscrew the two door switches

3. Remove screws from the perimeter of the NCAT tray.

4. Slide out the tray about three inches. If a red quick disconnect and a white quick disconnect are visible unplug them both.

5. If there is no disconnect remove the back panel from the NCAT

6. Disconnect T1, T2, T3, the ground wire, and the two white wires running up the center of the oven. Be sure to note the location of each wire. Typically one line is marked on T1 with a permanent marker, two lines on T2 etc.

7. Slide the tray out until you can see the two green plugs that connect the thermocouples to the interface board.

8. Mark the plugs with a "C" for chamber or a "F" for furnace based in which port on the board they are plugged into. Then unplug both connectors from the interface board.

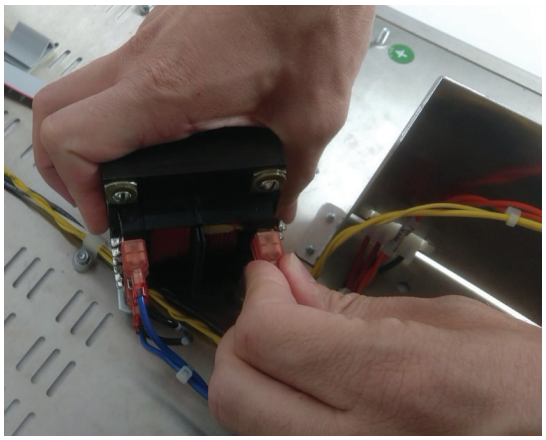
9. Remove the tray from the NCAT.

REMOVAL OF TRAY PARTS:

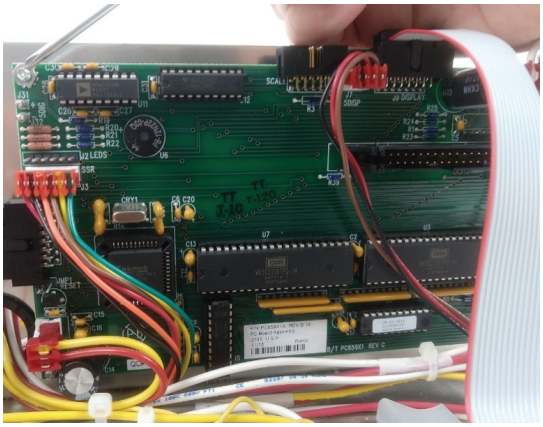
1. Remove the lower tray.
2. Place the tray on a flat work surface.
3. Using a Philips head screwdriver remove the four screws holding down the transformer.



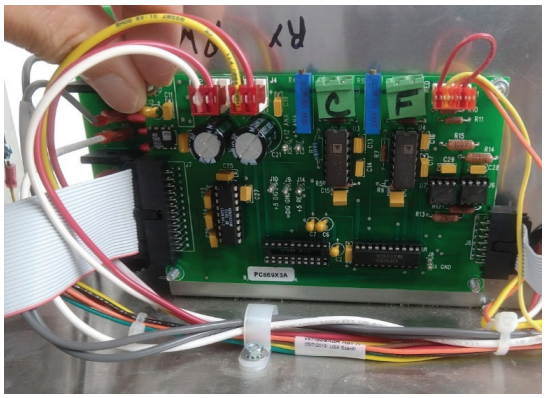
4. Unplug the wires connected to the transformer.



5. Remove the control board by removing the four nuts and unplugging all wires.



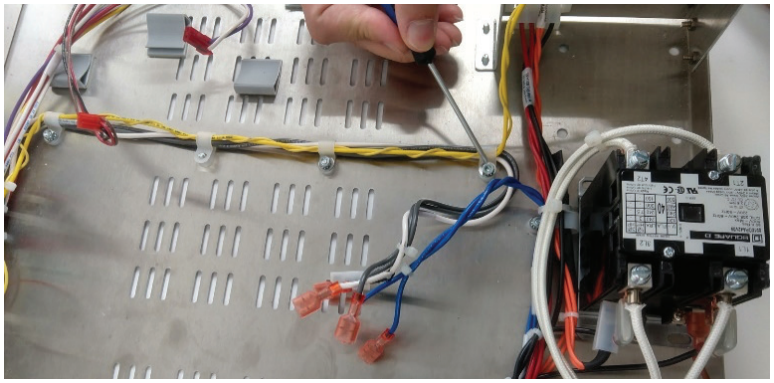
6. Remove the interface board by removing the four nuts and unplugging all wires.



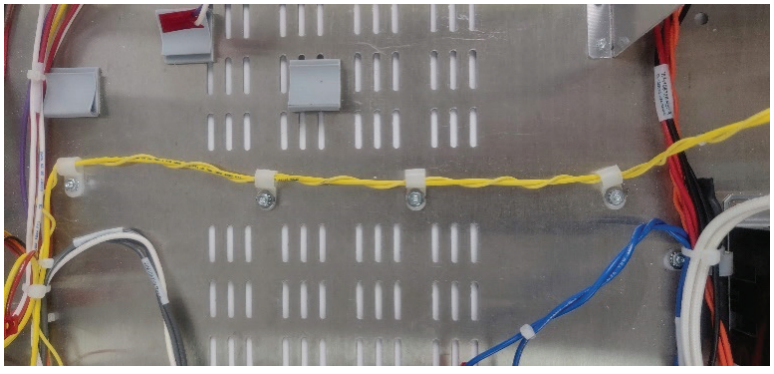
7. Remove the power supply board by removing the four nuts and unplugging all wires.



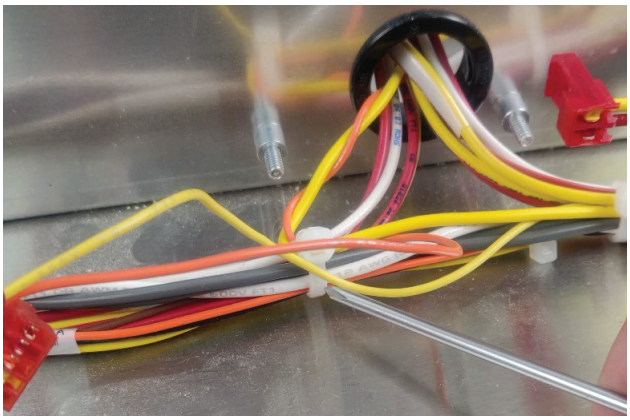
8. The gray and white wires from the transformer are no longer needed and can be removed by unscrewing the four nuts shown below.



9. After removing the gray and white wires reinstall the nuts to secure the yellow wires.

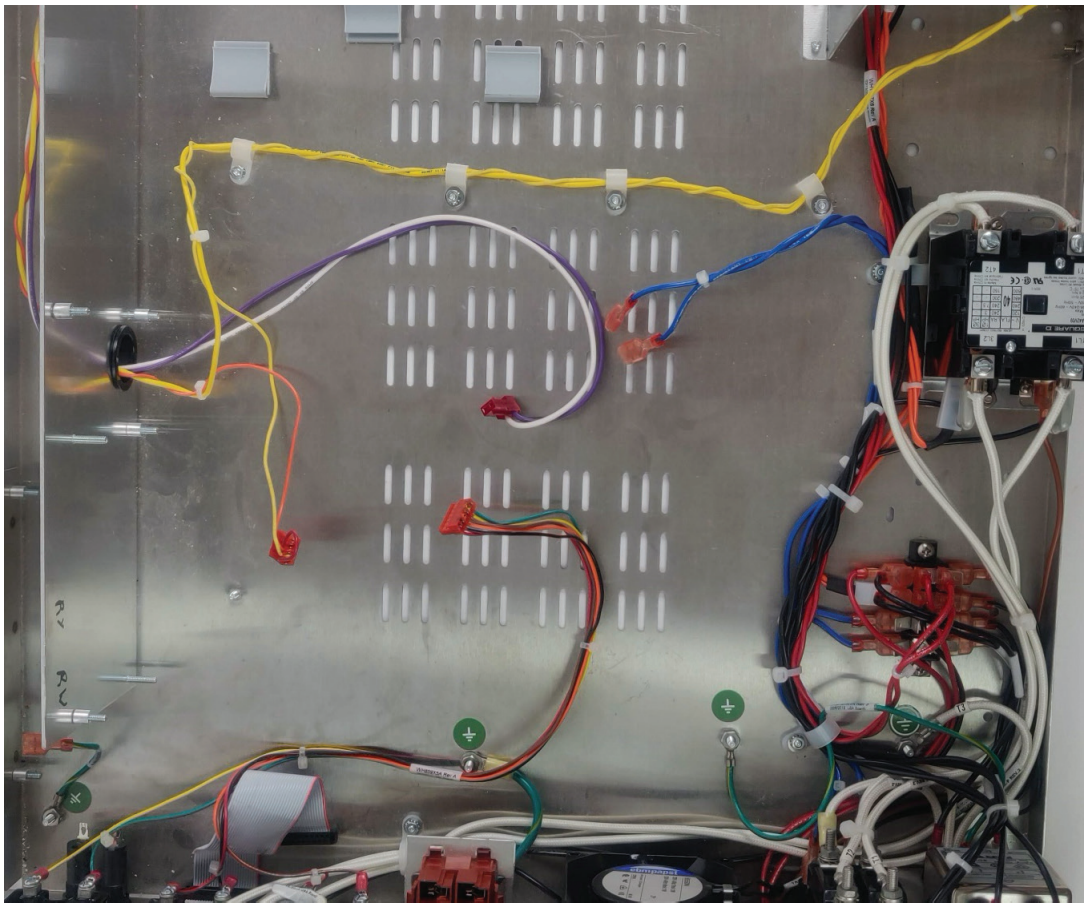


10. Cut all the zip ties that hold the wires in a bundle. Then pull the wires through the hole shown below except for the yellow and orange wire as well as the white and purple wire.



11. With the three boards and transformer removed you will have:

a. 2 - Blue Wires
b. 1 – Yellow and Orange Connector
c. 1 – Purple and White Connector
d. 1 – Red, Black, Orange, Brown, Yellow and Green Connector



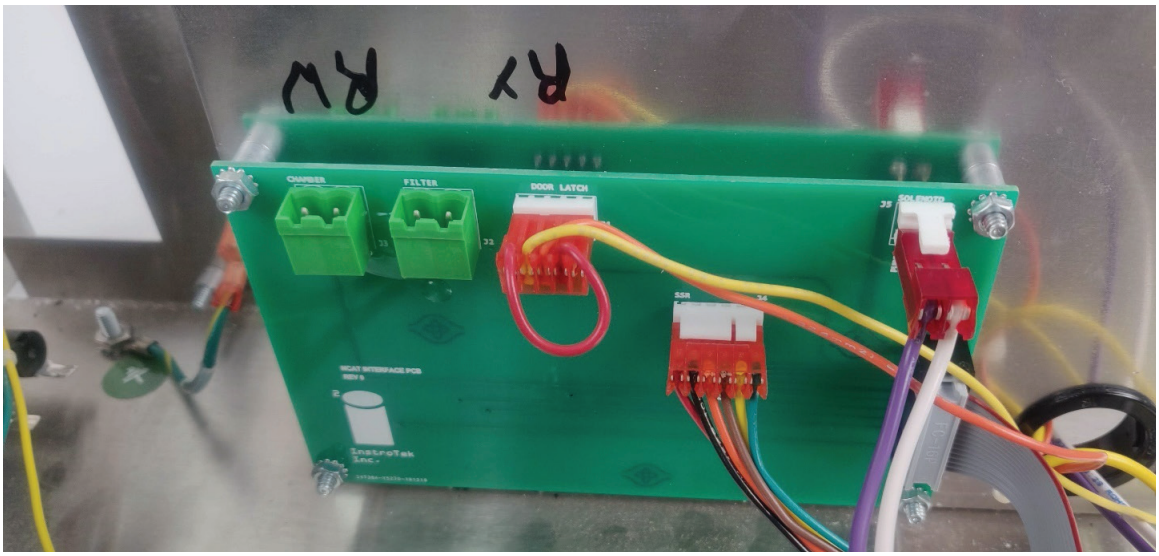
INSTALLATION OF NEW PARTS:

1. Use four nuts to attach the 'Interface Board' to the tray. The gray ribbon cable that is preinstalled to the board should point toward the front of the tray.

2. Connect the Yellow and Orange connector to the pins labeled 'Door Latch'.
    - Older ovens will have two red wires and two black wires for the door latch. In this case you will need to cut the outside wires. Leaving a red and black wire in the center of the connector. This will allow you to remove the wire harness that ran to the small switch on the front panel that is no longer needed.

3. Connect the Purple and White connector to the pins labeled 'Solenoid'.

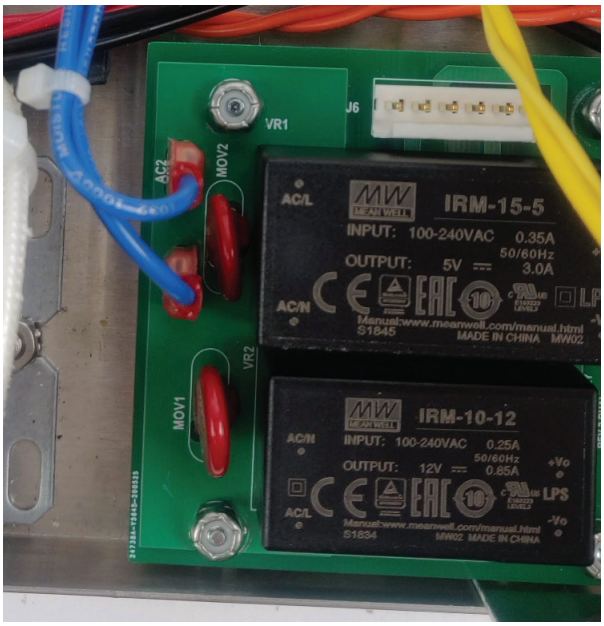
4. Connect the Red, Black, Orange, Brown, Yellow and Green connector to the pins labeled 'SSR'.



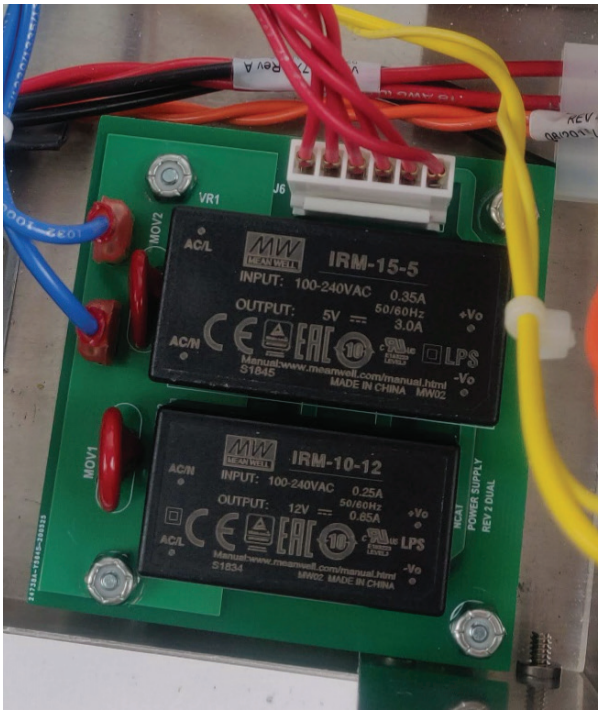
5. The new power supply will need to be attached from the underside of the tray. Align the four holes in the tray with the power supply standoffs and attach the power supply to the tray using the supplied four screws and lock washers.



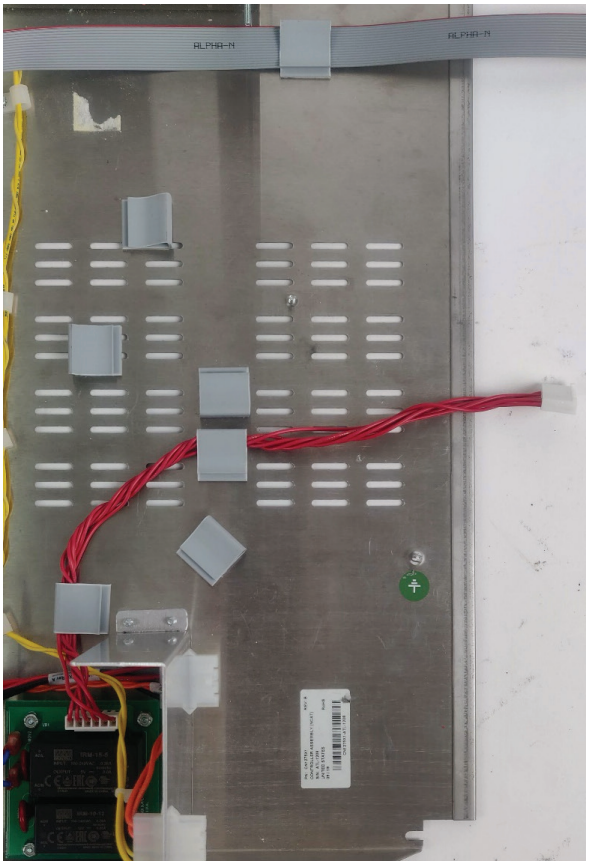
6. Plug the two blue wires into the power supply.



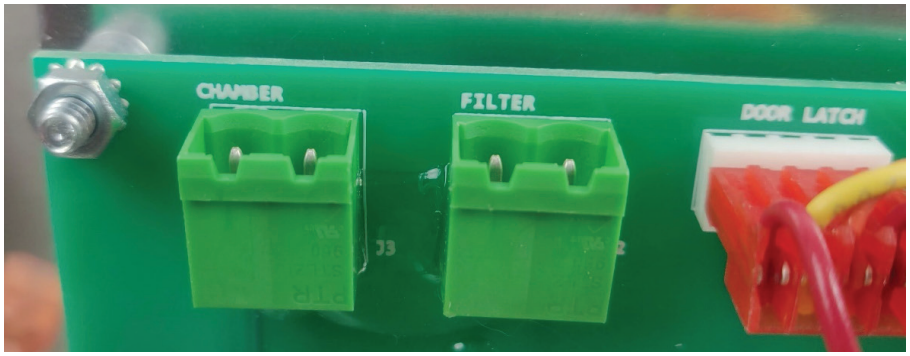
7. Plug in the included red wire to the power supply.



8. Use the wire guides to route the red power supply wires and the 'interface board' ribbon cable to the front of the tray.



9. The tray can now be reinstalled into the oven. Be sure to plug in both the 'Chamber' and 'Filter' thermocouples into the 'Interface board' as you install the tray.



10. Plug in the red and white connectors running from the elements into the tray or for older ovens reattach the wires that were disconnected using the lines on the wire to ensure they are put back correctly.

11. Secure the back of the tray to the oven using screws.

12. If the back panel of the oven was removed screw it back into plate.

INSTALLATION OF NEW FRONT PANEL:

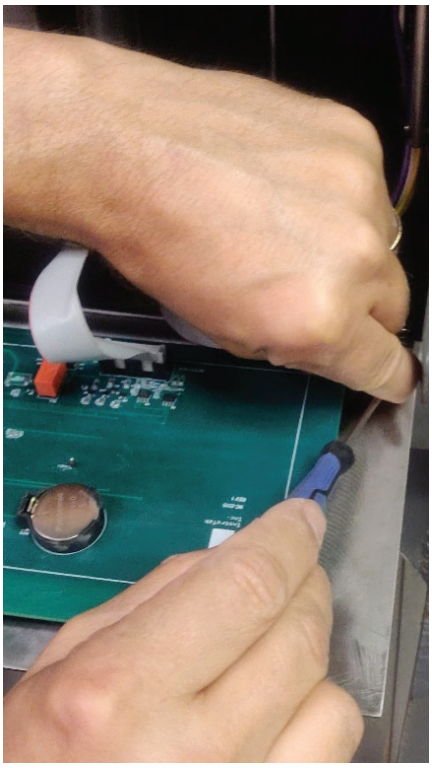
1. Plug in the connector for the door switches.
    - If the door switches do not have a connector and were removed earlier reinstall them to the NCAT frame.

2. Reattach the door solenoid and solenoid switch connector.

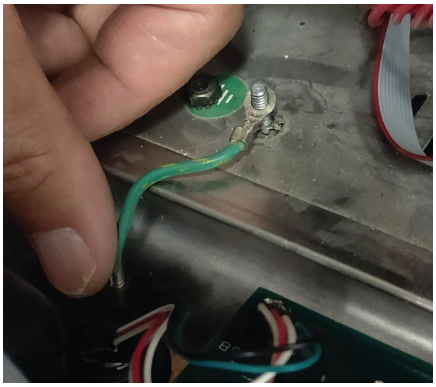
    - If they do not have a connector they will need to be plugged back in with the red and white wires going to the solenoid and the black and yellow wires going to the solenoid switch.

    - If your door does not lock when you start a test you will need to reverse the red and white wires.

3. Attach the new front panel to the oven using two screws on the left and right sides of the front panel.



4. Run the green ground wire from inside the oven to the front panel and secure it using the included nut.

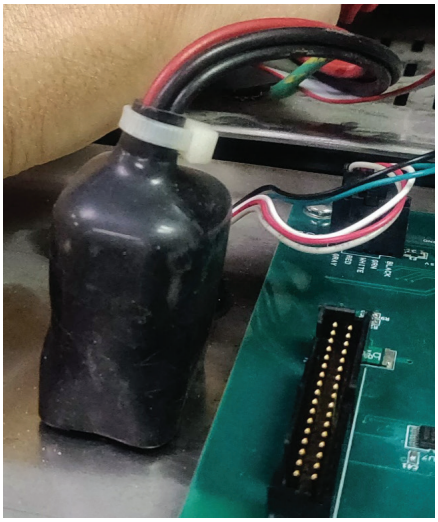


5. Reinstall the power switch into the front panel. It should click into place.

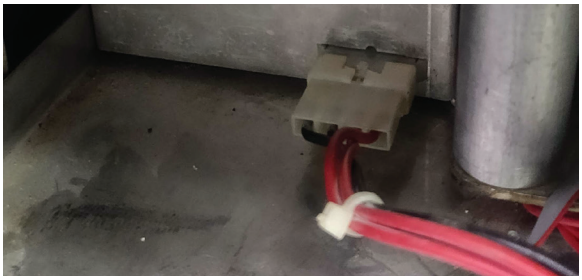
- If the red and black wires had to be removed from the switch reinstall them into the position they were before being removed. Typically the two black wires will attach to the middle two terminals.



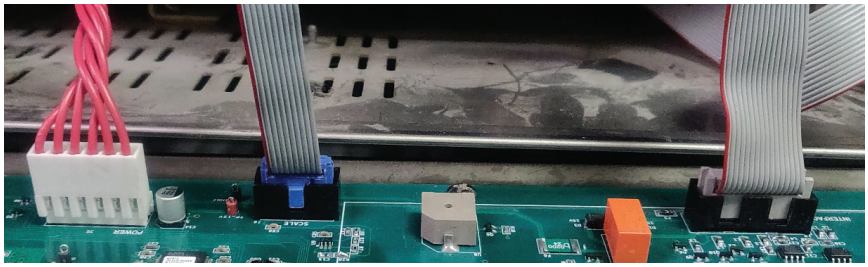
6. Reseat the rubber cover on the backside of the front panel.



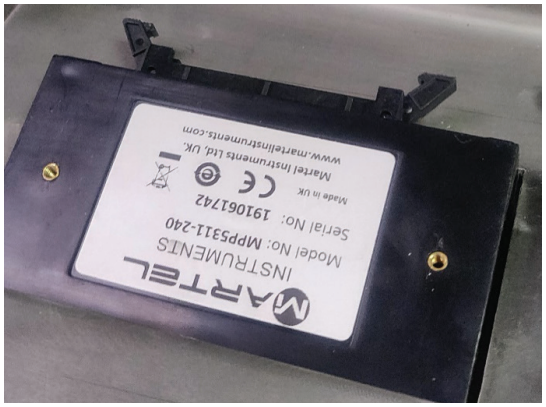
7. Reconnect the power switch inside the oven.



8. Plug in the wire from the power supply, scale, and interface board into the control board attached to the front panel.



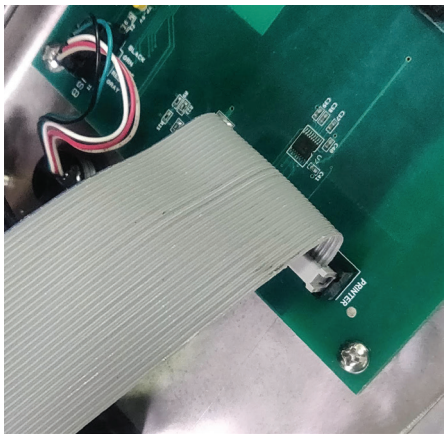
9. Reinstall the print to the new front panel taking care to make sure the tabs that secure the ribbon cable are not damaged.



10. Screw the metal bracket onto the printer to secure it to the front plate.



11. Plug the ribbon cable into the printer and then into the board.



12. Close the front panel and secure it closed using four screws.



SETTING UP THE THERMAL PRINTER:

The original printer is set up for parallel printing, the Ignition Panel uses serial printing, which is more efficient. The printer must be setup for serial printing. Use one of the below options to change your existing printer settings from parallel to serial mode.

Changing the communication settings of the thermal printer is performed through the paper feed button.

Setup Option 1

1. Turn the NCAT Furnace off.
2. Press and hold the paper feed button and turn the NCAT Furnace on.
3. After about 5 seconds, the Status light will flash five times. Release the button.
4. Press the button once.
5. Wait until the Status light blinks once.
6. Press the button once.
7. The Status light will blink once.

Setup Option 2

1. Turn the NCAT off.
2. Press and hold the paper feed button and turn the NCAT on.
3. After about 5 seconds, the Status light will flash five times. Release the button.
4. Press the button twice.
5. Wait until the Status light blinks twice.
6. Press the button once.
7. The Status light will blink once.

Setup Option 3

1. Turn the NCAT off.
2. Press and hold the paper feed button and turn the NCAT on.
3. After about 5 seconds, the Status light will flash five times. Release the button.
4. Press the button three times.
5. Wait until the Status light blinks three times.
6. Press the button twice.
7. The Status light will blink twice.

Setup Option 4

1. Turn the NCAT off.
2. Press and hold the paper feed button and turn the NCAT on.
3. After about 5 seconds, the Status light will flash five times. Release the button.
4. Press the button four times.
5. Wait until the Status light blinks four times.
6. Press the button once.
7. The Status light will blink once.

INITIAL SCALE SETUP:

When using the new Ignition Furnace Upgrade, the balance must be calibrated.

1. The calibration will be at 11 points: 0 to 10kg in 1kg steps. This requires:
    a. 1 - 1kg mass
    b. 2 - 2kg masses
    c. 1 - 5kg mass

2. Turn on the NCAT and let it stabilize for ½ hour.

3. The uncalibrated output from the balance must be read at each mass.
   This output is available in the Balance Cal. menu.

a. Press ‘1’ or “MENU” from the main screen



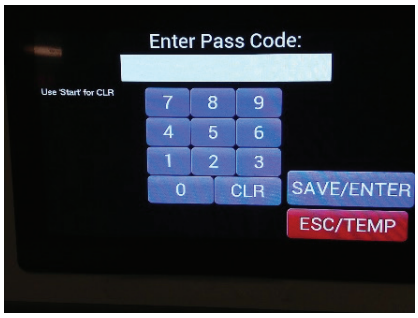
b. Press ‘7’ or “DIAGNOSTICS”



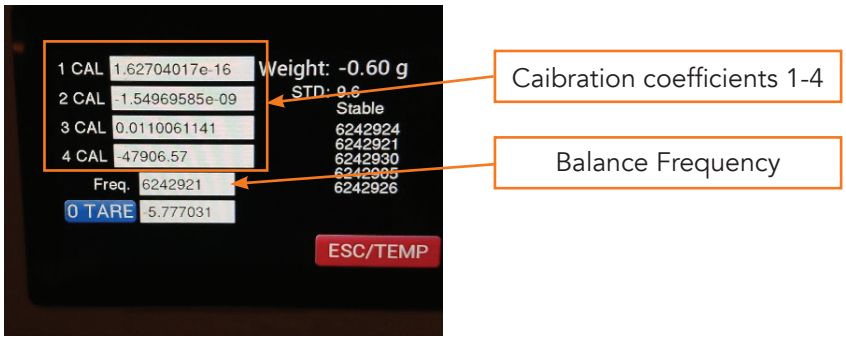
c. Press ‘4’ or “Balance Cal.”



4. Enter the four-digit pass code (6228).

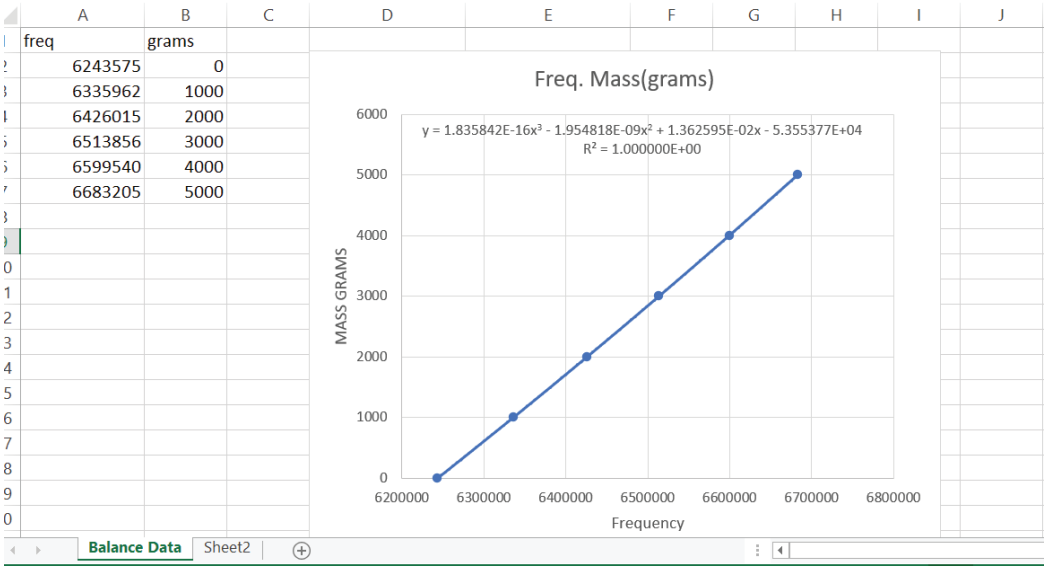


5. There are 4 calibration constants listed as calibration 1 to 4. It is these constants that must be determined.



6. Below the constants is the Freq. (Frequency) Label. This is the raw, uncalibrated output of the balance. In steps of 1kg from 0 kg to 8kg, place the correct mass on the balance, wait 10 seconds for the scale to settle and record the balance frequency at that mass.

7. Place the values in an Excel spreadsheet. The raw value is the X value and the mass is the Y value. Make a chart of the X vs Y values. Add a trendline that is a polynomial of order 3. The R value and the coefficients of the third order polynomial will appear on the chart. The R value should be > .999999.



The equation is y = a*x^3 + b*x^2 + c *x + d

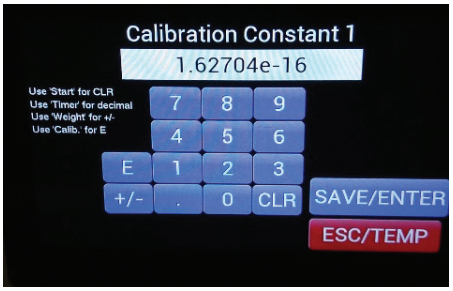
8. For this set of data, the equation is
y = 1.835842E-16x3 - 1.954818E-09x2 + 1.362595E-02x - 5.355377E+04

The four coefficients are a, b, c, d. The coefficients should have at least 6 positions of accuracy. Format the trendline to get these values.

The “a” coefficient is displayed as value (1), “b” is displayed as value (2), “c” is displayed as value (3), and “d” is displayed as value (3).

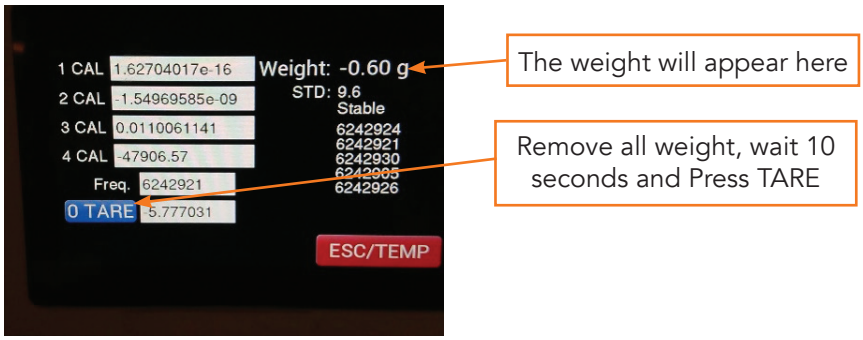
1 CAL: 1.835842E-16
2 CAL: -1.954818E-09
3 CAL: + 1.362595E-02
4 CAL: - 5.355377E+04

9. Tap on the screen at each value and enter the new calibration coefficient. Press <CLR> to erase the number, and type in the new value.



10. After four values are entered, double-check the values entered.

11. Remove all the weight from the balance. Wait 10 seconds for the balance to stabilize, and press <TARE>. The weight value in the upper right corner should display 0 grams.



12. Place each weight back on the balance, and verify the weight from 0 to 8kg, in 1kg increments. The error should be < 1g max. Record these values on the calibration sheet.

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Upgrade for NCAT Furnace

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